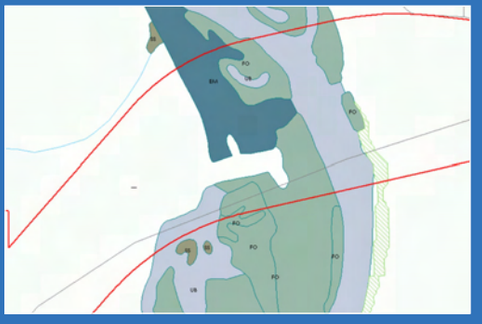
Office of Location and Environment Manual



Iowa Department of Transportation

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August 2009

CONTENTS

PART IV - Resource Studies

ACRONYMS

AADT	average annual daily traffic
AASHTO	American Association of State Highway and Transportation Officials
ACHP	Advisory Council on Historic Preservation
ACRA	American Cultural Resource Association
ADA	Americans with Disabilities Act
ADT	average daily traffic
AE	adverse effect
AIRFA	American Indian Religious Freedom Act
AMF	accident modification factor
APE	area of potential effect
ARPA	Archaeological Resources Protection Act
ASSR	Archaeological Survey Short Report
AST	above-ground storage tank
ASTM	American Society of Testing Materials
ATR	automatic traffic record
AW	Artificial Wetland
AWSC	all-way stop-controlled
BA	Biological Assessment
BCR	Bridge Condition Report
BE	Biological Evaluation
BO	Biological Opinion
Btu	British thermal units
CAA	Clean Air Act
CAD	Computer-aided drafting
CADD	computer-aided design and drafting
CAE	computer-aided engineering
CE	Categorical Exclusion
CEQ	Council on Environmental Quality
CERCLA	The Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	The Comprehensive Environmental Response, Compensation, and Liability Information System
CO	carbon monoxide
CORSIM	traffic model used to simulate traffic conditions at intersections
CSS	context sensitive solution
CTAMS	Coordinated Transportation Analysis and Management System
CW	constructed wetland
CWA	Clean Water Act
D&C	design and computation
dB	decibel
DBE	disadvantaged business enterprises
DBH	diameter at breast height
DEIS	draft Environmental Impact Statement
DNR	Department of Natural Resources
DOE	Determination of Eligibility
DOT	Department of Transportation
DRG	Digital Raster Graphs
DTM	digital terrain model
EA	Environmental Assessment

ACRONYMS

EC	Early Coordination
EIS	Environmental Impact Statement
EJ	Environmental Justice
EPA	U.S. Environmental Protection Agency
ERMS	Electronic Records Management System
ESA	Endangered Species Act
ESAL	equal single axle load
ESRI	Environmental Systems Research Institute, Inc.
FAPG	Federal-Aid Policy Guide
FEIS	final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FGDC	Federal Geographic Data Committee
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Maps
FMIS	Fiscal Management Information System
FOIA	Freedom of Information Act
FONSI	Finding of No Significant Impact
FPPA	Farmland Protection Policy Act
FTA	Federal Transit Administration
FW	Farmed Wetland
GDL	GeoData Library
GIS	Geographic Information Systems
GISU	Iowa State University Geographic Information Systems Support and Research Facility
GPS	Global Positioning System
HABS	Historic American Building Survey
HAER	Historic American Engineering Record
HCS	Highway Capacity Software
HGM	Hydrogeomorphic Method
HHS	U.S. Department of Health and Human Services
HCM	Highway Capacity Manual
HSA	Highway Safety Analysis
IAC	Iowa Administrative Code
IHSDM	Interactive Highway Safety Design Model
IJR	Interchange Justification Report
Iowa DOT	Iowa Department of Transportation
IPMP	Iowa Pavement Management Program
ISTEA	Intermodel Surface Transportation Efficiency Act
IWRACP	Iowa Wetland and Riparian Area Conservation Plan
LAWCON	Land and Water Conservation Fund Act
LIDAR	light detection and ranging
LOS	Level of Service
LRS	Linear Referencing System
LRTP	Long-range transportation plan (minimum planning horizon)
LUST	Leaking Underground Storage Tank
MBRT	Mitigation Banking Review Team
MCL	Maximum Contaminant Level

MOA	Memorandum of Agreement
MOE	measures of effectiveness
MOU	Memorandum of Understanding
MPO	Metropolitan Planning Organization
MS4s	Municipal Separate Storm Sewer Systems
NAAQS	National Ambient Air Quality Standards
NAC	Noise Abatement Criteria
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act
NESHAP	National Emissions Standard for Hazardous Air Pollutants
NFIP	National Flood Insurance Program
NHL	National Historic Landmark
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOA	Notice of Availability
NOI	Notice of Intent
NO_x	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
NPL	National Priority List
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NRI	National Rivers Inventory
NSDI	National Spatial Data Infrastructure
NSR	Noise Study Report
NWI	National Wetland Inventory
O_3	Ozone
OLE	Office of Location and Environment
ORV	Outstandingly Remarkable Values
OSA	Office of the State Archaeologist
OSWER	Office of Solid Waste and Emergency Response
PA	Programmatic Agreement
PAT	Project Advisory Team
PC	Prior Converted
PCE	Programmatic Categorical Exclusion
PCI	Pavement Condition Index
PDF	portable document format
PEM	palustrine emergent wetland
PFO	palustrine forested wetland
PHF	peak hour factors
PI	Public Involvement
PM_{10}	Particulate matter of 10 microns or less in size
PMIS	Pavement Management Information System
PMT	Project Management Team
PMOU	Programmatic Memorandum of Understanding
P&N	Purpose and Need
PN	Public Notice

ppm	parts per million
PPM	Policies and Procedures Manual
PPP	Pollution Prevention Plan
PRP	potentially responsible party
PS&E	Plans, Specifications, and Estimates
PSS	palustrine scrub-shrub wetland
PSS	Project Scheduling System
PWA	Protected Water Area
RC	Resource Center
RCRA	Resource Conservation and Recovery Act of 1976
RGL	Regulatory Guidance Letter
ROD	Record of Decision
ROW	right-of-way
RPA	regional planning affiliation
SAFETEA-LU	Safe Accountable, Flexible, Efficient Transportation Equity Act
SARA	Superfund Amendments and Reauthorization Act of 1986
SAVER	Safety, Analysis, Visualization, and Exploration Resource
SDS	Spatial Data Standards
SEIS	Supplemental Environmental Impact Statement
SHA	State Highway Agency
SHPO	State Historic Preservation Office
SIA	Statewide Implementation Agreement
SIP	Iowa State Implementation Plan
STIP	State Transportation Improvement Program
SWANCC	Solid Waste Agency of Northern Cook County
T/E	Threatened and Endangered
TAZ	traffic analysis zones
TIN	triangulated irregular networks
TIP	Transportation Improvement Program
TMA	Transportation Management Association
TMDL	total maximum daily load
TNM	Traffic Noise Model
TSCA	Toxic Substances Control Act of 1976
TSM	Transportation System Management
TWLTL	two-way left-turn lane
TWSC	two-way stop-controlled
UA	urbanized area
UNETRANS	Unified Network and Transportation
USACE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	underground storage tank
V/C	volume-to-capacity
W	wetland
WUS	Waters of the United States

Access control. For roads under the jurisdiction of the Iowa DOT, access control exists when the agency regulates the right of adjacent property owners to gain access to or from the highway. (Iowa DOT. Office of Traffic and Safety. January 2004. Traffic and Safety Manual. Chapter 9C Access—Policy.) Access control may be full or partial. Access is controlled through purchase of rights or through design controls, such as turning restrictions. Local governments may have a role in access control by regulating driveway spacing, lot widths, and setbacks.

Access controlled highway. A highway for which the Iowa DOT controls the rights of adjacent property owners to have direct access to or from the highway at their properties. This includes locations where local roadways gain access to highways.

Access management. The "means to maintain the safe and efficient movement of traffic by controlling the design of access, the location of access, and the number of access points allowed" or the process of controlling and maintaining access to a roadway. (Iowa DOT, Office of Traffic and Safety. http://www.dot.state.ia.us/traffic/sections/itsauwz/access.htm.) An access management program may include acquisition of rights and also application of building and zoning regulations. The latter may require early and ongoing coordination or agreements with local governments that control land use and zoning off the highway right-of-way.

Access priority. A system by which highways of different functional classifications are rated in terms of the type and frequency of access points allowed.

Additional farmland of statewide or local importance. Farmland other than prime or unique farmland that is of statewide or local importance for the production of food, feed, fiber, forage, or oilseed crops, as determined by the appropriate state or unit of local government agency or agencies *(7 USC 4201[c][1][C])*.

Administering office. The office responsible for administering a consultant contract.

Adverse effect (AE) (cultural resources). A change to a historic building, structure, or archaeological site, directly or indirectly caused by the project, that alters the characteristics that qualify the property for inclusion in the National Register. Adverse effects on buildings, structures, or sites include physical destruction, damage, or alteration; isolation from (or alteration of) the setting; introduction of out-of-character visual, audible, or atmospheric elements; neglect resulting in deterioration or destruction; and transfer, lease, or sale.

Adverse effect (AE) (environmental justice). The totality of significant individual or cumulative human health or environmental effects, including interrelated social and economic effects *(U.S. Department of Transportation [U.S. DOT] Order on Environmental Justice)*.

Advisory Council on Historic Preservation (ACHP, or Advisory Council). The independent federal agency that provides a forum for influencing federal activities, programs, and policies as they affect historic resources. Its mission is to promote the preservation, enhancement, and productive use of the nation's historic resources and to advise the President and Congress on national historic preservation policy.

Alternative. A proposed action that is or was under consideration to address a transportation need.

Approach criteria. For the purpose of this document, to approach the criteria means to be within 1 decibel (dBA) of the appropriate FHWA abatement criteria *(23 CFR, Part 772)*.

Archaeological terms.

- Phase Ia. Background research only, no fieldwork.
- Phase I. Identification of new sites.
- Phase II. Evaluation of potentially significant site's eligibility for the National Register. Phase II information is also used to formulate a Research Design for a mitigation strategy.
- Phase III. Data recovery/mitigation; usually recovery of significant data from the site.

Area of potential effect (APE). The geographic area or areas within which a transportation project may cause changes in the character or use of any historic buildings, structures, or archaeological sites. The APE always includes the actual project area and may include areas where the project will cause changes in land use, traffic patterns, setting, and other environmental aspects that could affect historic buildings, structures, or archaeological sites.

Arterial roadway. A highway with provisions to serve larger volumes of vehicles, traveling longer distances and at higher speeds, than local roadways serve.

Asset management plan. A systematic process of cost-effectively maintaining, upgrading, and operating physical assets. It combines engineering and mathematical analyses with sound business practice and economic theory.

Benefit-cost analysis. Comparison of the costs associated with an investment to the benefits that it will return. It also addresses and accounts for both tangible and intangible considerations.

Benefited receivers. Noise-sensitive receivers who will obtain at least 5 dBA of noise reduction as a result of the use of a noise abatement measure, regardless of whether they are identified as affected. Only benefited receivers will be included in the calculation needed to determine whether a particular noise abatement scheme has a reasonable cost.

Biological Assessment (BA). Evaluates the potential effects of an action on listed and proposed species and designated and proposed critical habitat; determines if the species or habitat are likely to be adversely affected; findings are used to determine the necessity of formal consultation or conference with the U.S. Fish and Wildlife Service.

Biological Opinion (BO). A document that is the product of formal consultation, stating the opinion of the U.S. Fish and Wildlife Service whether an action is likely to jeopardize the continued existence of listed species or to result in the destruction or adverse modification of critical habitat.

Borrow pit. An excavation used to obtain soil, material, or fill for construction activities.

Bridge scour analysis. A method to estimate scour effects on both existing and proposed structures.

Business. Any lawful activity (commercial, etc.) except a farm operation (Uniform Relocation Act).

Byway. A public road having special scenic, historic, recreational, cultural, archaeological, or natural qualities that have been so recognized through legislation or other official declaration (Washington DOT *Environmental Procedures Manual*).

CAL3QHC. Carbon monoxide hotspot model used to determine localized conformity and air-quality impacts.

Categorical Exclusion (CE). An action that falls within a category that has been found not to have significant environmental impact and, thus, does not require an environmental assessment or environmental impact statement (23 CFR 771.117).

CERCLA. The Comprehensive Environmental Response, Compensation, and Liability Act of 1980, including SARA (the Superfund Amendments and Reauthorization Act of 1986), also known as the federal Superfund program.

CERCLIS. The Comprehensive Environmental Response, Compensation, and Liability Information System. A database containing information on potentially hazardous waste sites that have been reported to the EPA by states, municipalities, private companies and private persons, pursuant to Section 103 of CERCLA. CERCLIS contains sites that are either proposed for or on the National Priorities List and sites that are in the screening and assessment phase for possible inclusion on the National Priorities List.

Class of action. The level of environmental impact and its corresponding environmental documentation. There are three classes of action:

- **Class I** actions have significant environmental impact and require an environmental impact statement
- **Class II** actions are categorical exclusions because they are known to not have a significant environmental impact

- **Class III** actions that require an environmental assessment because the significance of the environmental impact is unknown.

Cohesion. Behavioral or perceptual relationships shared among residents of a community that cause the community to be identifiable as a discrete, distinctive geographic entity within the urban pattern (FHWA).

Collector roadway. A roadway that serves vehicles traveling shorter distances than arterial roadways allow but longer distances and with a less frequency of ingress and egress than local roads.

Community facility. An organization, public or private, that provides goods and services to the population of a community.

Community. A distinctive, homogeneous, stable, self-contained unit of a larger spatial area defined by geographic boundaries, ethnic, or cultural characteristics of inhabitants; a psychological unity among the residents; the concentrated use of the area's facilities (FHWA).

Comparable replacement dwelling. Any dwelling that is decent, safe, and sanitary, adequate in size to accommodate its occupants, within the financial means of the person, functionally equivalent, is not subject to unreasonable adverse conditions, and is in a location generally not less desirable than the location of the displaced person's dwelling with respect to public utilities, facilities, services, and the displaced person's place of employment (Uniform Relocation Act).

Comprehensive plan. An official document adopted by a local government that sets forth its general policies regarding the long-term physical development of a city or other area (*Dictionary of Real Estate Appraisal*).

Construction debris. Waste generated by construction, renovation, and demolition projects, including wood, concrete, steel, brick, and gypsum.

Consultant Contract Coordinator. The person responsible for coordinating Departmental work with consultants.

Consultant contract. A contract between the Iowa DOT and the consultant.

Consultant Steering Committee. A committee responsible for ranking consultants selected by a selection committee in order of preference for contract negotiations. The leader of the committee shall be designated by the division director for the administering office. For the Highway Division, the team leader shall be the Director of the Engineering Bureau. Other members of the committee include the office director from the administering office and, for a specific project within a district, the district engineer. The team leader may designate other members as appropriate.

Consulting parties. The primary participants in the Section 106 process. Consulting parties always include federal agencies with jurisdiction over the project, Iowa DOT, SHPO, Native American tribal representatives and perhaps ACHP, local governments, applicants for federal grants, licenses, or permits, affected landowners, and other interested persons.

Contaminant. Any physical, chemical, biological, or radiological substance or matter that has an adverse affect on water (EPA, *Terms of Environment*).

Contamination. The presence of any hazardous waste or regulated substance in soil, surface water, or groundwater at a property that may require assessment, remediation, or special handling, or that may pose future liability.

Contract Manager for the Administering Office. The person responsible for managing the work for the administering office.

Contributing agency. A federal, state, or local agency or a Native American tribe with jurisdiction, as well as public organizations and private interest groups that have special expertise that entitles them to participate in the development of an environmental document, typically an environmental impact statement.

Cooperating agency. The federal agency, other than the lead agency, that acts on a proposed action (e.g., permit approval) or has jurisdiction by law; one with special expertise asked to participate in the development of an environmental document, typically an environmental impact statement.

Corridor. Road or highway right-of-way and the adjacent area, visible from and extending along the highway. The distance that the corridor extends from the highway could vary with different intrinsic qualities.

Corridor preservation. The act of recording and preserving a corridor for future transportation use. By preserving a corridor before construction takes place, the local government is able to plan or administer adjacent land uses in a manner consistent with the proposed transportation facility.

Corridor preservation zone. Land surrounding existing or proposed corridors or areas where transportation infrastructure is expected in order to meet future traffic demands that may require acquisition of right-of-way. The corridor preservation zone is a buffer zone around a transportation corridor where the likelihood of development impacts is great.

Cowardin classification. A hierarchical coding system used to distinguish wetland types: palustrine emergent (PEM), palustrine forested (PFO), and palustrine scrub-shrub (PSS). The Cowardin system is often used to classify wetlands as identified in the National Wetland Inventory (NWI).

Critical habitat. Specific geographic areas, whether occupied by listed species or not, determined to be essential for the conservation and management of listed species, and that have been formally described in the *Federal Register*.

Cultivated land. Land prepared for or used for raising crops.

Cultural resource. A property or artifact that pertains to or identifies human activities. This is also a common term for "historic properties" on the National Register of Historic Places. It can mean an archaeological site, historic structure, building, district, and landscape.

Date of public knowledge. The date the public is officially notified of the adoption of the location of a proposed highway project; the date of FHWA approval of the final environmental document.

Decibel (dB). A descriptor of the difference between measured sound pressure levels. For traffic noise purposes, the A-weighted scale (dBA), which closely approximates the range of frequencies a human ear can hear, is used.

Design year. The future year used to estimate the probable traffic volume for which a highway is designed. A time (usually 20 years) from the start of construction is normally used.

Designated uses. Water uses identified in state water quality standards that must be achieved and maintained as required under the Clean Water Act. Uses can include cold water fisheries, public water supply, and irrigation (EPA, *Terms of Environment*).

Determination of Eligibility (DOE). An expedited process for applying National Register criteria and making a formal evaluation of the significance of a historic building, structure, or archaeological site. A property eligible for National Register listing is afforded the same protection under Section 106 as one that is actually listed.

Development moratorium. A development moratorium typically is applicable in corridors that have been preserved for future highway use. The local government with jurisdiction over land use, zoning, and building permits works to obtain a development moratorium under which no new substantial construction could occur within a defined area. This action helps to minimize future construction and right-of-way.

Diagonal severance. Diagonal separation or division of a parcel of land. To separate or divide a parcel of land diagonally.

Direct effect. An effect caused by an action that occurs in situ and concurrently with project development.

Direct energy impact. Energy consumed by vehicles using the facility *(FHWA Technical Advisory T6640.8A)*.

Displaced person. Any person who moves from real property, or moves his personal property from real property, as a direct result of a written notice of

intent to acquire such real property in whole or in part for a program or project undertaken by a federal agency or with federal financial assistance; or on which property such person is a residential tenant or conducts a small business or farm operation as a direct result of rehabilitation, demolition, or such other displacing activity as the lead agency may prescribe under a program or project undertaken by a federal agency or with federal financial assistance in any case in which the head of the displacing agency determines that such displacement is permanent *(Uniform Relocation Act)*.

Disproportionately high and adverse effect. An adverse effect borne predominately by a minority or low-income population. An adverse effect suffered by a minority or low-income population that is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the non-EJ population (U.S. DOT Order on Environmental Justice).

Dominant species. Plant species from each stratum that prevail in larger amounts within the community and exert considerable influence on other species as a result of shading and nutrient allocation.

Economic development. In general, expansion of a community's property and sales tax base, or expansion of the number of jobs through office, retail, and industrial development.

Effect. A change to a historic building, structure, or archaeological site caused by the project that may alter the property's characteristics that qualify it for National Register listing. Effects may include alteration to features of a property's location, setting, or use depending on its significant characteristics *(36 CFR Part 800.16 [i])*.

Eligible property. A historic building, structure, or archaeological site formally determined eligible for the National Register of Historic Places, or one that meets the National Register criteria.

Emergent vegetation. Herbaceous wetland plants with roots submerged and foliage above water.

Energy or energy sources. Gasoline, fuel oil, natural gas, propane, coal, special fuels, and electricity *(FHWA Technical Advisory T6640.8A)*.

Environmental Assessment (EA). A concise document that explains the decision of whether to prepare an environmental impact statement or a finding of no significant impact.

Environmental Impact Statement (EIS). A document written to explain a proposed major federal project that will significantly affect the human environment. It illustrates the following: purpose of and need for the proposed project, alternatives considered, the affected environment, environmental consequences, the relationship between short-term uses of the local environment and the results of its maintenance over the long-term, and any commitment of resources that would be irretrievable if the project were implemented.

Environmental justice (EJ). The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including racial, ethnic, or low-income groups, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or from the execution of federal, state, local, and tribal programs and policies; agencies should identify and address disproportionately high and adverse effects of agency programs, policies, and activities on minority and low-income populations. (See "minority" and "low-income.") (EPA "Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analysis," April 1998 and Executive Order 12898)

Environmental studies. The exploration of environmental resources in the project location and determination of what type of environmental document should be written.

Equality. The state of having the same quantity as another (*American Heritage Dictionary*).

Equity. The state of being just, impartial, or fair (*American Heritage Dictionary*).

Farm operation. Any activity conducted solely or primarily for the production of one or more agricultural products or commodities including timber *(Uniform Relocation Act)*.

Farm unit. A portion of a farm generally based on noncontiguous parcels, ownership, or farming operation.

Farmland. All land, as defined by the Farmland Protection Policy Act (see prime farmland, unique farmland, and additional farmland of statewide or local importance).

Fatal flaw. An element of an alternative (whether engineering or environmental) that eliminates it from further consideration.

Feasibility studies. The Location Section also conducts *feasibility studies*, which may be used as a precursor to location studies.

Federal agency (cultural resources). The party with jurisdiction over the action and legal responsibility for complying with Section 106. In the Division of Transportation Infrastructure Development, highway projects are the FHWA's responsibility When projects require permits from a federal agency, such as the U.S. Army Corps of Engineers, the permitting agency must also comply with Section 106. The FHWA also monitors compliance with Section 4(f).

Federal candidate species. Candidate species (candidates) are taxa for which the U.S. Fish and Wildlife Service has on file sufficient information on biological vulnerability and threats to support a proposal to list the taxa as endangered or threatened.

Federal endangered species. The classification provided to an animal or plant in danger of extinction within the foreseeable future throughout all or a significant part of its range.

Federal funded/regulated. Wholly or partly funded by federal agency or requiring approval from a federal agency. This is one of the criteria that triggers NEPA.

Federal proposed species. Any species of fish, wildlife, or plant proposed in the *Federal Register* to be listed under the Endangered Species Act.

Federal threatened species. The classification provided to an animal or plant likely to become endangered within the foreseeable future throughout all or a significant part of its range.

Federal Wild and Scenic Waterway. A federal designation resulting from the Wild and Scenic Rivers Act of 1968 (Public Law 90-542); Applies to certain, selected rivers (and their immediate environments) that have outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values, and should be preserved in free-flowing condition.

Finding of No Significant Impact (FONSI). A document that supports the decision that there is no significant impact and thus, the preparation of an environmental impact statement is unnecessary. The FONSI must include a summary of the Environmental Assessment. Any additional supporting environmental documentation should be summarized or included as attachments.

500-year floodplain. Area expected to be covered by a flood an average of once every 500 years.

Flood frequency. The likelihood of a flood of given magnitude occurring within a set time period.

Flood Insurance Rate Maps (FIRM). A mapping product available as hardcopy or as a GIS layer that depicts the calculated boundaries of the 100- and 500-year floodplains. The maps have been developed by the Federal Emergency Management Agency.

Form AD-1006. Form developed by the Natural Resources Conservation Service to aid local, state, and federal agencies in documenting impacts to farmland.

Full access control. Through traffic is given priority on a full access controlled highway. For highways in this category, properties abutting the roadway are not allowed direct access but gain access along frontage roads or other roads that connect to an interchange point. Side roads are connected with interchanges, are terminated at the right-of-way line, or are carried across the highway with grade separations.

Groundwater. The supply of fresh water found underneath the Earth's surface, usually in aquifers, which supply wells and springs. (EPA, *Terms of Environment*)

Growing season. Pertaining to wetland delineation, either (1) the length of time between the average last frost date and the average first frost date based on a 30-year average before 2000 or (2) the part of the year when soil temperatures are above biological zero (5 degrees C; 41 degrees F) at a depth of 19.7 inches (50 cm) from the soil surface. The growing season can also be approximated by the number of frost-free days.

Habitat evaluation procedure (HEP) model. A method by which a wetland can be assessed based on its suitability for a suite of wildlife. HEP concentrates on the wildlife habitat function of wetlands, whereas other assessment methods may focus on a broader array of wetland functions.

Hazardous waste generator. Any person (including companies, agencies, and municipalities), by site, whose act or process produces hazardous waste or whose act first causes a hazardous waste to become subject to regulation.

Hazardous waste. Any waste or combination of wastes as defined in 40 CFR 261.3 or Iowa Code section 455B.411.

HEC-2 hydraulic modeling. A method used to estimate the extent to which in-stream structures; e.g., bridge piers, may affect water levels upstream from the structure.

Herbaceous strata (stratum). Plants species that are not woody.

Historic district. A significant concentration of sites, buildings, structures, landscapes, or objects united historically or aesthetically by plan or physical development.

Historic property. Any prehistoric or historic district, site, building, structure, or object included in (or eligible for) the National Register (36 CFR Part Section 800.16 [l][1]).

Household hazardous waste. Any leftover household products that contain corrosive, toxic, ignitable, or reactive ingredients, including products such as paints, cleaners, oils, batteries, and pesticides.

Human environment. The relationship between humans and their natural and physical environment.

Hydric soil. Soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part. See *Field Indicators of Hydric Soils of the United States, v. 4.0, 1998* for the currently accepted technical definition of hydric soils. See *The 1987 Corps of Engineers Wetland Delineation Manual* for additional information.

Hydrophytic vegetation. Plants that are adapted to growing in wet, saturated conditions. According to *The National List of Plants Species That Occur in Wetlands*, this would include species listed as FAC, FAC+, FACW-, FACW, FACW+, or OBL.

Impacted receiver. A noise sensitive receiver that is or will be subjected to highway traffic noise that approaches or exceeds the noise abatement criterion or substantially exceeds existing noise levels.

Impaired water. A water body that is only partially supporting or not supporting its designated use *(Iowa Department of Natural Resources)*.

Indian tribe. An Indian band, nation, or other organized group or community, including a native village, regional corporation, or village corporation, as those terms are defined in Section 3 of the Alaska Native Claims Settlement Act (43 USC 1602), that is recognized as eligible for the special programs and services provided by the U.S. to Indians because of their status as Indians *(36 CFR 800.16 [m])*.

Indirect energy impact. Energy impacts associated with construction energy and items such as the effect of changes in automobile usage *(FHWA Technical Advisory T6640.8A)*.

In-lieu fee mitigation. A form of wetland mitigation provided for in the Clean Water Act that allows fees to be paid to resource agencies as compensation for wetland impacts. The accumulated fees are then used to create or restore wetlands.

Interested persons. Individuals and organizations that have made known their concerns about a particular project's effects on historic buildings and structures and archaeological sites. Interested persons may include local governments; applicants for federal assistance, permits, and licenses; affected landowners; Native American tribes; and the general public. Contact with interested persons should be made at each stage in the Section 106 process (identification, evaluation, assessment of effects, and consultation).

Iowa Protected Water Areas (PWA) Program. Initiated in 1987 to address the need for additional open space protection in Iowa. Its basic purpose is to maintain, preserve, and protect the existing natural and scenic qualities of selected lakes, rivers, marshes, and their adjacent areas. The Iowa PWA program is administered by the Iowa Department of Natural Resources.

L_{Aeq1h}. The hourly value of L_{Aeq}.

L_{Aeq}. The A-weighted equivalent steady-state sound level that, in a stated period of time, contains the same acoustic energy as the time-varying sound level during the same time period.

Last resort housing. Housing provided through an administrative process if, in the case of a displaced person, there is a housing shortage and comparable housing is not available, or it is not available within the maximum $5,250 or $22,500 payment limits. This requirement is addressed by the Office of Right-of-Way during the property acquisition process. See *Uniform Relocation Assistance and Real Property Acquisition Policies Act* or FHWA, "Your Rights and Benefits as a Displaced Person Under the Federal Relocation Assistance Program."

Lead agency. The lead agency is FHWA and joint lead agencies would be the direct recipients of the federal funds. Subrecipients may be invited to also be joint lead.

Leaking underground storage tank (LUST). Any underground storage tank system (as defined below) that demonstrates through fill records, tightness testing, or the presence of environmental contamination that the tank is leaking or has leaked in the past.

Least harm analysis. According to Section 4(f) regulations, if there is no feasible and prudent avoidance alternative, the agency "may approve only the alternative that causes the least overall harm in light of the statute's preservation purpose." The "least overall harm" is determined by balancing the following list of factors:

- The ability to mitigate adverse impacts to each Section 4(f) property (including any measures that result in benefits to the property)
- The relative severity of the remaining harm, after mitigation, to the protected activities, attributes, or features that qualify each Section 4(f) property for protection
- The relative significance of each Section 4(f) property
- The views of the official(s) with jurisdiction over each Section 4(f) property
- The degree to which each alternative meets the purpose and need for the project
- After reasonable mitigation, the magnitude of any adverse impacts to resources not protected by Section 4(f)
- Substantial differences in costs among the alternatives

Level of service (LOS). An indicator tool that determines the functionality of the roadway in terms of capacity, volume, and delays at intersections. It ranges from A to F, F indicating worst possible congestion and longest delay.

Life-cycle costs. The components of cost associated with buying, owning, and using a physical product or service.

Listed species. A species included on federal or state lists of endangered and threatened wildlife and plants. Listed species are protected under the Endangered Species Act, which prohibits killing, harming, or otherwise taking a species.

Local streets. Functional classification consisting of all roads not defined as arterials or collectors; primarily provides access to land with little or no through movement.

Location Section. The Office of Location and Environment has a section within its organization called the Location Section. It traditionally has performed engineering studies needed to determine the type and location of an improvement, known as location studies (or planning studies).

Location study and Location Section business. Throughout Part II of the manual, this distinction is important when determining whether a topic is addressing an element of performing a location study or of conducting the business of the Location Section; in other words, completing the location study process (or planning study process).

Logical termini. The rational endpoints for the proposed project and the review of its environmental resources.

Long-range transportation plan (LRTP). A document resulting from regional or statewide collaboration and consensus on a region's or state's transportation system. In metropolitan areas, the plan indicates all the transportation improvements scheduled for funding over the next 20 years.

Longitudinal impacts (encroachment). A road crossing 30 degrees or less with respect to the floodplain edge; for example, a roadway running alongside the edge of a 100-year floodplain.

Low-chroma matrix. A soil (or soil ped) in which most of the soil surface or volume has a chroma less than or equal to 2. Generally associated with soils that are saturated and anaerobic for part of the growing season, though black upland prairie soils may meet this criterion as well.

Low-income. May refer to households at or below the HHS poverty-level guidelines, or to persons/households with incomes substantially lower than the median income of the general population *(FHWA Environmental Justice Guidance)*.

Maximum contaminant level (MCL). Maximum permissible level of a contaminant in water that is delivered to any user of a public water system *(Iowa Department of Natural Resources)*.

Memorandum of agreement (MOA). A contractual document, negotiated and executed under Section 106, that specifies how the project's adverse effects upon eligible properties will be taken into account. The MOA is agreed upon and signed by the consulting parties.

Memorandum of understanding (MOU). An agreement between two or more entities that documents policies and procedures of mutual concern, provides mutual assistance or exchanges that results in the promotion of common endeavors. It is a stand-alone agreement that establishes the general parameters between two entities.

Mineral soil. Soil that is composed predominately of mineral matter (either clay, silt, or sand) and relatively low levels of organic matter (usually less than 20 percent).

Minority. Persons who identify themselves as Asian or Pacific Islander, Native American, or Alaskan Native, Black (not of Hispanic origin), or Hispanic *(U.S. Census Bureau)*.

Mitigation. Compensation for an environmental impact, including in order of consideration, (1) avoiding the otherwise impacted area altogether; (2) minimizing impact by lessening its degree or magnitude; (3) repairing the affected area; (4) minimize impact over time by preservation or maintaining the quality of the area; and (5) mitigating for the resource lost by creating it elsewhere, protecting similar environmental resources located elsewhere, or recording site information through documentation or data recovery.

MOBILE 5b. Emission factor model to determine vehicle emissions.

Multi-jurisdictional agreement. An agreement between the Iowa DOT and another state, or the Iowa DOT and a city.

Multimodal alternative. The consideration of alternative modes of transportation such as mass and rapid transit as well as nonmotorized vehicles.

National Flood Insurance Program (NFIP). An office of the Federal Emergency Management Agency responsible for the program that maintains and publishes flood insurance rate maps.

National Historic Landmark. This is a special category for an eligible property so designated by the Secretary of the Interior because of its national importance in American history, architecture, archaeology, engineering, or culture. The Section 106 process affords special protection of such landmarks.

National Priorities List. A list of seriously contaminated sites across the country slated for cleanup under CERCLA or EPA enforcement action.

National Register of Historic Places (NRHP or *National Register*). The National Park Service, on behalf of the Secretary of the Interior, administers the *National Register*. Register listings include buildings, structures, sites objects, and districts of historic architectural, engineering, archaeological, or cultural significance. Properties listed are not limited to those of national significance; most listed properties are significant at the state or local level.

National Resources Conservation Service (NRCS) field office. Office that is the contact point regarding Farmland Protection Policy Act issues and Form AD-1006 for the county within which a project is located; each county has a field office.

National Rivers Inventory. A listing of potential "candidates" for the Wild and Scenic Rivers designation. Listing indicates that a study for inclusion on the Wild and Scenic Rivers list is deemed appropriate.

National Wetland Inventory (NWI). A nationwide remote-sensing effort conducted in the early 1980s to assess wetland locations. The results of this effort are published as overlays with estimated wetland boundaries on 7.5-minute U.S. Geological Survey topographic maps. The definition of wetlands according to the NWI is not the same as the definition used in ground surveys, although there is some overlap.

Neutral chroma matrix. A soil (or soil ped) in which most of the soil surface or volume has a chroma less than or equal to 1. Generally associated with soils that are saturated and anaerobic for part of the growing season.

New alignment. The provision of a new roadway, or the improvement of an existing roadway which would place the roadway at a new location.

No-Build Alternative. NEPA requires the consideration of no action as an alternative as a useful comparison base for action alternatives.

No feasible and prudent alternative. If Section 4(f) land must be used in a project, it must be demonstrated that there is no feasible and prudent alternative to the use of the land. Alternatives must attempt to avoid Section 4(f) land and supporting information must demonstrate unique problems with such alternatives in order to state that no feasible and prudent alternative exists. Adverse factors such as environmental impacts, safety and geometric problems, decreased traffic service, increased costs, and any other factors may be considered individually or collectively in the determination.

Noise abatement criteria. Noise level, depending upon land-use type, at which Iowa DOT must consider noise abatement.

Noise sensitive receiver. Any property (owner occupied, rented, or leased) where frequent exterior human use occurs and where a lowered noise level would be of benefit. In those situations where there are no exterior activities to be affected by the traffic noise, the interior of the building shall be used to identify a noise sensitive receiver.

Nonpoint source pollution. Pollution from sources that are diffused which does not have any single point of origin or discharge, such as pollutants generally carried off land by runoff. (EPA, *Terms of Environment*)

Notice of Availability (NOA). A notice that indicates that an environmental document is ready for public and agency review.

Notice of Intent (NOI). A document that states that an environmental impact statement will be prepared, describing the proposed action, possible alternatives, a proposal for developing scope, including whether, when, and where any scoping meeting will take place, and contact information for the agency that can answer questions regarding the project and its associated environmental impact statement.

Obligated funds. Funds that the federal government (FHWA) agrees to pay as its share of the cost for a project eligible for the federal-aid highway program.

100-year floodplain. The area covered by a flood having a 1 percent chance of occurring in any given year. The 100-year floodplain is officially designated on Flood Insurance Rate Maps.

Onsite wetland mitigation. The creation, restoration, or enhancement of wetlands within or adjacent to the project site.

Organic soil. A substrate (hydric by definition) very high in partially decomposed plant fibers. Mucks are organic soils with a high amount of plant decomposition; peats are organic soils with a low amount of plant decomposition.

Outstandingly remarkable values (ORV). An eligibility criterion intended to establish minimum thresholds in evaluating river segments for the Wild and Scenic Rivers system and the National Rivers Inventory. The criterion is not all-inclusive and may be modified to provide a more meaningful comparison of the values.

Planned, designed, and programmed property. Planned, designed, and programmed property must be evaluated in the noise analysis. Development will be deemed to be planned, designed, and programmed if a proposed noise-sensitive land use—a residence, school, church, hospital, library, etc.—has received a building permit from the local agency with jurisdiction for each building at the time of the noise analysis.

Planning study. The process of undertaking analyses for either a feasibility study or a location study. Planning studies pertain to large or complicated projects on which initial planning activities are under way, or for which planning activities will be initiated. Several years typically are needed to develop a complicated or large highway construction project. The time is needed to accomplish the necessary location and concept planning studies, environmental studies, archaeological research, preliminary and final design plan development, right-of-way acquisition, and actual project construction. The Iowa Transportation Improvement Program often does not provide enough time to include all the developmental steps required for a large project; therefore, projects are identified as planning studies until they are sufficiently developed for consideration for the Program.

Pollutant. Any substance introduced to the environment that adversely affects the usefulness of a resource or the health of humans, animals or ecosystems (EPA, *Terms of Environment*).

Potentially responsible party (PRP). A party (persons, companies, agencies, or municipalities) identified by the EPA or any other agency as potentially liable for cleanup costs associated with environmental contamination. Such parties may be generators, past or present owners/operators of facilities or real property, or transporters having accepted waste and selected the disposal facility.

Prime farmland. Land that has best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other agricultural crops with minimum inputs of fuel, fertilizer, pesticides, and labor, and without intolerable soil erosion, as determined by the Secretary of Agriculture. Prime farmland includes land that possesses the above characteristics but is being used to produce livestock and timber. It does not include land already in or committed to urban development or water storage *(7 U.S.C. 4201[c][1][A])*.

Principal systems. Arterial roadways that connect major municipalities and provide statewide or interstate travel.

Programmatic agreement (PA). A document that records the terms and conditions agreed upon to resolve the potential adverse effects of a federal agency program, complex undertaking, or other situations in accordance with Section 800.14(b). Procedures for developing a PA are in 36 CFR 800.13. The PA signed by the consulting parties.

Proposed action. A proposed transportation project that requires federal funding and subsequent environmental document.

Protected species. A species listed on the federal or state lists of endangered and threatened wildlife and plant.

Public comment period. The time allowed for the public to express its views and concerns regarding a proposed project or environmental document (e.g., a draft environmental impact statement).

Public hearing. A statutory meeting where Iowa DOT officials hear the public's views and concerns about a proposed project. A public hearing is conducted for a project with an environmental impact statement, an environmental assessment, and typically for a project where condemnation of agricultural land is anticipated.

Public involvement plan. A document that identifies the Iowa DOT's plan for soliciting public and agency input.

Public meeting. A forum to solicit input from or provide information to the public on a proposed project.

Purpose and need statement. A declaration of the purpose of the project and the needs the proposed alternatives will rectify.

Q value. A volume of water flowing past a specific point in a given period.

Real property. Generally refers to any interest in land.

Reasonable and feasible. With respect to noise abatement, feasibility deals primarily with engineering considerations; e.g., Can a barrier be built given the topography of the location? Can substantial noise reduction be achieved given certain access, drainage, safety, or maintenance requirements? Are other noise sources present in the area? Reasonableness implies that common sense and good judgment will be applied in a decision related to noise abatement.

Reasonably foreseeable. Likely to occur in the future, as evidenced by existing documentation, such as planning documents and information from planning officials.

Reconstruction. A project that entails the removal of surface or structure and replacing it with new surface or structure.

Record of Decision (ROD). A document prepared after the final environmental impact statement that describes the Selected Alternative and why it was chosen, outlines mitigation measures that will be integrated into the project, and describes what Section 4(f) approval was received.

Redox concentration. A bright rust-colored mottle caused by deposition of ferric iron, often found within the rooting zone of wet, anaerobic soils.

Redox depletion. A dull gray-colored mottle caused by the leaching of iron and other compounds, often found within the rooting zone of wet, anaerobic soils. The gray is the color of soil quartz after leaching occurs.

Regulated substance. As defined in part by Iowa Code 567-135.2(455B), an element, compound, mixture, solution, or substance that, when released into the environment, may present substantial danger to the public health or welfare or to the environment. Regulated substances include the following:

- Hazardous substances as defined in 40 CFR 302.4 (which includes asbestos, lead, and PCBs).
- Substances that exhibit the characteristics identified in 40 CFR 261.20 through 261.24 and that are not excluded from regulation as a hazardous waste under 40 CFR 261.4(b).
- Any substance defined in Section 101(14) of CERCLA.
- Petroleum, including crude oil or any fraction thereof that is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit, 14.7 pounds per square inch absolute).

- The term "regulated substance" includes but is not limited to petroleum and petroleum-based substances composed of a complex blend of hydrocarbons derived from crude oil through processes of separation, conversion, upgrading, and finishing, such as motor fuels, jet fuels, distillate fuel oils, residual fuel oils, lubricants, petroleum solvents, and used oils.
- Potentially infectious medical waste, radioactive substances, industrial process waste, pollution control waste, potential asbestos-containing materials, and soil or groundwater contaminated with any of these substances.

Regulatory floodway. The channel of a water course or bed of a water basin that carries and stores floodwaters during a regional flood, e.g., the 100-year flood.

Rehabilitation. (a) The process of returning a property to a state of utility, through repair or alteration, which makes possible an efficient contemporary use while preserving the features of the property that are significant to its historic, architectural, and cultural values. (36 CFR 67.2). (b) An action that includes resurfacing or restoration, new concrete barrier, improvement of an existing structure, new traffic signals, new sign structures, modification of access configuration, minor widening, and noise barriers.

Release. Any spilling, leaking, pumping, pouring , emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing of a material into the environment.

Residence. A building used as a home; the place where one lives.

Right-of-way. Generally, a longitudinal strip of land used for transportation purposes.

Scoping. The early process of deciding what environmental issues will be explored. Intended to prevent the accumulation of superfluous information.

Secretary's guidelines. The Department of Interior's "Archaeology and Historic Preservation, Secretary of the Interior's Standards and Guidelines." The guidelines are not regulatory but are frequently cited as a source for technical advice about archaeological and historic preservation activities, methods, and professional qualifications.

Section 106 process. A review of project impacts established under Section 106 of the National Historic Preservation Act and its implementing regulations, 36 CFR Part 800.

Section 4(f). A special provision in the U.S. DOT Act of 1966 (now codified at 49 USC 303, 23 USC 38) that states special effort should be made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites. Section 4(f) applies only to federally funded transportation projects and only if the park, recreation area, or waterfowl or wildlife refuge is significant and publicly owned.

Section 6(f). The Land and Water Conservation Fund Act of 1965 (LAWCON or L&WCF) stipulates that any land planned, developed or improved with LAWCON funds cannot be converted to any use other than outdoor recreation unless replacement land of at least equal fair market value and reasonably equivalent usefulness is provided. The Iowa Department of Natural Resources is responsible for oversight of Section 6(f) requirements. While often linked with the Section 4(f) regulation, Section 6(f) involvement may occur in the absence of Section 4(f) involvement.

Section 7 consultation. The section of the Endangered Species Act that requires all federal agencies, in "consultation" with the U.S. Fish and Wildlife Service, to ensure that their actions are not likely to jeopardize the continued existence of listed species or result in destruction or adverse modification of critical habitat.

Selection committee. A committee appointed by the division director that selects consultants with whom to initiate negotiations *(Iowa DOT PPM 300.12)*.

Sequencing. Determining the type of mitigation by considering the measures from most desirable to least: avoid, minimize, repair or restore, reduce over time, and replace.

Severance. A separation or division of a parcel of land into two or more pieces.

Shrub strata (stratum). A layer of woody vegetation with multiple stems less than 5 inches in diameter at breast height and usually less than 20 feet high.

Significantly. The degree to which a project affects the environment, such that it triggers the NEPA documentation process. Consideration is given to both context and intensity. *Context* refers to relative impact on society as a whole, the affected region, the affected interests, and the locality. *Intensity* refers to the severity of the impact, taking the following into consideration: both beneficial and adverse impacts, the degree of impact on public health and safety, the uniqueness of the geographic area, how controversial the impact would be, the degree to which impact on the human environment is uncertain or the risk is unique or unknown, the likelihood that the project would set a precedent for future projects, the degree of environmental impact when combined with the impact of other closely related projects, the degree to which the project might affect the historical significance of sites listed on or eligible for the National Register of Historic Places or how much it might decrease the significance of scientific, cultural or historical resources, the degree to which federal or state endangered or threatened species or their associated habitats might be affected, and whether state or local environmental protection regulations may be threatened or violated.

Site. A location that would be converted by the proposed action.

Soil ped. A single unit of soil structure.

Soil survey. A book published by the Natural Resources Conservation Service that describes the soil properties of all soil types for each county in the U.S. Each county soil survey is available as a hardcopy or as GIS layers.

Solid waste. Any garbage, refuse, sludge, and other discarded material including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, agricultural, or community activities.

Special land use. Noise-sensitive land uses such as schools, churches, and parks.

State endangered species. As applied to state-listed species, the classification provided to an animal or plant in danger of extinction within the foreseeable future throughout all or a significant portion of its range. Those species included on the state list may or may not also be listed on the federal list.

State hazardous waste site. Any property listed on the Registry of Hazardous Waste or Hazardous Substance Disposal Sites as required by Iowa Code section 455B.426 and defined in the Iowa Administrative Code 567 Chapter 148.

State Historic Preservation Officer (SHPO). The officer or office in each state or territory, appointed by the Governor, responsible for consulting with federal agencies during the Section 106 process. In Iowa, the State Historical Society of Iowa acts as the SHPO. A SHPO reflects the interest of the state and its citizens in the preservation of their cultural heritage and helps FHWA identify those persons interested in a project and its effects upon eligible properties. A SHPO also maintains data on historic buildings, structures, and archaeological sites.

State special concern species. In addition to the state list of threatened and endangered species, the Iowa Department of Natural Resources also maintains a list of "special concern "species that it is currently monitoring throughout the state. Those species are provided no regulatory protection in the state, but avoiding impacts to them is strongly encouraged .

State threatened species. As applied to state-listed species, the classification provided to an animal or plant likely to become endangered within the foreseeable future throughout all or a significant part of its range.

State Transportation Improvement Program (STIP). A compilation of TIPs from Iowa's nine Metropolitan Planning Organizations, 18 Regional Planning Affiliations, and the Department.

Stormwater. Stormwater runoff, snowmelt runoff, and surface runoff and drainage (EPA).

Study rivers. A stretch of river being evaluated for potential designation in the National Wild and Scenic Rivers System. Such designations are based on "outstandingly remarkable values," such as scenic beauty, biological diversity, geological formations, and recreational opportunities.

Study. The word *study,* where used in this manual, refers to the act of conducting a study rather than to the written summary of that work, which will generally be referred to as a *report*.

Substantial noise increase. This is an increase of 10 or more decibels above the existing noise level as a direct result of the transportation improvement project in question.

Substantial noise reduction. This is an effort to reduce traffic noise impacts at benefited receivers by 8 to 10 dBA, if possible, with a minimal acceptable level of reduction at no less than 5 dBA.

Supplemental Environmental Impact Statement (SEIS). A document that is written either because new developments have arisen in the project process or a long time has passed since the initial EIS. Only pertinent new information is discussed in the SEIS; existing information contained in the EIS is referenced as necessary.

Surface water. All water naturally open to the atmosphere, such as rivers, lakes, reservoirs, ponds, wetlands, and streams. (EPA, *Terms of Environment*)

Survey. Fieldwork and literature search conducted to identify properties of architectural, historical, or archaeological interest that may be affected by a project. Surveys should be completed under the guidance of a principal investigator who meets the Department of Interior's professional qualification standards.

SYNCHRO. Traffic model used to simulate traffic conditions at intersections.

Tax base. The amount on which a tax rate is applied (Department of Finance in Canada, Glossary).

Tax rate. The percentage derived by dividing the levy for a fund by the assessed value (Illinois DOT, *Socio-Economic Impact Assessment Manual*).

tax revenues. Amounts collected by the state and local taxing authorities. These revenues become tax expenditures. Categories of tax revenues include both property tax and sales tax (Illinois Department of Transportation, *Socio-Economic Impact Assessment Manual*).

Taxing body. A group or entity that levies a tax.

Tiering. A system of preparing multiple environmental documents, the first of which discusses the environmental impacts on a broad scale, while the others focus on more specific environmental impacts.

Total maximum daily load (TMDL). The maximum amount of a pollutant that can be discharged into a water segment by all sources without violating a water quality standard. (EPA, *Terms of Environment*).

Traffic noise impacts. Impacts that occur when the predicted traffic noise levels approach or exceed the noise abatement criteria, or when the predicted traffic noise levels substantially exceed existing noise levels.

Transportation Improvement Program (TIP). A staged, multiyear, intermodal program of transportation projects that is consistent with the long-range transportation plan. The Department and each of Iowa's nine Metropolitan Planning Organizations and 18 Regional Planning Affiliations develop their own TIPs, which typically covers a 3- to 5-year time period.

Transportation system management (TSM) alternative. The consideration given to maximizing and optimizing the efficiency of the present roadway. This is a minimal construction option that is usually considered in a highly urbanized area.

Transverse impacts (encroachment). A road crossing at 30 to 90 degrees with respect to the edge of a floodplain; example: a roadway perpendicular to the edge of a 100-year floodplain.

Tree strata (stratum). A layer of woody vegetation with stems greater than 5 inches in diameter at breast height and usually greater than 20 feet high.

Type I projects (Noise). A proposed federal aid or state-funded project for the construction of a highway on new location, or the physical alteration

of an existing highway that significantly changes either the horizontal or vertical alignment or increases the number of through-traffic lanes.

Type II projects (Noise). A proposed federal aid or state funded highway project for noise abatement on an existing highway, commonly referred to as retrofit projects.

Underground storage tank (UST). Any one tank or combination of tanks (including underground pipes connected thereto) that is used to contain an accumulation of regulated substances, and the volume of which (including the volume of underground pipes connected thereto) is 10 percent or more beneath the surface of the ground, excluding specific systems described under the definition of UST in Iowa Administrative Code Chapter 135.2(455B).

Undertaking. A project, activity, or program funded in whole or in part under direct or indirect jurisdiction of a federal agency, including those carried out by or on behalf of a federal agency; those carried out with federal financial assistance; those requiring a federal permit, license or approval; and those subject to state or local regulation administered pursuant to a delegation or approval by a federal agency *(36 CFR Part 800.16[y])*.

Unfarmable parcel. Piece of land that cannot be farmed owing to limiting factors of either natural conditions (e.g., wetlands) or man-made conditions (e.g., diagonal severances).

Unique farmland. Land other than prime farmland that is used for the production of specific high-value food and fiber crops, as determined by the Secretary of Agriculture. It has the special combination of soil quality, location, growing season, and moisture supply needed to economically produce sustained high quality or high yields of specific crops when treated and managed according to acceptable farming methods. Examples of such crops include citrus, tree nuts, olives, cranberries, fruits, and vegetables *(7 USC 4201[c][1][B])*.

Urban development/water storage. Land that meets any one the following criteria is considered committed to urban development or water storage, as per 7 CFR 658.2(a):

- Land with a density of 30 structures or more per 40-acre area.
- Land identified as "urbanized area" on the Census Bureau Map.
- Land mapped as an urban area using the tint-overprint on the USGS topographical maps.
- Land shown as "urban-built-up" on USDA Important Farmland Maps.
- Land that receives a combined score of 160 points or less for the Land Evaluation (Part V) and Site Assessment (Part VI) criteria on the Farmland Conversion Impact Rating form.

Use of land. A "use" of land occurs when:

- Land from a Section 4(f) site is acquired for a transportation project,
- There is an occupancy of land that is adverse in terms of the statute's preservationist purposes, or
- When proximity impacts of a transportation project on Section 4(f) sites, without acquisition of land, are so great that the purpose for which Section 4(f) sites exist are substantially impaired (normally referred to by courts as a *constructive use*).

Visual element. A particular feature of the visual quality.

Visual function. An element of a transportation project designed and experienced primarily from a visual perspective that may include positive guidance and navigation, distraction screening, corridor continuity, roadway and adjacent-property buffering, and scenic-view preservation (Washington Department of Transportation *Environmental Procedures Manual*).

Visual quality. The character of the landscape that generally gives visual value to a setting (Washington Department of Transportation *Environmental Procedures Manual*).

Waters of the United States. In general terms, all waters currently used, or were used, in interstate or foreign commerce, including all interstate and intrastate waters such as lakes, rivers, streams, and wetlands. A more detailed definition of waters of the United States can be found under federal regulation 33 CFR Part 328.

Wellhead protection area. The protected surface and subsurface zone surrounding a well or well field supplying a public water system to keep contaminants from reaching the well water (EPA, *Terms of Environment*).

Wetland (W). As defined in *The 1987 Corps of Engineers Wetland Delineation Manual*, "areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas."

Wetland delineation. The process of determining the boundary of a wetland in a specific location. The process is defined in *The 1987 Corps of Engineers Wetland Delineation Manual.*

Wetland functional assessment. A qualitative or quantitative process by which the capacity of a wetland to provide services is evaluated.

Wetland functions and values. *Wetland functions* are services that a wetland provides regardless of human awareness of them. *Wetland values* include the goods and services that come from wetlands and riparian areas that benefit humans or human society (*Iowa Wetlands and Riparian Areas Conservation Plan*).

Wetland hydrology. Inundation or saturation conditions for a significant contiguous period during the growing season, about 2 weeks in Iowa.

Wetland mitigation bank. A location created, restored, enhanced, or preserved as a functioning wetland or wetland complex that can be later used as compensatory mitigation for unavoidable wetland effects associated with authorized development that occurs within an agreed upon vicinity, or service area, of the mitigation bank.

Wetland mitigation. An action performed to compensate for wetlands lost due to construction, by restoring, creating, or enhancing wetlands in another location.

Zoning map. A map that depicts the various sections of a community and divides the sections into zones of land uses permitted under the zoning ordinance (*Dictionary of Real Estate Appraisal*).






PART I

Introduction and Project Management

Iowa DOT and the Project Development Process

CHAPTER 1

1.1 Introduction

This manual captures the experience of practitioners in the Iowa Department of Transportation's (Iowa DOT's) Office of Location and Environment (OLE). It also documents the need for coordinated project development efforts during the highway project planning, or location study phase and engineering design. The location study phase establishes:

- The definition of, and need for, the highway improvement project
- The range of alternatives and many key attributes of the project's design
- The recommended alternative, its impacts, and the agreed-to conditions for project approval

The location study process involves developing engineering alternatives, collecting engineering and environmental data, and completing design refinements to accomplish functional designs. The items above also embody the basic content required for projects compliant with the National Environmental Policy Act (NEPA) of 1969[1], which directs federal agencies to use a systematic, interdisciplinary approach during the planning process whenever proposed actions (or "projects") have the potential for environmental impacts. In doing so, NEPA requires coordination with stakeholders, review, comment, and public disclosure.

Are location studies and environmental studies more about the process or the documents? If properly conducted, they concern both—unbiased and reasonable processes with quality and timely documents. In essence, every project is a story that needs to be told. Engineering and environmental regulations and guidance, as documented in this manual, will help project staff and managers become better storytellers.

1.2 Purpose and Organization of the OLE Manual

This manual is designed for use by Iowa DOT project managers, staff, and consultants working in similar roles. It will help project management teams to:

- Communicate effectively within Iowa DOT and with outside agencies and the general public during the planning and functional design phases of the project development process
- Develop alternatives and conduct related engineering studies according to the standards and procedures essential to the location study process

In essence, every project is a story that needs to be told. Engineering and environmental regulations and guidance, as documented in this manual, will help project staff and managers become better storytellers.

[1] 42 USC 4321-4347; and CEQ regulations at 40 CFR 1500.

- Execute project work more effectively, with consistent procedures and products compliant with NEPA and other environmental regulations, while being responsive to project issues and public input
- Deliver quality projects to customers—the traveling public, local communities, and resource/regulatory agencies

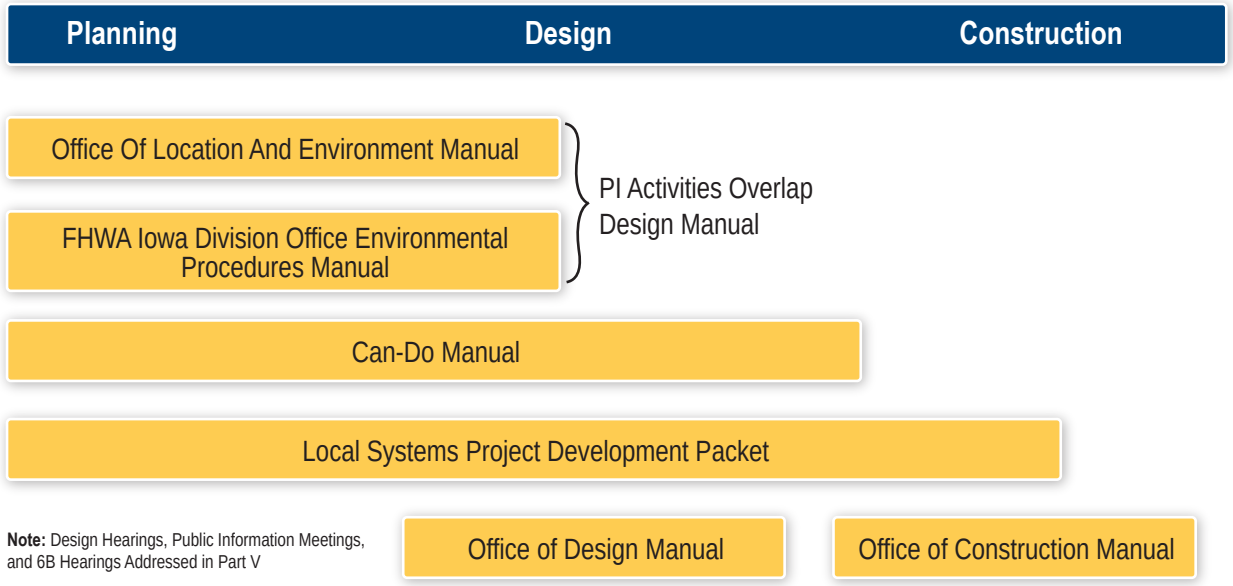
The prerequisites for effective use of this manual include some level of relevant technical training or experience and the ability to access additional referenced information, including the cited regulations, legislation, and other guidances. As noted in the introduction, this manual focuses on coordinating and conducting both engineering and environmental analyses during the location study phase of the highway project development process. Exhibit 1-1 is representative of how the *OLE Manual* fits into that overall process, with reference to some of the other Iowa DOT guidance documents and manuals. The "Other Resource Materials" discussion at the end of this chapter provides brief descriptions of other Iowa DOT guidance.

The prerequisites for effective use of this manual include some level of relevant technical training or experience and the ability to access additional referenced information, including the cited regulations.

This manual is organized into six parts:

- Part I: Introduction and Project Management provides an overview of the OLE Manual and how it relates to other Iowa DOT guidance documents. Chapter 2 in this Part also provides information on contract management for projects managed by OLE staff.
- Part II: Location Studies discusses the engineering analyses and documentation required for location studies. This includes chapters on data collection, alternatives development and evaluation, computer-aided drafting (CAD) practices, and corridor management.
- Part III: Environmental Documentation and Special Analyses provides details on environmental documentation, agency coordination, Section 4(f) regulations, assessment of indirect and cumulative impacts, and mitigation.

Exhibit 1-1
How the OLE Manual fits into the project development process compared to other Iowa DOT manuals



- Part IV: Resource Studies details how to evaluate environmental resource impacts, including natural resources (such as wetlands, water features, plants, and animals) socioeconomic resources, air quality, noise, agricultural lands, regulated materials, public lands, and cultural resources.
- Part V: Public Involvement documents Iowa DOT requirements for public involvement, developing an administrative record, and responding to Freedom of Information Act Requests.
- Part VI: Geographic Information Systems (GIS) includes data management methods and data sources for GIS and outlines tools for coordinating GIS mapping with other information resources.

This manual also includes an appendix containing materials referenced in the chapters. Items in the appendix are numbered the same as the chapter to which they relate (e.g., Appendix item 14a contains materials from Chapter 14). Copies of many of the regulations and guidance documents noted at the beginning of each chapter are also included. They are located in a separate folder within the appendix.

This manual should be used in conjunction with the Iowa DOT's Can-Do Manual, the FHWA's Iowa Division Office Environmental Document Procedures Manual, and other guidance documents, as described in Section 1.5.

This manual should be used in conjunction with Iowa DOT's *Can-Do Manual*, the Federal Highway Administration's (FHWA's) Iowa Division Office *Environmental Document Procedures Manual*, the Iowa DOT *Design Manual*, and other guidance documents as described in Section 1.5.

1.3 Project Development Terms Commonly Used in this Manual

Where appropriate, technical terms and concepts are introduced and defined throughout the chapters of this manual. Several of these terms are critical to understanding the Iowa DOT project development process. The following are key terms used in this chapter and throughout the manual:

- *Iowa DOT Office of Location and Environment (OLE)*—This Iowa DOT office consists of several sections, including: Location Studies, NEPA Compliance, Regulated Materials, Water Resources, Threatened and Endangered Species, Public Involvement, and Cultural Resources. OLE is responsible for developing projects through location approval by the FHWA, reviewing local systems projects, and providing continuing support on environmental issues as projects move through design and construction.
- *Project Management Team (PMT)*—A multidisciplinary team assembled to guide a project concept from early planning through design and letting, and possibly into construction. The PMT is responsible for setting and then maintaining the project production schedule, with the goal of letting the project on time and on budget. The PMT also identifies needed project resources and works with office directors to schedule those resources when needed. A PMT includes representatives from the Offices of Design, Location and Environment, and Right-of-Way; the Iowa DOT District staff; the FHWA; and possibly other resources needed to provide additional project management expertise.
- *Location Studies*—Location studies are engineering analyses that establish the engineering limits and preliminary design concepts for a transportation improvement, including assessment of reasonable alternatives. These analyses are typically documented in engineering reports and functional plan drawings.
- *National Environmental Policy Act (NEPA)*—NEPA was enacted in 1969 and has since been a foundation of U.S. environmental policy.[2] It directs federal agencies to use a systematic, interdisciplinary approach during the planning process whenever a proposed action has a potential environmental impact.

[2] 42 USC 4321-4347; and CEQ regulations at 40 CFR 1500

- *NEPA Documents or "Environmental Documents"*—NEPA documents are the written records of the project decision-making process, analysis of impacts, and regulatory reviews and approvals.
- *Section 4(f)*—Section 4(f) of the 1966 Department of Transportation Act 3 protects publicly owned parks, recreation areas, historic sites, and wildlife or waterfowl refuges from conversion to transportation use.
- *FHWA Technical Advisory T6640.8A*—The 1987 FHWA Technical Advisory (TA T6640.8A) is a fundamental federal guidance document for NEPA implementation, providing overall procedures for completing environmental documents and Section 4(f) Evaluations in compliance with Council on Environmental Quality (CEQ), NEPA, and related FHWA regulations. It is included within the FHWA Iowa Division Office *Environmental Document Procedures Manual* and is frequently referenced throughout this manual.

1.4 The Project Development Process

This section provides a brief overview of the project development process and an introduction to OLE, its organization, and its function within Iowa DOT.

As noted, OLE is organized into several sections, including the Location Section (which manages the engineering functions of location studies), the NEPA Compliance Section, and several sections that manage resources studies . Some consider the engineering and environmental functions to be separate actions, but a complete and successful project development cycle requires effective integration of these specialties. A principal purpose of this manual is to help Iowa DOT project managers and other specialists work together effectively, by merging and integrating project location and environmental study efforts. This integration is important for the following reasons:

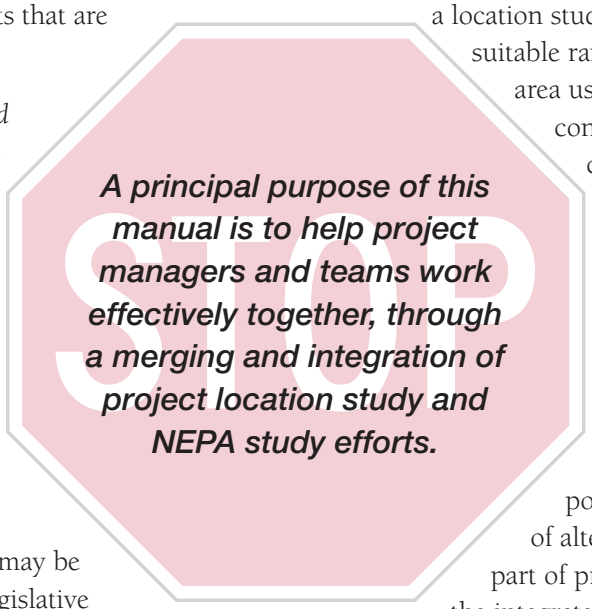
Location studies have sometimes been thought of as separate from environmental studies, but a complete and successful project development cycle requires that these analyses be integrated.

- Location study preliminary engineering designs cannot be completed in a NEPA-compliant manner without early consideration of the project area's environmental features. Many projects undertaken by Iowa DOT are subject to the requirements of NEPA because they use federal funds or require a federal action. NEPA-related regulations require that project alternatives be developed to avoid impacts to some resources (such as wetlands, cultural resources, and public parks), and to minimize those impacts when avoidance is not possible. Developing alternatives that achieve this goal requires effective coordination between the engineering and environmental functions to understand and document the engineering factors and the environmental considerations and how they enable or limit each other. Through such coordination, the project development process ensures a balanced consideration of engineering principles and environmental issues.
- Preparation of thorough, quality NEPA documentation requires an understanding of the engineering options and decisions that determine the project's impacts upon resources. A NEPA document is fundamentally a disclosure document that supports the decision made concerning the proposed action. The information in a NEPA document may become the basis for legal challenges to projects. For a NEPA document to be a complete record of the decision-making on a project, the OLE engineering and environmental staff must communicate well and share knowledge, options, and observations about the constraints and opportunities presented by each project and its alternatives.

[3] In January 1983, as part of an overall recodification of the DOT Act, Section 4(f) was amended and codified in 49 USC, Section 303. The regulation is more commonly known as "Section 4(f)."

The project development process is a complex system of decision-making in its actual practice. It will vary some from project to project, based on the circumstances of the individual project. There are, however, some basic elements that are involved in each project:

- *Identification of a Proposed Action*—A project begins by identifying the need for action. Projects may be identified through condition surveys (pavement or bridge conditions, for example), through observations of insufficient capacity on a roadway, or from crash histories. Some projects may be identified through the legislative process or by elected officials.
- *Collection and Analysis of Engineering Data*—Engineering data collected includes information such as current and projected traffic volumes, accident data, and pavement conditions. Raw data is analyzed to document existing or future transportation needs and to define the criteria against which alternatives will be judged.
- *Collection of Environmental Data*—Environmental resources potentially present in the study area should be identified based on published data and field surveys. The conditions in the general project area must be documented, with emphasis on the most relevant resources. The level of detail and bulk of such information should correspond to the magnitude of the proposed action and resulting potential impacts. The data will be used to help shape the alternatives development process.
- *Definition of the Purpose and Need for Action*—If a project requires the preparation of a NEPA document, a statement of the purpose and need for action must be developed. This is a concise statement of general project goals (the purpose), and discussion of the underlying issues that make the project necessary (the need).



A principal purpose of this manual is to help project managers and teams work effectively together, through a merging and integration of project location study and NEPA study efforts.

- *Development of Alternatives*—Developing a project typically requires looking at a range of alternatives to determine the best choice for the traveling public and the surrounding area. For a location study, the study team develops a suitable range of alternatives for the study area using such data as traffic forecasts, condition information, and crash histories as the basis for design. For complex projects involving a NEPA study, it is critical to have a credible process that identifies a range of alternatives early and to provide documented justifications for eliminating alternatives based on their technical merits and potential impacts. The analysis of alternatives, more than any other part of project development, requires the integrated work of both engineering and environmental staff.
- *Determination of Impacts*—As alternatives are developed, the potential impacts of each alternative should be calculated. Opportunities to avoid or minimize impacts should be identified, possibly resulting in the refinement of the alternative. This iterative process is fundamental to balancing the engineering and environmental performance of transportation improvements.
- *Conducting Coordination and Outreach*—Rather than representing a specific, singular function, public involvement and agency coordination should be woven throughout the project development process. Opportunities should be provided for the public and agencies with an interest in the project to view information about the project and provide feedback.

When reviewing the elements of the project development process, it is important to consider that the level of effort associated with each element is tied directly to the type of project under study. In other words, these elements are scalable. A project involving installation of traffic signals at an existing intersection will require less data gathering, the examination of fewer alternatives, and less

outreach than a project involving the study of a new roadway on new alignment. Therefore, the elements discussed above are applicable for all projects but require a varying level of effort to address.

The remainder of this manual is devoted to explaining the details of these elements and the proper manner to document consideration of them.

For complex projects involving a NEPA study, it is critical to have a credible process that identifies a range of alternatives early and to provide documented justifications for eliminating some.

1.5 Other Resource Material and Related Processes

Besides this manual, there are several other Iowa DOT references of which the reader should be aware. Although there are references to many of these documents throughout this manual, it is the reader's responsibility to identify which apply to his or her project.

- *Can-Do Manual*—The Iowa DOT's Can-Do project development process was created to streamline and expedite the development of Iowa DOT projects from concept to contract. Like this manual, it promotes an integrated project-team-oriented work process. The Can-Do process uses concurrent planning and design to minimize linear sequencing and shorten schedules. It uses Project Management Teams (PMTs) that consist of representatives from the Iowa Offices of Design; OLE; and Right-of-Way, Bridges, and Structures as well as the FHWA. The purpose of PMTs is to identify issues early in the process, to develop solutions tailored to individual project needs, to provide continuous guidance and ownership, and to identify and schedule needed project resources.
- *FHWA Iowa Division Office Environmental Document Procedures Manual*— The FHWA's Iowa Division manual supplements FHWA's overall NEPA guidance with Iowa-specific information and example documentation and regulations. Much of its content is referenced herein. It contains the complete FHWA TA T6640.8A and copies of applicable regulations, such as Protection of Historic Properties, 36 CFR Part 800. The major topic areas include the following:
  - Overall process guidance, such as notices of intent/availability, cooperating agencies, Environmental Impact Statement (EIS) scoping, and document-review checklists
  - Programmatic processing of Categorical Exclusions (CEs)
  - Section 4(f) and Section 106 (historic/archaeological resources) considerations
  - FHWA Iowa Division organizational and contact information
- *Office of Local Systems Local Projects Guidance Manual*—This packet provides flowcharts and other guidance on how to develop local systems projects—that is, roadway projects other than Iowa's primary system of federal- and state-funded highways.
- *Financial Plan Guidance Document*—FHWA regulations require the preparation of a financial plan for projects with a sufficiently high construction cost. This stand-alone guidance documents Iowa DOT's procedures for preparing and reviewing financial plans.
- *Iowa DOT Access Management Policy*—Iowa DOT's Access Management Policy contains regulations for controlling access to the Iowa DOT roadway system. It provides guidance for determining the priority of access control that should be applied to roadways and criteria for determining the frequency for which interruptions to access control will be allowed.
- *Process for New or Revised Interstate Access in Iowa*—This publication of the Iowa DOT provides guidance for studying new or altered access to the Interstate system in Iowa, including the preparation of interchange justification reports. Also related to this topic is Iowa DOT Policy 500.15.

Project Management

CHAPTER 2

This chapter provides information for Project Managers on how to manage consultant contracts. It contains a brief overview on contracting, contract administration, scope of services and contract cost development, and development of multijurisdictional agreements. This section should be used in conjunction with the Office of Location and Environment's (OLE) Consultant Selection and Contract Administration Document and Iowa DOT's *Policies and Procedures Manual (PPM)*.

2.1 Initial Project Setup

2.1.1 Obtaining a Project Number

When a new project is initiated by OLE, including OLE developed corridor preservation projects, the assigned Project Manager should obtain a project number for the study. The steps in this process are as follows:

1. Obtain a project number from the Office of Contracts.
2. Contact Information Technology to assign a Planning Study number (P number) and create a project record in Project Scheduling System.
3. After assigning a P number, Information Technology coordinates with other staff within Information Technology to establish a project directory on the Iowa Department of Transportation (DOT) network.

2.1.2 Accounts Payable Screen

If the project will involve the use of outside services, the Accounts Payable Screen will need to be set up for the project. The OLE administrative assistant will assist in setting up the Accounts Payable Screen.

2.2 Scope of Services and Contract Cost Development

2.2.1 Policies and Procedures Manual

Iowa DOT has policies that cover the contracting process for consulting services. The policies can be found in the *Policies and Procedures Manual*. Where policy applies to the topics discussed in this chapter, reference is made to the policy; no attempt is made to reinterpret the policy. Table 2-1 lists the applicable policies to which the Iowa DOT Project Manager should refer when working on a consultant project. The policies in the *Policies and Procedures Manual* cross-reference other related policies. The cross-referenced policies are not mentioned in this manual. Exhibits 2-1, 2-2, and 2-3 are flowcharts depicting the consultant, request for proposal selection, and scope and budget processes.

This chapter provides information for Project Managers on how to manage consultant contracts.

2.2.2 Consultant Selection

Request for Outside Services Letter

The consultant selection process involves several steps that begin with obtaining approval to seek outside services. The administering office prepares the Request for Outside Services letter and sends it to the Division Director for approval. Format guidelines for the letter are included in Policy No. 300.12.

Prequalification Requirements

The consultant prequalification process is covered in Policy No. 300.04 and shown in Exhibit 2-1.

The consultant is responsible for completing the prequalification paperwork and submitting it to Iowa DOT for approval and renewal. The Consultant Coordinator within the Highway Division maintains a list of prequalified consultants and is responsible for updating prequalification information. The consultant will update the prequalification information using the link: http://www.prof-tech-consultant.dot.state.ia.us/. The prequalification information can be found on the webpage under "Prequalification for Iowa DOT Work." The page lists firms prequalified in each prequalification category.

The Selection Committee will evaluate the prequalification requirements in relation to project needs when preparing the request for proposal (RFP) for the project and will list the required prequalification categories in the RFP. Depending on the complexity of the work, the consultant team may be required to be prequalified in more than one category, or provide prequalified subconsultants.

Disadvantaged Business Enterprises

Iowa DOT works to ensure that disadvantaged business enterprises (DBE) have opportunities to obtain Iowa DOT contracts for professional and technical services. The following webpages contain information about Iowa DOT's DBE policies and provide links to the latest directory of DBE firms:

- http://www.dot.state.ia.us.
- http://www.ia.bidx.com.

Requests for Proposals and Pre-RFP Conferences

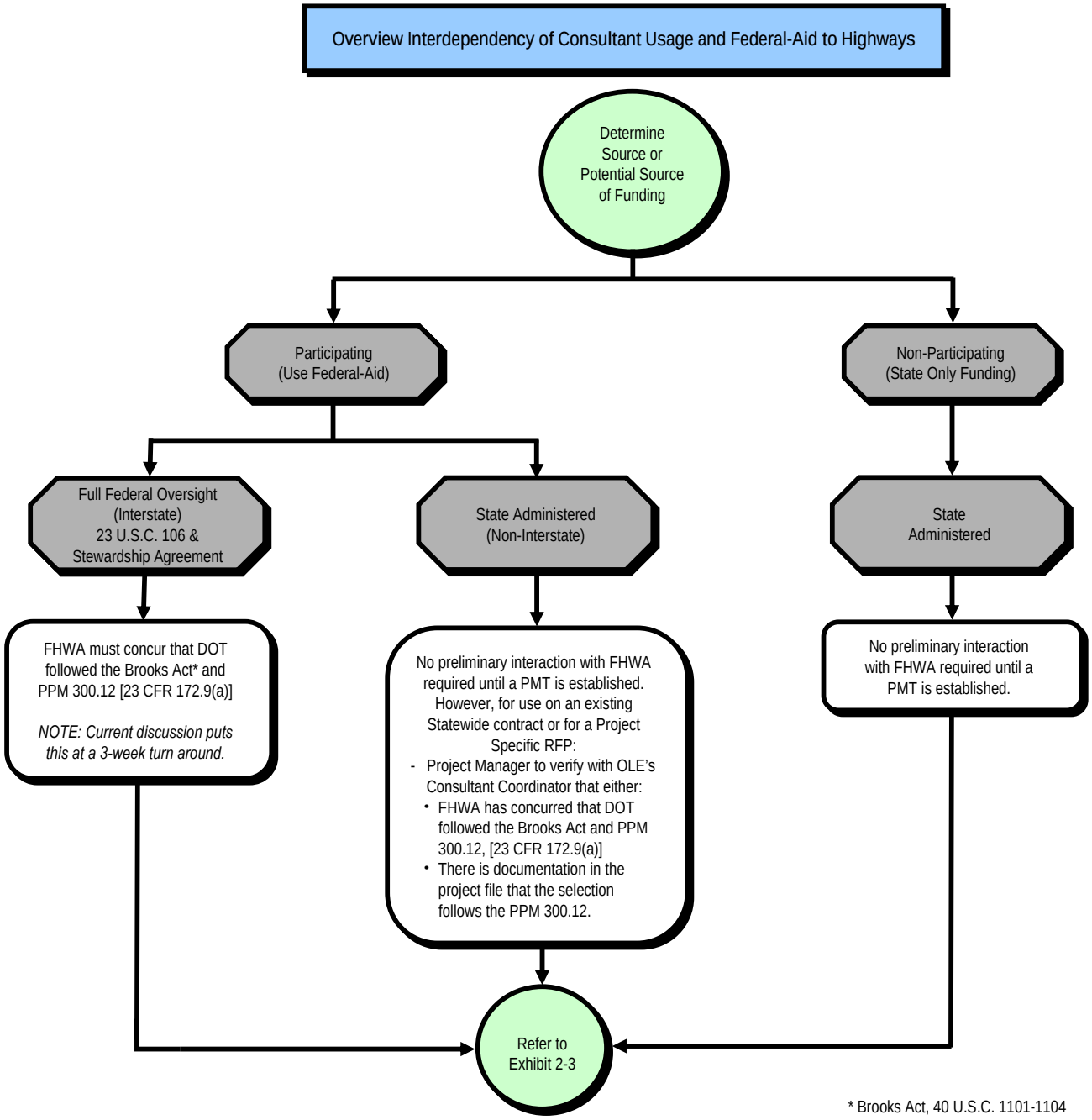
A Consultant Selection Committee will be established for contracts involving a request for proposals. The consultant selection process, including the procedures for assembling a selection committee, is covered in PPM 300.12 and in Exhibit 2-2. The committee will prepare the RFP for the project. The process to prepare and execute the RFP is discussed in PPM 300.12.

A pre-RFP conference may be conducted before the proposal submittal date for large, complex projects. In coordination with the District, OLE will schedule the conference date and make the arrangements. The Selection Committee will indicate in the RFP where and when the conference will be held. The conference should provide additional information about the project not already covered in the RFP. The conference

Table 2-1

Applicable Policies		
Title	Policy No.	Content
Approval of items of department business	300.02	Establishes accountability for the final approval of important items of department business. Staff actions.
Prequalification of architectural, engineering, and related professional and technical firms	300.04	Establishes procedures for reviewing and evaluating the qualifications of consulting firms.
Negotiated contracts for architectural, engineering, and related professional and technical services	300.12	Provides guidance and direction in the administration of consultant contracts. Includes guidance on requests for outside services, consultant selection, negotiation and development of contract, preaudit, contract legal review, and staff actions.
Disadvantaged business enterprise participation	300.18	Establishes procedures for disadvantaged business enterprises in federal-aid highway contracting opportunities.

Exhibit 2-1
Consultant Process Overview



* Brooks Act, 40 U.S.C. 1101-1104

may be mandatory if the information to be shared is necessary for consultants to prepare their proposals correctly. The District, in coordination with OLE, will facilitate the conference and prepare the agenda. The agenda can be modified to include additional project-specific information. Questions asked during the pre-RFP conference and responses to the questions will be documented on Iowa DOT's website.

The RFP should indicate the last accepted date for questions related to the project. Consultants are required to submit questions by letter or e-mail. Questions and answers will be added to the webpage. At least 4 weeks should be allowed for consultants to submit their proposals. Additional time should be considered for large contracts. If a Pre-RFP Conference is arranged, there should be at least 2 weeks both before and after the conference for consultants to submit proposals.

Consultant Selection Process

The members of the Consultant Selection Committee will score the proposals and provide the list of the top three consultants to the Consultant Steering Committee. The Consultant Steering Committee will review the list and confirm the rankings. Following approval from the Consultant Steering Committee, the Contract Coordinator will submit the ranking to the Highway Division Director for approval to initiate negotiations.

Once the Highway Division Director grants approval to begin negotiations, the Consultant Contract Coordinator will notify consultants submitting proposals of the names of the top three consultants selected. Negotiations may then begin with the consultants in the order of the ranking.

2.2.3 Notice to Proceed to Develop Scope and Contract Cost

The appropriateness and the availability of funds to pay for scope and fee development will be determined by the Project Manager, in conjunction with the Office Director and others as needed, on a project-by-project basis. The terms for the scope, budget, and schedule development will include a clearly expressed maximum amount payable to the consultant, in writing, so as to avoid misunderstanding.

The determination as to whether a consultant should be compensated for developing the scope, fee, and schedule should generally follow these guidelines:

- No compensation for scope, fee, and schedule development will be provided when projects are developed using a statewide consultant contract.
- For projects advertised as part of an RFP, compensation for scope, fee and schedule development will initially be limited to 1 percent of the anticipated planning costs to a maximum amount payable of $50,000. The Project Manager, along with the Office Director, will exercise discretion in determining the actual amount to be paid for scope, fee, and schedule development.

Compensating a consultant for scope, fee, and schedule development can be best accomplished by using a lump sum contract. The lump sum contract is written to pay for only the development of the scope, fee, and schedule. If mutually agreeable terms are reached, a base contract would execute the scope, fee, and schedule negotiated from the lump sum contract. Any subsequent supplemental agreements would be developed using a defined number of project management hours from the previous contract. This method will require a separate staff action for each contract.

Early Authorization of Tasks

Early authorization is not allowed except in extreme cases when required to meet schedule requirements. If the project is using federal funds, then eligibility of federal funds for early authorized tasks may be put at risk. Prior Federal Highway Administration (FHWA) concurrence on contracts is required for work to be eligible for federal reimbursement. If work is allowed by early authorization prior to FHWA concurrence, then the work may be reimbursable with state funds only. Any early authorization of tasks will be documented by the consultant and approved by Iowa DOT in writing.

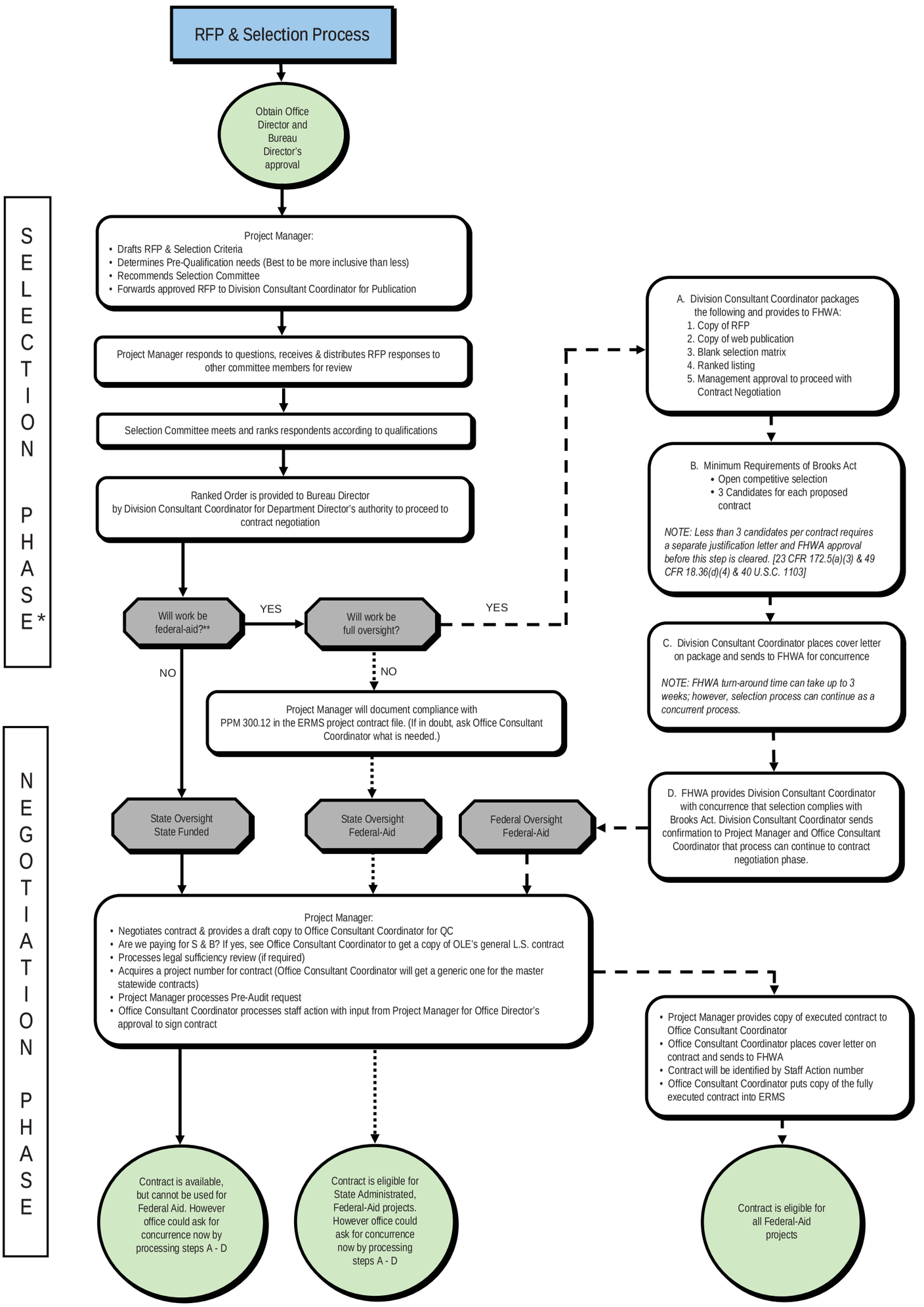
Authorization of Out-of-Scope Tasks

It is the nature of planning studies that not every task can be anticipated. Potential out-of-scope tasks that are identified should be discussed with the OLE Project Manager, and any decisions regarding the outcome should be documented. No out-of-scope work should occur without written authorization and contract modification by the OLE Project Manager.

2.2.4 Scope Development and Contract Cost

The OLE Project Manager will coordinate within the agency to ensure that the person from Iowa DOT responsible for each work element is involved in the scope and contract cost development process and will be available to review and give guidance on the expectations for the work.

Exhibit 2-2
RFP Selection Process



* *Follow PPM 300.12*
** *All OLE contracts will go to FHWA for concurrence because we need to reserve the ability to use Federal-aid on all work.*

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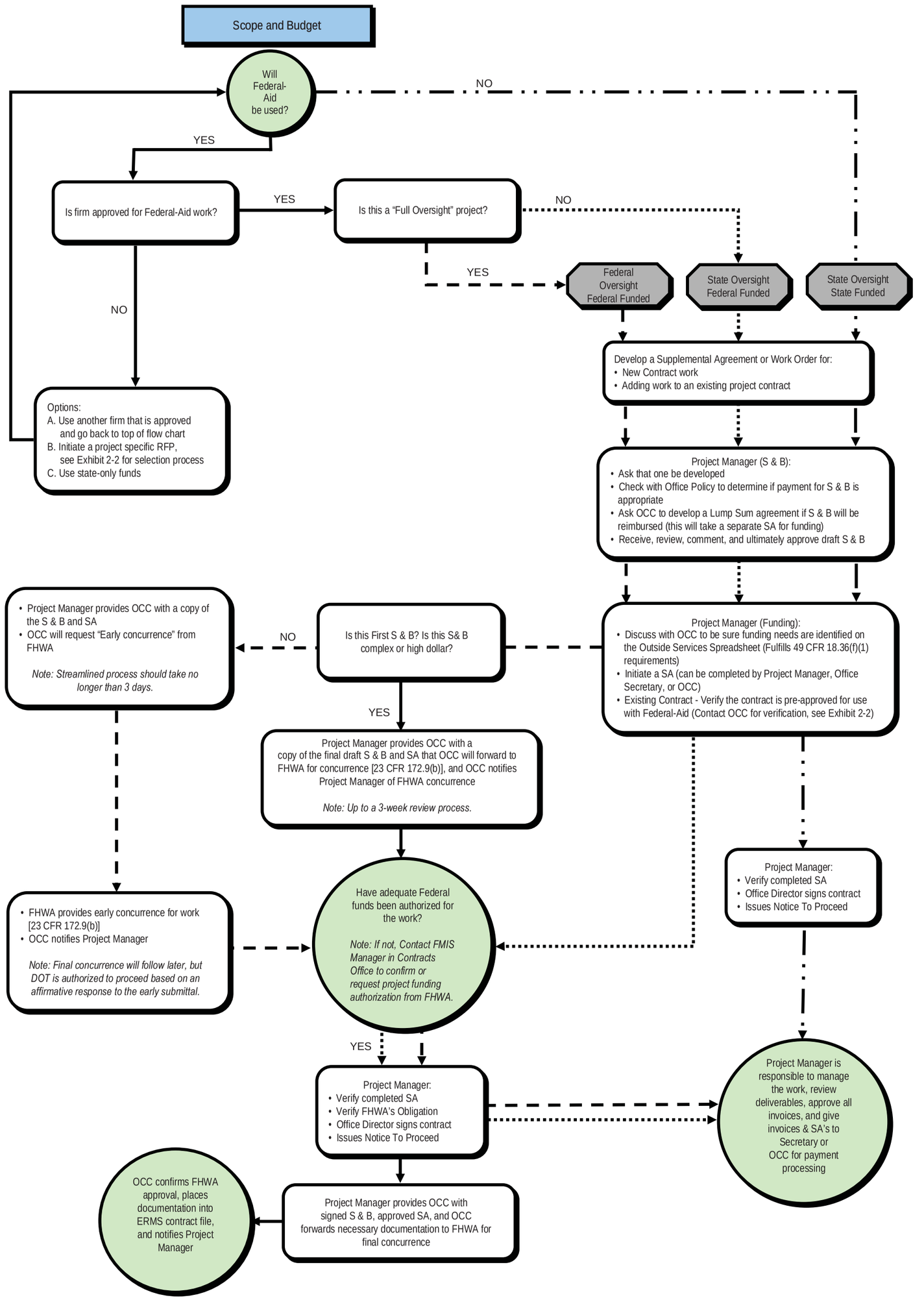
Exhibit 2-3
Scope and Budget Process



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The Project Manager will schedule a meeting with the consultant and appropriate Iowa DOT resources to discuss the requirements for the project scope. The consultant will then prepare a draft scope and contract cost based on the information received from the DOT, field visits, and resource agencies, if applicable. The draft scope and contract cost are sent to the Project Manager who will send them for an internal DOT review. The Project Manager will collect the review comments from Iowa DOT personnel, summarize the comments, and send them to the consultant. If there are significant proposed changes to the scope or contract cost, the Project Manager will arrange a meeting with the consultant to discuss comments before they are finalized. The consultant will finalize the scope and contract cost based on the comments received.

Once the scope and fee are finalized, OLE will prepare the consultant contract and send it to the consultant for signature. A staff action and FHWA concurrence (for federal-aid work) are required prior to the contract being signed. See Section 2.4, Staff Action. The OLE Director will sign the contract for Iowa DOT. Signed originals are needed for the following:

- OLE
- Office of External Audits and Contracts
- Consultant
- Office of Finance (copy only)
- Other project sponsors, if the project is multijurisdictional

2.2.5 Contingency

For OLE projects, contingency is not included in the contract maximum amount payable but is included in the staff action. A standard 10 percent contingency is used for most projects, calculated based on labor, overhead, and expenses. The Project Manager will evaluate the need for increasing or decreasing the contingency based on project size, complexity, schedule, and other factors. Contingency funds do not become available for the project unless a supplemental agreement is completed, increasing the contract maximum amount payable. The purpose of contingency is to reconcile a contract upon the completion of a final audit. In special cases, contingency may be used to compensate for reasonable efforts to complete work included in the original scope of work.

2.2.6 Pre-audit

When the scope and cost proposal is agreed upon or draft version is available, the Project Manager will request a pre-audit and request the consultant to prepare a project contract. A pre-audit is required for all new contracts and contracts over $50,000. This includes all supplemental agreements as well as the base contract. PPM 300.12 covers the pre-audit process, preparation of the contract, responsibilities of each party, and defines the criteria for when a pre-audit is required.

2.2.7 Legal Requirements

The Project Manager shall submit the proposed contract to General Counsel for legal review and approval if the contract does not follow OLE standard contract language (see PPM 300.12 for guidance). Legal review can be requested by e-mail. To expedite the legal review, any changes from the approved office contract should be highlighted.

2.2.8 Project Expenditures for Outside Services

Project expenditures for outside services should be updated regularly and included in Iowa DOT's outside services spreadsheet. Invoice amounts for outside services must be entered into the accounts payable system.

For federal-aid projects, prior approval is required from FHWA before signing a contract or supplemental agreement with a consultant. Flowcharts outlining the federal approval process are shown in Exhibits 2-1, 2-2, and 2-3.

See OLE's Consultant Coordinator for more information.

2.3 Federal Authorization of Funding

Transportation programs in Iowa are funded with a combination of local, state, and federal dollars. Many planning studies are funded with state-only funds. Some projects receive nonformula federal funds through congressional designation. These typically are referred to as federal earmark funds. Each federal earmark must be authorized.

The following describes the required actions to authorize the federal funds for a project.

- Confirm that the project is in the Statewide Transportation Improvement Program. Contact: Program Management.
- Confirm there is a valid obligation (work is now approved for federal aid). Use the federal-aid flowchart in Exhibits 2-1, 2-2, and 2-3.
- Obtain the federal earmark enabling legislation. This provides the funding amount and explains what the earmark can be used for. If more than one earmark is available for the project, check enabling legislation to verify that funds can be used for the proposed work. Contact: OLE Office Director or Office of Policy and Legislative Services Director.
- Request obligation authority from the Office of Contracts. Contracts will need the exact amount of money to be obligated (staff action amount), revenue source (program code), and DOT project number. Contracts will process the request online and notify the Project Manager when the funds are available or if there is a problem and the request doesn't get approved. The Project Manager will need a hard copy of the Fiscal Management Information System (FMIS) authorization for the project file. Contact: Office of Contracts, Project Scheduling and Funding Section.
- Notify Accounting in writing and let them know how funds should be tracked and the percentage of federal reimbursement for the project.
- The Office of Contracts, Project Scheduling and Funding Section, submits the federal-aid request electronically to FHWA for signature.
- A hard copy of the FMIS authorization may be obtained from the Office of Contracts, Project Scheduling and Funding Section.
- The source for state funding match is confirmed.

Examples of Safe Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) federal earmarks include the following:

- Interstate maintenance (discretionary)
- Bridge set-aside
- Intelligent Transportation Systems (ITS)
- High-priority projects
- Transportation Infrastructure

For additional information on federal funding, see "A Guide to Federal-Aid Programs and Projects: Introduction" at http://www.fhwa.dot.gov.

2.4 Staff Action

The staff action procedure is an approval process for Iowa DOT allocation of funds for a consultant contract or certain types of agreements. Depending on work type, the approval of the Office Director, Division Director, General Counsel, Program Management, and External Audits is required. The Office of Operations and Finance is responsible for overseeing the process, but the process applies to all offices within Iowa DOT. Staff actions requested by OLE staff typically are related to contracting for consultant services and agreements with other states or agencies. For a comprehensive discussion of staff actions, see PPM 300.02.

A staff action is required for OLE projects when a request is being made for the allocation of funds for consultant contracts. This will most often occur when a request is made for approval of a new consultant contract if funds have not already been allocated, for a supplement to an existing contract, or for task orders issued as part of an on-call services agreement with a consultant.

All staff actions for OLE are submitted by the OLE Consultant Coordinator. The final scope of services will be provided to the Consultant Coordinator for use in writing the staff action.

For projects requiring a pre-audit, the pre-audit must be completed before Audits will approve the staff action.

2.5 Contract Administration

2.5.1 Project Filing [Location Section Only]

The Project Manager will organize project files under standard filing tabs. All financial and technical data must be filed, in addition to correspondence. In the case of a consultant project, the consultant will use similar filing tabs.

Project e-mail correspondence will be organized in a similar directory structure within Microsoft Outlook. At the close of a project, the Location Section Project Manager will archive e-mail correspondence within the project directory under the correspondence subdirectory. At the close of a consultant project, the consultant will also include a copy of their e-mail correspondence with the deliverables that the Project Manager will then store within the project directory.

2.5.2 Invoicing and Progress Reports

PPM 300.12 includes invoice processing guidelines and indicates the role of the administering office. Iowa DOT standard progressive invoice format and final invoice format will be used for all projects.

The consultant will submit one invoice and one progress report to the Project Manager for the billing period. Invoice and progress reports can be submitted in hard copy or electronically. Direct expenses over $500 shall be itemized showing detail for each item. Receipts are not needed, but should be available for the Project Manager or audits upon request.

The consultant will attach a progress report with each invoice indicating the progress made during the billing period and any problems encountered. The progress report and invoice should include at least the following information:

- Table summary of the tasks, including budgeted hours, direct expenses, and fixed fee budgeted and spent to date
- List of staff members, hours billed, and hourly rates for each consultant member working on the project
- An exhibit that depicts the project scheduled percent complete, percent complete to date, project scheduled cost to date, and total earned to date
- Written report including the following items:
  - Background information
  - Progress achieved this billing period
  - Progress anticipated next billing period
  - Problems encountered during the billing period
  - Notes on progress
  - Project issues
  - Listing of out of scope work and when it was authorized
  - Project schedule

The OLE Project Manager will review the invoice and progress report before initialing the invoice and filling in the required information (function code, object code, contract number, and cost center) for payment. In some cases, other Offices and OLE Sections should be consulted to review the progress report. Items such as the following should be checked:

- Was the work performed according to the scope during the billing period? Check spent versus progress made.
- Is the work planned to be performed during the next billing period according to the scope?
- Was progress made according to the schedule?
- Are subconsultant percents complete reasonable?
- Are the direct expenses reasonable?
- Review the budget curve, current spent-to-date curve, and estimated percent complete curve to see whether there is need for a supplemental agreement; that is, is the percentage spent more than the percentage completed?
- Has the contract term expired?
- Is work on budget, under budget, over budget?
- Math on the invoices (paid last period, paid this period, paid to date).

- Fixed fee (paid on current bill, not on percent complete).
- Is project/work task about to go over budget (check maximum amount payable)?

2.5.3 Invoice Approval Process

Once the Project Manager is satisfied with the invoice content, the Project Manager will:

- Stamp the invoice and fill in the required information (cost center, object code, function code, and contract number).
- Initial the invoice and note "okay to pay."
- Place one copy of the invoice in the project files.
- Provide one copy and the original to OLE's administrative assistant.
- Update the project's financial tracking spreadsheet.

The administrative assistant will then initiate the online accounts payable voucher and send the original to the designated staff member in the Project Accounting Office and a copy to the designated staff member in the External Audits Section.

If this is the first payment on a new contract or supplemental agreement, the Project Manager should work with the administrative assistant to assure proper processing of the payment.

Multijurisdictional Projects

For multijurisdictional projects, the Project Manager will note funding arrangements on the staff action and contact the accounting supervisor of the Project Accounting and Payables Section at the beginning of the project to discuss the process for invoicing other jurisdictions or FHWA. The Project Accounting and Payables Section needs copies of the contract, all cost sharing agreements, and copies of invoice summaries and the prime consultant invoices.

The Project Manager will track and document all financial transactions in the project's financial tracking spreadsheet.

Federal Reimbursement

The Project Manager will contact the Project Accounting and Payables Section to gain access to the Project Cost Reporting system in order to track project accumulated costs, federal reimbursement, other state reimbursement, local reimbursements, funding sources, and federal billings for each funding source.

When situations dictate, OLE will work with the consultant to identify a format for tracking billable hours per state/jurisdiction before any work on the contract begins. This will help the invoicing of each jurisdiction to be done correctly. The Project Accounting and Payables Section will bill the appropriate agencies in order for Iowa DOT to receive reimbursement of funds from federal and state matching funds.

When setting up the accounts payable screen, invoices to other state jurisdictions are non-participating for Iowa. Only Iowa DOT billing Iowa FHWA is designated as participating.

2.5.4 Project Closeout

The final responsibility of the Project Manager is to close the project. When all project stakeholders agree that the project is complete, the project activities can be closed and a final audit requested. The following steps outline the key items for the Project Manager to complete when closing the project:

1. Request a final invoice from the consultant. The consultant must use the standard final invoice format and send it in with all the supporting documentation.

2. Check the project deliverables to ensure the consultant has delivered all the items in the scope and that the agency has copies of all the deliverables.

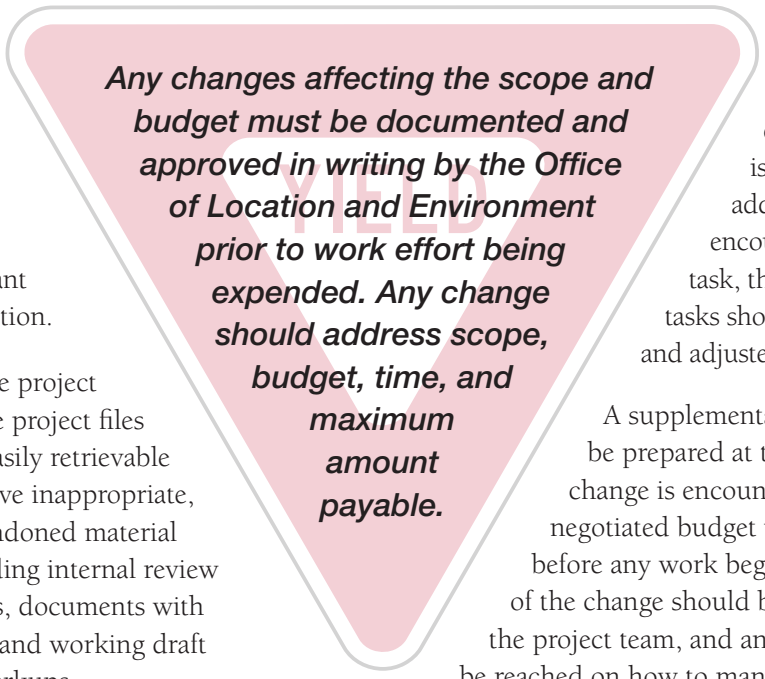
3. Check the final invoice, and approve, if appropriate.

4. Request a final audit. See PPM 300.12 for the process of requesting the final audit. The request may be sent by e-mail.

5. Perform an exit interview with the consultant. See PPM 300.12 for the process of conducting an exit interview. Also complete a consultant performance evaluation.

6. Collect and organize project files. Check that the project files are complete and easily retrievable in the future. Remove inappropriate, incomplete, or abandoned material from the file, including internal review drafts of documents, documents with handwritten notes, and working draft documents with markups.

7. Check that all final documents are included in the Electronic Record Management System and Iowa DOT project directory.



2.5.5 Supplemental Agreement

A change encountered during a project generally arises from a modification in the defined scope because of unforeseen circumstances, changes in project assumptions, changes in scope of work, changes in project cost, external unpredictable changes, or changes in the project schedule. When the scope of work is prepared several assumptions are made about the work at hand. As the project progresses, some assumptions may no longer apply, or there may be new requirements that were unknown when the scope was prepared. It is important to identify the change in the scope or project direction as early as possible and to discuss with the project team how the change is going to affect the key project elements: cost and schedule.

A well-defined scope is needed to identify and effectively manage change. Managing change is important at all stages of the project and should be identified as early as possible so that the impacts to schedule, scope, and fee can be identified.

The project schedule should be reviewed and revised, if needed, every time a change is encountered. In addition, if a delay is encountered for a project task, the impact to dependent tasks should also be reviewed and adjusted accordingly.

A supplemental agreement should be prepared at the time a scope change is encountered or if the negotiated budget will be affected, and before any work begins. The implications of the change should be discussed with the project team, and an agreement should be reached on how to manage the change. Any changes affecting the scope and budget must be documented and approved in writing by OLE prior to work effort being expended. Any change should address scope, budget, time, and maximum amount payable.

2.6 Project Leadership

2.6.1 Project Management Team

The membership of the Project Management Team (PMT) is discussed in Chapter 3 of the *Can-Do Manual*. That document, which is intended for a wider audience than the OLE Manual, is the primary guidance for PMT actions. The discussion in this document summarizes the Can-Do materials and expands upon them for the purposes of the Location Section staff and their consultants.

Chapter 3 and Appendix B of the *Can-Do Manual* address a range of PMT issues, including roles, authorities, leadership, project review, consultant usage, public involvement, scheduling, and the types of projects to which a PMT is typically applied. Also of note in Chapter 3 are the guiding principals for each PMT, summarized here:

1. Take responsibility for developing a quality, constructable project, on time and on budget.

2. Identify potential problems early.
3. Initiate data collection and external comments early and continuously.
4. Develop solutions based on complete and reliable data.
5. Work continuously for consensus in decision-making and communicate these decisions thoroughly to all affected offices.
6. Develop a project from the bottom up, with the goal of zero rework.
7. View the teamwork and consensus-building model as a multidirectional process, not just a forward process.
8. Complete investigations and documentation early and on multiple alignments, recognizing that some data may not apply to the ultimate solution; base decisions on factual information and broad-based stakeholder input; and avoid making decisions before collecting adequate data to defend that action.

Important in understanding the PMT process is understanding that the PMT is not intended to remove any responsibilities of the offices or individuals involved in the PMT. The Offices and individuals involved in the different phases of project development are still responsible for accomplishing their functions; the difference is that the PMT allows for the involvement of other offices, with both lateral (simultaneous) and subsequent project involvement.

PMT Membership

The membership of the PMT is intended to provide a cross section of the technical staff at Iowa DOT. Some of the membership is standard, while some are included on an as-needed basis (or at specific points in the project development process).

The standard membership includes the following:

- District (the PMT is chaired or co-chaired by representatives of the District)
- OLE, Location Section, NEPA Compliance Section, or both
- Office of Design
- Office of Bridges and Structures
- Office of Right-of-Way
- Office of Traffic and Safety
- FHWA

As needed, the following may be included in the membership of the PMT or attend meetings as a resource:

- Office of Systems Planning
- Photogrammetry/Preliminary Survey Section (Office of Design)
- Specifications (Office of Design)
- Soils Design (Office of Design)
- Other engineering: Office of Contracts; Office of Maintenance; District Field Services
- Other environmental: wetlands; noise; air; water; threatened and endangered species; other specialists as needed

Engineering or environmental consultants generally will not be members of the PMT. However, they may be expected to attend meetings, make presentations, or provide input specific in their areas of expertise.

Roles of PMT Members

The District Engineer typically leads the PMT. The District Engineer may elect to delegate the day-to-day operations of the project to other members of the PMT during different stages of the project. For example, the Location Section Project Manager may lead the PMT (or share responsibility with the District Engineer) during the planning phase of the project. Similarly, the Office of Design Project Manager may provide day-to-day PMT leadership once the project has been given location approval and begins the design process. It should be clear that the District Engineer will maintain authority over—and responsibility for—the decisions made by the PMT.

From the District perspective, the District Planner may be delegated the responsibility of providing the District leadership on the PMT during the location study, while the Assistant District Engineer may provide District leadership during the design phase.

Other PMT members are expected to review the project materials, contribute in their areas of expertise, and raise issues in a timely manner in order to keep the project on schedule and within budget.

Consultant involvement in the PMT is not mandatory but should be judged on a case-by-case basis. Consultants may be called upon to participate in meetings by contributing to the discussions, preparing supporting materials, or presenting current study efforts.

Additional PMT Considerations

Timing

The timing and agendas for PMT meetings should be customized to the needs of the project. Appendix B of the *Can-Do Manual* includes a PMT Responsibility Checklist and a PMT Meeting Agenda Checklist as guidance.

Management Communications / Briefings

Managers and supervisors of PMT members should be informed of issues raised by the PMT. Each project is unique and expectations for this coordination should be established for each project.

Management Changes in Project Direction

Project development is the responsibility of the PMT. Management retains the right to make changes to the recommendations of the PMT. In such cases, the PMT shall provide information on the impacts of the changes to management so that management will be aware of and responsible for the implications of its changes.

2.6.2 OLE Project Advisory Team

The Project Advisory Team (PAT) will meet prior to PMT meetings or as needed on a project. The PAT may be thought of as a "mini-PMT" in the sense that it has the same type of function as the full PMT but is contained within OLE. The PAT will provide internal coordination within OLE, allowing a dialog among the diverse sections and specialists. The PAT also helps to increase the efficiency of the PMT by selecting a PAT leader who will represent OLE at PMT meetings, thus reducing the attendance at PMT meetings to essential members.

All OLE staff members assigned to a project are members of the PAT for that project. A PAT leader is selected from among that membership. The PAT leader should be selected as follows:

- The Location Section will provide the PAT leader if the project requires preliminary engineering work.
- The NEPA Compliance Section will provide the PAT leader if the preliminary engineering or location work has been completed (or is not required) and the NEPA work remains.
- The PAT leader will be selected from among the PAT members for projects that have advanced to the design phase. The selection should be based on the amount and nature of environmental work remaining (for example, where the primary remaining environmental efforts are focused on obtaining a Section 404 permit, the Water Resources Section representative may be the PAT leader).

Although the PAT leader is the OLE PMT representative, on projects where the NEPA documentation is not yet complete, the NEPA Compliance Section representative should attend the PMT irrespective of their role as PAT leader.

While it may still be appropriate for OLE specialists to attend PMT meetings, depending on the critical issues raised on a project, the intent of the PAT is to allow the OLE PMT representative to be fully briefed and therefore to convey OLE's concerns to the PMT. Thus, the PMT attendance is kept to a more reasonable and efficient number. This approach also allows OLE staff to reach a consensus on controversial issues before bringing them to a larger group, which may include consultants or local project sponsors and FHWA.

2.6.3 Project Briefings and Project Review Meetings

Project Briefings

Project briefings are the PMT's opportunity to discuss project level details with senior management. The purpose of the briefings is to update senior management with timely information about the project or particularly sensitive issues on the project, and to obtain direction from management on issues such as policy, funding, programming, design, or other decisions at critical times within development.

Project briefings should be scheduled in coordination with District management or the OLE Director at critical points in the location study process. At a minimum, this should include project briefings to allow for policy-level input to the development of project planning and design criteria; identification of the Build Alternatives and recommended alternative; and to address project cost, scheduling, and implementation issues. Project briefings are small group, internal working meetings designed to update management and seek guidance.

The Project Manager, in coordination with District staff, is responsible for scheduling and supporting project briefings, including identifying topics and preparing pertinent presentation materials. Project briefings are typically scheduled as needed; however, project-specific briefings may be scheduled at the request of management.

Project Review Meetings

The purpose of project review meetings is to update senior management with timely information about the project or particularly sensitive issues on the project and to discuss funding and delivery timelines. A project is discussed at project review meetings at the request of the District Engineer and often addresses major project milestones (i.e., public hearings and a project entering the 5-year program). A project is discussed at project review meetings at the request of the District Engineer.

Project review meetings should be scheduled at critical points in the location study process. The meetings are geared to a wider audience than project briefings and involve multiple offices and FHWA. The District Engineer, in coordination with the Project Manager, is responsible for scheduling and supporting project review meetings, including identifying topics and preparing pertinent presentation materials.

The following are some of the items that could be discussed and reviewed by DOT Management at either a Project Briefing or Project Review:

- Clarification of management policy more than can be provided by the District Engineer
- Controversial project issues
- Changes in project cost and schedule
- Materials to be presented at a public information meeting
- Materials to be presented at the location/design hearing
- Identification of a preferred alternative or concept

The following items may be discussed and reviewed (as needed) by the Management Team:

- Project technical issues
- Range of alternatives considered for the project
- Substantial project concept changes
- Project costs and schedule review or update
- Financial plan and project management plan development or changes, if prepared for the project

Information presented to the Management Team should be succinct and have a clear purpose. Agenda items shall be designated as "for information" or "action required."

2.7 Scheduling

Creating and maintaining a schedule is one of the most critical elements of planning and managing a project. The schedule helps to guide the pace and development of the project. For consultant projects, it may also be used as one of the measuring sticks by which consultant performance is judged.

Most Iowa DOT project schedules for design projects include similar project events; therefore, for consistency, a list of these events has been created for these projects to help standardize the scheduling process. Each event has been assigned a code, definition, action, purpose, need, and output, and lists affected parties. The code represents an abbreviated form with which to identify and track each event. The Project Scheduling System (PSS), maintained by Iowa DOT's Project Scheduling Engineer, records and tracks design projects. PSS is an internal DOT system that tracks the project development process. The list of events used in PSS is available in Chapter 2 of the *Can-Do Manual,* along with an explanation of each event.

Although event codes are used for tracking design projects, detailed codes have not been established for feasibility or location studies, and these types of studies are not currently tracked in the Project Scheduling System.

The responsibility for developing the schedule lies primarily with the Project Manager, but coordination with the PMT and the district office is also required. The Scheduling Engineer may be included in the discussions, and is also a source of information. If a consultant is under contract for the project, the consultant should be included in the schedule development to ensure ability to meet the schedule demands.

2.7.1 Project Schedule

In each PMT meeting, the project schedule should be discussed and reviewed to determine whether changes are needed. OLE will use the Prime Consultant's schedule to track the overall project schedule. The schedule should be updated every time there is a change, quarterly at a minimum. The Project Manager is responsible for providing the approved project schedule information to the District. The District Engineer will forward the schedule changes to the Project Scheduling Engineer for inclusion in the production schedule, if applicable.

2.7.2 Steps in Developing a Schedule

Once a project is identified and assigned to the Location Section, the Project Manager, in coordination with the consultant, may begin creating the schedule. The initial considerations for the schedule include:

- Scope of work/category of project (e.g., feasibility versus location study)
- Size of the study area
- First potential year for programming and letting
- Potential for off-alignment alternatives
- Availability of engineering and environmental data
- Need for traffic modeling or coordination with the local metropolitan planning organization (MPO)
- Need for environmental studies
- Availability of aerials and mapping
- Deliverables required for the project
- Funding commitments
- Political commitments
- The number of potential reviewers / project sponsors

If the project is multijurisdiction, consider the rules of the other agencies.

Taking all these factors into consideration, develop a schedule using steps similar to the following:

1. List all special studies.
2. List all deliverables.
3. Determine development and review times for deliverables.
4. Identify key decision points.
5. Establish a likely start date for the project.
6. If study timeframe commitments have been made, note the completion date for the entire project.
7. Using the event codes currently available in PSS, make a list of all the project events.
8. Assign specific start dates and end dates for each event.

2.7.3 Format of a Schedule

As of the writing of this manual, no single format has been established as the standard for a location section project schedule. Gantt charts typically are used for representing schedules. Appendix A of the *Can-Do Manual* contains typical Gantt charts for Can-Do projects. Microsoft Project, which includes a Gantt chart function, may be used to create schedules.

The Gantt chart format is one of the easiest methods with which to present a schedule. It may be as complex or as simple as needed for a given event and is often used in public involvement materials as an easy way to relate schedule lengths and relationships to the general public.

2.7.4 Approval of a Schedule

The Project Manager and the PMT are tasked with developing the schedule. The PMT and the district office have the authority to approve the schedule.

Once the initial schedule is complete and approved, the PMT should provide the schedule to the Scheduling Engineer. The Scheduling Engineer is responsible for incorporating it into the production schedule and maintaining a list of projects with PMTs and the members assigned to each team.

2.7.5 Changes to a Schedule

On any project, there may arise occasions when it becomes necessary to make a change to an established schedule. Schedules may change for a variety of reasons, including changes in the Iowa DOT's priorities, lack of needed or available data, funding obligations, or increased public or political pressure.

The Project Manager and PMT should monitor the schedule as well as internal influences to make realistic schedule changes as needed. Changes that may be significant in nature or have a financial impact should be communicated to management.

2.8 Advisory Committee

2.8.1 Purpose of the Committee

An advisory committee is a useful means by which the Iowa DOT can gain the perspective of those who will use a highway facility or be affected by it. An advisory committee typically comprises citizens, property owners, business leaders, MPOs/Regional Planning Affiliations (RPAs)/Transportation Management Associations (TMAs), or local officials, and provides a forum for discussion and comment on various project-related issues. The advisory committee is not responsible for making any final project decisions, but is encouraged to provide input to the PMT and Iowa DOT Management. The committee should have the following primary goals:

- Provide effective communication with the community by being a link to the community at large.
- Make the Iowa DOT aware of the local perspective on the proposed project, its alternatives, and its potential impacts.
- Provide assistance at public information meetings and hearings to help achieve public support for alternatives.
- Assist in obtaining project funding from various sources.

Committee members may be identified through existing organizations, such as neighborhood groups, churches, business organizations, environmental groups, and elected bodies. The exact composition of the group should depend on project-specific circumstances. Where projects have known issues of controversy and there are organized groups related to the issue, involving a representative of the group may be beneficial. Local, subject matter experts may be of benefit for issues such as aesthetics, cultural and historic properties, and others. Where residential properties may be affected, neighborhood associations or churches may be a venue through which to identify advisory committee members.

2.8.2 Committee Meetings

Advisory committee meetings should be held early in the project to obtain local information, gain the perspective of residents, and establish the idea that Iowa DOT values the importance of public involvement. As the project progresses, advisory committee meetings should be held near milestone events, key deliverables, or other times as determined by the project team.

Meeting notifications should include the name and address of the contact person to whom responses will be directed and should also explain the purpose of the upcoming meeting. When appropriate, meeting materials should be provided to allow committee members to prepare for the meeting or seek the input of those they represent prior to the meeting.

The committee may be asked for input on the following items:

- Purpose of and need for the project
- The social, economic, and environmental impacts of project alternatives
- Help with resolving conflicts among various interests
- Assistance in educating the public about the proposed action and the decision-making process

2.9 Multijurisdictional Agreements

2.9.1 Process for Developing Multijurisdictional Agreements

When preparing multijurisdictional agreements, the Project Manager should follow Iowa DOT policies as closely as possible.

In the absence of a specific agreement between the states, the Border River Bridge Agreements are used. These agreements specify the lead agency and the cost sharing of the bridge study, design, and maintenance.

Iowa DOT is the lead agency on primary route and interstate projects within the borders of Iowa. The District office is responsible for coordinating the staff from the other agencies to develop and execute agreements for a multijurisdictional project. OLE will provide support as requested.

The District office will discuss expectations and cost sharing for the project with the states involved in the project. The discussion will include a determination of what the agreement should cover. A separate agreement is processed for each phase of the project (preliminary engineering, final design, construction, etc.).

2.9.2 Approvals of Multijurisdictional Agreements

Multijurisdictional agreements are approved by staff action and signed by the District Engineer (see PPM 300.01). The agreements section in the Office of Local Systems will prepare final signature copies of the agreement. The agreement is signed by Iowa DOT and sent to the other agency for signature. Signed originals are needed for the following:

- District Office
- Copy to OLE (for preliminary engineering phase)
- The other project sponsors
- External Audits and Contracts Section
- Accounting and Payables
- Accounting and Payables—Federal-Aid Section (only if using federal-aid)

2.9.3 Agency Differences and Resolution

When the lead agencies have different design standards and processes, it is important to reach an agreement on the design process, required deliverables, and standards before the scope is developed and work proceeds. Any change from the agency's standard process may have a significant impact on the agency's legal responsibilities, the project schedule, and the contract cost.

Before the scope development is started, the participating agencies' representatives should be invited to a project scope development meeting to discuss the standards and specific requirements of each agency and to resolve which process and standard will be used at which locations throughout

the project corridor. During the meeting, the terminology used and how it is understood by each agency should be discussed to verify understanding of work elements by all agencies. The scope should clearly define which standards are to be used for each design element and where one agency's standards end and the other's begin.

Differences in processes and standards should be evaluated for the following items:

- Understanding of whether the intent/outcome of the study has the same meaning for each agency
- Impact to the project schedule
- Impact to the project fee
- Understanding of the implications of deviating from the agency process or design standards (i.e. legal, preference, etc.) for each agency

Once the evaluation is completed by both parties, the evaluation results should be reviewed and a best approach for the project developed. This approach should be reviewed by each agency and approved in writing before the scope is finalized and work is started.

The following potential outcomes could be expected:

- Other agencies will accept the process that Iowa DOT is using, or Iowa DOT will accept the processes that the other agencies are using.
- The design process could follow the more rigid requirements.

If the project involves other states, it can be agreed that each state's design standards will be used for the work within their state provided the location change is documented.

NOTES:

CHAPTER 3

Reserved for Future Expansion

PART II

Location Studies

Introduction to Location Studies

CHAPTER 4

Chapter 4 is the first chapter in Part II of the *OLE Manual*. It explains how and when the location process fits into the context of the overall project development process. The focus of Part II is on the location process conducted by the Location Section of the Office of Location and Environment. Whereas Part I of the *OLE Manual* concentrates on common elements of the processes undertaken by OLE, specifically, project management-related topics, and the following Part III shifts toward environmental topics, Part II focuses on the engineering process, which is known as the location process.

In examining how project development occurs from long-range planning through to the design phase and eventually construction, it is shown that more detail is added through each step and the field of vision narrows until the focus is on a single element or improvement concept. The Planning Ahead plan focuses on identifying the general area that a transportation investment is needed. The location process—through feasibility studies and location studies—focuses on identifying what, if anything, should be built. A design study focuses on how. Construction, of course, executes the design, focusing on how the pieces fit together in the field. (See Exhibits 4-1 and 4-2.)

The responsibility for the location preliminary engineering process falls to the staff of the Location Section. The Location Section primarily conducts two types of studies: feasibility studies and location studies. The subsequent chapters in Part II will focus on the details of both feasibility and location studies, including both their common points as well as the distinctions between them.

The types of projects done by the Location Section typically involve work greater than straightforward rehabilitation and improvements within the existing right-of-way, including the following:

- Routes on new alignments
- Roadway widening
- Safety improvements
- Capacity improvements
- Interchange studies
- Projects that could result in environmental impacts or changes in access and mobility
- Asset management
- Reconstruction requiring additional right-of-way and potential environmental impacts

This chapter explains how and when the location process fits into the context of the overall project development process.

Exhibit 4-1
Project Development

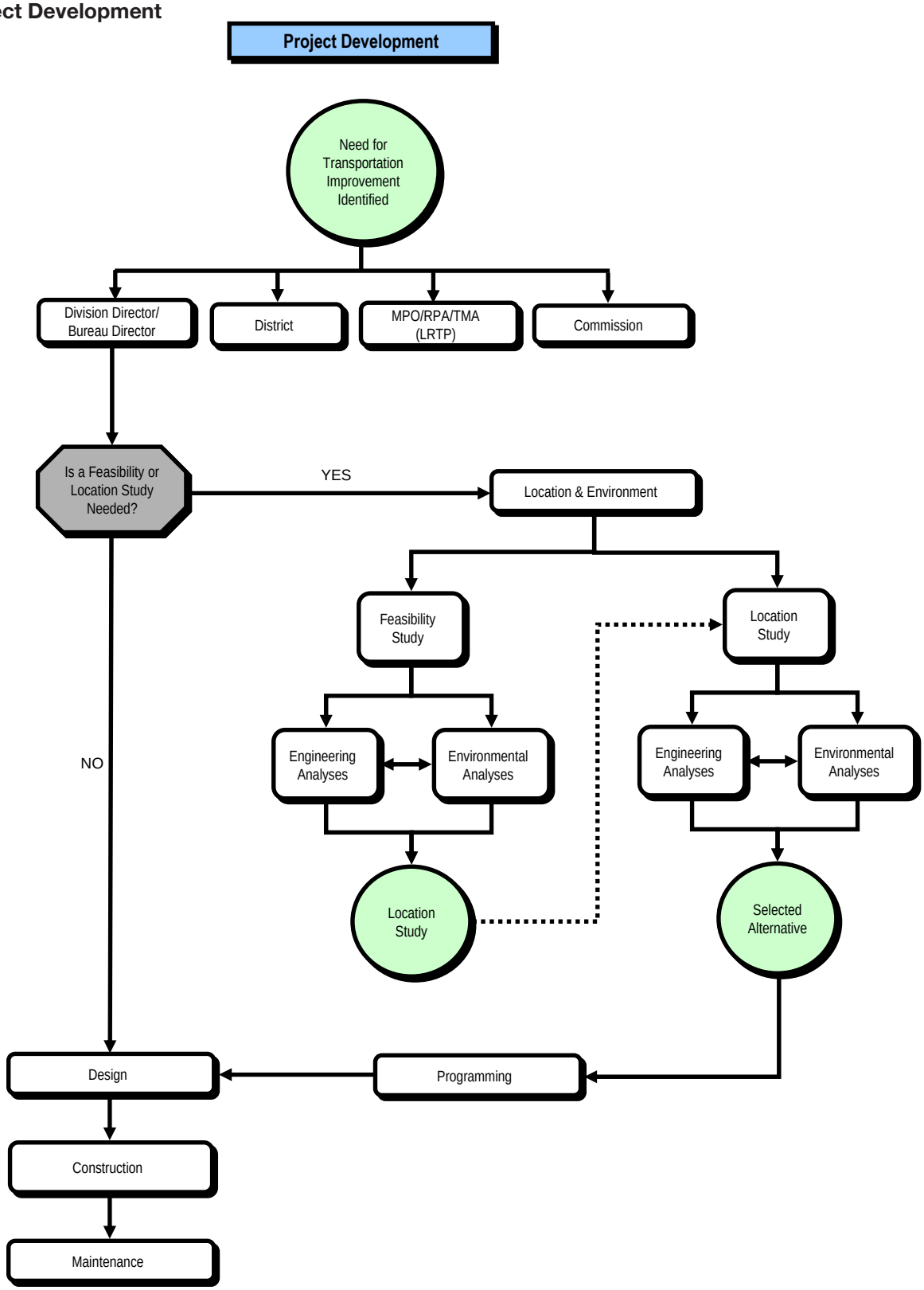
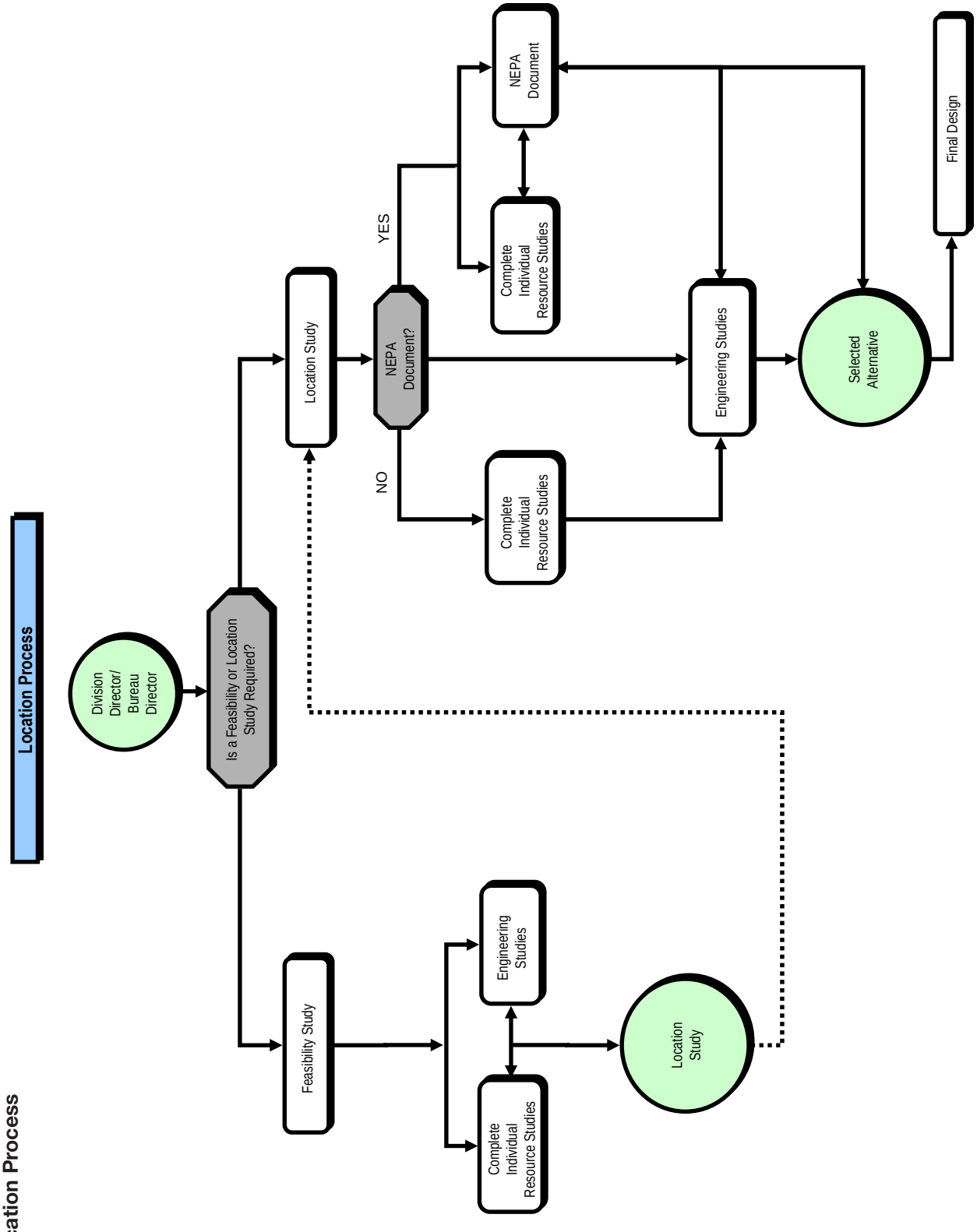


Exhibit 4-2
Location Process



This chapter helps to set the stage for the location process and its various project types. The discussions herein provide a background for what happens before a feasibility or location study begins, as also some of the very preliminary steps of the study process.

Once it has been decided that the Location Section will complete a project, it will be either a feasibility study or a location study. Understanding the goals, objectives, and products of feasibility and location studies from the outset is crucial for planning the study process and making decisions. The goals, objectives, and products are introduced in this chapter but portrayed in depth throughout the remainder of Part II. A keystone for understanding the location process is understanding how the various study elements relate to each other and to other activities that must occur simultaneously; e.g., environmental studies and public/agency coordination.

The final part of Chapter 4 introduces a very preliminary step of the location process, defining the project. Preparing a Project Definition Statement helps to outline the goals, objectives, and products of a given project and provides a roadmap for continuing work on the project.

Part II: Location Studies contains 9 chapters, including this chapter and one other for future additions to this manual. The chapters are designed to show the steps and procedures for completing the location process, whether in the form of a feasibility or location study, as well as the supporting analyses that help to identify the transportation problems and their respective solutions. Table 4-1 lists the chapters within Part II.

Table 4-1

Part II Chapters	
Chapter	Title
4	Introduction to Location Studies
5	Data Collection
6	Existing Conditions Analyses
7	Alternatives Development and Evaluation
8	Feasibility Studies
9	Location Studies
10	Microstation / Geopak Practices
11	Corridor Management Tools
12	(Reserved for future additions)

4.1 Project Origination

A project is initiated when it is defined and officially recognized as a transportation problem that needs to be addressed. Location projects come from three main sources: TIME-21, the Iowa DOT Commission, and the six District Engineers. Ultimately, it is the decision of the Engineering Bureau Director which projects are carried forward by the Location Section.

The emphasis of this part of the *OLE Manual* is on projects that become feasibility or location study projects. Not all projects identified by TIME-21, the Iowa DOT Commission, or District Engineers are destined for the Location Section. Those of a limited scope and potential range of alternatives and impacts may move directly into design. Others, including those funded through a DOT grant program, may be administered by a local transportation provider or managed directly by the Office of Systems Planning. Still other proposed work could be local projects, developed and administered by any one of a number of local transportation jurisdictions (local public agencies [LPAs], Federal Transit Administration [FTA], etc).

4.2 Goals, Objectives, and Products of the Location Process

4.2.1 Overview of the Location Process

Before delving into the detailed discussions of the location process covered in subsequent chapters of Part II, the basic definition and purpose of the location process should be understood. A simple understanding may be gleaned from examining the answers to three questions:

1. What is involved in a feasibility or location study?
2. What are the goals for a project being developed as a feasibility or location study?
3. Why is this study level of effort required?

What is Involved in a Feasibility or Location Study?

At the onset, both a feasibility study and a location study are identical in that they focus on defining a problem in order to identify a range of potential transportation solutions. This stage of the study process offers the greatest possibility for avoiding environmental impacts and for controlling costs.

Solutions must meet transportation engineering design principles, be economically feasible, and be publicly/politically acceptable. Specifically, the solutions must specify a type of improvement (access control, basic number of lanes, level of service [LOS], design characteristics) and where the project should be located. The location process then builds on this base by considering a broad array of approaches and alternatives to address a problem.

The introductory section of this chapter discussed the types of projects that may be the subject of the location process. Some improvements are defined adequately at the programming phase and generally do not require a feasibility or location study. These may include the following:

- Resurfacing
- Reconstruction within the existing cross section (with little or no new right-of-way)
- Straightforward bridge replacements or repairs
- Improvements within an existing right-of-way, with little or no potential for environmental impacts

What are the Goals for a Project Developed within the Location Process?

Once there is a clear definition of the problem, the study should examine a range of alternatives. This examination should withstand the National Environmental Policy Act of 1969 (NEPA) process as well as apply good engineering principals. Each alternative developed should be fully documented for NEPA, even if it is not carried forward. The examination of alternatives should involve applying a series of filters to proposed solutions/alternatives to test and narrow them:

- *Technical*—Is it possible to construct the alternative? Does it meet safety standards? Does the solution create other problems (such as downstream congestion)?
- *Environmental*—Does the alternative significantly affect sensitive resources, such as wetlands, park and recreational lands, historic resources, or homes and businesses? Do alternatives exist that would accomplish the project goals that avoid or have less impact?
- *Financial*—Does the alternative accomplish the goals and avoid or minimize impact to resources, but still have a reasonable financial cost? Is the alternative beyond the programmed budget for implementation?
- *Public/Political*—Can the alternative be implemented? Have context sensitive solutions (CSS) been included in the alternative's development? Is this project of keen interest to the commission? Implementing an alternative that is opposed by the majority of the public can be a precarious undertaking. Likewise, the input and preferences of public and elected officials may be used to aid in decisionmaking.

To achieve the end goals of the location process, certain criteria need to be met for the study to be successful. The criteria include economic feasibility, a well-defined project cost, inclusion of public and agency input, and incorporation of environmental considerations (Table 4-2). The study should also result in a legally defensible solution, and should not require significant re-examination of the study during the subsequent design phase.

Why is a Feasibility / Location Study Level of Effort Required?

Many of the activities undertaken by Iowa DOT are developed in stages, rather than all at once. A location study is an example of one such stage. A feasibility or location study takes a conceptual system level improvement and defines it as a project with logical termini. The feasibility study and location study stages allow for an intermediate stage of development that involves the following:

Table 4-2

Criteria for a Successful Study	
Criteria	**Description**
Economic feasibility	An economically feasible alternative must be identified through a development and screening process. This can help maximize the state transportation revenue, which, in return, can generate the maximum number of projects.
Well-defined project cost	A well-defined cost is needed for inclusion in the transportation plan. Costing methodology should be applied, using accurate pricing or risk-based costing for the type and location of facility.
Public and agency input	A public involvement process should gather information, suggestions, and opinions from the public, elected officials, and resource agencies throughout the process.
Environmental considerations (Resource Agencies)	Impacts to natural, socioeconomic, and cultural resources should be identified early to avoid, minimize, or mitigate impacts. The project needs to be permittable.
Preliminary Design (Preferred Alternatives(s))	The preferred alternative must satisfy purpose and need. It must also be constructible using reasonably available technology. Alternatives should document the application of CSS (when appropriate), value engineering at the planning level, and be broad enough to allow massaging during final design and right-of-way acquisition.
Legally defensible solution (NEPA, 4(f), and 6(f))	If the regulatory process is followed, both at the state and federal level, the solution should be legally defensible. Courts usually consider the validity of the process, rather than the actual decision, to be the crucial element in legal actions.
Results should not require significant re-examination in subsequent phases	As a project proceeds to the design phase, the basic project concept and study corridor should not require re-examination, nor should significant parts of the work require re-engineering. Re-examination of project concepts risks three pitfalls: failure to fulfill commitments made to the public or resource agencies during the location study; invalidation of the NEPA process by causing impacts that were not previously identified; and requiring the expenditure of additional time, person-hours, and dollars.
Documentation	A successful study will document: • All commitments made during the preliminary engineering process (green sheets) • Planning level value engineering study • CSS considerations • Interchange justification reports (IJRs) (If neccessary) • Special studies (hydrology, noise, traffic, etc.) • NEPA compliance

- Allows work to be done at an appropriate level of detail for the decision at hand
- Minimizes the higher costs that design studies could require (higher degree of geometric and data accuracy, when that accuracy does not necessarily translate to better decision-making)
- Allows Location Section engineers to step back to view the bigger picture

For long-range planning, statewide data and trends are used to identify locations within the state where an investment of transportation funds are needed. When the type of improvement cannot be clearly identified from condition data, the project could be moved from long-range planning to either a feasibility study or a location study.

The feasibility stage is for determining whether the improvement is feasible, the range of feasible alternatives, the general locations where the future improvements should be focused, the issues that need to be addressed in the future, and the potential cost of implementing the project (for programming purposes).

A project moves to the location study stage because management or the commission has chosen to place a planning level priority on the project or corridor, NEPA approval is needed prior to proceeding further, or a reasonable range of alternatives may be developed without the need to determine the project's feasibility independently. The location study contains sufficient engineering information to allow the development of design documentation.

4.2.2 The Relationship Between the Location and Environmental Processes

The relationship between the engineering and environmental processes is a dynamic and iterative one. It is during the location process that environmental issues are identified, avoidance opportunities are recognized, mitigation concepts are developed, and public involvement and necessary coordination with agencies with jurisdiction over resources is conducted.

As noted, the location process includes either a feasibility study or a location study. Each type of study results in a report that summarizes the analysis

and findings. The environmental process also has different study types and corresponding reports. The engineering and environmental studies/reports are not related in a linear manner; given the specifics of a project, they may be combined in different ways. These combinations will change depending on the following factors:

- The complexity of the project or proposed action
- The timing of the project (when is it programmed for construction?)
- The need for a "master plan," from which smaller projects may be broken out for development
- The expected level of controversy that will be generated by the project
- Knowledge of whether there is potential for significant environmental impacts as a result of the project

The relationship between engineering and environmental studies should be explored through a tight, iterative process during project development. The purpose of the location process is, in the most general terms, to develop a recommended solution for a transportation need. Knowing the environmental constraints and opportunities on a project aids in both better decisionmaking on a project (in terms of the quality of the solution) and in easier processing of the project (in terms of practical ability to acquire approval to execute the project). Learning about these constraints and opportunities requires coordination among the sections within OLE.

The environmental studies may be conducted under the aegis of NEPA or under more general practices of good planning, with the possibility of applying NEPA to the project in the future (particularly in the case of a feasibility study). Refer to Chapter 13 for a detailed description of the NEPA process.

Environmental Documentation

To begin to understand this relationship, it is important to know the range of options available for environmental studies and documentation. Several different levels of environmental analysis may be applied with a feasibility or location study. The sections below describe how the environmental analysis may result in different types of documents if the NEPA process is applied to the study.

- *Tiered Environmental Impact Statement*—A series of environmental documents that address projects in increasing levels of detail throughout the series. Most often applied to situations where a corridor of improvements is being considered in broad detail, but priority or order of individual projects and their funding or programming are unknown, and subsequent elements of the selected plan will be studied as individual projects with more detailed (Tier 2) environmental documents.[1]
- *Environmental Impact Statement (EIS)*—An EIS is the traditional level of detail for projects with known potential to have a significant impact on the environment.
- *Environmental Assessment (EA)*—An EA is a less exhaustive environmental document than an EIS. The goal is to examine a proposed action to determine whether there is enough potential for significant impact to the environment to warrant an EIS.
- *Categorical Exclusion (CE)*—Although there is generally documentation for a CE project, a CE is not a stand-alone environmental document in the same way as EA or EIS. CEs are a category of projects under NEPA that have been determined to be of a nature of work that does not, in most cases, have the potential to cause significant environmental impacts. CE documentation is accomplished through the material included in the engineering report.

Even if the NEPA process is not required, environmental issues are still considered. The environmental analysis is documented within the project report and various technical memorandums, rather than in a separate environmental document.

[1] For example, the first tier may involve studying an urban interstate system and recommending the general types of improvements needed, a general sequence in which they should occur, and logical termini for subsequent projects/actions. The second tier may then be a series of separate projects with their own environmental documents and a recommended solution that leads to the design phase.

Location Process Documentation

Feasibility studies are covered in greater detail in Chapter 8. Location studies are covered in greater detail in Chapter 9. Following is a brief summary of the feasibility and location study efforts with respect to environmental studies.

- *Feasibility Studies*—A feasibility study is generally a pre-NEPA process, although that is not always the case. It examines alternatives on a broad scale and environmental issues to identify "show stoppers" and large-scale potential mitigation options. It does not result in the approval of a project location needed to proceed to construction.
- *Location Studies*—Location studies typically are done concurrently with the NEPA process, unlike feasibility studies, which are usually completed pre-NEPA. A primary distinction between feasibility and location studies is that a location study involves making a more detailed decision than a feasibility study. The NEPA process associated with a location study results in a decision about the selected alternative to implement a project; therefore, it results in location approval for the proposed project.

The focus of a location study is on a specific project and its solution, potentially out of a range of solutions investigated in a prior feasibility study. Whereas the feasibility study may have looked at some very broad solutions, both modally and geographically, the location study results in the selection of the solution that will be developed in design. (Unless the solution is the No-Build Alternative, see Chapters 15 and 16 in Part III of this manual for more information.)

The location approval signals acceptance by Iowa DOT and FHWA that a reasonable range of alternatives has been studied for the project and that an alternative best meeting the project goals has been selected. The approval is of the general location and type of improvement. For most location studies, this approval is achieved through the completion of the NEPA process, when the Record of Decision (ROD) or Finding of No Significant Impact (FONSI) is signed. It is also possible that a project may be categorized as a CE project, but this is less common for projects assigned to the Location Section.

Determining Study and Document Type

For some projects, the determination of the appropriate study and documentation types will be clear from the proposed action. For example, new multi-lane highways on new alignments that are proposed for near-term implementation generally require a location study and an EIS.

If it is not already clear by the time a project reaches the Location Section, the process for developing the project definition is used to determine the engineering study type and environmental processing type. The tools used in developing the project definition to determine the study and document type include the following:

- Coordination with FHWA through the NEPA Compliance Section (coordination typically begins with a project concept or draft purpose and need statement)
- Input from Iowa DOT Management (including the programmed /scheduled year for construction or implementation, whether the current study is part of a program of improvements, and the basic reasoning for programming the study)
- Input from the District or Engineering Bureau Management on the basis for the project and potential for controversy at the local level
- Coordination with the resource specialists at Iowa DOT

With this input, a decision should be reached on whether the project will involve a feasibility study or a location study, whether a NEPA document will be required, and if so, the type.

As can be seen from Table 4-3, there is no automatic and direct relationship among the processes. More than one type of environmental document may be applicable with a location study. The decision as to which is appropriate depends on the type of work proposed. A recommendation on document type is made by the NEPA Compliance section of OLE, and FHWA concurs.

4.3 Project Definition Statement

4.3.1 What is a Project Definition Statement and How is it Used?

The Project Definition Statement is a short, written description of the proposed work and tasks involved with a location study. It is developed at the beginning of a study and may be used as the basis for a consultant scope of services. The Project Definition Statement may also be used to describe the project during the determination of environmental document type. Specifically, the Project Definition Statement does the following:

- Establishes the study area and the basic project concept.
- Helps to define the data collection needs (e.g., aerial photos; engineering, operations, sufficiency, and safety information; cultural and natural resource surveys).
- Helps to guide the development of a project and keep the project on track.
- Defines who is involved with project development. Knowing what studies, topics, and resources may be required helps to determine those who should be involved in the study, inside and outside Iowa DOT .
- Defines roles and responsibilities for individuals involved with a project.
- Delineates a sequence to the project development process, if not actually a schedule.

4.3.2 Responsibilities for Development of the Project Definition Statement

The Location Section Project Manager is responsible for developing the Project Definition Statement, although this task may be assigned to others, including a consultant, if a Project Definition Statement was not developed before engaging the consultant. The draft Project Definition Statement should be reviewed by and approved by the Director of OLE.

4.3.3 The Process for Developing the Project Definition Statement

The development of the Project Definition Statement requires coordination between the Location Studies Project Manager and several other sections within Iowa DOT. The Project Manager should coordinate with staff in the appropriate District office and the NEPA Compliance Section. Other Iowa DOT staff, including resource specialists, design, bridge, traffic and safety, and maintenance staff, may be consulted for information needed to determine the concept and associated work tasks.

The following published documents, studies, or staff may be consulted for input about the project:

Published Inputs

- Long-Range Transportation Plan
- Previous Needs Assessment
- State Transportation Plan

Table 4-3

Potential Study and Document Types		
Engineering Study Type	Range of Environmental Analysis Types	Potential Environmental Document Types
Feasibility Study / Report	• Issues analysis • Published data research • Windshield surveys	None
Location Study / Report	• Issues analysis • Published data research • Windshield surveys • Detailed field studies	• CE • EA • Tiered EIS; Tier 1 or 2 • EIS

- Modal Implementation Plan
- Bypass Guidance Policy
- Narrow Roadway Policy
- Metropolitan Planning Organizations (MPOs)/ Regional Planning Affiliations (RPAs)
- Highway Sufficiency Plan
- Traffic Forecasts
- Safety Performance/High Accident Location
- Planning Ahead Plan
  - Interstate
  - Commercial and Industrial Network (C.I.N.)
  - Access routes
  - Development routes
  - Local service

Staff and Studies

- Systems Planning
- Project Management Team
- Input from District staff
- NEPA Compliance Section
- Resource Specialists
- Prior studies:
  - Feasibility
  - Planning
  - Design documents from prior projects

4.3.4 Format and Content

No specific format need be used for the Project Definition Statement. The intent is to provide a short description of the project and study (about 2 pages long). During preparation of the Project Definition Statement, stating the specific number of alternatives to be investigated shall be avoided. *The development of alternatives is unconstrained at this time.* To do otherwise could suggest that Iowa DOT has precluded possible alternatives from consideration before initiation of the project.

For consistency, the Project Definition Statement should contain the following elements:

1. *Introduction*—The Introduction section should note the following:
   - Project location and, as possible, project termini. Corridor study limits to the extent known. IJR study limits, if applicable.
   - Project need (general, from DOT Management and District staff).
   - Proposed action (to the extent known, such as expansion to four lanes, relocation, new route, etc.).
   - Project category (feasibility, location study, etc.).
2. *Schedule (or Sequence of Events) and Budget, to the extent known*—The Schedule and Budget should provide the major milestones, if known, for the project. It is not expected that a detailed project schedule would be available at this time. However, milestones such as programmed construction start dates, public or political commitments, or funding restrictions should be noted. If applicable, a sequence of project events could be included that would delineate how project tasks interrelate. This section should also note the project finances, to the extent that they are known. This may include the programmed amount (for this and other phases of work) or earmarked funds.
3. *Anticipated Engineering Work Tasks*—The Anticipated Engineering Work Tasks discussion should address the following items to the extent possible:
   - List of types of engineering analyses expected.
   - Limits of analysis (if applicable). This may be geographic, if different than the study area or logical termini, or may be analysis tolerances.
   - Level of detail of analyses and data gathering.
   - Deliverables: specify type of report (e.g., location study, feasibility study, etc.).

4. *Anticipated Environmental Work Tasks*—Similar to the engineering discussion, the Anticipated Environmental Work Tasks should cover the following:
   - List of types of resources to be studied (e.g., wetlands, socioeconomic, water quality, noise).
   - Limits of analysis (generally geographic, if different than the study area).
   - Level of detail. This may note whether the work is expected to include field investigations, to be limited to published data gathering, or to be something in between.
   - Qualification of staff (if applicable).
   - Format and content of final work products. (What does Iowa DOT need in order to document the work done?)
5. *Public and agency coordination effort*—The Public and Agency coordination effort text should list all known coordination efforts for the general public as well as for agencies. This may be difficult to do in detail at this stage of the project; however, an effort should be made to discuss the groups with an interest in the project, whether the project may be subject to the NEPA/404 process, and whether there are any areas of controversy on the project.
6. *Anticipated Staffing (in-house staff, outside services)*—Where work tasks are sufficiently complex or require special expertise, the Project Definition Statement may note that staff performing the task must meet minimum qualifications. (This can be advantageous if the project definition will be used as the basis for a consultant project-related information that does not clearly fall into one of the other categories.
7. *Other/Miscellaneous*—The Other/Miscellaneous section is reserved for project-related information that does not clearly fall into one of the other categories.

Questions to Ask When Developing a Project Definition

What is the basic project type?

What is the reason for studying an improvement? (e.g., safety, economic development, consistency with planning efforts, capacity, etc.)

What types of alternatives could potentially address the problem?

What is the geographic extent of those alternatives?

Is there any historical work by the Iowa DOT or others in the project area that could be used as a reference?

Will the project involve the need for environmental studies? (If so, coordinate with the NEPA Compliance section and appropriate resource specialists.)

What are the milestones that the project needs to meet? (e.g., lettings, Commission approval, expenditure of federal program funds before they expire, etc.)

What is the sequence of work? (Are any of the tasks dependent upon others occurring first?)

NOTES:

Data Collection

CHAPTER 5

The process of initiating and completing a project or study involves the collection of defendable data, which serves as information on which the study is developed. The collection of appropriate or "correct" data is as important as how those data are interpreted. This chapter helps establish a process for collecting and formatting the data needed for a study. Included in this chapter are descriptions of the range of potential data, considerations for determining what data to request, file and directory naming conventions for electronic files collected, and forms for making the data requests.

Data collection is as much a process as it is a stage in project development. It involves answering the following questions:

1. What does one need to know about the project, or what type of question is the study attempting to answer?
2. What category (type) of information must be requested to answer that question? What do you need to know about that information in order to make a data request?
3. Who has, holds, or develops the information?
4. What is the format of the request?

5.1 General Background Considerations

The first two questions above go directly to the background of the study and data collection. The type of study—in other words, the type of question to be answered—directly relates to the type of data needed. Bridge replacement projects may need different data than new route studies. Urban safety projects need different information than rural interchange projects. That is not to say that a bridge replacement project may not need, for example, crash history for the project; but the limits of the crash history data to be requested and the type of crashes analyzed may be different. Likewise, the method of analysis and information presentation may be different.

Similarly, feasibility studies need different information than location studies. As discussed in Chapters 8 and 9 of this manual, feasibility studies are more general, less detailed studies of a range of potential solutions to a transportation problem, whereas location studies are more detailed and result in the identification of a specific, recommended solution. Generally, the more detailed the study, the more effort required to obtain the data. This greater detail also often means that the data will need more frequent updating and are more fluid or changeable in nature.

This section provides guidance on some of the background that needs to be considered at the beginning of the data collection process.

This chapter explains the process of initiating and completing a project or study that involves the collection of data.

5.1.1 Study Period

The study period and the expected steps to be followed dictate not only the data collection, but also the type of study. Location studies use information and analyses that are detailed and time-dependent (for example, design-year traffic information and recent 3- or 5-year crash data). If such a study does not quickly progress into the design phase and construction, these analyses need to be updated and revised.

Similarly, a NEPA document associated with a location study has a valid time period—generally 3 years—during which the project must continue to progress. Many of the individual environmental analyses used in the NEPA document also have time periods after which they are no longer valid. Wetland delineations, for example, generally must be reviewed after a 5-year period.

The Project Manager should consult with the Project Management Team (PMT) and Project Advisory Team (OLE staff) to reach an agreement on the types of data, analyses, and level of detail necessary to complete a project based on the time frame for implementation.

5.1.2 Corridor Study Limits

In keeping with the remainder of this manual, where other Iowa DOT guidance has been provided, this manual will not attempt to duplicate or interpret the other guidance. Chapter 1 of the *Can-Do Manual* establishes guidelines for determining corridor study limits. It should be used as a reference in setting the limits of the study.

The guidance in the *Can-Do Manual* is intended to define a study area wide enough to accommodate the potential range of alternatives. Establishing a study area of such size at the outset of a study eliminates (or at least reduces the potential for) the need to supplement data collection at a later point in project development, which could have schedule and cost implications.

For most location studies, the guideline widths established by the Can-Do process will be used for corridor study limits. The following, therefore, represent rules of thumb for setting project and data gathering limits. Certain resource studies however, may require larger photogrammetry and mapping limits in order to fully display potential project impacts and provide enough data for fieldwork.

Corridor

A 0.25-mile width throughout the corridor (0.125 mile on both sides of the proposed centerline) is considered to provide sufficient study area for which to gather data for resource and engineering purposes. In most cases, a 0.25-mile-wide study area allows sufficient room for exploring alternatives without creating having to the field for additional surveys or mapping. Note that each resource study may have its own study limits. This usually depends on the cost, level of detail, and other details specific to the corridor.

The 0.25-mile width is only a guideline that may be adjusted based on the resources and terrain within the corridor. For instance, the location of railroad lines, dense building developments, lakes, and other natural and manmade boundaries may require the study limits to be adjusted. Some areas may be excluded when it is known that the project will not have an impact on them. For example, when the project involves an existing transportation corridor in a densely developed urban area, the full width for mapping may not be necessary if the project is not likely to be relocated very far from its existing alignment. Coordination with other sections within OLE (e.g., NEPA Compliance or Wetlands) may be appropriate before finalizing whether to reduce the study area and mapping.

Side Roads

The area to be studied along a side road is highly situation-dependent, and should be determined on a project-by-project basis. The determination should consider such issues as topography and whether any work will be necessary at intersections. As a rule, a 200-foot width (100 feet on either side of the centerline) and 0.5 mile along the side road should be studied.

Project Limits vs. Extent of Available Data

How the data will be made available is an issue worth considering. The geographic extent of available data sources may not always match exactly the limits of the Can-Do study area. This is particularly true of published information. In such cases, it is generally prudent to collect the larger extent of the available data.

The potential area of effect of a project may extend beyond the physical footprint of the alternatives. For example, the areas affected by indirect impacts and cumulative impacts may be larger than the immediate project area, as may off-system impacts on the transportation system. Consideration should be given to items such as these when determining the extent of the data collection.

5.1.3 Level of Detail of Requests and What Is Ordered

Both engineering and environmental data may be gathered in phases. As broader alternatives are investigated, early study requests may focus on less detailed information, whereas more detailed alternatives analysis and related data requests later in the project may require a greater level of effort and detail. The level of detail depends upon the type of study requested.

Initial engineering data requests may seek all the known published engineering data about the project area. The difference in the level of detail for engineering data may be in the analyses required in the scope of the project, more so than in the type of engineering data actually requested. Information regarding existing traffic, crash history, level of service (LOS), etc., may be requested initially during the early stages of project development. If necessary, additional capacity analyses or traffic simulations may be requested after the initial data has been ordered and analyzed.

5.1.4 The PMT and Project Advisory Team as Sources of Data

This chapter largely addresses the process of collecting data, but it is important to note that the PMT is also a source of information for project development. In this role, the PMT can help to refine data requests and provide advice on what data requests should include.

5.2 The Data Collection Process

The data collection process does not always produce immediate results. Some information may be readily available, but others (e.g., digital orthophotography) may need to be ordered and, therefore, require time to obtain. The data collection process must consider not only what type of information is needed, but also the time requirements for getting it and the period during which the data will be remain valid. For example, if a project has already been through the Photogrammetry Section, digital orthophotos and mapping may be available. However, if a new flight is required, the Project Manager may need to consider other means to get information that allow some work to be done while waiting for the official Iowa DOT mapping and photography. This same process is applied in other areas of study, such as for wetlands, where National Wetland Inventory mapping may be used as a data source for conducting field studies and early screening activities.

5.2.1 Formats for Data Requests

Requests for data may take on several different forms, such as e-mail requests or corridor study letters. Requests should be made to each of the sections or offices within Iowa DOT from whom it is determined that data is needed. The sections will in turn assign a staff member to the project. Collected data should be presented in geographic information system (GIS) or computer-aided design and drafting (CADD) layers if appropriate (wetlands, cultural resources, threatened and endangered species surveys, etc.), in addition to a hard copy of the report.

Some data collection may require field surveys, which may be completed by Iowa DOT staff or be out-sourced to a consultant depending upon the nature of the work. This decision is left to the discretion of the appropriate section. Examples of information typically requested through the Corridor Request Letters include the following:

- Utilities
- Threatened and endangered species/ biological studies
- Wetlands
- Cultural resources
  - Archeological
  - Historical
- Regulated substances
- Noise
- Traffic
- Photogrammetry
- Soils
- Pavement condition
- Federal Emergency Management Agency (FEMA) flood mapping

5.3 Photography and Mapping

For both photography and mapping data collection, data collection effort may take two paths. The Location Section Project Manager must first determine whether mapping and photography is already available. If they must be ordered, the Project Manager and the Photogrammetry Section must decide together whether a planning level or design level digital terrain model (DTM) is the most cost-effective way to proceed.

The steps involved in obtaining a planning-level DTM are described below. While much of this work is completed outside the Location Section, it is important to understand the steps and effort involved.

1. Order flights.
2. Establish photo control (mark targets, ground points, and ground survey points).
3. Fly the project area (typically during the spring).
4. Conduct the survey—bench run.
5. Create a stereo plot.
   a. Planning-level DTM
   b. Photo file
   c. Digital orthophotos

To create a design-level DTM, two further steps are required:

1. Complete a field survey—break lines.
2. Add the additional data to the planning-level DTM.

5.3.1 Digital Terrain Model

Data Source / Data Owner

The Photogrammetry Section orders, formats, and creates DTMs for Iowa DOT. The Location Section may include DTMs as part of a feasibility study or a location study, but even in those cases, the proposed work should be coordinated with the Photogrammetry Section.

Background Considerations

DTMs use a three-dimensional approach known as triangulated irregular networks (TIN), which record *x*, *y*, and *z* coordinates of a single point for earth features. Numerous TINs (depending on surface size) are then placed next to one another, like pieces of a puzzle, making a network of TINs that accurately display the terrain of the study area. DTMs are also used to create contours and cross sections of land features.[1]

Iowa DOT defines two levels of DTMs: a planning level and a design level.

Planning-Level DTM

A planning-level DTM is typically generated from photogrammetrically collected data. That data includes mass points and breaklines. Mass points are defined as individual survey points at spot locations in a grid pattern. Breaklines are defined as a group of points

[1] Source: University of Melbourne http://www.sli.unimelb.edu.au/planesurvey/prot/topic/top08-07.html

representing a terrain discontinuity and are typically collected as three-dimensional stringlines. Breakline examples include edge of roads, banks of rivers, streams and draws, and other terrain break lines as needed. The planning-level DTM mapping limits should be defined by the Project Manager and portrayed on an aerial photo. The perimeters of the corridor are defined as per the PMT's needs. Refer to the Photogrammetry Section for the required specifications, including the spacing for the survey points.

Planning-level DTM mapping limits must be provided to the Photogrammetry Section during the Order Aerial Photography event of the Can-Do process.

The planning-level DTM is used to determine a proposed alignment and critical areas along the project associated with the terrain. The completed planning-level DTM will be used for corridor analysis and the selection of a proposed alignment.

Design-Level DTM

A design-level DTM may be created from lower level flights or from a planning-level DTM supplemented with field survey. The field survey will be conducted in a narrowly defined corridor along the selected construction alignment. The design-level DTM mapping limits should be defined by the Project Manager and portrayed on an aerial photo. The perimeters of the corridor are defined as per the PMT's needs along the preferred alignment decision.

Upon completion of the preliminary survey, all field data collected at critical points and at critical lines will be merged into the original planning-level DTM. Field-collected point and line data collected in the design-level DTM will supersede photogrammetrically collected data. The planning-level DTM supplemented with field data then becomes the final design-level DTM.

A design-level DTM may be ordered for Can-Do process purposes. The flights to capture design-level DTM data are lower in altitude and more expensive to conduct, but result in greater detail, as noted in the preceding discussion. Such level of detail is not typically necessary for a location study; however, if a project may move quickly into the design phase, ordering a design-level DTM at the outset eliminates the need for a second flight prior to design and therefore reduces overall costs.

If, however, a study will not be quickly progressing to the design phase, then a new flight may be needed to capture changes in the project area once design eventually starts. In such cases, the planning-level DTM may be the most cost-effective option.

Light Detection and Ranging vs. DTMs

Light Detection and Ranging (LIDAR) is another method the Iowa DOT is using to collect photogrammetry/DTM information. LIDAR scans the earth's surface with infrared laser light to detect features such as surface features, vegetation, and structures. LIDAR works by sending a laser light pulse from an airplane or satellite down to the earth. The laser pulse is then reflected back to the airplane or satellite. The time that the laser takes to travel from the airplane to satellite and back is recorded and used to measure the distance of each feature.

Format of Data Request

The DTM may be requested from the Photogrammetry Section by e-mail. If a DTM is not already available or in process, it may be included in the scope of a consultant contract.

5.3.2 Digital Orthophotography

Data Source / Data Owner

The Photogrammetry Section is the owner of the photogrammetry data. The data source is either the Photogrammetry Section or the Location Section consultant, when included in a consultant scope for a feasibility study or location study. The photogrammetry data are maintained by the Photogrammetry Section and the files are located on Iowa DOT servers under the appropriate project directory.

Background Considerations

The Location Section will submit the data request to the Photogrammetry Section for aerial photography needs for the upcoming year by November 1 of the prior year. The data request should be prioritized so that preliminary survey schedules can be created. At this time the Location Section should also furnish

flight boundary limits outlined on past aerial photos or quad maps. The Location Section should also provide the desired planning-level DTM date, which will be used to prioritize the geographic positioning system (GPS) network scheduling.

Based on the input from the Location Section, the Photogrammetry Section will lay out flight lines. The flight layouts should then be given to the aerial flight contractor performing the work. A project control will be created and a GPS network plan for the following year will be determined. The remaining preliminary data required before the field GPS work can begin should be gathered at this time. If the Location Section hires a consultant to do this work on a project, the work effort should be coordinated with the Photogrammetry Section.

Format of Data Request

The DTM may be requested from the Photogrammetry Section by e-mail. If a DTM is not already available or in process, it may be included in the scope of a consultant contract. In cases for which a consultant contract is in effect, coordination with the Photogrammetry Section is needed.

Initial Data Options

Orthophotos of a project area may be available from city, county, state, or federal agencies, depending on the location of the project within the state. Potential sources include:

- Iowa Geographic Map Server (http://ortho.gis.iastate.edu/).
- GeoCommunity—This is a commercial site; however, it does offer free downloads (http://data.geocomm.com/).
- Iowa DNR Geological Survey—Iowa imagery can be found here (http://www.igsb.uiowa.edu/nrgislibx/).

5.4 Engineering Data—Sources

At the initiation of the project, the Location Studies Project Manager should start identifying and collecting pertinent engineering data from available sources. The following topics should be considered.

5.4.1 Published Program Documents (Including 5- and 25-Year Plans)

Published program documents include the 5-year program, State Transportation Improvement Plan (STIP), Long-Range Transportation Plan (LRTP), transit plans, trail plans, bicycle and pedestrian plans, rail and aviation system plans and updates to these plans. If the Location Section does not have a current copy of these plans, they may be requested from the Office of Systems Planning or Program Management. The documents are also available online at http://www.iowainmotion.com/index.html or http://www.dot.state.ia.us. Other program documents that affect transportation planning and the transportation system include county, local, and regional transportation plans, as well as land-use and development plans. Many of these plans are available on the Internet, or they can be requested directly from the agencies involved through early coordination or corridor request letters.

Knowing what is planned is required if federal aid is involved, assists in the determination of logical termini for projects and the prioritization of projects, and ensures that projects do not conflict with long-term land-use or transportation goals.

5.4.2 Traffic Volumes and Projections

Traffic data generally fall into two categories: existing (traffic volumes and counts) and projected (traffic forecasts).

Existing

Existing traffic data include traffic counts on roadway segments from automatic traffic recorders or specific count programs, information on vehicles miles traveled (VMT), and turning movement count information at intersections.

Existing data are available from the Iowa DOT's Transportation Data Section, a primary source for traffic data. The Transportation Data Section can provide online maps with traffic counts displaying road networks at the city, county, and state level. Existing traffic data may be available from other sources, including the MPO, county, city, previous studies, or specific projects. The type and quality of these sources should be evaluated relative to the intended use. Data may be requested by e-mail. The format for requesting information from a local MPO may vary on a case-by case basis.

Existing traffic data that are commonly used include: all-day traffic counts, A.M. and P.M. peak hour counts, the peak hour factors (PHF), LOS, average running speed, and free flow speed. The types of existing data available from the Transportation Data Section are as follows:

- *Average annual daily traffic (AADT) on primary roadway segments*—the total number of vehicles in a year divided by 365 for a specific roadway segment.
- *Average daily traffic (ADT)*—the average traffic volume for a 24-hour period, over a period of time, which is less than a year. ADT can be figured for a month, a week, or daily.
- *Automatic traffic record (ATR) Monthly Report*—monthly and cumulative traffic trends as compared to the previous year.
- *ATR Annual Report*—annualized traffic trends compared over the previous decade.
- *Average speed*—average travel speed calculated by permanent recorders or specific studies.
- *Average running speed*—based upon the running time of a vehicle. Running time is the total time that the vehicle is moving. It does not account for any stops or delay.
- *Total travel time*—the total time it takes a vehicle to travel from point A to point B. Total travel time takes into account stops and delays.[2]
- *Average free flow speed*—the speed that it would take a motorist to drive under ideal conditions. Conditions such as congestion and adverse weather do not apply to free flow speed. The free flow speed decreases as the number of "passenger cars per hour per lane" increases.[3]
- *Intersection turning movement counts*—hourly or 15-minute summaries of all vehicles, single unit trucks, and combination trucks counted; and an estimated AADT turning movement.
- *LOS*—lettered A through F, LOS describes the operating conditions for different types of roadway facilities. LOS A is equivalent to favorable operating conditions, with free flowing traffic. LOS F indicates the worst operating conditions, where queuing and congestion are present. LOS is usually determined by measures of effectiveness (MOE), which are representative of traffic operations. Speed and travel time, density (vehicles), and delay typically are used as MOEs to determine LOS.
- *Portable recorder counts*—annual average daily traffic with a summary showing the traffic by hour for the duration of a recorder being set at a specific location.
- *Permanent recorder*—continuous traffic data collected by hour at specific locations.
- *Peak hour volume*—the hour in a 24-hour period with the highest hourly volume of traffic. The peak hour volume is also known as the peak hour or rush hour.
- *Peak hour Factors (PHF)*—the ratio of the total hourly traffic volume to the peak rate during the hour (usually observed in 15-minute intervals).
  - PHF = hourly volume / peak rate of flow, OR
  - PHF (for 15-minute intervals) = hourly volume / 4 × V15 where V15 = volume during the peak 15-minute interval
- *Vehicle Classification Data*—specific recorder locations that provide vehicle type data by 13 classifications designated by the FHWA.
- *Vehicle miles traveled (VMT)*—total miles driven by vehicles over a given road segment over a period of time.

[2] Source: Roess, McShane, and Prassa. *Traffic Engineering: Second Edition.* 1998.

[3] Source: University of Idaho. Transportation Engineering Online Lab Manual. http://www.webs1.uidaho.edu/niatt_labmanual/Chapters/capacityandlos/theoryandconcepts/FreeFlowSpeedAndFlowRate.htm

- *Equal single axle load (ESAL)*—weight and class distribution tables of sampled truck traffic. ESAL must be requested for use with pavement determination.
- *Expansion factors*—a listing of factors by hour, day of the week, or month used to expand short-term portable recorder or turning movement counts to AADT.
- *Design Hour Factors*—30th highest hour calculated from permanent recorders.

Existing traffic data is used to establish base conditions on travel performance for projects. The analysis will be used in the assessment of existing traffic operations and support the purpose and need for the project. Existing traffic counts are used to calibrate and validate travel demand models to help forecast future traffic as consistently as possible.

Electronic traffic data can also be found on these Iowa DOT webpages:

- Iowa DOT maintains a webpages with GIS data for the state. The Coordinated Transportation Analysis and Management System (CTAMS) provide GIS data online at http://www.dot.state.ia.us/gis/. GIS data found at CTAMS includes county road data from 2002, statewide structures from 2002, and city and county limits.
- Iowa DOT's website is a good tool when looking for roadway and traffic information. Maps with AADT counts can be accessed online by city and county. These maps are found at http://www.iowadotmaps.com. Detailed maps for the state, counties, and cities can be obtained electronically as well. The maps provide detailed and current information on road networks and are available at the same site.
- Also located on the Iowa DOT website are federal functional classification maps. Functional classification maps by city and for certain urban areas can be obtained online at http://www.sysplan.dot.state.ia.us/fedfuncclass.html. The maps can be opened and downloaded as .pdf files or MicroStation files.
- Traffic data can be used in a variety of ways, as demonstrated in Table 5-1.

Table 5-1

Activities That Use Traffic Characteristics Data			
Highway Activity	**Traffic Counting**	**Vehicle Classification**	**Truck Weighing**
Engineering	Highway geometry	Pavement design	Structural design
Engineering economy	Benefit of highway improvements	Cost of vehicle operation	Benefit of truck climbing lane
Finance	Estimates of road revenue	Highway cost allocation	Weight Distance Taxes
Legislation	Selection of highway routes	Speed limits and oversize vehicle policy	Permit policy for overweight vehicles
Maintenance	Selecting the timing of maintenance	Selection of maintenance activities	Design of maintenance actions
Operations	Signal timing	Development of control strategies	Designation of truck routes
Planning	Location and design of highway systems	Forecasts of travel by vehicle type	Resurfacing forecasts
Environmental analysis	Air quality analysis	Forecasts of emissions by type of vehicle	Noise studies, NO_x emissions
Safety	Design of traffic control systems and accident rates	Safety conflicts due to vehicle mix and accident rates	Posting of bridges for load limits
Statistics	Average daily traffic	Travel by vehicle type	Weight distance traveled
Private sector	Location of service areas	Marketing keyed to particular vehicle types	Trends in freight movement
Source: FHWA Traffic Monitoring Guide at http://www.fhwa.dot.gov/ohim/tmguide/tmg1.htm#ch3			

Projected

Regional travel demand models are used to forecast and estimate future traffic volumes. Future traffic volumes are based on forecasted land use and socioeconomic growth anticipated for the regional area. It is required that the regional MPO maintain an active travel demand model and use it for the development of its long-range planning efforts.

The Office of Systems Planning at Iowa DOT or the local MPO maintains the regional travel demand models. Traffic forecast data from the Office of Systems Planning and the local MPO may be requested by e-mail. Based on project-specific needs, if a consultant is tasked with traffic forecasting processes, then the consultant must make sure to coordinate with the Office of Systems Planning and regional MPO for their input and review. When requesting forecast data, be sure to identify the forecast design year. This is typically design year plus 20 (that is, if the construction year is 2005, then the forecast design year is 2025).

Future forecasted traffic data are used for long-range transportation planning and programming. Future traffic forecasts are generated from regional travel demand models. The regional travel models estimate traffic on all-day, peak-period, or peak-hour time slices. The traffic forecasts are used to estimate growth factors based on existing counts on projects for planning and programming purposes.

Data Requests

Traffic data requests are to be made to the Office Systems Planning through the completion of a Traffic Forecast Request form and submitting the form through the Pavement Design and Management Section in the Office of Design. Requests should include contact information as well as the following:

- Project number and project description
- Design year
- Turning movements
- Peak hour traffic
- Study limits
- Side roads where traffic projections are needed

5.4.3 Crash Data

Primary Data

Police crash reports are the primary source of crash data. Iowa DOT's Office of Traffic and Safety maintains a database of crash history in the state called TraCS. TraCS creates a database at the local enforcement office and transmits the data electronically to the Motor Vehicle Division statewide DB2 database. For more information on TraCS visit http://www.tracsinfo.us/.

Data Analysis

The Safety, Analysis, Visualization, and Exploration Resource (SAVER) is an analysis tool that primarily uses the crash records from the DB2 database. SAVER enables mapping, querying, reporting, and visualization of safety data. Refer to the Iowa DOT crash analysis resources website: http://www.dot.state.ia.us/crashanalysis/savermain.htm for more detailed information.

The SAVER database allows for in-depth traffic safety analysis for Iowa. With the integration of GIS, SAVER allows for crash locations and data to be mapped. Data of interest provided by SAVER includes the location of the crash, time of day, severity, type or basic characteristics of the crash, environmental conditions, and vehicle and driver characteristics.

Crash data is inherently imprecise because not all crashes are reported and, for those that are make it into the SAVER program may be recorded with inaccuracies. Some error can be found in a database such as SAVER because inconsistencies in the collection and recording of crash reports. For example, when a crash occurs, in many instances, the officer on the scene writes a report that records the date, location, and relevant information. This information is then transferred from paper to electronic format, which is input into SAVER. In this process there are many instances where error might occur, such as the transition from the written report to the electronic file.

Data Requests

Data requests can be made to the Office of Traffic and Safety. Requests should include contact information as well as the following:

- Beginning and ending date
- Detailed site and problem description (that is, enough information to locate the site or understand the requester's need)
- Detailed description of desired output (maps, counts, tables, particular interests and subsets, graphs)
- Detailed explanation of request reason/impetus
- Comments/suggestions/questions

The SAVER Training Guide and User Guide/ Manual can be found at: http://www.dot.state.ia.us/ crashanalysis/savermanualandtrainingguide.htm.

Safety

Crash data are used in the analysis of existing conditions, and specifically safety studies. For example, a history of the number and types of crashes experienced by the existing transportation facility provides a means of comparison to other similar facilities, as well as an indication of the nature of problems requiring future correction. Safety may be measured by crashes per mile or crashes per million vehicles entering an intersection.

5.4.4 Pavement Information

Pavement information, including the pavement condition report/index, may be used by contractors and engineers to determine pavement condition, life expectancy, methods of pavement removal, and possible opportunities to incorporate and reuse the existing materials. Iowa DOT also uses pavement information to project financial needs and allocate financial resources.

Pavement History

Pavement history information can be obtained from the IDMS database through the Pavement Management Information System (PMIS). The information is available in both electronic and hard copy and is broken down by route number and milepost. Pavement history information may also be obtained from the document entitled Test Sections by Mileposts, which is prepared by the Office of Materials.

Pavement Condition Index

In Iowa, automated pavement condition data are collected for the entire county paved network through the Iowa Pavement Management Program (IPMP) for federal-aid portions and the Iowa DOT non-federal-aid-eligible county project for the remaining paved miles. The IPMP is a statewide program to develop pavement condition databases to support the application of pavement management by the Iowa DOT and cities and counties for the federal-aid-eligible highways within their jurisdictions. Condition data are collected using automated equipment. This equipment uses lasers and digital video to collect roughness, rutting, and cracking information. Automated distress data are objective and consistent, and provide for a complete coverage of the pavement surface.

The Pavement Condition Index (PCI) is a composite measure of the pavement condition. It combines all the distresses collected (cracking, patching, ride, and roughness) into a single measure of pavement condition (on a 0 to 100 scale). Different distresses can have different weights in the PCI calculation process.

The Office of Materials should be consulted for PCI information.

Sufficiency Ratings

In Iowa, the numerical process of rating roadway and structures is called a sufficiency rating study and is published each year for the Primary Road System as required by Section 307A.2(12) of the Code of Iowa. Sufficiency ratings allow highway administrators to measure a particular road section objectively with all other road sections in the state against a selected LOS.

In 1974 Iowa DOT developed a sufficiency rating process that provided for a direct comparison of all primary road section ratings, rural and municipal. The approach used was termed "the tolerable standard approach." A tolerable standard is defined as the minimum prudent condition—geometric or structural—that can exist without being in need of upgrading.

The Office of Materials should be consulted for sufficiency rating information. A searchable sufficiency rating database and additional information about the sufficiency rating process may be found at: http://www.sysplan.dot.state.ia.us/sufficiency/index.htm.

5.4.5 Bridge / Structure Information

Bridge and structure information may be used by contractors and engineers to determine structure condition, life expectancy, and possible opportunities to incorporate and reuse existing materials. Iowa DOT also uses structure information to project financial needs and to allocate financial resources, by planning for future structure modification or replacement.

Background and Preliminary Bridge Considerations

The Bridge Rating Engineer in the Office of Bridges and Structures maintains a record of bridge inspection reports that provide background and preliminary bridge information. Bridge and structure information may be requested by e-mail from the Bridge Rating Engineer in the Office of Bridges and Structures.

Sufficiency Ratings

As discussed in Section 5.4.4, Iowa publishes bridge sufficiency ratings each year. The process used to calculate sufficiency ratings for structures in past years has been eliminated and the corresponding structure data has been replaced with federal structural inventory and appraisal data. The rating listed in the log is the federal sufficiency rating used to evaluate structure conditions and federal funding eligibility.

A searchable sufficiency rating database is located at: http://www.sysplan.dot.state.ia.us/sysplanapps/b1123010/query.asp.

5.4.6 As-Built Plans

As-built plans are useful in determining the existing conditions of the facility being evaluated. Scanned copies of as-built plans are maintained in the Electronic Records Management System, a document management system administered by Records Management Services.

Field visits may also provide early information about as-built conditions, including measurements and photos.

5.4.7 Utility Locations

Both utility locations and planned utility improvements should be investigated to determine compatibility with proposed transportation improvements. Utilities of concern include telephone lines, telegraph lines, electric transmission lines, gas lines, and railroad tracks. Utility information should be requested from the District or the utility section in the Office of Local Systems by e-mail. Statewide GIS data can be obtained online.

Field observations and local maps provide basic utility information. Municipal websites may also provide sources.

5.4.8 S1 Soils Review

NRCS county soils books, Iowa Geological Survey publications, or digitally available data may provide preliminary soils information. The NRCS's web Soil Survey is available at: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx. The formal soils review may be requested by e-mail from the Office of Design, Soils Section, or may be identified as a need during a PMT meeting.

The need for borrow material (and potential quantities) and an estimate of borrow acreage should be noted in communications with the Soils Section. Shale considerations, soil considerations, and potential material sites should also be identified.

5.5 Environmental Data

Environmental data are requested by the Location Studies Project Manager. The Resource Section supplies the data and provides analysis of the data.

A 3-step approach typically is used to identify the presence of target resources within the project area. The appropriate phase is dependent on the project development stage and the level of effort required in obtaining the required data. Part IV of this manual includes information about the data needs for the various resources that may be investigated as part of the feasibility or location study.

- Step 1 involves a database and literature search for the presence of target resources that may be located within the project area.
- Step 2 consists of a windshield survey or site review (drive-through) of the project area with the purpose of identifying target resources that are easily identifiable from the roadway. This step does not involve detailed fieldwork and should be done in combination with the information obtained through the database search.
- Step 3 consists of a walk-through of the study area to verify the presence, or lack, of target resources. This step is used to field verify information obtained during the database search.

Agency coordination should be a constant throughout the three steps, but it will be dictated by the needs of the project and whether the project is included in the NEPA/404 concurrence process.

See the resource chapters in Part IV, as shown in Table 5-2, for a more detailed discussion of data requests and study methodology.

5.6 Storing and Filing the Collected Data

Once data have been received or collected, they should be stored or filed in the appropriate locations and file structure to provide a record of the information that was used in the various project analyses. Hard copies of data, correspondence, electronic files (CADD/GIS), and other file materials should be maintained as discussed in Chapter 2, *Project Management*.

Table 5-2

Resource Chapters in Part IV	
Resource	Chapter
Introduction: Resource Studies	25
Surface Water and Water Quality	26
Special River Designations	27
Waters of the United States, Including Wetlands	28
Floodplains and Hydraulics	29
Threatened and Endangered Species, Wildlife, and Upland Communities	30
Land-Use Impacts	31
Social/Community Impacts	32
Environmental Justice	33
Relocation Impacts	34
Economic Impacts	35
Energy	36
Visual Impacts	37
Air Quality	38
Noise	39
Agriculture	40
Regulated Materials	41
Cultural Resources: Archaeology, Historic/ Architectural Preservation, and Tribal Notification	42
Reserved for future additions	43

5.7 Additional Data Requirements

5.7.1 Functional Design

As the location process proceeds into functional design, additional design-related information will be required to develop the plans and their associated environmental consequences. Functional design often immediately follows the concept design phase. However, if several years elapse between phases, it may be necessary to update the existing and forecast data in order to confirm previous assumptions. For example, a project that began as a feasibility study and did not immediately proceed to a location study may require updated data.

When revisiting previous assumptions, it is important to recognize that most traffic forecasts assume a minimum 20-year planning period. Unless significant unplanned traffic generators are going to be developed

within that time, the traffic forecast prepared for the concept phase should be sufficient. Other time-sensitive information includes the following:

- Crash data
- Land use/population
- Environmental data
- Condition reports (structures and pavement)
- Aerials and mapping

The procedures discussed in the chapter should be used to obtain up-to-date data. Consideration should be given to each data type discussed and to whether they need to be updated.

5.7.2 Preliminary Location Design

To advance the preliminary location design process for the preferred alternative, it is often necessary to augment early mapping and survey data with more detailed field data suitable for preliminary and final design development. It may be appropriate to obtain field data related to subsurface (soil) conditions or utility facility locations so that location design plans reasonably reflect site conditions. If several years have elapsed between the functional and preliminary location design phases, it would also be appropriate to review and update existing and forecast design year traffic to confirm previous assumptions and recommendations.

The following additional data may be required to advance the preliminary location design:

- *Mapping*—Throughout the course of developing projects in the Can-Do Process, it is important to have mapping that will be used throughout the remainder of the design. if not done previously, high-flight aerial photography should be produced for use throughout the remainder of the design process.
- *Digital Terrain Model*—A digital terrain model of the area should be created. The collection of features will involve determining the horizontal and vertical (elevation) positions of terrain features. The model should yield a precise representation of the terrain along the corridor by incorporating such information as spot elevations, mass points, and break lines.
- *Supplemental Ground and Drainage Surveys*—Existing surveying data should be reviewed, and supplemental ground, drainage, and existing right-of-way surveys should be conducted as needed:
  - Locate aboveground features that do not show on aerial surveys.
  - Incorporate these features in the planimetric base mapping file.
  - Obtain invert elevations at manholes of existing storm and sanitary sewers.
  - Prepare digital plan and profile of existing storm and sanitary sewers.

Obtain supplemental ground and drainage survey information as needed to define off-system improvement needs associated with construction staging traffic operations.

- *Hydraulic Surveys*—Hydraulic surveys should be performed to support development of a hydraulic report. This should include compiling existing cross sections. Cross sections should be developed in digital format.
- *Right-of-Way Surveys*—The existing right-of-way should be surveyed within the maximum improvement limits of build alternatives. Right-of-way dimensions obtained from as-built plans and other data sources should be verified during prior studies. Drawings should be prepared showing existing rights-of-way. The T1 level survey work is typically completed by the District.
- *Mainline Surveys*—Mainline centerline, pavement edges, and shoulder edges should be surveyed on 50-foot increments. Additional pavement shots would be needed in locations where existing and proposed profiles tie in.
- *Cross Road Surveys*—Existing side roads should be surveyed as needed to obtain centerline and edges of pavement on 50-foot increments.

5.8 Additional References

Other links and attachments with data and relevant information are listed below. These resources were not covered in this chapter, but they are very useful in the data collection process.

Iowa DOT Photogrammetry website: http://www.dot.state.ia.us/.

Iowa DNR: http://www.igsb.uiowa.edu/.

Iowa Geographic Image Map Server: http://ortho.gis.iastate.edu/.

U.S. Fish and Wildlife Service: http://www.fws.gov/.

USGS website: http://www.usgs.gov/.

USGS, Iowa Water Resources Science Center: http://ia.water.usgs.gov/.

USGS, Upper Midwest Environmental Sciences Center, Iowa GIS data: http://www.umesc.usgs.gov/.

NOTES:

Existing Conditions Analysis

CHAPTER 6

This chapter provides guidance on the analyses performed to examine existing systems and to project their performance characteristics over time. It addresses the following:

- Infrastructure condition
- Geometric features
- Crash analyses
- Traffic volumes and projections
- Capacity analysis
- Level of Service (LOS)
- System operational features

These analyses are important both individually and cumulatively. By considering all the performance features of a facility, an understanding of potential alternatives with features that would address the problems of the existing facility can be gained. That understanding allows Iowa DOT and other project sponsors to identify the goals and basic criteria to be applied to the project and form the basis of the alternatives evaluation.

A comprehensive analysis of the transportation facility is required to evaluate its ability to meet current and projected travel demands and to establish a framework within which to develop improvements. The purpose and need statement for a transportation improvement project relies heavily on an appraisal of the adequacy of the existing facility. Also, the development and testing of alternative improvement concepts is guided by the type, magnitude, and location of deficiencies uncovered in the analysis. The existing condition analysis should consider the following components for all projects:

- *Pavement and Structure Conditions*—The level of improvements will be determined largely by physical adequacy of the existing facility. If some of or all the pavement and structures can be reused, the cost of modifications can be reduced substantially.
- *Geometric Design*—If design of the existing facility does not comply with current accepted standards, it may be necessary to modify or reconstruct the facility.
- *Safety*—A history of the number and types of crashes experienced provides a means of comparison to other similar facilities and an indication of the nature of problems requiring future correction.
- *Capacity Operations*—It is important to know how much reserve capacity is available with the existing facility. This is a required input to potential improvements.

This chapter provides guidance on the analyses performed to examine existing systems and to project their performance characteristics over time.

- *System Operational Features Related to Freeway Geometry*—Freeway operational analysis requires special treatment because of unique operating characteristics of the highway. Attention must be given to lane and route continuity, lane balance, ramp sequence and spacing, and signing.

Analyses should be done to evaluate relationships among deficiencies and the overall effect on system operations.

There are several methods for reviewing and analyzing physical, operational, and geometric features. Information such as roadway width, gradient, curve radii, and K values commonly is gathered quantitatively. These values are compared to the design criteria specified in the Iowa DOT *Design Manual* or the American Association of State Highway and Transportation Officials (AASHTO) *Policy on Geometric Design of Highways and Streets* (Green Book) to determine the sufficiency of the facility. It is then determined whether each feature meets or fails to meet the specified design criteria. Other roadway features or characteristics that are commonly evaluated qualitatively include the following:

- Traffic operational performance
- Safety performance based on a comparison of crash data with that on similar facilities
- Physical condition of roadways and bridges
- Geometric performance based on current design guidelines
- Overall system operational characteristics for freeway facilities

Performance measures are a means of determining the adequacy of each feature. For example, traffic operational performance may be measured by average speed, volume/capacity ratio, or LOS. Safety may be measured by crashes per mile or crashes per million vehicles entering an intersection. For each performance measure, qualitative ranges are developed to express the degree by which each feature met or failed to meet a desirable level of compliance. This allows a better understanding of problems and their causes. Qualitative ratings such as the following are commonly used:

- Exceeds, meets, does not meet
- Good, fair, poor
- High, medium, low

The qualitative and quantitative ratings often are displayed graphically over the length of a roadway. Through use of symbols or shading, segments where one or more features do not meet design criteria or have been assigned "poor" or "low" ratings are easily identified. This type of presentation allows reviewers, either professionals or the general public, to target areas of poor performance or design.

6.1 Infrastructure Condition

6.1.1 Introduction

The age, physical condition, and remaining functional life of pavement and bridges are another important early consideration in the project development process. An early assessment of physical condition ensures that the alternatives design features properly reflect the nature of required infrastructure improvements. The end of remaining functional life should be compared to project design year. Pavements and bridges are assigned sufficiency ratings based on physical condition and remaining functional life. Desirably, the improved facility would require minimal maintenance repairs through the design year.

6.1.2 Structural Evaluation

The decision regarding the practicability of reusing or rehabilitating an existing structure within the roadway improvement relies on the following factors, available from the Bridge Maintenance Office:

- Age of the bridge
- Physical condition and identified deficiencies that require repair
- Soundness of the substructure, superstructure, and deck
- Need for geometric or hydraulic improvement

The means for requesting bridge information is described in Section 5.4.5, Bridge/Structure Information.

If an existing bridge is structurally sound, if it meets the project's design loading, minimum width and clearance requirements, and if it is not a high crash location, it probably will be cost-effective to retain at least some elements of its elements. In some cases, only the bridge substructure (abutments, piers) or foundation (footings, piles) may need to be rehabilitated. In others, it may be appropriate to retain or rehabilitate the substructure and to replace the superstructure or deck. The latter generally would occur when geometric features of an existing structure, such as width, clearances, or profile, would be incompatible with the planned improvement.

6.1.3 Pavement Condition

When an improvement to an existing roadway is planned, a decision must be made regarding the feasibility of reusing the existing pavement within the improvement, or whether the pavement should be rehabilitated or replaced. The condition of existing pavement must be known to make an informed decision as to whether the pavement can be used in its present form, or whether rehabilitation or complete reconstruction are required. Elements of information needed to support such a decision include the following:

- Pavement type and date of original construction
- Subsequent pavement rehabilitation
- Traffic history
- Rutting, roughness, and faulting data

The presence of ruts in asphalt pavement indicates excessive pavement wear, an unstable mixture, or permanent deformation in the pavement structure by traffic loading. Deep pavement ruts can be a significant hazard to drivers. Water can pond in ruts and create a potential for excessive spray, which can obscure a driver's vision, and for hydroplaning. Roughness also serves as an indicator of pavement performance and the need for rehabilitation. The presence and degree of faulting—the difference in elevation across a pavement joint or crack—affects the selected type of rehabilitation. Evaluation of the remaining pavement life would consider alternative pavement improvement concepts.

6.2 Geometric Features

6.2.1 Introduction

Several principal elements of design, such as the following, are common to all classes of highways and streets:

- Horizontal alignment
- Vertical alignment
- Sight distance
- Cross section

As a prerequisite to analysis of geometric features, criteria, or values need to be established that describe compliance with established design criteria. It should be recognized that any existing roadway was built to guidelines and standards in effect many years ago. Many of the standards may have changed over the years as a result of research, change in typical driver, operational experience, and changes in vehicle characteristics. By applying current criteria and standards as a basis for evaluating older roadways, opportunities can be discovered for upgrading outdated system features to current standards.

The AASHTO Green Book explicitly recognizes the relationship between the functional classification of a highway and the design criteria. The Iowa DOT *Design Manual* likewise relates design criteria to functional classification. The AASHTO Green Book states:

> *The first step in the design process is to define the function that the facility is to serve. The LOS needed to fulfill this function for the anticipated volume and composition of traffic provides a rational and cost-effective basis for the selection of design speed and geometric criteria within the ranges of values available to the designer. The use of functional classification as a design type should appropriately integrate the highway planning and design process.*

The functional classifications listed in the AASHTO Green Book are not used in Iowa. Instead, Iowa DOT has opted to use the following functional classification system:

- Freeways
- Expressways
- Super two-lane highways
- Rural two-lane highways
- Transitional facilities
- Reduced-speed urban facilities
- Ramps and loops

See also Section 1C-1, Design Guide for New and Reconstructed Highways, of the Iowa DOT *Design Manual* for design criteria for each highway functional classification.

6.2.2 Selection of an Appropriate Design Speed for Review

Before reviewing existing geometry, an appropriate design speed must be established that will be acceptable for future design modifications within the system. Because design speed has a direct correlation to the roadway design criteria, it is important that design speed be considered carefully at the onset of a project.

The assumed design speed should be a logical one with respect to topography, anticipated operating speed, adjacent land use, and functional highway classification. Except for local streets, where speed controls frequently are included intentionally, every effort should be made to use as high a design speed as practical to attain a desired degree of safety, mobility, and efficiency within the constraints of environmental quality, economics, aesthetics, and social or political impacts. Once the design speed is selected, all the pertinent highway features should be related to it to obtain a balanced design.[1]

The selected design speed should be consistent with speeds that drivers are likely to expect on a given roadway. If design speed is set too high, it may not be feasible to meet all the horizontal and vertical criteria, resulting in future design exceptions. Alternatively, if design speed is set too low, traffic may travel at a higher rate of speed than the system was designed for, resulting in crashes.

[1] AASHTO Green Book—Policy on Geometric Design of Streets and Highways. Washington DC. 2004.

6.2.3 Horizontal Alignment

The horizontal alignment consists of a series of tangents, curves, and transitions that define the route taken by a highway. Horizontal alignment generally is the governing factor in determining speed on rural highways. The selected design speed establishes the limiting values of curve radius and minimum sight distance. In urban situations, however, horizontal alignment is patterned to the existing street system, and minor horizontal alignment changes usually are made at intersections.

The Green Book suggests the following considerations pertinent to evaluation of horizontal alignment:

- *Directionality*—Winding alignment composed of short curves usually leads to erratic operation. Also, long tangents are needed on two-lane highways so that sufficient passing sight distance is available on as great a percentage of the highway length as practical.
- *Curvature*—The minimum radius of curvature for a designated design speed should be avoided where practical. Generally flat curves are preferred. The central angle of each curve should be as small as physical conditions permit.
- *Consistency*—Sharp curves should not be introduced at the ends of long tangents. Sudden changes from areas of flat curvature to areas of sharp curvature are undesirable.
- *Kinks*—For small deflection angles, curves should be sufficiently long to avoid semblance to a kink.
- *Compound Curves*—The use of compound curves should be avoided where curves are sharp. The use of compound curves on ramps, with a flat curve between two flatter curves, is not good practice.
- *Reversals*—Reversals in alignment should be avoided. Such changes make it difficult for drivers to stay within their own lanes. It is also difficult to superelevate both curves adequately, and erratic operation may result.

- *Broken-back Curves*—A broken-back arrangement of curves (with a short tangent between two curves in the same direction) is undesirable in most situations. Except on circumferential highways, most drivers do not expect successive curves to be in the same direction.
- *Coordination with Vertical Alignment*—Horizontal alignment should be coordinated carefully with the profile, from the standpoints of sight distance, aesthetics, and driver comprehension of the highway visible ahead. The view of the road, the distance the driver can see, correct interpretation of horizontal and vertical alignment in combination (which avoids distortions and misleading characteristics), and awareness of smoothness and rhythm of longitudinal form (aesthetic quality) all contribute to driver comfort and safety.

6.2.4 Vertical Alignment

Elements of vertical alignment consist of minimum and maximum grades, critical length of grade, truck climbing lanes, vertical curvature, vertical clearance, and roadway aesthetics. Whereas horizontal alignment is most affected by speed, topography has a more pronounced effect than speed on vertical alignment. The Green Book suggests that the following general controls be considered with regard to vertical alignment:

- *Gradeline*—The profile gradeline is described by a series of tangents connected by parabolic vertical curves. A smooth gradeline is preferable to a line with numerous breaks and short lengths of grades. Specific design criteria are the maximum grade and critical length of grade, but the manner in which they are applied and fitted to the terrain on a continuous line determines the suitability and appearance of the finished product.
- *Roller Coaster*—A "roller coaster" type of profile is undesirable, especially where the horizontal alignment is relatively straight. This type of profile is unattractive and may be hazardous.
- *Undulating Gradeline*—Undulating gradelines involving substantial lengths of momentum grades should be evaluated because of the effect they have on traffic operations. Such profiles permit heavy trucks to operate at higher overall speeds than when an upgrade is not preceded by a downgrade, but may encourage excessive speeds of trucks with attendant conflicts with other traffic.
- *Broken-back Curves*—A "broken-back" gradeline (two vertical curves in the same direction separated by a short section of tangent grade) is undesirable. This alignment is particularly noticeable on divided highways with an open-ditch median section.
- *Long Grades*—On long ascending grades, it is preferable that the steepest grade be at the bottom with a flatter grade near the top. It is also desirable that a sustained grade be broken with short intervals of flatter grade.
- *Intersections*—When an at-grade intersection occurs on a section with moderate to steep grade, it is desirable that the gradient be reduced through the intersection.
- *Sags*—Sag vertical curves are undesirable in cuts unless adequate drainage can be provided.

6.2.5 Sight Distance

The AASHTO Green Book presents the following general considerations regarding sight distance:

> *A driver's ability to see ahead is of the utmost importance in the safe and efficient operation of a vehicle on a highway. For safety on highways, the designer should provide sight distance of sufficient length that drivers can control the operation of their vehicles to avoid striking an unexpected object in the traveled way. Certain two-lane highways should also have sufficient sight distance to enable drivers to occupy the opposing traffic lane for passing other vehicles without risk of crash.*

The Iowa DOT *Design Manual* specifies five categories of sight distance that should be considered in assessing the adequacy of an existing roadway:

- Stopping sight distance
- Decision sight distance
- Passing sight distance
- Sight distance on horizontal curves
- Sight distance on vertical curves

Stopping Sight Distance

Stopping sight distance is the sum of two distances: (1) the distance traveled by the vehicle from the instant the driver sights an object necessitating a stop to the instant the brakes are applied, and (2) the distance needed to stop the vehicle from the instant that brake application begins. These are referred to as brake reaction distance and braking distance, respectively.[2]

Roadway segments are deemed deficient when adequate stopping sight distance for the appropriate design speed, as specified in the Iowa DOT *Design Manual,* has not been provided.

Braking distance is affected by grade. Uphill grades reduce braking distance, and downhill grades increase it. As a general rule, sight distance on downgrades is greater than on upgrades, more or less automatically providing the appropriate correction for grade. Iowa design guidelines, therefore, do not require an adjustment for grade except for one-way roads or divided highways with independent profiles for the two roadways.

While the sight distance design values provided in the *Design Manual* are based on passenger cars, they also apply to trucks since the truck driver typically is seated higher, thus having greater sight distance.

Decision Sight Distance

According to the AASHTO Green Book, decision sight distance is "the distance needed for a driver to detect an unexpected or otherwise difficult to perceive information source in a roadway environment that may be visually cluttered, recognize the condition or its potential threat, select an appropriate speed and path, and initiate and complete the maneuver safely and efficiently." Criteria for decision sight distance, keyed to design speed and the type of avoidance maneuver required, are found in both the Green Book and the Iowa DOT *Design Manual.*

Decision sight distance should be considered and evaluated at intersections and interchanges, lane drops, toll booths, and areas where drivers are likely to be exposed to multiple sources of information such as directional signs, traffic control devices, and advertisements. On freeways and expressways, decision sight distance should be provided in advance of exits, major forks, and lane drops. At such locations, drivers must perceive conditions, decide a course of action, and navigate.

Passing Sight Distance

Passing sight distance is determined on the basis of the length of roadway needed to complete a normal passing maneuver on a two-lane roadway. The Green Book defines passing sight distance as consisting of four components:

- The distance traveled by the passing vehicle during perception and reaction time and during the initial acceleration point of encroachment on the opposite lane.
- The distance the passing vehicle travels while in the opposite lane.
- The distance between a passing vehicle at the end of its maneuver and an opposing vehicle.
- The distance traveled by an opposing vehicle for two-thirds of the time that the passing vehicle occupies the opposing lane.
- Sight distance adequate for passing should be encountered frequently on two-lane highways, but neither AASHTO nor Iowa DOT specify a minimum number of opportunities per a given distance under different conditions. Passing opportunities enter into the determination of LOS on two-lane highways where LOS is based on both average travel speed and percent time following. The assessment of adequacy of passing sight distance, therefore, is a function of LOS.

[2] AASHTO Green Book.

Sight Distance on Horizontal Curves

Horizontal curves on existing roadways should be analyzed to determine if there is adequate stopping sight distance. Objects such as cut slopes, walls, buildings, bridge piers, and longitudinal barriers can create sight obstructions on the inside of curves (or on the inside of a median lane on a divided highway).

Sight Distance on Vertical Curves

Both crest vertical curves and sag vertical curves should be checked to determine if adequate stopping sight distance is available, as required by design speed and ambient conditions. Criteria for both types of curves are presented in the Iowa DOT *Design Manual*.

6.2.6 Cross Section

The cross section should be checked for appropriate design of the following:

- Shoulder treatment (type, width, cross slope)
- Side slopes (cut, fill, ditch, or curb treatment)
- Guardrail treatment and location
- Roadside obstacles
- Median treatment

Along with compliance with *Design Manual* requirements, the roadway cross section should be investigated for ease of maintenance and ability to store snow.

6.3 Crash Data Analysis (Tools and Techniques)

6.3.1 Introduction: Role and Importance of Safety Information in Decision-Making

Motorists have certain expectations for the publicly provided transportation system. One expectation is that the system be safe for users. Safety applies not only to projects defined based on a safety need but also to all projects. Any proposed transportation solution must be safe, regardless of project need.

Improved safety often is a key factor in justifying a transportation facility improvement. For existing facilities, need may be related to crash experience that reflects unsafe conditions. For new improvements, justification may be related, at least in part, to expected reduction in crashes that would be achieved by provision of a higher type facility.

Safety can be described in two forms: nominal safety and substantive safety. *Nominal safety* refers to a design's adherence to design criteria or standards. Design guidelines and practices outlined in the AASHTO Green Book, the *Manual of Uniform Traffic Control Devices,* and *the AASHTO Roadside Design Guide* represent guides that define nominal safety. *Substantive safety* refers to the actual performance of a highway or facility as measured by its crash experience. One would characterize a road as being substantively safe or unsafe based on the performance relative to expectation. While nominal safety and substantive safety are often related, they are different. A roadway may be substantively safe and nominally unsafe, or vice versa.

This section covers the fundamentals of safety analysis. To begin, the terms and concepts used in performing a safety analysis are defined. Next, the relationship between improved safety and the countermeasure are described. Finally, the processes and procedures for effectively conducting a safety analysis are discussed. Analyzing existing conditions, determining high crash locations, and determining the effectiveness of the action proposed are discussed.

6.3.2 Fundamentals of Safety Analysis

Safety Information

The primary source of data for safety analysis is police crash reports. These data include crashes for which a police record exists, typically in which a fatality, injury, or property damage greater than $1,000 has occurred. The threshold for reported crashes was changed in 1997 from $500 to $1,000. When evaluating crash data before 1997, care must be taken to account for this difference. Police crash reports may be obtained for minor crashes where police were called to the

scene and a report was created. Such reports may be found through local jurisdictions, such as the county sheriff's office, and may not be forwarded to the state database. Crash reports should include the conditions and circumstances of the crash and classify the crash according to severity and type.

Crash data are portrayed visually in several ways. A crash "spot map" may be produced with a symbol on the street map at the location of each crash. Different symbols may be used to depict different types of crashes, time of day, weather conditions, or other pertinent factors. Vertical bars may be added to a street map with the height of each bar proportional to the number of crashes. Another widely used visual tool is a "collision diagram." In a collision diagram, each crash (usually at an intersection) is depicted by an arrow showing the crash location and direction of travel, and a symbol showing crash type (such as angle, sideswipe, rear-end, and so forth). Information on date, time, and weather conditions for each crash is often added to the diagram.

Iowa DOT maintains a traffic database called TraCS that creates a database at the local enforcement office and transmits the data electronically to the Motor Vehicle Division statewide DB2 database. TraCS has limited geographic information system (GIS) functionality insofar as it uses a Location Tool that enables law enforcement personnel to point and click incident locations on a map. A software development consultant updates, maintains, and enhances TraCS.

SAVER is an analysis tool that primarily uses the crash records from the DB2 database. However, a tool has been created to convert the TraCS local database to SAVER format for both crashes and citations. SAVER is an analysis tool that enables mapping, querying, reporting and visualization of safety data, with the intent of accessing all data with relation to safety concerns. Refer to the Iowa DOT crash analysis resources website—http://www.dot.state.ia.us/crashanalysis/—and the SAVER link on that page.

Key data of interest include the location of the crash, time of day, severity, type, or basic characteristics, environmental conditions, vehicle characteristics, and driver characteristics:

Crash location is noted by milepost reference. Most police reports reference a crash location to a nearby intersection or other landmark. The milepost is determined only when entered into the database unless police jurisdictions use global positioning system or similar technologies. Of greatest interest is the location of the crash relative to major highway features, such as an intersection, highway curve, exit or entrance ramp, or bridge. Reference to inventories of highway geometric features is necessary to establish this relationship. Care should be taken when using location information as the locations are often estimated.

Time of day of the crash is also important. It is reported in military time.

Severity of crashes is defined in three categories: fatal, injury, and property damage only. Fatal crashes are those in which one or more fatalities occur. Injury crashes can be broken down into three categories based on injury severity: major injury, minor injury, or possible injury. Major injury crashes are those resulting in incapacitating injuries, such as paralysis. Minor injury crashes are those related to nonincapacitating but visible injuries, such as abrasions, bruises, and swelling. Possible injury crashes are those likely resulting in injuries that are not visible. Property damage only crashes are those for which at least $1,000 in damage occurred, but no injuries or fatalities were reported. Care should be taken in use of police crash reports from before 1997 because of the change in the reporting threshold from $500 to $1,000.

Iowa DOT crash records provide information on the type of crash and the manner of the collision. The type of crash indicates the type of collision, such as a rear-end collision, a sideswipe collision, or a single vehicle crash. Classification of crash type can aid in identifying the overall cause of the crash and in turn assist in the identification of countermeasures. For example, a high occurrence of right angle crashes at an intersection may indicate inadequate sight distance. Crashes are classified according to type such as the following:

- Fixed object
- Angle and turning
- Head-on
- Rear-end
- Right angle
- Same direction sideswipe
- Train–vehicle
- Pedestrian–vehicle

Crash data also provide information on the number of vehicles involved in each crash (single vehicle versus multiple vehicles). Single vehicle crashes are more typical of low volume rural roads, where vehicle-to-vehicle conflict points are minimized. Single vehicle crashes generally are off road. In some parts of the state, numerous crashes with deer occur. These are considered single vehicle crashes. Multi-vehicle crashes are more common on high volume urban roads. For example, where a median crossover may result in a multi-vehicle crash on high-volume roads, the same median crossover most likely would result in a single vehicle crash on a low volume road because of the lower probability of another vehicle on the road. Multivehicle crashes also are more common where there is a large concentration of conflict points, such as at an intersection.

Environmental conditions are those that may be related to the crash and include the following:

- Light conditions (day, night, dawn/dusk, presence or absence of illumination)
- Weather conditions (clear, rain, snow, ice)
- Pavement conditions (dry, wet, icy)
- Visibility (fog, glare)
- Conditions of drivers and pedestrians (drowsy, asleep, under the influence of drugs or alcohol)

Other data are available from police crash reports, such as vehicle condition, driver actions (first harmful event, maneuvers, etc.), milepost/node numbers and direction, and driver age. These may offer some insights to designers, but the quality or reliability of such information may vary significantly.

Unreported Crashes and Near Misses

Many crashes are unreported and typically are minor property damage only crashes below the reporting threshold. A near miss is a crash that was avoided by evasive action. While unreported crashes and near misses are not recorded in the crash database, they may be indicative of locations with unsafe conditions. Other sources of information may help identify where unreported crashes and near misses occur.

Other Sources of Safety Information

Police crash reports provide the best available data for substantive safety analysis, but other sources of information also exist. Other sources of information include interviews with stakeholders and first responders, and also maintenance records. Area stakeholders, such as residents/business owners and frequent drivers of the area, have firsthand knowledge of the area and can identify locations perceived to be unsafe. Although information gathered from stakeholders is only perceived information, it can help identify potential problem locations. A more detailed interview can help define the cause of the perceived safety concern and in turn help define what the leading cause of the safety problem is, such as large turning volumes, inadequate signal timing, or inadequate sight distance. Perception can also be based on a high occurrence of near misses. Public perception should be verified through the use of technical safety analysis.

First responders, such as emergency medical services and the police, have firsthand knowledge of the area they serve. They can help identify high crash locations by identifying locations to which they are frequently called. They also are aware of locations where the most severe crashes occur.

Maintenance records are helpful in identifying locations with a high number of unreported crashes. For example, records of guardrail repairs provide insights to unreported run-off-road crash risks.

Traffic citation patterns are an additional source of data for identifying potential safety problems in an area. Traffic citations identify behavior patterns that may result in crashes and can include speeding

violations, stop sign noncompliance, jaywalking, improper parking, etc. Comparing high citation locations with high crash locations may identify locations with an immediate need.

Video cameras can be used to identify locations with near misses. Based on input from stakeholders concerning the perceived safety problems at an intersection or along a particular segment of highway, video cameras may be installed to record traffic patterns. Video cameras already in place for congestion management can be used to identify safety problem areas. The cameras will capture conflicts, near misses, and actual crashes. Video also can be reviewed and incidents recorded by time. Video data are an additional source where other data are unavailable or when public perception does not match safety analysis results.

Concepts of Risk and Exposure

In safety analysis, the concepts of risk are related to the level of exposure to potential crashes. Exposure is the level of opportunity for a crash. Three factors contribute to risk: traffic volume, time of day, and highway facility characteristics.

The single best measure of exposure and risk is traffic volume. As the traffic volume increases, the potential for a crash also increases. This relationship is nonlinear, but traffic volume nonetheless remains the most important data to help characterize exposure to potential crashes on a particular segment of highway.

Time of day is another measure of risk and exposure. During peak periods, traffic volumes increase creating a greater exposure to potential crashes. Also, during non-daylight hours, visibility is reduced, increasing the risk of crashes caused by poor visibility.

Highway characteristics define the other contributor to risk. Two fundamental types of risk are related to highway characteristics: length-related and point-related. Conflict points occur where the potential exists for a crash, such as at intersections, areas with lane change maneuvers, interchange ramps where opposing movements may occupy the same position on the roadway, and areas with speed changes, traffic control devices, and other driver distractions. Analysis of conflict points for proposed countermeasures may aid in identifying safety benefits. For example, the elimination of a weave section would remove conflict points, potentially improving the safety of that section.

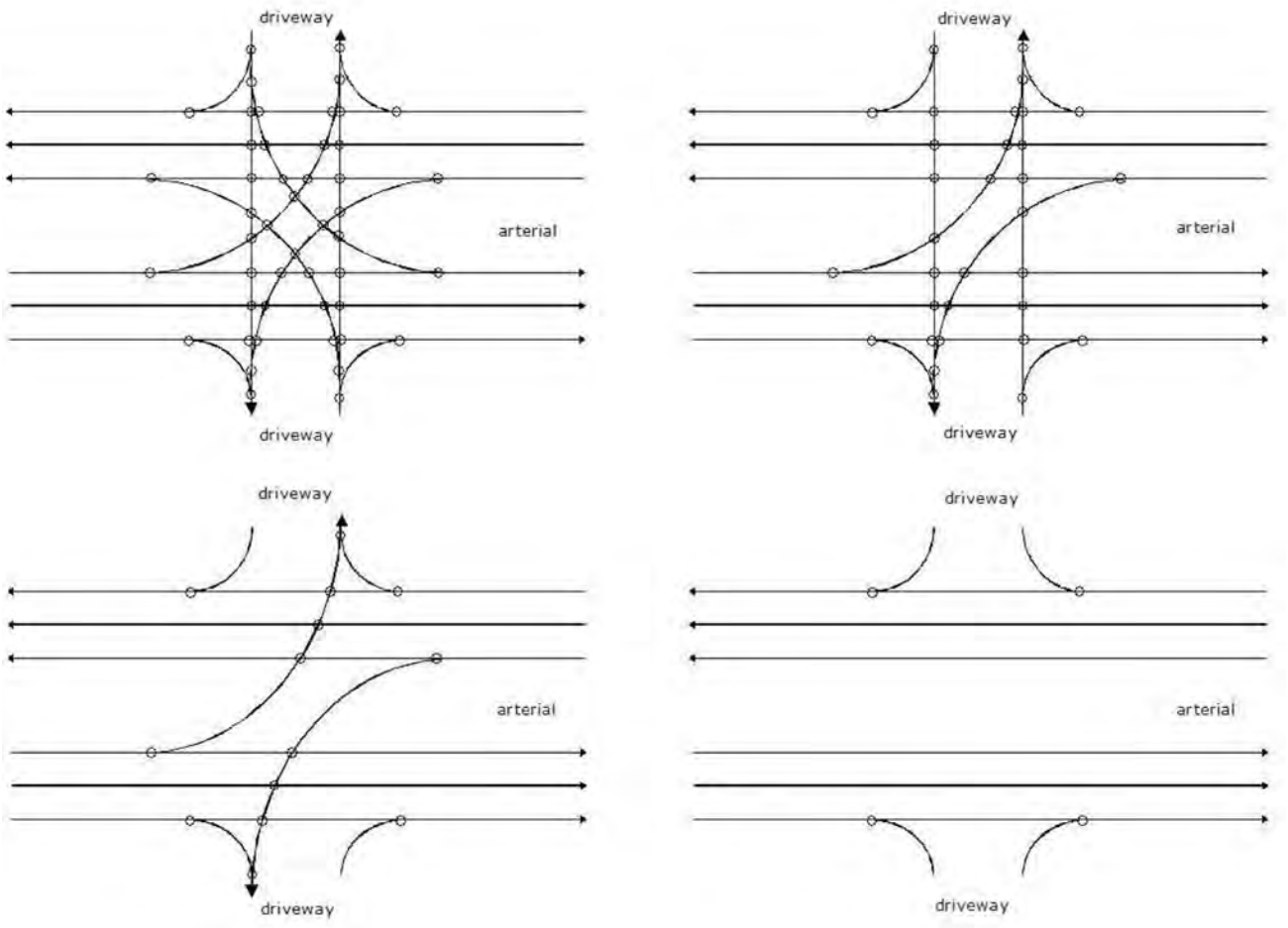
For the purpose of safety analysis, intersections are defined as the area where two roadways cross (the common pavement they share) and a 250-foot length of each roadway segment approaching the intersection. Conflict points associated with an intersection include through traffic, turning movement traffic (left turn versus the opposing through movement), and changes in speed related to the approach to an intersection. Exhibit 6-1 shows typical intersection conflict points. Intersection control is also a measure of the type of exposure to a potential crash. Depending on the intersection control, different exposures to different types and severity of crashes may exist. Other elements of design affect the level of exposure at an intersection, such as roadway cross section, free flow right turns, turn lanes, right-in/right-out restrictions, and signal phasing.

Intersections represent one type of spot or point location. Other types of spot locations include isolated curves, bridges, and railroad crossings. Not all spot locations may be studied independently. A spot location may be included in a segment based on available data, crash history, or other factors. A segment is then defined as the length of roadway between two spot locations. The length of segments should be confined to homogeneous sections in terms of geometry and traffic. This is done to ensure an accurate correlation between safety characteristics and contributing road characteristics. At a gross level, general road and volume characteristics should be consistent over large segments with the benchmark of comparison. For example, a segment could be compared to a benchmark for a rural area.

Key Safety Indicators

Two ways of describing safety—crash rates and crash frequency—are explained below. Both are based on the measures of exposure to potential crashes defined from historical data and are used in comparison to a predefined benchmark to determine high crash locations.

Exhibit 6-1
Typical Intersection Conflict Points



Crash Rates

Crash rates are a means of determining or characterizing the substantive safety of a highway point location or highway segment. Comparing the calculated rate to a benchmark rate identifies locations with safety concerns. Crash rates commonly are defined as the number of crashes per unit of exposure as defined by time, length of segment, and type of highway. For highway segments, this typically is expressed as crashes per 100 million vehicle miles. For intersections, it is typically crashes per million vehicles entering the intersection.

A crash rate should be calculated for a homogeneous segment of highway; that is, a segment with common characteristics (number of lanes, type of access control, lane and shoulder width, constant traffic volumes, and surrounding area type). The data needed for the rate calculation are as follows:

- Number of reported crashes (usually for a 3- to 5-year time period)
- Average daily traffic volumes for an intersection or roadway segment
- Location type, either the type of intersection or functional class of a segment
- Area type: rural or urban
- Segment length, if a roadway segment is being evaluated

Care should be taken in computing crash rates. As crashes are rare events, best practices suggest using a multi-year analysis period (3 to 5 years) and segment length of at least 0.5 mile but no longer than 4 miles. The analyst should make sure that no significant changes in roadway characteristics or traffic volume occurred during the period being studied.

The following equations[3] are used to calculate crash rate:

For intersections

(EQ1)

$$CR = C/[(Sum(ADTs)/2) \times N \times 365 \times 10\text{-}6]$$

If, for example, 100 crashes occurred over a 5-year period and the ADTs on the intersection legs were 10,000, 15,000, 20,000, and 25,000, the crash rate (CR) would be calculated as follows:

(EQ2)

$$CR = 100/[(10{,}000 + 15{,}000 + 20{,}000 + 25{,}000)/2) \times 5 \times 365 \times 10\text{-}6] = 1.57 \text{ crashes/MEV}$$

For segments

(EQ3)

$$CR = C/[ADT \times 365 \times N \times L \times 10^{-8}]$$

If, for example, 100 crashes occurred over a 5-year period, the ADT is 20,000, and segment length is 2.0 miles, the crash rate would be calculated as follows:

(EQ4)

$$CR = 100/[20{,}000 \times 365 \times 5 \times 2.0 \times 10^{-8}] = 137 \text{ crashes/HMVM}$$

CR = crash rate expressed as crashes per 100 million vehicle miles traveled (HMVM) for segment and per million entering vehicles (MEV) for intersections

C = number of crashes during study period

N = number of years of study period

Sum(ADTs)/2 = sum of all average daily traffic entering the intersection

ADT = average daily traffic

L = length of segment (mi)

Comparing crash rates is one method of comparing the substantive safety performance of roads with differing traffic volumes or length. Care should be taken in comparing roadways with significantly different characteristics. Crash rates will differ by type of highway, location, and control.

Research has confirmed that total crash rates vary with ADT. Normalizing crash frequencies with exposure estimates causes rates to appear to be continuous random variables instead of discrete, random events.[4] Rates are based on linear methods that tend to overstate safety problems for high volume locations and understate safety problems for low volume locations. Low volume roads with crash frequencies of small integer values near zero, as typically found on low volume rural roads, do not follow a normal distribution as assumed by linear methods and are therefore not characterized accurately through the use of rates.

Crash Frequency

To compute actual crash frequency, the data requirements are the number of crashes over a historic period, usually 3 to 5 years. Frequency is the number of crashes divided by the number of years to achieve a value of crashes per year.

A method of determining the substantive safety of a facility is to compare the actual historic crash frequency to an expected crash frequency. Crash predictions models are used to calculate an expected crash frequency. The data requirements for the crash prediction models include traffic volumes (ADT), facility types, and any specific input values that the data prediction model lists as variables. Different models have been created for different facility types and can include a wide range of additional variables beyond ADT. Many prediction models have a simpler form in which ADT is the only variable. Assumptions were made regarding the other variables arriving at a constant value. For segments, the crash frequency should be divided by length of roadway to provide frequency on a per-mile basis (or 10-mile, etc.) for accurate comparison among segments.

[3] D. W. Harwood, F. M. Council, E. Hauer, W. E. Hughes, and A. Vogt. Prediction of the Expected Safety Performance of Rural Two-Lane Highways. Report FHWA-RD-99-207. FHWA, U.S. Department of Transportation. 2000.

[4] K. M. Bauer and D. W. Harwood. Statistical Models of At-grade Intersection Accidents. Report FHWA-RD-96-125. FHWA, U.S. Department of Transportation. 1996.

There are many crash frequency prediction models that apply to similar and alternative road configurations.[5] The models are deterministic, meaning that for a given set of inputs, the output is always the same. Since actual crash frequencies vary from year to year, the model-predicted frequency should be used as an average expected value.

The prediction models output a number of expected crashes per year that can be compared to the number of actual crashes per year. Locations where the actual value is significantly higher than the expected value could be labeled as high crash locations.

When crash history is not available for a proposed facility, an alternative method for describing traffic safety considers frequency of crashes expected to occur over a given time period. One may be interested in comparing, for example, the relative safety benefits of constructing a long bypass around a town versus maintaining a short segment through town. Computing the expected crash frequencies per year for each alternative, using models similar to those listed above, is one way to compare two alternatives.

Benchmarks

A benchmark is a predefined value that can classify a location as a high crash location. The benchmark used is based on the type of analysis. The benchmark for a rate analysis may be the statewide average rate or critical crash rate for classifying a segment or intersection. Current benchmark crash rates may be obtained from the Iowa DOT Office of Traffic and Safety. The frequency method could be compared to a statewide average frequency or critical frequency, or to a computed predicted crash frequency for the particular location. When comparing crash history to a benchmark, care must be taken to compare the location to an equivalent benchmark based on the classification of the location, such as rural versus urban, facility type, control type, access control, and volume.

Crash Data Variability

Safety analysis is based on the computations and statistical analysis of random events over time. Crash data are inherently incomplete and variable for type and time. Understanding the data and statistical trends of crashes are key factors in identifying high crash locations and necessary improvement actions.

Variability and Quality of Data

Crash data often can be incomplete and variable. Iowa has a standard police crash report form as of 2000, but different agencies within the state may have varying methods of completing the form and of filing and maintaining crash records. Reporting errors and inaccurate reporting of crash locations are common. Along with inaccurate and incomplete crash data, geometric and traffic data for study locations may not be current or properly inventoried. Also, geometric and traffic data may not be for a time period consistent with crash data. Other sources of information can supplement the basic data provided through the typical reporting mechanism. Site visits and traffic counts may be conducted to collect geometric and traffic information.

Variability of Crash History

Crashes are random events that can occur at any location at any time. Given their random nature and their relationship to many environmental, geometric, and driver/vehicle conditions, crashes can vary over time. A short period of time (1 year or less) is not a desirable study period for crash analysis. Seasonal changes in weather and travel patterns also have an effect on the potential for crashes. Other changes from year to year affect the crash rate/frequency, such as an unusually snowy winter. For Iowa DOT projects, 5 years of crash data are suggested for crash analysis, but a 3-year period can be requested for locations with high volumes (greater than 3,000 ADT) or if a traffic operational change has occurred, preventing a full 5 years of data from being analyzed accurately.

[5] Bauer, K. M., and D. W. Harwood. Statistical Models of At-grade Intersection Accidents. Report FHWA-RD-96-125. FHWA, U.S. Department of Transportation, 1996; A. Vogt. Crash Models for Rural Intersections: Four-Lane by Two-Lane Stop-Controlled and Two-Lane by Two-Lane Signalized. Report FHWA-RD-99-128. FHWA, U.S. Department of Transportation, 1999; D. W. Harwood, F. M. Council, E. Hauer, W. E. Hughes, and A. Vogt. Prediction of the Expected Safety Performance of Rural Two-Lane Highways. Report FHWA-RD-99-207. FHWA, U.S. Department of Transportation, 2000. James A. Bonneson and Patrick T. McCoy. Capacity and Operations Effects of Midblock Left-Turn Lanes. In National Cooperative Highway Research Program Report 395, TRB, National Research Council, Washington, DC, 1997.

Equation	Equation Number
Two-Way Stop Controlled—Three Legs (2 lane × 2 lane)	
$N_{bi} = \exp(-10.9 + 0.79\ln(ADT_1) + 0.49\ln(ADT_2)$	(EQ5)
Two-Way Stop Controlled—Four Legs (2 lane × 2 lane) **All-Way Stop Controlled—Four Legs (2 lane × 2 lane)**	
$N_{bi} = \exp(-9.34 + 0.60\ln(ADT_1) + 0.61\ln(ADT_2)$	(EQ6)
Signalized Intersections—Three Legs (2 lane × 2 lane) **Signalized Intersections—Three Legs (4 lane × 2 lane)** **Signalized Intersections—Four Legs (2 lane × 2 lane)** **Signalized Intersections—Four Legs (4 lane × 2 lane)** **Signalized Intersections—Four Legs (4 lane × 4 lane)**	
$N_{bi} = \exp(-5.73 + 0.60\ln(ADT_1) + 0.20\ln(ADT_2)$	(EQ7)
Equations for variables 5 through 7: N_{bi} = predicted number of total accidents per year ADT_1 = major Roadway ADT ADT_2 = minor Roadway ADT	
Two-Way Stop Controlled—Three Legs (4 lane × 2 lane)	
$\hat{y} = \text{Number of years} \times (ADT_1)^{1.148} \times (ADT_2)^{0.262} \times \exp(-12.220)$ $\times \exp(-0.0546 \times Medwidth1 + 0.0391 \times Nodrwy1)$	(EQ8)
Two-Way Stop Controlled—Four Legs (4 lane × 2 lane) **All-Way Stop Controlled—Four Legs (4 lane × 4 lane)**	
$\hat{y} = \text{Number of years} \times (ADT_1)^{0.850} \times (ADT_2)^{0.329} \times \exp(-9.463)$ $\times \exp(-0.110 \times PK\%Left1 - 0.484 \times LTLNIS)$	(EQ9)
Variables for equations 8 and 9: $\hat{y}$ = predicted mean number of intersection-related crashes ADT_1 = major road ADT ADT_2 = minor road ADT Medwidth1 = major road median width in feet Nodrwy1 = number of residential and commercial driveways on major road within 250 feet of intersection center PK%Left1 = percentage of major road traffic turning left LTLN1S = 0 if major road has no left-turn lane; 1 if major road has at least one left-turn lane	

Equation	Equation Number
Two-Lane Segments	
$N_{br} = (ADT)(L)(365)(10^{-6})\exp(-0.4865)$	(EQ10)
Variables for equations 10:	
N_{br} = predicted number of total accidents per year	
ADT = roadway ADT	
L = roadway length (mi)	
Four-Lane Raised Curb/Divided Segment	
$A_R = ADT^{0.910} Len^{0.852} \times e^{(-15.162-0.296 I_{b/o}-0.596 I_{r/i}+0.00478(DD+SD) I_{b/o}+0.0255 PDO)}$	(EQ11)
Four-Lane Two-Way Left Turn Lane	
$A_T = ADT^{0.910} Len^{0.852} \times e^{(-15.162-0.018 I_{b/o}+0.093 I_{r/i}+0.00478(DD+SD) I_{b/o}+0.0255 PDO)}$	(EQ12)
Four-Lane Undivided	
$A_U = ADT^{(0.910+1.021 I_{r/i})} Len^{0.852} \times e^{(-15.162-10.504 I_{r/i}-0.570 I_{park}+0.00478(DD+SD) I_{b/o}+0.0255 PDO)}$	(EQ13)
Variables for equations 11 through 13:	
A_R = annual accident frequency for raised median segments	
A_T = annual accident frequency for TWLTL segments	
A_U = annual accident frequency for undivided segments	
ADT = roadway ADT	
Len = roadway length (ft)	
$I_{b/o}$ = indicator variable for business or office land uses (1.0 for business/office; 0 otherwise)	
$I_{r/i}$ = indicator variable for residential or industrial land uses (1.0 for residential/industrial; 0 otherwise)	
I_{park} = indicator variable for parallel parking (1.0 for if allowed; 0 otherwise)	
DD = driveway density (two-way total,) in driveways/mile	
SD = unsignalized public street approach density (two-way total) in approaches/mile	
PDO = property damage only accidents as a percent of total accidents	

Another time-related function of crash data is the "regression to mean" phenomenon. The phenomenon describes the time variability of crash data. A particular location may experience a high number of crashes one year and low number of crashes the next. If safety analysis were based solely on 1 year of data, the location would be classified as a high crash location the first year but not the second. For this reason, a long period for historic data is used as a better representative of the actual or average crash trends. Similarly, if a corrective measure is taken at an identified high crash location, the resulting reduction in crashes may not be caused by an improvement but by the regression to mean phenomenon. Conclusions on the effectiveness of corrective actions should be made only after a study of adequate duration.

6.3.3 Relating Safety to Design or Other Actions

Characterizing Crashes

An initial step in a study of a highway or intersection should be the characterization of crashes. This involves summarizing the type, severity, and environmental factors contributing to the crash. Crash types and measures of exposure are discussed above.

Introduction

Substantive safety analysis provides important information to support design and traffic operational decision-making. When an action is proposed at a specific location, designers, officials, and the public want to know the resulting effects on safety. For example, if turn lanes are added at an intersection, one will want to quantify the expected modification in number of crashes (or modification in number of certain type of crash) at this location. This can be done using crash modification factors.

Accident Modification Factors

The quantitative or substantive safety effectiveness of an improvement or alternative being considered should be estimated wherever possible. Accident modification factors (AMFs) are used to quantify the change in the number of crashes given a specific improvement. AMFs are derived from research studies. They may apply to total crashes or to a select classification of crashes. For example, an AMF expressing the effectiveness of adding illumination to an unlit intersection would only apply to night crashes.

Note that certain potential actions may reduce crashes of one type but result in an increase in expected crashes of another. Examples include placement of a guardrail and adding a median barrier. An AMF value less than 1.0 means a reduction in crashes is expected; a value greater than 1.0 suggests an expected increase in crashes. For this reason, accident modification factors are preferred to crash reduction factors. Accident modification factors and crash reduction factors are linked by the relationship CRF = 1 - AMF. AMFs can be applied to either rates or frequencies. The basic equation is:

(EQ14)

$$Nafter = Nbefore(AMF)$$

where:

Nafter = number of crashes after the action item hasbeen installed

Nbefore = number of crashes before action

AMF = accident modification factor for proposed action

For example, if a segment of highway had 100 crashes of a certain type and the AMF for a countermeasure to avoid that type of crash is 0.85, it would be expected that the number of crashes would be reduced to 85 after application of the countermeasure. If more then one action is proposed for a location (e.g., flatten a curve and widen a shoulder), the AMF can be combined to create an overall AMF using the equation:

(EQ15)

$$AMFcom = 1-[(1- AMF1) \times (1- AMF2) \times (1- AMF3) \ldots]$$

AMFs for Design and Operational Improvements

Tables 6-1 and 6-2 show AMFs recommended for use in Iowa for design and operational improvements. This document does not discuss why a specific improvement has an effect on safety. These representative AMFs are presented for common improvements.[6]

6.3.4 Process and Procedures for Safety Analysis

Safety analyses can be conducted as a specific study or as an element to a project. The type of study and level of analysis should be tailored to the problem and location being considered. With consideration of both nominal and substantive safety, this section provides an overview of safety analysis procedures.

[6] Transportation Research Board, Report Series 500, Guidance for Implementation of the *AASHTO Strategic Highway Safety Plan*, National Cooperative Highway Research Program, Washington DC. various dates; U. S. Department of Transportation and Institute of Transportation Engineers, *Safety Issue Briefs*, Washington DC, April 2004.

Table 6-1

Accident Modification Factors: Spot Location Improvements			
		Service Life (years)	Accident Modification Factor
Intersections			
	Add signals	15	0.8
	Upgrade signals	15	0.85
	Channelize / add turning lanes	15	0.75
	Improve sight distance	15	0.65
	Upgrade signs / markings	6/2	0.64
	Illuminate	15	0.8
	Add acceleration / deceleration lane	20	0.75
	Rumble strips (applies only to accidents involving stop)	A.C. = 5 P.C. = 10	A.C. = 56 P.C. = 56
	Reconstruct approach angle	20	0.65
	Add beacons	10	0.75
Curves			
	Vertical realignment	20	0.43
	Horizontal realignment	20	0.62
	Horizontal / vertical realignment / correct superelevation	20	0.27
	Pavement markings / delineate	2/6	0.85
Bridges			
	Widen	20	0.52
	Guardrail	15	0.76
	Impact attenuator	10	0.65
	Replace	50	0.5
	Eliminate	50	0.25
Culverts			
	Lengthen	20	0.52
	Guardrail or gate	15	0.76
	Remove headwall and delineate (outside shoulder line)	20	0.65
Railroad crossings			
	Add signals	10	0.5
	Upgrade warning devices	10	0.73
	Illuminate	15	0.38
	Replace with grade separation	50	0.61
	Eliminate	50	0.25
High fills			
	Guardrail	10	0.84
	Delineate	6	0.9
	Flatten foreslopes	20	0.75
Source: Iowa DOT Office of Traffic and Safety, January 2000.			

Table 6-2

Accident Modification Factors - Rural Roadway Section Improvements		
	Service Life (Years)	Accident Modification Factor
Add Lanes	20	0.95
Widen Pavement	20	0.78
Widen Shoulder	20	0.92
Widen Pavement / Shoulder	20	0.72
Flatten Foreslopes	20	0.92
Widen Shoulder / Flatten Foreslopes	20	0.85
Friction Improvement		0.73
Overlay	10	0.86
P.C. Grooving, Diamond Profiling, Texturing	6	0.95
Signing	2	0.96
Edgeline Markings	20	0.75
Horizontal Realignment	20	0.7
Horizontal / Vertical Realignment / Correct Superelevation	20	0.55
Roadway Lighting	15	0.94
Relocate Driveways	20	0.95
Flatten Entrance Slopes	20	0.95
Right-of-Way	100	—
Source: Iowa DOT Office of Traffic and Safety, January 2000.		

Basic Data Requirement

When performing a safety analysis, the following data are required depending on the study intent:

- Traffic data
- Crash data
- Geometric data
- Benchmark/comparison statistics data

The following sections describe these data. Section 6.4 provides additional detail on data collection procedures.

Traffic Data

For most safety studies, ADT data, including classification of traffic (truck, passenger car) are adequate. For intersections, the all day approach volume (ADT divided by 2) for each approach leg is needed for a summation of total entering traffic. ADT should be obtained for roadway segments. Where concerns over specific patterns of crashes are evident, additional information such as time of day traffic volume distribution data, monthly distribution, or weekly distribution data may be needed.

If the safety analysis includes an evaluation of future performance, forecast traffic is needed to determine the crash statistics. The forecast traffic data should be in the same format with the same definition as the existing traffic data.

Crash Data

Crash data at locations of interest for the most recent 3 to 5 years should be obtained. The data should include information on severity, type, and conditions at the location. At a minimum, the following data are desirable:

- Crash location (road and cross road names where applicable)
- Date and time of day
- Severity classification
- Collision type (rear-end, sideswipe, fixed object)
- Weather conditions
- Surface conditions

Geometric Data

The geometry of the location to be studied is also required. The type of information required depends on the desired safety analysis method used. The frequency crash prediction models may require more detailed knowledge about the geometry of a location than the crash rate analysis. At a minimum, the following information is desirable for roadway segments:

- Road name
- Functional classification
- Number of lanes
- Access control
- Location (urban, rural)

The following information is desirable for intersections:

- Road names (street and cross street)
- Number of legs
- Number of lanes per leg and lane restrictions (right-turn, left-turn, through)
- Traffic control type
- Geometric conditions
- Access control
- Location (urban, rural)

Benchmark / Comparison Statistics Data

Statewide crash rates/frequencies or other comparison statistics may be needed as a benchmark to identify high crash locations. For rates, this is the statewide average or critical rate for comparable locations. For the frequency prediction method, the expected crash frequency will be computed at each location. This will serve as the benchmark for identifying high crash locations.

Developing a Substantive Safety Profile

To understand the substantive safety (existing safety performance) of a location, a safety profile should be created. The profile is a graphical tool used to represent the crash patterns of a location, either segment or intersection, and to identify high crash locations.

Segments

The segment substantive safety profile divides the corridor into smaller subsegments, typically 0.5 mile in length, and plots the crash rate/frequency of the subsegments. The average or expected crash rate/frequency can be drawn identifying those locations with a crash rate or frequency higher then the benchmark at high crash locations. Exhibit 6-2 represents a sample safety profile for a segment.

A higher crash rate for segments including intersections is not uncommon. The large quantity of crashes at these locations is a function of the intersection, not of the segment. A more detailed intersection substantive safety profile will assist with the identification of safety issues related to the intersection.

Intersections

At intersections, the substantive safety profile consists of collision and condition diagrams. The diagrams should be drawn for the full extent of the intersection, as described in Section 6.3.2.

A collision diagram is a graphical representation of all crashes that occurred at the intersection over the analysis period. The varying types of crashes are represented by a set of predefined symbols (see Exhibit 6-3). The symbols are placed as accurately as possible to the location of the crash and one symbol is used for each crash. More than one crash may occur at a particular location within the intersection, and the symbols representing a group of crashes are placed as close together as possible. The diagram can then be used to define recurring patterns and any safety problems. Exhibit 6-4 represents a sample collision diagram.

Exhibit 6-2
Sample Safety Profile Segment

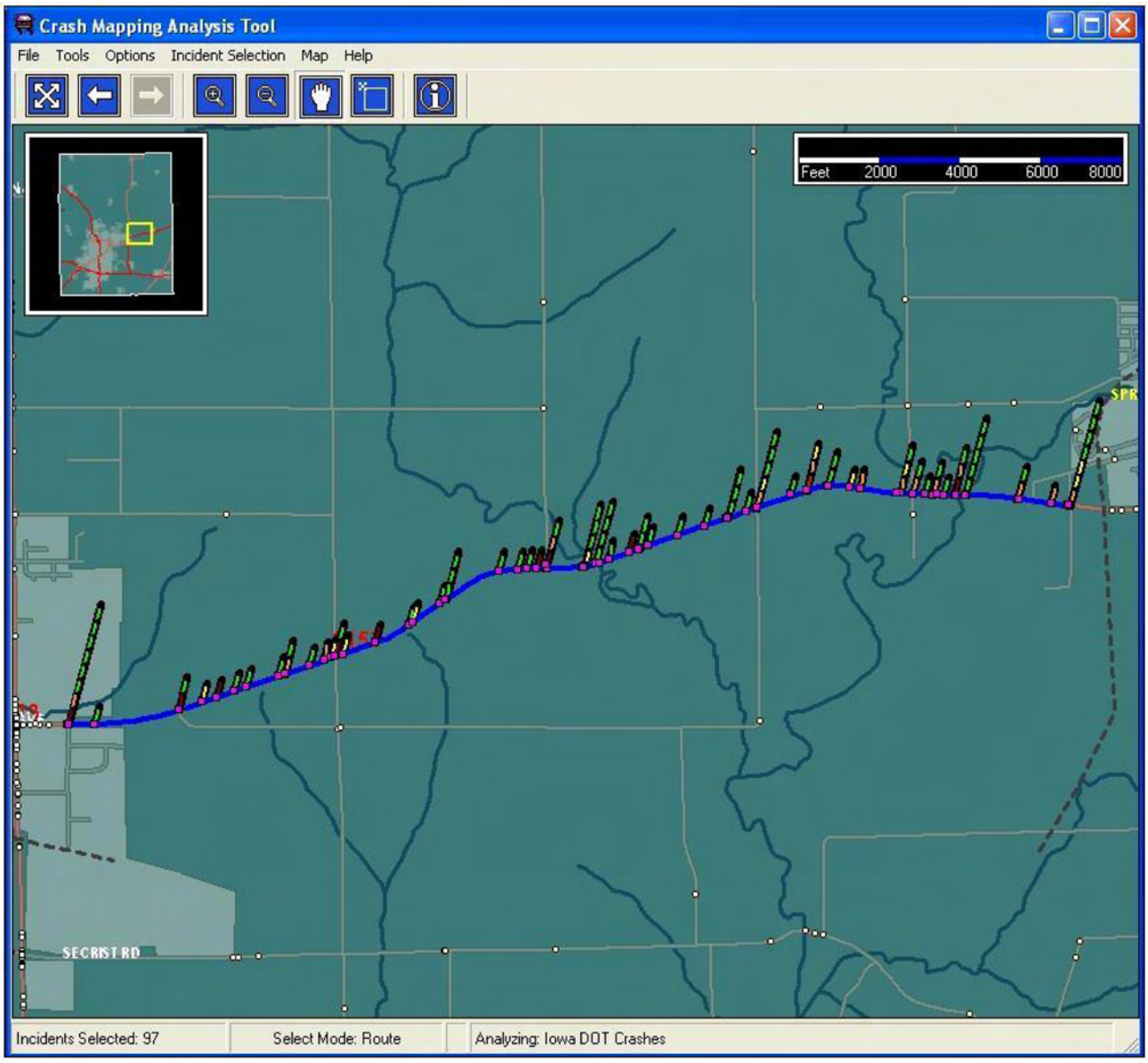
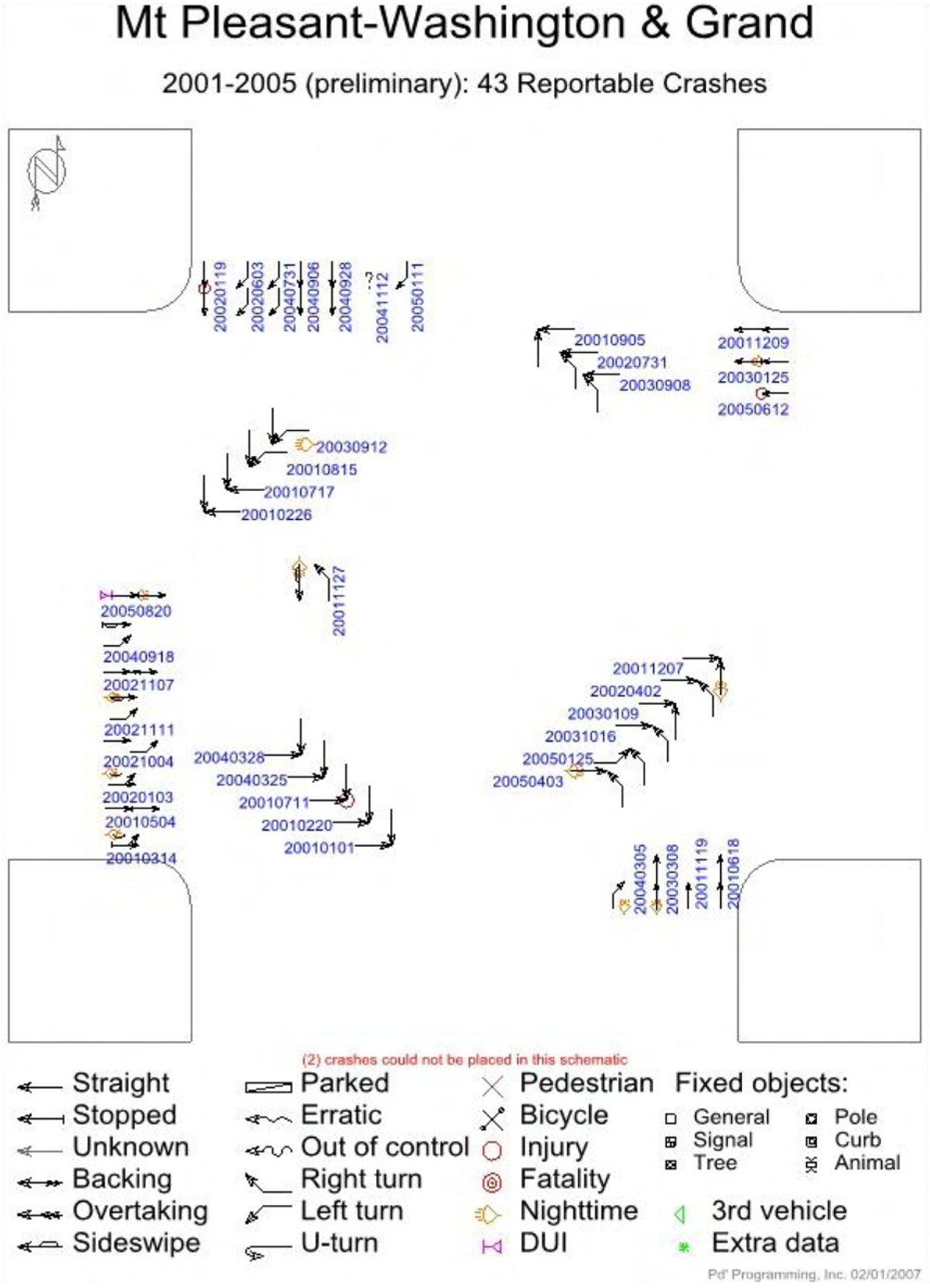


Exhibit 6-3
Collision Diagram Symbols

Exhibit 6-4
Represents A Sample Collision Diagram



A conditions diagram is produced to illustrate the physical and environmental features at the intersection. It shows the geometric, signing, lighting, traffic control features of an intersection, and all the roadside environmental features such as trees, shrubs, buildings, and utility poles. For the condition diagrams, sight triangles can be drawn for locations with suspected sight distance problems. A sight triangle is drawn from the location of a vehicle along one roadway where the sight distance of another vehicle on the opposing roadway becomes critical.

Identifying High Crash Locations

This section describes three methods for identifying high crash locations: graphical method, rate method, and frequency method.

Graphical Method

With the safety profiles complete, the relationship of the crash history to statewide averages or expected crash frequencies developed for each location can be made. For a segment, the safety profile highlights areas where the rate/frequency is high compared to neighboring locations and to the predefined benchmark. The comparisons can be made for all crashes or for crashes categorized by type or severity.

For intersections, the overall rate/frequency or severity/crash type rate/frequency can be compared to the chosen benchmark. For example, a rate may be compared to a statewide average rate for similar locations or to the calculated expected crash frequency. The collision diagram can be used to represent the types of crashes that are most common within an intersection or particular leg of an intersection.

Crash Rate Method

With the crash rate method, the following steps can be applied:

1. Determine the crash rate, as described in Section 6.3.2.
2. Define the location by type. Categorize the location by area type (urban/rural), roadway functional class (for an intersection use the highest functional class), number of through lanes, predominant traffic control (intersection uses signalized or stop control, segments use speed limit), and ADT. These categories may be recategorized into broader groups based on lack of data or lack of an appropriate comparison benchmark. Other data needed as well are listed in the *Highway Capacity Manual* (HCM).
3. List the locations of interest in descending order. Maintain separate list for the categories mentioned in step 2.
4. Determine crash rate (can be statewide average rate).
5. Compare the crash rate at each location to the "critical crash rate." If the crash rate equals or exceeds the critical crash rate, that location is identified as a high crash location.

Crash Frequency Method

With the crash frequency method, the following steps can be applied:

1. Determine the crash frequency (crashes per year) for the locations in the study, as described in Section 6.3.2.
2. Determine the expected crash frequency for the same locations using appropriate model.
3. Determine the difference between the expected crash frequency and actual crash frequency.
4. List the locations in descending order by the calculated difference or expected and actual crash frequency.

Determine Effectiveness of Action

With the high crash locations identified, probable causes and design deficiencies can also be identified. For high crash segments, a review of the area within the segment with a confluence of crashes, as well as a review of what the types and severity of these crashes are, can aid in identifying the presence of contributing factors such as inadequate sight distance, need for additional signage, or roadside safety hazards. For intersections, the collision and condition diagrams can be used jointly to identify factors that contribute to crashes. Tables 6-3 and 6-4 illustrate the possible cause for identified crash patterns.

Crash Countermeasures (Key to Table 6-3)

Once the primary cause or causes have been identified, the safety improvement measures can be explored. Some improvements may be driven by nonsafety considerations that may also be evaluated for effect on safety; for example, improvements needed for capacity enhancements. The effect of possible safety improvement measures can be quantified through the use of crash modification factors as described above.

The crash modification factor is applied to the historic rate or frequency to determine the number of crashes for the modified location.

This method determines the anticipated substantive safety of the proposed action. Care must be taken to ensure that the proposed action meets nominal safety related to the engineering guidelines set forth in Design Manuals.

Table 6-3

A Summary of Accident Countermeasures

Accident Pattern	Probable Cause	Possible Countermeasures
Left-turn, head-on	A	1–11
	B	3, 6, 12–15
	C	16, 17
	D	3
	E	15
Rear-end at unsignalized intersection	A	4, 13, 18
	E	15
	F	14
	G	15, 19–22
	H	23
	I	10, 24
	J	25
Rear-end at signalized intersection	A	3, 4, 13, 18
	G	15, 19–22
	H	23
	J	25, 26
	K	12, 14, 15, 27–32
	L	16, 17, 33
	M	34
Right angle at signalized intersection	B	6, 12, 14, 15, 35, 36
	E	15, 16, 37
	H	23
	K	14, 27–32, 38
	L	11, 16, 17, 33, 39, 40
	N	14
	O	2, 11
Night	K	14, 23, 59
	V	14, 59, 89
	X	14, 53, 59, 89
	FF	44, 90
Right angle at unsignalized intersection	B	6, 10, 12, 14, 15, 24, 35, 36, 41, 42
	E	15, 16, 37
	H	23
	N	14
	O	10, 43
	P	44, 45
Pedestrian-vehicle	B	12, 25, 35, 46
	E	14, 15, 45, 47
	H	23
	I	10, 25, 26
	L	11
	P	26
	Q	47, 48
	R	49
	S	14, 15, 47, 50
	T	51–53
Ran off roadway	E	15
	G	15, 19–22
	H	23
	K	54
	U	55–58
	V	14, 53, 59
	W	60
	X	6
	Y	61
Fixed object	E	15
	G	20, 22, 55, 62
	H	23
	T	53
	U	14, 63
	Z	58, 64–67
	AA	68
Parked or parking vehicle	E	15
	T	69
	BB	35
	CC	70
	DD	45, 50, 71
	EE	1, 43
Sideswipe or head-on	E	15, 72, 73
	T	53
	U	1, 55
	W	60
	X	6, 13, 74
	Y	61
	FF	38, 75
Driveway-related	A	13, 18, 35, 55, 72, 76
	B	12, 15, 23, 35
	E	15
	H	23
	GG	77–81
	HH	43, 79, 82
	II	6, 10, 74
Train-vehicle	B	12, 14, 24, 83–85
	E	15
	G	62
	K	23, 54
	T	36, 42, 53
	JJ	11
	KK	86
	LL	87
	MM	88
Wet pavement	G	15, 19–22, 62
	T	53

Source: Traffic Engineering,1998.

Table 6-4

Crash Countermeasures (Key to Table 6-3)			
Key to probable causes			
A	Large turn volume	**U**	Inadequate roadway design for traffic conditions
B	Restricted sight distance	**V**	Inadequate delineation
C	Amber phase too short	**W**	Inadequate shoulder
D	Absence of left-turn phase	**X**	Inadequate channelization
E	Excessive speed	**Y**	Inadequate pavement maintenance
F	Driver unaware of intersection	**Z**	Fixed object in or too close to roadway
G	Slippery surface	**AA**	Inadequate TCDs and guardrail
H	Inadequate roadway lighting	**BB**	Inadequate parking clearance at driveway
I	Lack of adequate gaps	**CC**	Angle parking
J	Crossing pedestrians	**DD**	Illegal parking
K	Poor traffic control device (TCD) visibility	**EE**	Large parking turnover
L	Inadequate signal timing	**FF**	Inadequate signing
M	Unwarranted signal	**GG**	Improperly located driveway
N	Inadequate advance intersection warning signs	**HH**	Large through traffic volume
O	Large total intersection volume	**II**	Large driveway traffic volume
P	Inadequate TCDs	**JJ**	Improper traffic signal preemption timing
Q	Inadequate pedestrian protection	**KK**	Improper signal or gate warning time
R	School crossing area	**LL**	Rough crossing surface
S	Drivers have inadequate warning of frequent midblock crossings	**MM**	Sharp crossing angle
T	Inadequate or improper pavement markings		
Key to possible countermeasures			
1	Create one-way street	**46**	Reroute pedestrian path
2	Add lane	**47**	Install pedestrian barrier
3	Provide left-turn signal phase	**48**	Install pedestrian refuge island
4	Prohibit turn	**49**	Use crossing guard at school crossing area
5	Reroute left-turn traffic	**50**	Prohibit parking
6	Provide adequate channelization	**51**	Install thermoplastic markings
7	Install stop sign	**52**	Provide signs to supplement markings
8	Revise signal phase sequence	**53**	Improve or install pavement markings
9	Provide turning guidelines for multiple left-turn lanes	**54**	Increase sign size
10	Provide traffic signal	**55**	Widen lane
11	Retime signal	**56**	Relocate island

Table 6-4

Crash Countermeasures (Key to Table 6-3)			
Key to probable causes			
12	Remove sight obstruction	57	Close curb lane
13	Provide turn lane	58	Install guardrail
14	Install or improve warning sign	59	Improve or install delineation
15	Reduce speed limit	60	Upgrade roadway shoulder
16	Adjust amber phase	61	Repair road surface
17	Provide all-red phase	62	Improve skid resistance
18	Increase curb radii	63	Provide proper superelevation
19	Overlay pavement	64	Remove fixed object
20	Provide adequate drainage	65	Install barrier curb
21	Groove pavement	66	Install breakaway posts
22	Provide “slippery when wet” sign	67	Install crash cushioning device
23	Improve roadway lighting	68	Paint or install reflectors on obstruction
24	Provide stop sign	69	Mark parking stall limits
25	Install or improve pedestrian crosswalk TCDs	70	Convert angle to parallel parking
26	Provide pedestrian signal	71	Create off-street parking
27	Install overhead signal	72	Install median barrier
28	Install 12-inch signal lenses	73	Remove constriction such as parked vehicle
29	Install signal visors	74	Install acceleration or deceleration lane
30	Install signal back plates	75	Install advance guide sign
31	Relocate signal	76	Increase driveway width
32	Add signal heads	77	Regulate minimum driveway spacing
33	Provide progression through a set of signalized intersections	78	Regulate minimum corner clearance
34	Remove signal	79	Move driveway to side street
35	Restrict parking near corner/crosswalk/driveway	80	Install curb to define driveway location
36	Provide markings to supplement signs	81	Consolidate adjacent driveways
37	Install rumble strips	82	Construct a local service road
38	Install illuminated street name sign	83	Reduce grade
39	Install multidial signal controller	84	Install train-actuated signal
40	Install signal actuation	85	Install automatic flashers or flashers with gates
41	Install yield sign	86	Retime automatic flashers or flashers with gates
42	Install limit lines	87	Improve crossing surface
43	Reroute through traffic	88	Rebuild crossing with proper angle
44	Upgrade TCDs	89	Provide raised markings
45	Increase enforcement	90	Provide illuminated sign

Source: Traffic Engineering, 1998.

Safety Effects of Bypasses

Iowa DOT has developed a summary tabulation (see Table 6-5) to determine the safety effects of the implementation of bypass routes. The table compares number and severity of crashes and crash rates for existing conditions and the condition resulting from implementing a bypass. Note that the latter includes not only crashes on the bypass route, but also crashes that continue to occur on the existing route. This type of comparison provides a concise summary of the overall change in highway safety resulting from provision of a bypass.

Safety Audits

A road safety audit may be defined as a formal examination of a future road or traffic project, an existing road, or any project that interacts with road users, in which an independent, qualified team looks at the project's accident potential and safety performance.[7] Transportation Research Board's (TRB's) National Cooperative Highway Research Program Synthesis 336 presents an examination of the state of the practice of road safety audits. A road safety audit can be conducted at one of the following stages:

- At the feasibility stage
- Once the preliminary design has been developed
- Once the detailed design is complete
- At the pre-opening state
- On existing roads

In recognition of staffing/budget constraints, safety audits typically are performed on highways when 3R improvements (rehabilitation, resurfacing and reconstruction) are being made. Therefore, in a 20-year time span, based on a 20-year pavement life cycle, all roads theoretically should be reviewed.

An audit of a plan set is desirable, as this allows for the greatest range of options for redesign. A road safety audit can be incorporated into the design of any road or traffic project. The audit must be conducted by an independent team comprising staff different than those on the design team. The audit team should include members knowledgeable of the fields of accident prevention and road safety engineering. The road safety audit includes the following steps:

1. Select the road safety audit team.
2. Provide background information.
3. Hold a commencement meeting.
4. Assess the documents.
5. Inspect the site.
6. Write a road safety audit report.
7. Hold a completion meeting.
8. Write a response to the audit report.
9. Implement the agreed changes.

6.3.5 Computer-Based Tools and References

The safety analysis procedures discussed can be implemented using computer-based tools. For safety analyses of short road corridors or a select number of intersections, the number of crash records being analyzed is likely small and requires limited statistical analysis. Common spreadsheet software applications, such as Microsoft Excel, can be used to manage crash records, to develop summary reports characterizing crash history, to compute expected crash frequency, or to apply accident modification factors. Safety studies for large areas or those with a large number of crash records may require robust database systems to manage the data. Such systems lend themselves to linking with other data sources, such as geometric or traffic volume data, providing a more integrated data management and analysis environment. For safety analysis requiring more robust statistical analyses, specialized statistical software applications such as SAS or SPSS among other software applications, should be employed.

GISs provide a map-based environment within which to analyze data. Using GIS, relationships based on location can be easily analyzed, such as correlation between a particular crash type and geometric characteristic of the road at that same location. GIS can also be used to quickly develop maps to display crash

[7] Institute of Transportation Engineers. The Traffic Safety Toolbox. Washington DC, Institute of Transportation Engineers. 1999.

data (as pie charts at intersections), points for each crash, or colored road segments indicating rates. Maps, unlike tables, effectively communicate crash analysis results in an intuitive medium. GIS can be linked to other databases or statistical software applications to expand their analysis capabilities. FHWA has developed a set of GIS Safety Analysis Tools that are available to aid users performing safety analyses.

Table 6-5

Example Form of Table for Comparison of Safety Effects of a Bypass				
Location	Existing Route			
	Before	After	Bypass	After+Bypass
General				
Highway				
Type of Bypass				
Length (miles)				
Average ADT				
HMVM				
Dates Studied				
Accidents				
Fatal				
Personal Injury				
Property Damage Only				
Total Crashes				
Severity				
Fatalities				
Major Injuries				
Minor Injuries				
Possible Injuries				
$ Loss to Property				
Total $ Loss				
Rates				
Crashes/HMVM				
$ Loss per Crash				
% $ Loss Change After Bypass				
% Change # All Crashes After Bypass				
% Change # Fatalities After Bypass				
% Change # Personal Injuries After Bypass				
% Change in Crash Rate After BP (Crashes/HMVM)				
% Change in Crash Rate After BP (Crashes/HMVM)				

Software applications that automate various safety analysis functions include the following:

- Accident Information Management System (AIMS)—JMW Engineering
- Collision Database System—Crossroads Software
- Highway Safety Analysis (HSA) Software—X32 Group, Inc.
- Intersection Magic—Pd Programming
- TRAF-SAFE—Traffic Safety Software, LLC

Many of these applications provide standard and custom reporting functions, automated collision diagram generation, and crash data mapping.

The Interactive Highway Safety Design Model (IHSDM) being developed by FHWA promises to compile the latest knowledge on highway safety into a useful tool for engineers and planners. IHSDM consists of several modules:

- The Crash Prediction Module estimates the number and severity of crashes on specified roadway segments.
- The Design Consistency Module evaluates the operating speed consistency along a roadway.
- The Driver/Vehicle Module consists of a Driver Performance Model linked to a Vehicle Dynamics Model. The Driver Performance Module estimates drivers' speed and path choice along a roadway.
- The Intersection Review Module provides a structured process for evaluating the safety impact of intersection design alternatives using an expert system approach.
- The Policy Review Module automates checks of compliance with highway design policies.
- The Traffic Analysis Module uses traffic simulation models to estimate the operational effects of road designs under current and projected traffic flows.

The IHSDM for two-lane rural highways is available for testing and evaluation purposes. Development of the IHSDM for multi-lane rural highway is now under way.

To help highway agencies manage their safety programs, the FHWA's Safety Analyst project is developing software tools with capabilities beyond what is available now. The software will help agencies make better decisions on where to install safety improvements and which improvements to make. In addition, the tools will help transportation professionals to better evaluate the effectiveness of the improvements they choose.

6.3.6 Additional References

AASHTO Strategic Highway Safety Plan Implementation Guides.

Institute of Transportation Engineers (ITE). *Manual of Transportation Engineering Studies.*

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6.4 Traffic Volumes/ Projections

6.4.1 Introduction

To a large extent, transportation planning is data driven. The planner/analyst requires a clear understanding of the physical features of the transportation system, the patterns and characteristics of use, and projected travel demand. The data, on their own, have limited value, but they are a necessary input for a variety of analyses such as capacity/LOS, safety, noise, air quality, structural design, and so forth.

This section is intended to provide a basic understanding of:

- Characteristics of travel and the transportation system
- How travel is measured and where to obtain data
- How travel forecasts are made
- Identification of traffic needs for a variety of analyses

Along with fundamental explanations provided in this section, the reader is cautioned to be aware of some inherent inaccuracies in travel data. The generation of travel data is constrained by the capabilities of the technologies available. This is not to imply that the traffic counts and forecasts are incorrect, only that they are the best that can be derived given the procedures developed to date.

Traffic Data Sources

Iowa DOT's Office of Transportation Data handles and disseminates transportation data, such as traffic counts. It is a primary source for traffic data. Existing data may be available from other sources, including the MPO, counties, cities, previous studies, or specific projects. The type and quality of these sources should be evaluated relative to the intended use.

Types of Existing Traffic Data Available

The following types of data are available:

- *AADT*—Volume on primary roadway segments
- *ATR Monthly Report*—Monthly and cumulative traffic trends as compared to the previous year
- *ATR Annual Report*—Annualized traffic trends compared over the previous decade
- *Average Speed*—Average travel speed calculated by permanent recorders
- *Intersection Turning Movement Counts*—Hourly or 15-minute summaries of all vehicles, single unit trucks and combination trucks counted and an estimated AADT turning movement
- *Portable Recorder Counts*—Annual ADT with a summary showing the traffic by hour for the duration of a recorder being set at a specific location
- *Permanent Recorder*—Continuous traffic data collected by hour at specific locations
- *Vehicle Classification Data*—Specific recorder locations that provide vehicle type data by 13 classifications designated by the FHWA
- *ESALs*—Weight and class distribution tables of sampled truck traffic
- *Expansion Factors*—A listing of factors by hour, day of week, or month used to expand short-term portable recorder or turning movement counts to AADT
- *Design Hour Factors*—30th highest hour calculated from permanent recorders

6.4.2 Characteristics of Travel and the Transportation System

Composition of the Travel Stream

The vehicular components of the travel stream on the state's roadway system, referred to collectively as traffic, are:

- Autos
- Trucks and buses
- Nonmotorized travel

Autos are, by far, the largest component of the traffic stream. Passenger cars and light trucks constitute nearly 90 percent of traffic on rural roadways and upwards of 95 percent on urban streets.

Trucks are defined as vehicles having dual tires on one or more axles, or having more than two axles, and designed for the transportation of cargo rather than passengers. The physical and geometric characteristics of roadways are dependent on the proportionate use by trucks and buses. Buses operate similarly to a single-unit truck, but pickup and panel trucks operate similarly to cars.

Nonmotorized travel—bicycles and pedestrians—generally is of greater concern in urban rather than rural areas.

Traffic Volume Characteristics[8]

Traffic volumes vary with regard to both space and time. These variations are critical determinants of the way highway facilities are used, and they control many of the planning and design requirements for adequately serving traffic demand.

The following spatial factors affect traffic flow:

- *Traffic distribution by type of route*—Ninety percent of the mileage of paved streets in the U.S. are rural, but more than one-half of the total traffic volume is on urban streets.
- *Directional distribution*—For ADT, volume typically is about the same for each direction of travel, but traffic percentages by direction can and do fluctuate depending on the circumstances. Hourly flow of traffic by direction can vary widely especially when comparing the morning and evening flows.
- *Lane distribution*—If there are two or more lanes in one direction, there is usually a wide variation in the number of vehicles using each lane.
- *Traffic composition*—The percent of trucks and buses in the traffic stream affects traffic speed and operational characteristics, particularly on roadways with narrow lanes or steep grades.
- *Time variations in traffic flow*—Traffic demand varies by month of year, by day of week, by hour of the day and by subhourly intervals within any given hour. Traffic volumes for hourly (peak hour) and subhourly intervals normally form the basis for design of highway facilities.
- *Seasonal variations*—Seasonal fluctuations in traffic demand reflect the social and economic activity of the area being served by the highway. Monthly variations are larger on rural and recreational routes. Commuter and business-oriented travel occurs in more uniform patterns.
- *Daily variations*—Volume variations by day of week are also related to the type of highway. Weekend volumes are lower than weekday volumes for highways serving predominantly business travel. Peak traffic occurs on weekends on main rural and recreational access facilities.
- *Hourly variations*—For urban commuter routes, peak hours normally occur in the morning and evening with the evening somewhat higher.
- *Variations within the hour (peaking characteristics)*—Short-term rates of flow within the peak hour are variable between routes. Typically, the hourly flow rate of a highway is expressed as four times the peak 15-minute volume. The distinction between volume and rate of flow is important. Volume is the actual number of vehicles during a time interval. Rate of flow represents the number of vehicles for a time interval of less than 1 hour but expressed as an equivalent hourly rate.
- *Relating Hourly Volumes to Annual Averages*—Typically, daily traffic volume on a highway is represented by the ADT. When traffic volumes are counted over long periods of time, as is possible at permanent, continuous count stations, the AADT volume can be determined or estimated. AADT is the total annual traffic volume divided by the number of days in the year.

For design of new highways or major reconstruction of existing highways, the design volume is a forecast for a designated design year. The design year usually is 20 years into the future and represents the maximum time period over which land-use activity and the resulting traffic volumes and patterns can be reasonably forecast.

For most highways, the traffic volume for design is the design hour. Selection of an appropriate design hour volume represents a tradeoff between designing capacity for a recurring pattern of traffic, and the costs of providing additional capacity. Design hour volumes typically range from the 30th highest hourly volume occurring in a year (generally applicable to rural highways) to the 50th highest hourly volume (generally applicable to recreational routes) to the 200th highest or typical weekday peak hour volume (generally used in urban areas).

[8] Parts of this section are taken from Institute of Transportation Engineers. Traffic Engineering Handbook. Arlington, VA. 1999. Chapters 2 and 6.

6.4.3 How Travel is Measured

Because traffic flow is dynamic, the number of vehicles counted on a roadway today will differ tomorrow and on the same day next week. Methods of measuring traffic flow can cause imprecise measures. Counting errors can be caused by variation in the mix of vehicles in the traffic stream. Regularly occurring local events, special events, and highway crashes can distort counts on large segments of the highway system. Errors can be due to failure of the mechanical counter, field personnel mistakes, or improper count location. Procedures have been developed to help correct for some of this variation, but those procedures too are imperfect. Therefore, traffic counts should be thought of as approximations. The practitioner should ensure that when counts are presented, they are rounded sufficiently to reflect the realistic level of accuracy.

Methods of Counting

A wide spectrum of processes is available for traffic counting. The method selected should reflect the anticipated use of the data. To analyze or design an intersection, for example, counts of turning volumes and pedestrian activity are required. For assessment of air quality impacts, only daily and hourly volumes by vehicle classification are needed.

The two basic types of counts are those made using mechanical counters and manual counts made by field personnel. Automatic traffic record (ATR) counts are either portable or permanent. The count may be a classification count (indicating vehicle type along with volume) or just the total volume of all vehicles. Some ATRs can classify traffic, measure speed, and give the distribution of volume by travel lane.

The main advantage of an ATR over manual counting is lower cost. This is offset, however, by a host of things that can go wrong with mechanical devices. Some types of ATR are prone to over- or under-counting, depending on the type and placement of the vehicle detection device. The counter itself or the power source may malfunction for a variety of reasons.

Manual counts overcome the problems of mechanical failure but are subject to human error. Inexperienced surveyors often have difficulty simultaneously tracking and recording all the vehicles passing a count location. Mechanical counter tally boards allow the surveyor to record vehicles by direction and type without looking away, but practice is required to develop the technique necessary to use this type of equipment.

Both ATR and manual counts are recorded by time period, usually each hour or 15 minutes. As a simple check, the counts should be tested for consistency from day to day or during consecutive time periods. Large unexplained variations are reason enough to repeat the count.

Types of Counts

The following is a brief synopsis of some of the most common types of traffic counts.

- *Spot counts*—Manual spot counts typically are conducted at intersections or at driveways serving major traffic generators. They usually include the volume of through and turning traffic (by direction) on each leg, vehicle classification (type), and pedestrian activity. Spot counts typically are made only for A.M. and P.M. peak hours and are summarized by 15-minute increments.
- *Cordon counts*—A cordon count is one in which a particular area is completely encircled, and counts are made on all roads leading into and out of it. Traffic usually is recorded as total volume but may be by type of vehicle and direction of travel. Counts usually cover 48 hours and are tabulated for each hour.
- *Short counts*—Short count sampling involves counting vehicles for 5-, 10-, 15-, or 20-minute periods at a specific location. The counts are then expanded to hourly totals using factors from a nearby "control station." This technique, usually reserved for higher volume locations, allows one checker to cover more locations in a given period.

6.4.4 Travel Forecasting

Traffic Data Sources

The Office of Transportation Data is the unit within Iowa DOT that handles and disseminates transportation data. The Office of Transportation Data is a primary source for existing traffic data. Traffic data may also be available from other sources, such as the Metropolitan Planning Organization (MPO), counties, cities, previous studies, or specific projects. The type and quality of these sources should be evaluated relative to intended use.

The Office of Systems Planning of Iowa DOT oversees long-range planning, MPO/RPA support, and grant program management. The long-range planning and MPO/RPA Support section contains two units: Forecasting and Modeling, and Planning. The two main focus areas for Grant Program Administration are reviewing of project applications and selection of projects for approval, and assisting project sponsors with the development process and monitoring of construction progress.

Traditional Forecasting Methods

The proliferation of personal computers has facilitated an increase in the sophistication level of methods used to forecast travel. Before it large databases could be manipulated quickly and inexpensively, and transportation planners relied on much simpler forecasting techniques. Some are still applicable in cases where time or cost constraints require the use of short cuts.

Traffic forecasts can be developed based on historical growth of traffic at relevant count locations, or areawide population growth projections. For example, traffic can be extrapolated at a rate of 1 percent per year for a 20-year period to obtain a forecast. This approach can serve as a quick analysis method. The results from this approach can also be used as a comparison with other forecast methods as a relative check.

Origin-Destination Surveys

As the name implies, origin-destination studies are intended to obtain data regarding the points of beginning and ending a trip, but most also obtain other related information such as trip purpose, vehicle type (car, truck), vehicle occupancy, time of day, and frequency of travel. Surveys typically are used to conduct the study, and the types of questions asked should be tailored to the location and purpose of the survey.

When planning an origin-destination study, the first question to be answered is: What is the purpose of or reason for undertaking the study? The purpose will dictate, to a large extent, the number and types of questions to be asked. It is best to keep the interview or questionnaire as short as possible. This will result in the least traffic delay (if, for example, the survey is administered on the roadside) and the greatest rate of return. Experience has shown that travelers are more apt to respond if little effort or time is required. Superfluous questions should not be asked.

Chapter 9 of the *Manual of Traffic Engineering Studies*[9] contains a comprehensive description of various types of origin-destination studies. Those planning to make an origin-destination survey are referred to this publication for a detailed explanation of the recommended procedures and the advantages and disadvantages of various types of survey. The following sections provide further guidance to assist in the planning and conduct of these studies.

Surveys of Traffic Using a Particular Route

The roadside interview origin-destination study is the most common and effective means of obtaining travelers' information on a specific segment of highway. A representative sample of drivers (not less than 20 percent) is stopped at the survey location and questioned regarding origin, destination, trip purpose, etc. The surveyor can record time of day, vehicle type, vehicle occupancy, state of licensure, and other information, such as direction of travel. A concurrent count of the number and type of vehicles passing the survey station by ½- or 1-hour intervals provides a tool to expand the survey sample to represent the entire traffic stream.

[9] Institute of Transportation Engineers. The Traffic Safety Toolbox. Washington DC, Institute of Transportation Engineers. 1999.

Although the roadside interview survey can be administered quickly, limitations are imposed on the use of this procedure by the volume and speed of traffic on the roadway. Where traffic volume is so great that stopping even a small sample of drivers would cause undue congestion, or where high speeds would make it difficult or unsafe to stop vehicles (on a freeway, for example), other less intrusive methods should be used.

The *return postcard questionnaire survey* is a popular alternative to the roadside interview. This type of study requires stopping a sample of drivers but only long enough to hand out a return mail questionnaire. A concurrent vehicle classification count is required to expand sample survey returns. The Institute of Transportation Engineers (ITE) publication indicates that return rates of 25 to 35 percent may be expected. Experience has shown that the rate of return is extremely sensitive to the effort required to complete the questionnaire and the interest shown by drivers in the purpose of the study. Often, a short lead-in on the questionnaire explaining why the survey is being administered and how drivers may benefit from the findings will enhance the response rate.

The return postcard questionnaire survey can be administered efficiently on somewhat heavily traveled roads, bridges, or ramps, but stopping freeway or expressway traffic to distribute a questionnaire usually is infeasible. A method that can be used to avoid this problem is the license plate questionnaire survey. Here the license numbers of vehicles passing a survey point are recorded manually or by high-speed video. Through use of vehicle ownership registration records, a return mail questionnaire is then sent to the owner of the vehicle. There are serious drawbacks to this procedure beyond those presented in the ITE manual. First, there is an issue of confidentiality. Some see this type of survey as an intrusion on individual privacy. Also, it is necessary to match the license plate number with the registrant and to send out the questionnaire immediately after the trip is observed. Otherwise, the driver might forget the particulars or even having made the trip. Finally, it is often not possible to reach out-of-state drivers or truck operators in this way. When these types of vehicles make up a large share of the traffic stream, another survey method should be employed.

There is a family of survey methods designed to obtain point-to-point travel data rather than between origin and destination. These can be used, for example, to determine ramp-to-ramp travel patterns, or the proportion of drivers who make through or local trips. A common method employed is the *moving-vehicle license plate survey,* made by manually recording all or part of each vehicle's license plate or by using high-speed video to do the same. By matching license numbers, trips can be linked between survey points at the entrances and exits of a study corridor.

Areawide Origin-Destination Surveys

The home interview origin-destination survey is the most common survey technique applied to determine travel patterns throughout an area, rather than in a specific corridor. Comprehensive transportation surveys conducted in many urban areas during the last decades of the 20th century relied extensively on home interviews. Surveys were conducted of a statistically selected sample of dwelling units, ranging from as few as 5 percent or less in the largest areas to upwards of 20 percent in smaller areas. Each resident of the selected dwelling was asked to furnish a 1-day record of travel specifying the trip origin and destination, purpose, travel mode, time of day, and other related information.

Selected areawide travel patterns may be obtained through an *employee origin-destination survey* conducted by either personal interview or questionnaire at the place of employment. Similar surveys may be conducted at a shopping center, office building, recreational attraction, or other type of land use. The purpose of the survey would be to determine the travel patterns and characteristics of persons employed at or patronizing a particular location. As with other surveys of this type, it is always necessary to determine total employment or use of the location surveyed to facilitate expansion of the sample survey results to represent all travelers.

Because of the time and cost required to carry out a home interview origin-destination survey, this type of study is seldom conducted anymore. Because travel is habitual, it is possible to use the vast databank already assembled nationwide to synthesize areawide travel patterns.

Travel Demand Models

A transportation model is a series of mathematical equations running in specialized software programs that represent how choices are made when people travel. Models give transportation professionals the ability to analyze the effects that policy and programming decisions may have on travel patterns and traffic volumes on specific roadways.

Origin and destination data obtained through the types of surveys described above are seldom treated as discrete data points. Rather, the data are almost always aggregated into geographic units called traffic analysis zones (TAZ). The size of a TAZ varies greatly from one place to another, but usually they are designed to contain homogeneous land uses and should not be severed by a travel barrier, such as a river or railroad. Travel patterns are then described and analyzed by the volume of trips between pairs of zones, and stratified by purpose, time of day, travel mode, etc. The generally accepted four-step process consists of:

1. Trip generation
2. Trip distribution
3. Mode split
4. Traffic assignment

Exhibit 6-5 is a generic flowchart of the transportation planning process.

The trip generation analysis produces an estimate of the number of trips produced or attracted in each TAZ. Statistical relationships between land use and the number of trips that land use generates can be taken from prior studies, or from the commonly used ITE publication, Trip Generation. Trip distribution is the process of distributing the generated trips between origin and destination zones. Most studies achieve this by use of a "gravity" model fashioned after Newton's Law of Gravitation and then a revised form in Riley's Law of Retail Gravitation. In the simplest terms, trips produced in one TAZ are distributed to all others based on the number of potential attractions in each TAZ and some function of the separation between zones. Data on the distribution of trip lengths by purpose, taken from prior studies, is the starting point of this process. The result is an estimated "trip table" giving the number of trips between each pair of TAZ.

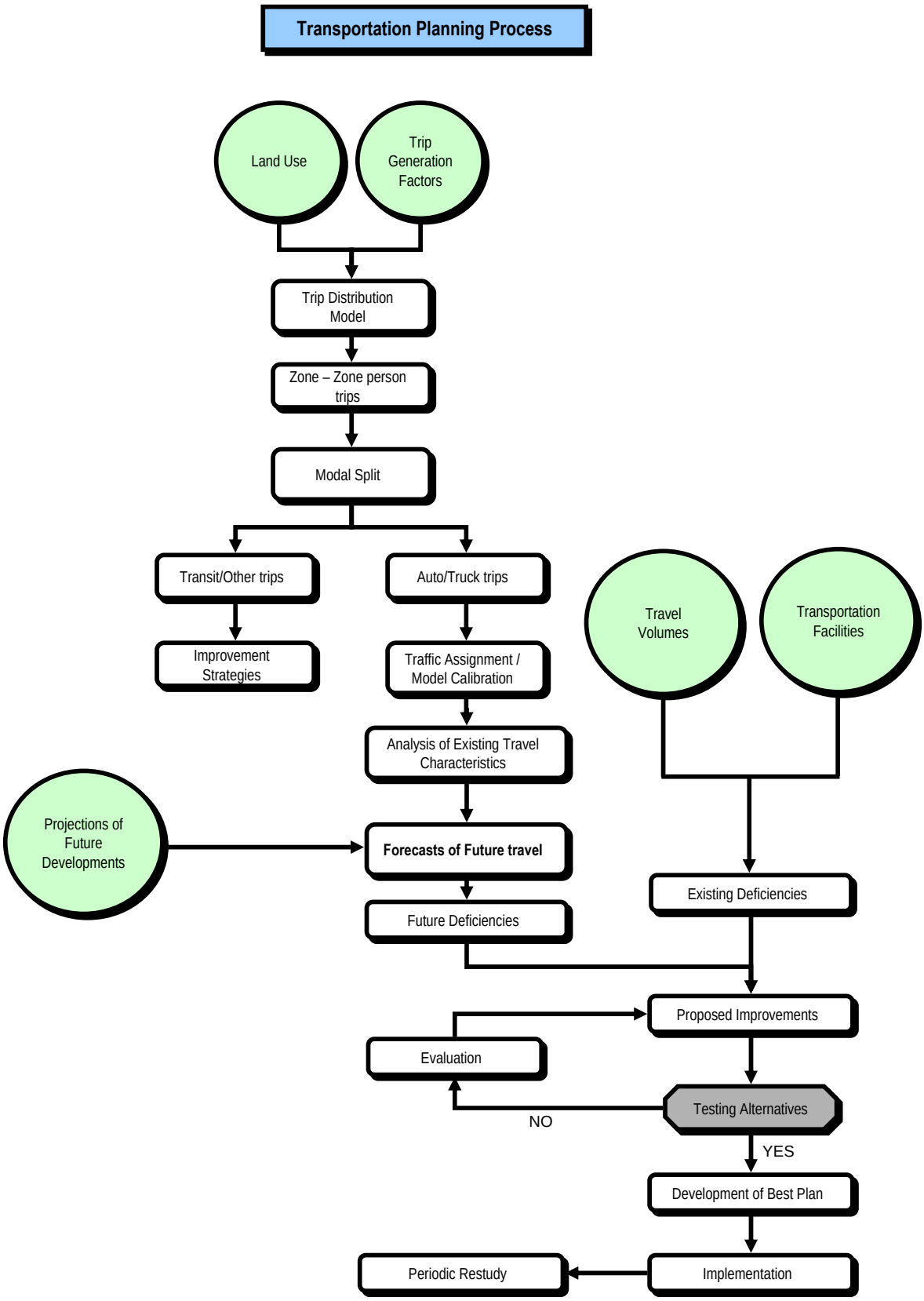
When trip tables are in terms of "person trips," another step is required to translate that information into vehicular trips. Complex mathematical modal split models have been developed for this purpose, but most studies simply apply vehicle occupancy factors to total person trips. Unless public transit patronage is a significant proportion of total travel, it is preferable to construct a "vehicle trip" model, thereby alleviating the need for modal split.

Finally, zone-to-zone trips are assigned to the roadway network using algorithms available in published software. The model is then calibrated to generally match counted traffic volumes by adjusting some of the factors used in trip generation and distribution, or in the assignment process.

Caution must be exercised in using the assigned traffic volumes for planning or design in their raw format. The calibrated traffic assignments usually are reliable when viewed areawide or for a highway corridor, but the process may not produce precise forecasts for specific highway segments. A particular caveat is appropriate in dealing with intersection turning movements. Most of the traffic assignment software packages will produce summaries of intersection turns, but again these should not be applied in raw form.

The model can best be used to test the sensitivity of traffic flow to changes in population or employment (trip generation) or modifications of the roadway system. Comparing the outputs of two assignments can develop realistic expansion factors. Application of these factors to ground counts will produce the most reasonable approximations of the effect that change would have on traffic.

Exhibit 6-5
Transportation Planning Process



6.4.5 Traffic Data Needs for Different Types of Analysis

Specific traffic data are needed for different types of analyses. The following analyses are described relative to the traffic data inputs:

- Traffic operational analyses
- Safety studies
- Pavement design

Traffic Operational Analyses

In most cases, traffic operational analyses will require peak hour traffic volumes for input. The peak hour traffic volumes can be determined from existing traffic counts or derived from projected all-day traffic volumes. To calculate future peak hour forecasts both 'K' and 'D' factors should be used from existing counts. The K factor is the percentage of all-day traffic that occurs in the design or peak hour. The D factor is the directional distribution of the traffic that occurs in the design hour. These factors should be evaluated and adjusted if projected development within the study area would affect the existing traffic patterns.

It is generally recommended that turning movements directly outputted from a travel demand model not be used in intersection operational analyses. Modeled turning movement flows should be evaluated for reasonableness with the aid of existing turning movement counts, knowledge of the location and the amount of new development in the region potentially affecting travel patterns, and understanding of local trip-making characteristics. In many cases, new land-use development and roadway facilities have a strong impact on the directional distribution at intersections. A combination of these resources should be used to determine future intersection turning volumes.

Safety Studies

Safety studies usually involve calculating an accident rate measured in crashes per mile, per million vehicle miles traveled (MVMT), or per 100 MVMT for a roadway segment. For intersections, the accident rate typically is measured in accidents per million entering vehicles (MEV). In both cases, an all-day existing traffic volume (ADT) is used in the analysis. Other safety studies may evaluate crash frequency over a 24-hour period compared to an hourly volume distribution over the same period. This type of analysis requires hourly traffic volumes developed from ADT.

Pavement Design

One of the major determinants of pavement design is the estimate of loads from vehicles that a roadway will carry over time. Loads are expressed as equivalent single axle loads (EASLs). Based on a forecast of opening day and design year traffic by vehicle classification and observed axle weight distribution by vehicle type, the number of estimated axle loads is equated to the equivalent number of repetitions of an 18,000-pound single axle.

6.4.6 Agency Coordination for Projects Requiring Traffic Data

Traffic data requests for existing information are available through Iowa DOT's Office of Transportation Data and perhaps other sources (see Sections 6.4.1 and 6.4.4). Where traffic data are not readily available or gathered from other sources, they need to be evaluated by Iowa DOT for reasonableness. In addition, traffic forecasts should be conducted in close coordination with the appropriate MPO/RPA and Iowa DOT's Office of System Planning to create or to verify traffic forecasts.

6.5 Highway Capacity Analysis Tools

The HCM provides methods for estimating performance measures for individual elements of transportation systems. The elements covered in the HCM and the service and performance measures are listed in Table 6-6.

6.5.1 Application of the Highway Capacity Manual

Analysis procedures provide results that can be used to identify when a facility is not operating at an established standard for a jurisdiction. Identification of such a facility can help explain the causes of deteriorated performance, and also allow analysts to determine appropriate countermeasures. The same procedures can be used to evaluate the effectiveness of implemented improvements.

The HCM is often used as a source for developing project purpose and need, and later in the evaluation of improvement alternatives. Failure of a roadway to satisfy capacity needs makes a strong point for future improvements.

Individual Elements

The HCM is used to analyze the performance of individual elements (such as a freeway section) and even sub-elements (ramp junctions, weaving segments, and basic freeway segments). The results of analyses of individual elements of a transportation system are often combined to obtain a broader view of the performance of the system.

Analysis of individual elements in a system helps identify the critical elements of the system;

Table 6-6

System Elements for Which the HCM Has Analysis Procedures		
HCM 2000		
Element	Primary Performance Measure (Determines LOS) for Individual Elements	Performance Measure Used to Calculate Travel Time for Systems Analysis
Vehicular		
Interrupted Flow		
Urban Street	Speed	Speed
Signalized Intersection	Delay	Delay
TWSC Intersection	Delay	Delay
AWSC Intersection	Delay	Delay
Roundabout	[a]	Delay
Interchange Ramp Terminal	Delay	Delay
Uninterrupted Flow		
Two-Lane Highway	Speed, % time spent following	Speed
Multilane Highway	Density	Speed
Freeway		
Basic Segment	Density	Speed
Ramp Merge	Density	Speed
Ramp Diverge	Density	Speed
Weaving	Speed	Speed
Other Road Users		
Transit	[b]	Speed
Pedestrian	Space, Delay	Speed, delay
Bicycle	Event, Delay	Speed, delay

[a]HCM does not provide a method for estimating performance of roundabouts; refer to HCM (Chapter 17) for additional information.

[b]Several performance measures are used to determine LOS for a transit system; refer to the HCM (Chapter 27) for additional information.

in other words, the elements that are limiting the system's overall performance. Specific sub-elements that operate poorly and affect the overall performance of an element can also be identified. Once the magnitude of a problem is determined, an appropriate countermeasure can be chosen. For example, a queue on a freeway caused by a downstream bottleneck affects not only drivers on the mainline but also drivers on ramps. A poor quality of service on the freeway mainline in a ramp junction area will result in lower quality merge operations. An analysis of both movements will help determine the appropriate solution, whether lengthening the turn lane, lengthening the protected left turn phase, or some other treatment.

System Analysis

An aggregate view of a system is obtained by combining the analyses of individual elements. A system analysis can be performed for a facility, corridor, and an area. System analyses can cover only one mode or consider all modes in a system. Performance measures for individual elements are aggregated into a measure for a facility. Performance measures for several facilities are combined to obtain a measure for a corridor. Measures for several corridors can be combined in the analysis of an area (the highest level for which an analysis can be performed). This is depicted in Exhibit 6-6.

Travel time generally is the performance measure used for a system. Speed and delay estimates for individual elements are converted to travel times and aggregated for the system. Sometimes speed and delay are aggregated for the system and used as performance measures. Parts III and IV of the HCM provide guidance on combining performance measures. If, for example, a number of separate improvement projects are proposed in an urbanized area study, the system analysis would involve determination of performance measures for each element of the improvement plan, and aggregating these measures by facility and corridor to arrive at an appraisal of overall performance.

Levels of Analysis

Several levels of analysis are available: operational, design, and planning. The choice of level depends on the purpose of the analysis, and the decisions that need to be made for the facility. The level of detailed analysis determines the data needed to perform the computations. Table 6-7 shows the main objectives of the three analysis levels.

Operational Analysis

This type of analysis is used to determine current or future operating conditions. The results help the analyst determine:

- The nature of existing problems
- Estimated effects of proposed alternative solutions (lane use, control devices, signal phasing, bus stop location)
- Improvements achieved by implemented treatments
- Larger-scale planning study needs
- At what volume levels the system will reach or exceed capacity

Operational analyses have a short-term, more immediate focus than other types of analyses. For this reason, it is necessary that data used as inputs

Table 6-7

Levels of Analysis			
HCM 2000			
	Analysis Objective		
Level of Analysis	Problem Identification	Countermeasure Selection	Evaluation
Operational	Primary	Primary	Primary
Design	Not Applicable	Primary	Secondary
Planning	Secondary	Primary	Not Applicable

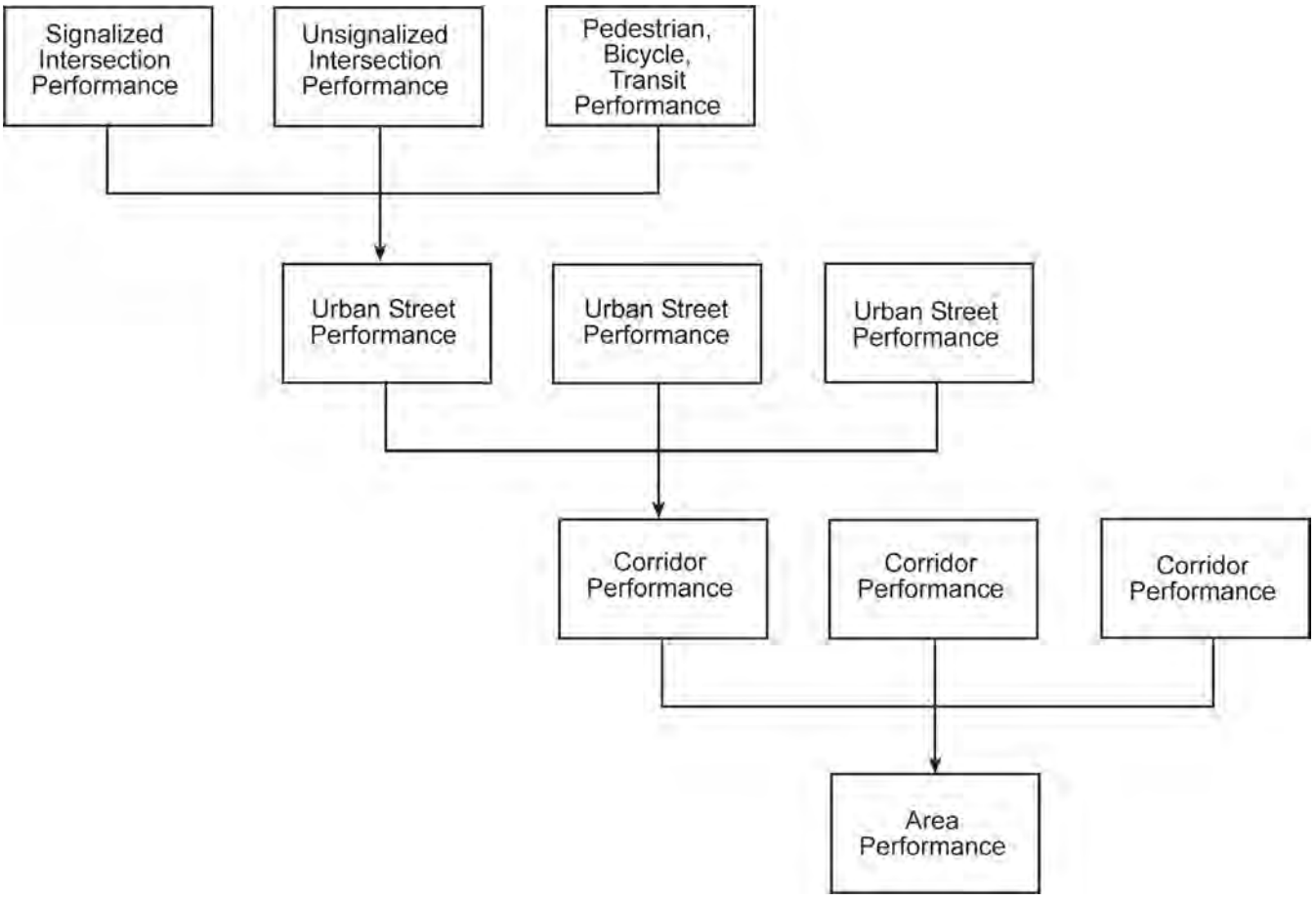
into the procedure be relatively detailed. Field measurements of traffic volumes, facility geometry, and other physical features, and traffic control devices should be used as inputs, rather than using default values suggested by the HCM. This allows for a more accurate estimation of performance measures. Examples of operational analyses would be studies of intersection modifications, or consideration of either providing or withholding access along a transportation route.

Design Analysis

Design analyses are used to determine physical features required for a new or redesigned facility to operate at a given LOS. Typically they are used for mid- to long-term projects. The results help the analyst determine features of the facility, such as basic number of lanes, need for auxiliary lanes, and other higher-level features. More specific geometric details can be determined based on the results as well, including lane width, grade, length of added lanes, and sidewalk widths. For example, the highway designer would incorporate capacity analysis into decision-making in the development of typical cross sections and establishing design criteria for horizontal and vertical elements.

Because design analyses do not account for all the physical features of a facility, the input is not quite as detailed as for operational analyses. As much information as possible should be used for the analyses, but because of their long-term nature, some default values will be needed. The accuracy and precision of traffic prediction methods have some limitations, and for this reason the use of some default values is sufficient in this level of analysis.

Exhibit 6-6
Area Performance



Planning Analysis

Long-term strategic issues are analyzed with planning level analyses. The HCM provides examples of situations in which this level of analysis is appropriate: configuration of a highway system or set of bus routes, expected effectiveness of a new rail system, or likely impact of a proposed development. Determination of when a system's LOS will fall below the desired level, and assessment of policies such as lane use controls, systemwide freeway ramp metering, and congestion pricing are also appropriate planning level analyses.

The amount of detailed data needed for operational or design level analyses is not needed for planning analyses. Default values are generally used, rather than detailed inputs.

Use of Default Values versus Field Values

Data that can be gathered in the field should be used in the analyses. This is especially true for operational analyses, which have a more immediate focus. For planning analyses for facilities not yet built, data from an existing facility similar to the planned one should be gathered in the field. If field data from the facility under analysis or a similar facility are not available, efforts should be made to determine local policy or typical local or state values. If no other information is available, default values presented in the HCM should be used. The more applicable to a specific facility input data are, the more reliable the results of the analysis will be.

6.5.2 Urban Street Concepts

Several performance measures related to traffic flow and speeds are used to describe the operation of urban streets. Average travel speed, which accounts for both vehicle interaction and traffic control delay, is used to determine LOS.

Urban Streets

Urban streets are arterials and collector roads in urbanized or downtown areas, and have a functional classification ranked between local streets and multilane suburban and rural highways. They provide more mobility than local streets, and more access than multilane highways.

There is more development along an urban street than on multilane suburban and rural highways, and the density of traffic at driveways and intersections is higher. Urban streets are characterized by traffic signals (spaced less than two miles apart) used both to move traffic through an urban area as well as provide access to local business. The signals could be timed to cause vehicles to travel in platoons. Time-of-day turning, parking, and lane use restrictions may be implemented to allow an urban street to function as an arterial during peak hours.

Pedestrian, bicycle, and transit operations are part of an urban street. In addition to disruptions in traffic flow caused by these other modes, stopped or standing vehicles such as taxis, trucks, and parking vehicles add to the turbulence in the traffic flow.

Traffic Flow

Traffic flow on urban streets is affected by the street environment, interaction between vehicles, and traffic control. *Street environment* refers to number of lanes and lane widths, median type, driveway density, signalized intersection spacing, parking, pedestrians, and the speed limit. Vehicle density, the mix of vehicle types, and turning movements affect the interaction between vehicles mainly at intersections but also on roadway segments between signals. Traffic control devices affect flow by causing speed changes and delay for some or all vehicles on an urban street but are necessary to assign right-of-way.

Free-Flow Speed

Free-flow speed is the speed at which drivers would travel if there were no interaction with other vehicles and no traffic control to cause the driver to decelerate. Free-flow speed is determined by finding the average travel speed on a facility at locations far enough from traffic control devices, and when traffic volumes are low enough, so that speeds are not affected by either. Free-flow speed typically is measured at mid-block locations along an urban street. Roadway traffic detectors or radar guns are most often used to measure free-flow speed.

Running Speed

As drivers are rarely able to travel at free-flow speed, the *average running speed* is a measure used to describe operations of an urban street. The average time taken to travel the urban street segment under analysis (excluding any stop delay) is the average running time, and the length of the segment divided by this average running time provides the average running speed. This value helps describe the interaction among vehicles but does not account for traffic control.

Travel Speed

Average travel speed is a measure of an urban street's performance that accounts for traffic control. This value is calculated using the length of the segment and the average time to travel along the segment, including stop delay.

Time-Space Trajectory

Time-space trajectories are graphical representations of vehicle travel along one lane of an urban street. A line is plotted for each vehicle, and the slope of the line represents the vehicle speed. The steeper the slope of the line, the higher the vehicle speed. A horizontal line indicates the vehicle is stopped.

Level of Service

The average travel speed is the performance measure used to determine LOS on urban streets. Since the average travel speed of through vehicles accounts for the running speed on a segment and also delay due to traffic control, it is the measure that best describes the operation of urban streets.

Urban streets provide both access and mobility. The average travel speed describes the mobility provided by an urban street. Although the level of access a street provides should be evaluated when considering a street's performance, it is not assessed by the procedures to determine an urban street's LOS.

Exhibit 15-2 in the HCM (2000) shows the LOS criteria based on average travel speed. LOS A is primarily free-flow operation, whereas LOS F is characterized by extremely low-speed flow. Intersection congestion is likely, along with high delay, volume, and queuing. Descriptions of the conditions at the various levels are provided in the HCM.

Data Needs

Data needed for analysis of an urban street segment include the following geometric and demand information:

- *Urban street class*—The classification of urban streets differs from AASHTO functional classifications in that posted speed limit, signal density, access-point density, and other design features are used to determine class, rather than travel volume, mileage, and characteristic of service, as with AASHTO functional classes. The HCM contains definitions of urban street classes.
- *Segment length*—The segment should be at least 1 mile long in a downtown area, 2 miles long in other areas. Shorter segments should be analyzed as individual intersections.
- *Free-flow speed*—If this cannot be measured for a facility under analysis, attempts should be made to measure free-flow speed on similar facilities in the area before default values are used. The method of measuring free-flow speed is described above.
- *Signal density*—This value is the number of signals on the analysis segment divided by segment length.
- *Peak hour factor*—If field measurements cannot be made to provide a peak hour factor, estimates can be obtained from the HCM that depend on whether the flow is congested or fairly uniform.
- *Directional distribution*—The proportion of vehicles traveling in either direction on a roadway in any given hour. For ADT, the volume is approximately the same in each direction of travel, but the hourly flow of traffic can vary widely.
- *Length of analysis period*—An analysis period of 15 minutes is appropriate unless demand at the intersections creates a residual queue for the period. In this case a longer period or multiple 15-minute periods should be used.
- *Service volume*—If the volume of traffic being served by an urban street cannot be measured in the field, the HCM provides estimates for volumes at given levels of service, urban street class, and number of lanes.

The HCM contains default values for many of these characteristics. When possible, field measurements should be made to determine parameter values to be used as inputs to an analysis of an urban street's performance. Default values are less reliable than field measurements, and should only be used when it is infeasible to obtain the field data.

Signalized Intersections

As the LOS on urban streets accounts for control delay, the operation of signalized intersections affects the LOS on urban streets. Given that signals allocate time among the traffic movements that use an urban street, the capacity of the intersection and its approaches are affected by the way in which time is allocated. This also affects the capacity of the urban street. Traffic flow and signal cycle characteristics, along with saturation flow rate, are used to analyze signalized intersection operations.

Traffic Flow

Fundamental attributes describing traffic flow at signalized intersections include length of the signal cycle and of each indication (red, green, and yellow), lost time, and flow rate. The HCM provides definitions of all the attributes, and a few are described here:

- *Effective green time*—The effective green time is the part of a signal cycle during which a specific movement may proceed through the intersection. This time is not exactly the same as the time allocated to the movement by the signal indication, because the green time is shortened at the beginning of the indication because of drivers' reaction times once they perceive the signal has turned green, and then extended when vehicles use the change and clearance interval (yellow plus all-red indication) to travel through the intersection. The remainder of the cycle is the effective red time.
- *Lost time*—The time during which the intersection is not used efficiently by any vehicles is termed lost time. Startup lost time is the time at the beginning of a green indication during which drivers react to the change of the signal from red to green and begin to accelerate through the intersection. Clearance lost time is the time after the effective green time for a movement that has ended, when no vehicles are using the intersection.

Traffic Signal Characteristics

The manner in which traffic signals allocate time affects the capacity and LOS of signalized intersections. The type of signal controller and the accommodation of turning movements both affect operations.

Controller Type

Each lane group is either actuated or nonactuated, and the signal controller provides either constant or variable phases for the lane group. Actuated lane groups have detectors that let the signal controller know a vehicle is present in that lane group and needs part of the cycle allocated to it. If vehicles are not detected by the signal controller, the phase for that lane group would be skipped. Nonactuated lane groups have fixed minimum green times, and these are extended if there are actuated lane groups at the intersection that do not use any part of the cycle. An intersection can be:

- *Pretimed*—There are only nonactuated lane groups.
- *Fully actuated*—All lane groups have detectors and are actuated.
- *Semiactuated*—Typically the minor approaches have detectors and are allocated green time only if a vehicle is detected.

Accommodation of Turning Movements

Turning vehicles can be given protected or permitted movements, or a combination of these. In addition, signal phases can be designed so that turning movements are not opposed. With permitted turn phasing, turning vehicles share a phase with opposing traffic, including opposing pedestrians and bicycles. Drivers need to wait for a gap in the opposing flow before proceeding through a turn. With protected turn phasing, turning vehicles are able to complete maneuvers without waiting for gaps since the opposing flow is stopped during the protected turn phase.

Depending on the turning volumes, opposing traffic, intersection geometry, and other conditions at a specific intersection, one type of turn phasing may be more efficient than the other. A combination of phasing types can be used for turns, as well. A permitted phase could be preceded by a leading protected phase or followed by a lagging protected turn phase.

In some situations, turning vehicles would not be opposed at all. This occurs at T-intersections, one-way streets, and intersections using split phasing. Split phases separate all movements in opposite directions. Providing for unopposed turns allows turning and through vehicles to share lanes in some cases.

Saturation Flow Rate

The saturation flow rate is the hourly flow rate at which vehicles can proceed through an intersection under prevailing conditions, assuming that the green signal is available at all times and no lost time is experienced. Capacity is determined using saturation flow rate, and it can be determined from field measurements or a default value can be used and adjusted for site-specific conditions.

Level of Service

Control delay is used to define LOS at signalized intersections. The control delay is defined as the difference between the travel time actually experienced and the travel time that would be experienced if there were no traffic control, geometric delay, incidents, or other vehicles affecting the travel time. Control delay measures driver discomfort, frustration, fuel consumption, and increased travel time. Delay depends on factors such as quality of progression, cycle length, part of the cycle that is green, and volume-to-capacity (v/c) ratio for the lane group.

The critical v/c ratio is a measure of how sufficient an intersection is, based on conflicting critical flow rates and signal phasing. As the v/c ratio increases, LOS worsens.

Exhibit 16-2 in the HCM shows the LOS criteria based on control delay. At LOS A, drivers experience low control delay. At LOS F, the arrival rates often exceed the capacity of lane groups and the v/c ratio may be high. Poor signal progression and long cycle lengths contribute to high delays. Descriptions of the conditions at the various levels are provided in the HCM.

Data Needs

Data needed for analysis of a signalized intersection include such geometric, demand, intersection, and saturation flow information as:

- Exclusive turn lanes
- Turning movements
- Peak hour factor
- Length of analysis period
- Cycle length
- Lost time
- Basic saturation flow rate
- Lane width
- Heavy vehicles
- Grades
- Parking maneuvers
- Bus stops
- Lane use

Many other data are needed as well and are listed in the HCM.

Traffic information for signalized intersections is usually collected in the a.m. and p.m. peak periods for a duration long enough (say, 2 hours in each peak period) to include the entire peak hour.

Unsignalized Intersections

The category of unsignalized intersections includes two-way stop-controlled (TWSC) intersections, all-way stop-controlled (AWSC) intersections, and roundabouts. Stop signs are used to control movements at TWSC and AWSC intersections, and yield signs are used at roundabouts.

Traffic Flow

Traffic flow at the three types of unsignalized intersections varies by intersection type but is similar in that the determination of right-of-way is left to drivers.

Two-Way Stop-Controlled Intersections

At TWSC intersections, through and right-turning vehicles on the major street (which does not have any stop signs) have the right of way. Left-turning vehicles must yield to opposing through traffic. This description implies that the major street through and right-turning vehicles will not experience any delay, but in reality major street left-turning vehicles can queue during congested conditions and delay the primary movement. Vehicles on the minor street approaches stop at the intersection and yield to all major street traffic. Minor street left-turning vehicles also yield to all other minor street traffic.

Capacity at TWSC intersections depends on gap acceptance by the drivers on minor streets. The availability of gaps, the usefulness of the gaps, and the relative priority of each movement needing to use the gaps all factor into whether a driver will accept a particular gap in the major street traffic. A striped median or center two-way left-turn lane (TWLTL) allows two-stage gap acceptance, where minor street drivers can use one gap to cross part of the major street, and then wait in the median or TWLTL for a second gap to use to complete their left-turn or crossing maneuver. The following factors that affect capacity at TWSC intersections:

- Pedestrians
- Whether minor street movement share lanes
- Existence of nearby signalized intersections that can provide gaps

All-Way Stop-Controlled Intersections

At AWSC intersections, every vehicle stops before proceeding through the intersection. If other vehicles are present, each driver proceeds only when it is his or her turn. AWSC intersections operate in a two-phase or four-phase pattern, depending on the intersection geometry. Right-of-way either alternates between the north-south and east-west traffic streams (for single-lane approaches) or proceeds one approach at a time (for multilane approaches). The more approaches that have vehicles, the greater the potential for conflicts between vehicles, as driver decision time and saturation headways are longer.

Roundabouts

Vehicles entering roundabouts yield to vehicles already in the roundabout. There are no conflicts for the circulating vehicles while they are in the roundabout. Speeds are controlled by the geometry of the roundabout rather than by signs or pavement markings. Gap acceptance methodology is used to evaluate capacity at roundabouts. Capacity of the approaches depends on the conflicting circulating traffic and the gaps that vehicles on the approaches need. There is no current (2008) section in the Iowa DOT *Design Manual* on roundabouts. The Iowa DOT is preparing draft modern roundabout guidelines, which should be available soon and may then be included in the *Design Manual*.

Level of Service

Control delay, delay to major street through vehicles, queue length, and v/c ratio are performance measures used to describe the operations of TWSC intersections. Control delay is the primary measure and is used to determine LOS. Summation of control delay for individual movements results in a delay estimate for each minor street movement and approach. Control delay is also used to determine the LOS for AWSC intersections. At AWSC intersections, control delay is the difference between the time it takes a vehicle to approach and pass through the intersection and the travel time if the vehicle were traveling at free-flow speed without having to stop at the intersection.

Exhibits 17-2 and 17-22 in the HCM show the LOS criteria for TWSC and AWSC intersections based on control delay.

Data Needs

Evaluation of unsignalized intersections requires geometric, control, and volume information, as with other facility types. The following data are needed:

TWSC

- Major and minor street through and turning lanes
- Channelization
- Approach grades

- Movement controls (stop- or yield-controlled)
- Turning movement volumes
- Peak hour factor
- Length of study period

AWSC

- Number and configuration of lanes on each approach
- Turning movement volumes
- Peak hour factor
- Length of study period

Roundabouts

- Intersection geometry
- Turning movement volumes
- Peak hour factor

6.5.3 Pedestrian and Bicycle Concepts

An important consideration when evaluating the operational performance of a transportation facility is the quality of service provided to nonmotorized forms of transportation. In addition, separate pedestrian and bicycle facilities also can be evaluated using procedures described in the HCM. Other key references are Iowa DOT Bicycle/Pedestrian Policies and the AASHTO Design Guides for Design of Bicycle Facilities and Planning, Design and Operation of Pedestrian Facilities.

Pedestrians

Many of the concepts of pedestrian capacity and LSO are similar to those for vehicular traffic.

Pedestrian Flow

The following factors affect pedestrian flow rate:

- *Pedestrian accommodation*—type and width of walkway
- Interaction with other pedestrians, including ability to:
  - Cross a pedestrian traffic stream
  - Walk in the opposite direction of a major pedestrian traffic stream
  - Maneuver generally without conflicts and walking speed changes
- Interaction with vehicular traffic, including delay at signalized and unsignalized intersections
- Environmental factors:
  - Comfort
  - Convenience
  - Safety
  - Economy

Pedestrian flow has the same relationship among speed, density, and volume as does vehicular traffic: as density and volume increase, speed decreases. Mobility declines as density increases, and pedestrians have less space for maneuvering.

If local data are unavailable, 23 persons per minute per foot or 1,380 persons per hour per foot can be used as capacity of a pedestrian facility. Capacity is affected by the design of the facility and factors related to the walking capabilities of pedestrians. These are listed below.

Space

An important concept in pedestrian facility design is space requirements for the pedestrians. Assumptions are made regarding the space a body occupies (3 square feet), as well as the size of a buffer zone around the body (8 square feet). Forward space is the room each pedestrian needs in front of him or her to walk and to sense obstructions or other pedestrians to the front. Space available for pedestrians in a queuing area is also a factor in the quality of service.

Walking Speed

Average walking speed is affected by age of pedestrians and by grade. Chapter 11 of the HCM presents speed values to consider in design of pedestrian facilities. The presence of slower-moving children in the pedestrian stream will reduce the average walking speed. A grade of 10 percent or more will reduce average walking speed by 0.5 foot per second.

Startup Time

Similar to vehicular traffic, pedestrian flow experiences lost time at crosswalks at traffic signals. A lost time of 3 seconds is a reasonable assumption.

Walkway Width

Although pedestrians do not walk in organized lanes, a width of 2.5 feet per person should be used to determine the number of people that can walk abreast on a facility. This allows room for comfortable passing. Pedestrians tend to shy away from objects at the edge of a sidewalk, such as curbs, buildings, and other physical obstructions, and the space at the edge should not be considered when analyzing a pedestrian facility.

Pedestrian Type and Trip Purpose

Pedestrian speed and behavior are dependent on age and the purpose of trips being made. As mentioned previously, elderly persons and children tend to walk slower than other pedestrians. People going to or from work will tend to walk faster than people walking for other purposes, such as shopping. In addition to slower speeds, shoppers can also affect pedestrian flow if they are carrying packages and stopping to window shop. The effect of varying trip purposes and pedestrian types should be considered when determining speed, volume, and density values to use in analyses.

Level of Service

Many factors affect the LOS of pedestrian facilities, including speed, presence of other pedestrians, ability to cross a pedestrian stream, ability to pass slower pedestrians, ability to maintain flow in the minor direction of flow, and average space available to pedestrians. LOS of pedestrian walkways is defined using space available for individual pedestrians and flow rate, and for queuing areas using average pedestrian space. Exhibits 18-3 and 18-7 of the HCM show the LOS criteria for pedestrian walkways and queuing areas. Additional descriptions of the various levels are provided in the HCM.

Data Needs

Operational analyses of pedestrian facilities needs data on the following:

- Length of sidewalk
- Effective width
- Street corner radius
- Crosswalk length
- Analysis period
- Number of pedestrians in a platoon
- Pedestrian walking speed
- Pedestrian startup time

These values should be measured in the field whenever possible. The HCM provides default values if field measurements are not feasible.

Bicycles

As speed, density, and flow of bicycle traffic do not have the same relationships as vehicular or pedestrian traffic, the performance measures described for vehicles and pedestrians are not appropriate for bicycle facilities.

Bicycle Flow

Bicyclists tend to operate in lanes, though bicycle facilities do not have well-defined lanes like roadways do. The number of effective lanes that bicyclists use is an important input in analysis procedures. Three-lane facilities tend to operate better than two-lane facilities because there are more opportunities for passing other bicycles and pedestrians.

Level of Service

LOS is defined for uninterrupted bicycle facilities (off-street bike paths) using hindrance, which measures the comfort and convenience bicyclists experience. This is dependent on interaction with other users, and how many bicyclists and pedestrians a bicyclist will pass in either the same or opposite directions. Hindrance is the fraction of users over 0.6 mile of a path who experience interference from passing and meeting maneuvers. While hindrance counts the number of bicyclists who experience

passing or meeting events, it does not account for the number of events a bicyclist experiences. Therefore, it is possible to reach an LOS of E or F before the facility reaches capacity. At low v/c ratios, the quality of service can deteriorate. Number of events may be used as a surrogate measure for hindrance.

For interrupted flow bicycle facilities, such as on-street bicycle lanes that pass through intersections, performance is measured with delay or average travel speed, similar to vehicular traffic. Off-street bike paths that occasionally intersect with roadways are not considered interrupted flow facilities. Control delay is the criterion used in determining LOS of an interrupted flow bicycle facility.

Chapter 19 of the HCM contains tables showing the LOS for various types of bicycle facilities (exclusive bike paths, shared paths, signalized intersections, and urban streets).

Data Needs

Data needed for analysis of bicycle facilities include the following:

- Length
- Bicycle path width
- Analysis period
- Peak hour factor
- Bicycle speed

These values should be measured in the field whenever possible. The HCM provides default values for path width, peak hour factor, and speed if field measurements are not feasible.

Additional information on pedestrians and bicycles may be found in Chapters 11 and 19 in the HCM.

6.5.4 Highway Concepts

Multilane and two-lane highways are in less of an urbanized environment than urban streets but provide more access than freeways and, therefore, require different analysis procedures from these other types of facilities, even though they have many characteristics in common.

Multilane Highways

Highways with a wide variety of geometric and traffic control characteristics can be analyzed using the HCM procedure for multilane highways. Multilane highways can have characteristics in common with urban streets, freeways, and rural two-lane highways, specifically in terms of providing access and mobility. Fewer traffic signals, more access points, fewer pedestrians, and speeds higher by 5 to 15 miles per hour (mph) are typical differences between multilane highways and urban streets. Though multilane highways can approach freeway conditions by having very few access points, the roadside development has more visual impact on drivers than along freeways. Multilane highways allow drivers the opportunity to pass slower moving vehicles without using lanes designated for opposing traffic as on two-lane rural highways. Other characteristics of a multilane highway may include:

- Located in suburban areas leading into cities or on high volume rural corridors
- Four or six lanes
- Speed limits 40 to 55 mph
- Median, TWLTL, or undivided
- Grade separated crossing, or at-grade intersections, with signals at least 2 miles apart
- Traffic volumes from 15,000 to 40,000 or more

Traffic Flow

Free-flow speed and flow rate are affected by cross section, access points, and vehicle and driver mixes.

Free Flow Speed

The free-flow speed for multilane highways is the average passenger car speed at low-to-moderate traffic flow. The upper limit of low volume is 1,400 passenger cars per hour per lane. The following factors affect free-flow speed:

- *Lane width and lateral clearance*—The effect of roadside obstructions close to the edge of travel way can vary. Drivers can become accustomed to certain obstructions, and the effect on speeds can be reduced.

- *Median type*—Undivided medians composed of a striped centerline, TWLTLs, and raised curb, barrier, or terrain medians can affect free-flow speed since they allow or prevent access to driveways on the opposite side of the highway and provide varying degrees of separation from opposing traffic. Proximity to opposing traffic reduces the speeds with which drivers can travel along the highway. Raised medians can also act as lateral clearance obstructions.
- *Access points*—The level of activity at access points on the right side of the roadway affects free-flow speed, and drivers tend to adjust their speeds simply because of the presence of access points. Driveways on the opposite side of the road that have a significant effect on traffic flow in a direction of travel being analyzed can be included in access-point density calculations.

Free-flow speed can also be affected by design speed, posted speed limits, and police enforcement of speeds.

Flow Rate

Capacity of a multilane highway is affected by the mix of vehicles and the driver population, and capacity calculations should take this into account. The number of trucks, buses, and recreational vehicles are converted to equivalent numbers of passenger cars in order to provide a standard unit of analysis. Conversion to passenger car equivalents is especially important on grades, where heavy vehicles are affected more than passenger cars.

Recreational traffic and commuter traffic do not have the same characteristics, and capacities for recreational traffic can be up to 20 percent lower than for commuter traffic on the same highway. Driver population does not affect free-flow speeds, however.

Level of Service

Density is the primary performance measure used to define LOS for multilane highways. Mean passenger car speed and v/c ratio are also used to describe the operational performance of a highway.

Exhibit 21-2 of the HCM shows the density values for each LOS for multilane highways. The HCM contains descriptions of the characteristics of each LOS and also provides detail on the average speed, maximum v/c ratio, and maximum service flow rate used to describe the various levels of service. The HCM defines driver population factors to use to account for this effect.

Data Needs

Data needed for analysis of multilane highways includes:

- Number of lanes
- Lane width
- Lateral clearance
- Presence of median
- Access point density
- Specific grade or general terrain
- Base free-flow speed
- Length of analysis period
- Peak hour factor
- Percent heavy vehicles
- Driver population factor

These values should be measured in the field whenever possible. The HCM provides default values for several of these values if field measurements are not feasible.

Two-Lane Highways

Two-lane highways are found in various geographic settings and serve a wide range of functions and traffic volumes. For analysis purposes, two-lane highways are divided into two categories:

- *Class I*—High-speed major intercity routes, primary arterials connecting major traffic generators, commuter routes, or primary links in state or national highway networks. They often serve long distance trips or provide links between facilities that do so.
- *Class II*—Lower speed two-lane highways that provide access to Class I facilities, serve recreational or scenic routes, or pass through rugged terrain. These highways are generally not used for long distance travel.

Traffic Flow

A two-lane highway provides one lane for each direction of travel. In order for a driver to pass a slower-moving vehicle, he must use the opposing lane to do so. The ability to do this is limited by sight distance and gaps in opposing traffic. Procedures for analyzing two-lane highway capacity includes consideration of factors such as:

- Lane width
- Shoulder width (clearance to lateral obstructions)
- Presence of passing zones and lanes
- Vehicle mix
- Traffic control
- Turning vehicles
- Terrain
- Directional split of traffic

Both directions of travel can be analyzed at the same time, or each direction can be analyzed separately. Evaluating individual directions of travel is appropriate in situations where the operational performance will differ significantly, such as on steep grades and on segments with passing lanes.

Level of Service

Percent time-spent-following and average travel speed are the primary performance measures used to evaluate LOS on Class I highways. On Class II highways, only percent time-spent-following is used. Exhibits 20-2 and 20-4 of the HCM 2000 show LOS criteria for Class I and Class II two-lane highways, respectively.

Data Needs

To evaluate the operational performance of two-lane highways, the following data are needed:

- Highway class
- Lane width
- Shoulder width (clearance to lateral obstructions)
- Access-point density
- Specific grade or general terrain
- Percent no-passing
- Base free-flow speed
- Length of passing lane
- Analysis period
- Peak hour factor (use HCM default values if detailed traffic data are unavailable)
- Directional split
- Percent heavy vehicles

Field measurements should be used whenever possible, but the HCM provides some default values for when this is not feasible.

6.5.5 Freeway Concepts

Freeways provide uninterrupted flow, full access control, and physical separation between opposing directions of travel through raised barriers or medians or an at-grade median. Operations on a freeway are affected by interaction among vehicles, geometric design, and environmental conditions. The elements of freeway systems are different enough in nature that they are evaluated individually. The following sections explain the concepts of basic freeway segments, weaving sections, and ramps and ramp junctions.

Basic Freeway Segments

Basic freeway segments are outside the influence areas of ramps or weaving areas. Analysis is performed on segments with consistent prevailing conditions. Should conditions change along a freeway segment, another basic segment should be defined for analysis purposes.

Traffic Flow

Capacity of basic freeway segments is affected by the following traffic and roadway characteristics:

- Vehicle types
- Driver populations
- Lane width
- Number of lanes
- Right shoulder lateral clearance
- Interchange spacing

- Vertical alignment
- Lane configurations

Traffic flow on basic freeway segments can vary greatly, as it is affected by upstream and downstream bottlenecks. Bottlenecks can be fixed or recurring sources of disruption to traffic flow or temporary incidents. Sources of bottlenecks include the following:

- Ramp merges
- Weaving segments
- Lane drops
- Maintenance operations
- Construction activities
- Accidents

Three types of flow can be experienced on basic freeway segments:

Undersaturated Flow

When traffic flow is unaffected by upstream or downstream conditions, it is said to be undersaturated. Speeds are generally in the range of 55 to 75 mph at low flow rates, and 45 to 60 mph at high flow rates.

Queue Discharge Flow

Queue discharge flow occurs just downstream of a bottleneck where vehicles are accelerating back to free-flow speed. Flow is relatively stable unless it is affected by another bottleneck downstream. Speeds range from 35 mph up to free-flow speed. Flow rates are between 2,000 and 2,300 pc/hr/lane. Typically, queue discharge flow rates are about 5 percent less than the flow rate just before breakdown at the bottleneck.

Oversaturated Flow

Traffic flow influenced by a downstream bottleneck is oversaturated. A wide range of flows and speeds are possible in the congested area just upstream of a bottleneck. Queues can extend several thousand feet back from the bottleneck, but they are not static. Vehicles move through the queue, although periods of both movement and stopping are experienced.

Level of Service

The primary performance measure used to estimate an LOS for basic freeway segments is density. Speed and v/c ratio can also be used to characterize quality of service. The HCM contains descriptions of the various levels. Exhibit 23-2 of the HCM 2000 shows the LOS criteria for basic freeway segments.

Data Needs

To evaluate basic freeway segments, the following data are needed:

- Number of lanes
- Lane width
- Lateral clearance
- Interchange density
- Specific grade or general terrain
- Base free-flow speed
- Length of analysis period
- Peak hour factor
- Percent heavy vehicles
- Driver population factor

If these values are not available through field measurements, the HCM provides default values.

Freeway Weaving

Freeway weaving segments occur when two or more traffic streams in the same direction cross without the aid of traffic control other than signs. A diverge area just downstream of a merge area creates a weaving segment, as does an on-ramp joined to a downstream off-ramp by an auxiliary lane. Significant numbers of vehicles must change lanes in order to access their desired path. The LOS of a weaving section is a function of the type of weaving, number of vehicles making each maneuver, and the length of roadway in which to complete the weave. Exhibit 6-7 shows undesirable traffic operations in a weaving segment.

Traffic Flow

More turbulence can be experienced by traffic on weaving segments than on basic freeway segments because of the lane changes necessary to access the

appropriate travel paths. The geometric design of the weaving segment affects the number of lane changes needed to complete a maneuver. The configuration of a weaving area affects both weaving and nonweaving vehicles. The ability of weaving vehicles to use outer lanes of the segment is limited since they must use the lanes adjacent to the crown line, the lane line that separates the main movements. The less lane changes that a configuration requires, the more flexible is the lane use.

Weaving Length

The space and time within which a driver can execute necessary lane changes is limited by the length of the weaving area. Intensity of lane changes and turbulence increases with decreasing weaving length. HCM procedures generally apply to weaving sections up to 2,500 feet in length. Weaving may occur in longer sections, but merging and diverging movements often are separated, with lane-changing tending to concentrate near merge and diverge gore areas.

Weaving Width

The number of lanes between the entry and exit gore areas of a weaving segment influences operation of the segment. As the number increases, capacity increases along with the opportunities for lane changes, whether they are necessary to follow a travel path or discretionary.

Type of Operation

The proportion of weaving and nonweaving vehicles using each lane is more important to operations of a weaving area than the number of lanes. Some vehicles are segregated: weaving vehicles will tend to use the lanes involved in the crossing flows, and nonweaving vehicles will use the lanes outside this area. In general, however, weaving and nonweaving vehicles compete for space, and the lanes will tend to reach an equilibrium in which all drivers experience the same conditions. The configuration of the lanes limits the number of lanes weaving vehicles can use. Further details on these limitations are described in the HCM.

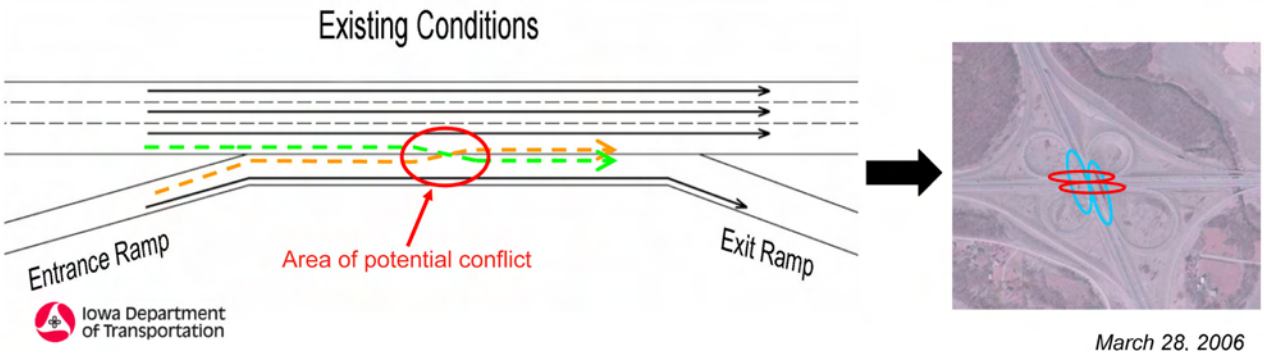
Level of Service

Density is the performance measure used to describe LOS for freeway weaving segments. One LOS value is used for the segment, but it is possible that nonweaving vehicles using lanes outside the weaving area may experience better operational performance. The densities for each LOS are slightly higher than for basic freeway segments, since drivers expect and will accept higher densities on weaving segments. The boundary between LOS E and LOS F does not

Exhibit 6-7
Why Weaving is Undesirable

Weaving occurs when:
- Entering traffic crosses paths with existing traffic
- There is a limited distance for merging

Weaving can:
- Create safety and capacity problems
- Cause problems due to speed differences



follow this approach, however, since it is believed that breakdown occurs at lower densities than for basic segments. Exhibit 24-3 of the HCM shows the LOS criteria for freeway weaving segments.

The HCM describes methodologies for analyzing weaving segments on multilane highways and collector-distributor roads, as well.

Data Needs

Data needed for the operational analysis of a weaving section include:

- Freeway free-flow speed
- Weaving number of lanes
- Weaving segment length
- Terrain
- Weaving configuration
- Weaving flow rate, nonweaving flow rate, and total flow rate in weaving section
- Peak hour factor
- Vehicle mix
- Driver population factor

Ramps and Ramp Junctions

Ramps are designed to provide smooth merge and diverge maneuvers. A ramp may consist of a ramp-freeway junction, a ramp roadway, and a ramp-street junction. Ramp-street junctions would be replaced by another ramp-freeway junction where two freeways are joined by the ramp. The ramp-freeway junction allows for high speed merges or diverges, and the geometric characteristics, free-flow speed of the ramp at the junction, and sight distance all influence ramp operations. Ramp roadways generally do not have operational problems unless an incident on the ramp affects operations. Ramp roadways can be affected by bottlenecks on freeways and by queues at ramp-street junctions. The potential for queuing at ramp-street junctions causes these intersections to be critical elements in the freeway system. Under extreme conditions, queues could extend into the ramp-freeway junction and the freeway mainline.

Traffic Flow

Upstream freeway mainline traffic and entering on-ramp traffic compete for space in a merge area. Merging vehicles create turbulence in the mainline stream, and often mainline vehicles move toward the left to avoid this. The operational effect of merging vehicles is heaviest in the two right lanes and in the acceleration lane for 1,500 feet from the merge point. At diverge areas, mainline vehicles also move to the left to avoid turbulence created by diverging vehicles moving to the right. The influence area of a diverge area extends 1,500 feet upstream of the diverge point.

The operation of ramp junctions is affected by the same roadway, vehicle, and driver characteristics as a basic freeway segment, and also the following factors:

- *Length of acceleration/deceleration lane*—Shorter acceleration and deceleration lanes give on-ramp drivers less space to change speeds as needed, and more acceleration or deceleration must occur on the mainline, disrupting through vehicles. Short acceleration lanes force drivers to slow or even stop while waiting for a gap in the through stream.
- *Ramp free-flow speed*—The free-flow speed on the ramp determines the speed at which merging vehicles enter the acceleration lane and diverging vehicles enter the ramp. This speed determines the amount of acceleration or deceleration that must take place.
- *Lane distribution*—As freeway conditions upstream of the merge or diverge point force more mainline vehicles to use the right-most lanes, merging and diverging maneuvers become more difficult.

Merge and diverge maneuvers influence operations at the ramp-freeway junction by adding or subtracting demand, but do not restrict the total capacity of the upstream or downstream basic freeway segments. The capacity of a basic freeway segment downstream of a merge area is the same as if the merge area was not present. The total number of through and merging vehicles that can be accommodated at a merge area is the capacity of the downstream basic freeway segment. Similarly, the capacity of the upstream basic freeway segment limits the capacity of

a diverge area. The total capacity of an off-ramp and the mainline can also limit the capacity of a diverge area. Breakdown at diverge areas is usually caused by a limited capacity on the off-ramp.

Level of Service

Density is used to define LOS for merge and diverge areas. Exhibit 25-4 of the HCM shows the LOS criteria for ramp junction areas.

Data Needs

Data needed for the analysis of ramp junctions include the following:

- Number of ramp lanes
- Length of acceleration or deceleration lanes
- Ramp free-flow speed
- Length of analysis period
- Peak hour factor
- Demand volume
- Percent heavy vehicles
- Driver population factor

If this information is not available through field measurements, the HCM provides default values.

6.5.6 Transit Concepts

Transit differs from automobile travel in that it is available only in certain locations and at certain times. Transit capacity is limited by the number of transit vehicles in use, the size of the vehicles, and how often the vehicles operate. Both people and vehicles are considered in transit capacity. Person capacity is calculated for transit stops and to determine maximum load points of a route or bus lane. Vehicle capacity of loading areas, stops and stations, and bus lanes limits the number of passengers that can use a stop or that may be carried past the maximum load point.

Bus

Bus services can be either fixed route, operating on set routes and schedules, or demand responsive, responding to requests for transportation. Demand responsive service is less common than fixed route. Concepts related to capacity of fixed route systems are discussed below.

Loading Areas

A loading area is a space for buses to pick up and unload passengers. A linear bus stop along a street curb is a common loading area. Buses either stop in the travel lane or in a pullout so that following buses may pass the stopped bus. Loading area capacity is determined by dwell time (the time required to serve passengers at the busiest door, plus the time to open and close the doors), dwell-time variability, and clearance time. Dwell-time variability is used since buses do not stop for the same amount of time each stop because passenger demand varies. Clearance time is the time between the closing of the bus doors and the departure of the bus. The loading area is not available for use by the following bus during this time.

Bus Stops

More than one bus can load and unload passengers at bus stops, which have multiple loading areas. The capacity of a bus stop is related to the capacity of individual loading areas, design of the loading areas, and the number of loading areas. Bus terminals and transfer centers are off-street bus stops that have additional factors affecting capacity, such as schedule recovery times, driver relief times, and layover times. On-street bus stops can be located on the near or far side of an intersection or mid-block. The location of on-street bus stops affects the passenger car capacity as well as the bus route capacity. Farside stops have the least effect on capacity if buses can use an adjacent lane to avoid right-turn queues. Nearside stops have the greatest effect on capacity when passenger cars can turn right from the curb lane, which the buses use for unloading and loading passengers.

Bus Lanes

A bus lane is any lane that buses use. It may be reserved for buses only or may allow use by other vehicles. Capacity is affected by the capacity of the critical bus stop in the lane, bus lane type (whether buses are allowed to use the adjacent lane to pass other buses), whether buses stop at every bus stop, bus platooning, and bus stop location.

Level of Service

Bus system quality of service is measured by availability, comfort, and convenience. Availability measures include:

- Service frequency at transit stops
- Accessibility at transit stops
- Passenger loads
- Route segment hours of service
- Route segment accessibility
- Comfort and convenience measures include:
- Passenger loads at transit stops
- Amenities such as shelters, benches, information signs, trash receptacles
- Route segment reliability
- Route segment travel speed

The HCM provides tables of LOS criteria for bus service based on many of these measures.

Light Rail and Streetcar

Light rail systems can operate either separated from other traffic or with road vehicles. Streetcars operate only on city streets. The capacity of a rail line is determined by the capacity of stations or travel ways, whichever is smaller. Capacity depends on car size, station length, allowable standees, and the minimum spacing between trains. Quality of service of light rail and streetcar systems is measured in the same way bus systems are measured. The performance measures for availability, comfort, and convenience of bus systems also apply to light rail and streetcars.

6.5.7 Simulation Tools

Simulation tools are often used in highway capacity analysis. HCM methodologies generally focus on individual network elements and assess the LOS provided by a particular facility. The HCM methods represent traffic flows with variables that reflect flow dynamics but do not represent movements of individual vehicles. Traffic simulation models describe how traffic behaves over extended periods of time on a facility or system, by tracking events as the system proceeds through time. Simulation models can incorporate demand-supply analysis, capacity analysis, car-following theory, shock wave analysis and queuing theory. In addition to other advantages, simulation models can vary demand over time and space and can evaluate interacting queues.

Application of Traffic Analysis Models

Traffic operational analysis can be performed with varying degree of detail, at macroscopic and microscopic levels. Macroscopic traffic analysis is used for planning efforts that can be evaluated with one or two measures of effectiveness, such as LOS and signal timing etc. Macroscopic traffic analysis tools include HCS, SYNCHRO, and TRANSYT-7F. Traffic simulation tools come under the microscopic traffic evaluation methodologies. Traffic simulation analyses are used for detailed project level (corridors and intersections) analysis, whereby decisions are based on multiple measures of effectiveness such as LOS, signal timings, intersection performance, queues, congestion, and travel time. Traffic simulation tools that can be used for analysis include CORSIM, VISSIM, SIMTRAFFIC, and PARAMICS.

- *Highway Capacity Software (HCS)*—the FHWA traffic analysis software that follows HCM procedures. HCS can be used for system wide planning analysis for freeways, intersections and arterials. The level of detail is limited and can be used at isolated intersections for fixed time periods.
- *SYNCHRO*—a software program that follows HCM procedures and is a complete software package for modeling and optimizing traffic signal timings. It is designed specifically for evaluating intersections.
- *CORSIM*—the FHWA microscopic model that can be used to evaluate freeways, surface streets, and integrated networks that include all traffic control types, such as traffic signals, stop and yield signs, and ramp metering. CORSIM typically is used for detailed traffic on freeway corridor projects. It has two components:
  - NETSIM is used for modeling surface streets.
  - FRESIM is used for modeling freeways.

- *VISSIM*—a microscopic model that can be used to evaluate integrated networks that include all facility types. VISSIM is used typically for detailed traffic analysis for small networks due to its intensive data input requirements. VISSIM has animation and 3D capabilities for display and presentation purposes.

6.6 Level of Service

A measure expressing the existing quality of service of a transportation facility is required to establish need for a project as well as to assess the benefits to be derived by improvement. Determination of LOS is often a key factor in describing a project's purpose and need and in evaluating alternative transportation improvements. LOS typically is discussed in the purpose and need section of a NEPA document, and in the various sections of an interchange justification report if one is prepared for a project.

LOS is a qualitative rating of a facility's operational conditions that is used to describe the facility's performance. Because different types of transportation facilities (freeways, unsignalized intersections, bus stops) have different operational characteristics, LOS is defined separately for each type. (See Section 6.5 for more detail.) This section provides an overview of concepts related to capacity and LOS, factors that affect LOS, and performance measures used to determine LOS for various facility types.

Operational analyses allow the identification of problems, analysis of alternative solutions, and evaluation of improvements made to facilities. Field observations and calculated performance measures allow the traffic operations analyst to compare an existing facility to proposed improvements and to evaluate the effectiveness of a chosen alternative. Levels of service have been given letter designations A to F (similar to school grades) with A representing the most favorable conditions and F very poor conditions. This nomenclature has proven to be especially useful in communicating the operational performance of existing and proposed facilities for decisionmakers or representatives of the public who may not have the technical background to understand the details of the performance measures.

6.6.1 Capacity

As defined by the HCM, capacity is a flow rate that is the "maximum hourly rate at which persons or vehicles reasonably can be expected to traverse a point or a uniform section of a lane or roadway during a given time period under prevailing roadway, traffic, and control conditions." Procedures for determining capacity assume standard, or base conditions for the roadway. Therefore, for a facility where conditions vary from the base conditions, the capacity estimated by the procedures is affected. Roadway, traffic, and traffic control conditions and intelligent transportation system technologies can all affect capacity on the facility. The v/c ratio also varies with LOS criteria, terrain type and other factors.

Capacity of both vehicles and persons can be determined for facilities. The facility type and type of analysis will determine the most appropriate measure of capacity. Vehicles per hour, passenger cars per hour, and persons per hour are measures of the capacity. *Vehicle capacity* is the number of vehicles passing a certain point in a given period under prevailing conditions. *Person capacity* is a value used in analysis of transit and high-occupancy vehicle facilities, as well as in determining mode types appropriate for heavily traveled corridors.

Uninterrupted Flow Facilities

Uninterrupted flow facilities are those that do not have fixed causes of delay or interruption to the traffic stream, such as traffic signals or stop signs. Freeways (including ramps) and rural two-lane highways and multilane highways fall into this category. Capacity is measured on a per-lane basis: in *passenger cars per hour per lane* on uninterrupted multilane facilities and *passenger cars per hour* on two-lane rural highways.

Interrupted Flow Facilities

Interrupted flow facilities include urban arterials, signalized and unsignalized intersections, and transit, pedestrian, and bicycle facilities.

Capacity of intersections is presented in units of *vehicles per hour.* For signalized intersections, capacity is defined for each lane group. A lane group is a set of lanes for which separate capacity and LOS analyses are performed. The capacity of two-way stop-controlled and all-way stop-controlled intersections is determined for each movement.

Capacity is measured in persons per minute per foot for pedestrian facilities and bicycles per hour per lane for bicycle facilities. Capacity of transit systems can be defined in terms of both persons and vehicles.

6.6.2 Quality and Level of Service

LOS is a measure used to describe the conditions of the traffic stream, or the quality of service provided by a transportation facility. Six LOS ranges are defined, and facilities are assigned one of the six levels based on service measures such as speed, travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. LOS A represents the highest quality of service, whereas LOS F is characterized by unstable flows or high delays. Each LOS is assigned a service flow rate and other performance measures. The analyst uses these values to determine the LOS of an existing or proposed facility, or to determine the operational conditions needed to provide a given LOS for proposed improvements. A range of these measures is used to define each LOS.

The six LOSs are defined as follows:[10]

A Free-flow, with low volumes and high speeds

B Reasonably free flow, but speeds begin to be restricted by traffic conditions.

C In stable flow zone, but most drivers are restricted in freedom to select their own speed

D Approaching unstable flow; drivers have little freedom to maneuver

E Unstable flow, may be short stoppages

F Failure

[10] AASHTO, Geometric Design of Highways and Streets.

Service Flow Rates

The HCM defines service flow rate as "the maximum hourly rate at which persons or vehicles can be reasonably expected to traverse a point or uniform segment of a lane or roadway during a given period under prevailing roadway, traffic, and traffic control conditions while maintaining a designated level of service." Service flow rates are based on a 15-minute period, and the hourly service flow rate is four times the peak 15-minute volume. In design or planning efforts, the service flow rates for LOS C or D are typically used as the level of acceptable operating service from the perspective of users.

Performance Measures

Performance measures are calculated for use in describing the operation of a roadway given a set of roadway, traffic, and control conditions. Volume, or traffic flow, is a performance measure used for both uninterrupted and interrupted flow facilities. Spacing and headway, which are related to flow, are also used. The following performance measures may also be used, depending on the facility type:

- Multilane highways: speed, density, volume to capacity (v/c) ratio
- Two-lane highways: percent time spent following, average travel speed (Class I highways only, which are high speed roadways)
- Freeways: speed, density, v/c ratio
- Urban streets: average travel speed
- Signalized intersections: saturation flow rate, control delay, critical v/c ratio, average queue length
- Two-way stop controlled intersections: control delay, delay to major street through vehicles, queue length, v/c ratio
- All-way stop-controlled intersections: average control delay
- Pedestrian facilities: space per pedestrian, walking speed
- Bicycle facilities: hindrance (uninterrupted flow), delay and average travel speed (interrupted flow)

- Transit facilities: vehicle speed, delay (drivers' perspective), availability, comfort, and convenience (passenger perspective), economic and productivity measures (operating agency's perspective)

Each facility type has one performance measure that is used to determine LOS. This is referred to as the *service measure* or the measure of effectiveness for a facility type. The performance measure that determines LOS for each facility type is discussed in Section 6.3, Crash Data Analysis (Tools and Techniques).

6.6.3 Factors Affecting Capacity and Level of Service

Capacity and LOS are affected by various geometric, traffic, and traffic control factors. Base conditions determine the best possible capacity for a roadway, and the prevailing conditions of the facility affect the performance measures or the capacity. LOS and capacity are also affected by access control. Iowa DOT's *Access Management Handbook* offers guidance on implementation of an effective access control policy.

Prevailing conditions generally vary from base conditions, and the calculations of performance measures such as capacity, service flow rate, and LOS must account for these differences. The following sections discuss base conditions and prevailing conditions for roadway, traffic, and control factors.

Base Conditions

Base conditions are defined for each facility type. The base geometric, traffic, and control characteristics result in the best possible capacity for a given facility type. These are ideal conditions for the facility. Therefore, changes to the base conditions (such as widening lanes) would not increase the facility's "base" capacity.

Base conditions vary by facility type. For uninterrupted flow roadways, base conditions include:

- 12-foot lanes
- 6-foot clearance between the edge of the travel way and obstructions on the roadside
- Free flow speed of 60 mph (multilane highways)
- Passenger cars only
- Level terrain
- No no-passing zones (two-lane highways)
- No interference from turning vehicles

Base conditions on intersection approaches include:

- 12-foot lanes
- Level grade
- No on-street parking on the approaches
- Passenger cars only
- No transit bus stops in the travel lanes
- Noncentral business district
- No pedestrians

Roadway Conditions

As prevailing conditions of a facility under analysis generally will not match base conditions, it is necessary to account for such differences in computations. Roadway conditions such as number and width of lanes, horizontal and vertical alignments, and presence of turn lanes, affect the capacity of the facility or the performance measures used to describe it.

Number of Lanes

Capacity clearly is affected by the number of lanes, and additional lanes also provide increased maneuverability. Additional lanes available for maneuvering around slower moving or turning vehicles allow for a higher average speed on freeways and multilane highways.

Type of Facility and Environment

The classification of a roadway and the amount of development along the roadway affect operating conditions. Higher functional class roadways are designed to provide more mobility and less access than lower class facilities. The development along a roadway will increase turning movements at access points and increase visual distraction for drivers. Both issues reduce travel speeds and capacity of the facility.

Access Control

Access controls to limit separate conflict points along the roadway play an important role in preserving highway capacity, reducing crashes, and avoiding or minimizing costly remedial roadway improvements.[11] Effective access management is a key to improving safety. The number of access points, coupled with the speed differential between vehicles traveling along the roadway and vehicles using driveways, contributes to rear-end crashes. The access control policy in force also affects the need for protected turning lanes to reduce conflicts between through traffic and vehicles that require access to adjacent sites.

Lane Widths

Typical lane width is 12 feet. Narrower lanes, which result in less lateral distance between vehicles, can result in lower speeds and capacities.

Shoulder Widths and Lateral Clearances

Objects such as sign posts, utility poles, and curbs, affect vehicle speeds by their proximity to the edge of the travel way. Under base roadway conditions, it is assumed that objects are far enough from the edge of the travel way that speeds are not affected (at least 6 feet).

Design Speed

Design speed is used to choose horizontal and vertical geometric elements. These elements will limit the speeds at which drivers feel comfortable traveling. Individual geometric elements that have significantly lower design speeds than adjacent elements will have a negative operational (and potentially safety) impact on drivers, who may not be expecting the need to decelerate.

Horizontal and Vertical Alignments

Design speed affects the design of horizontal and vertical alignments, as does terrain. More severe terrain generally reduces capacity and service flow rates, since the operational abilities of vehicles might be limited. Heavy vehicles, especially, might operate at much lower speeds on steep upgrades. Passenger cars and other vehicles for which speeds are not limited by grades also travel slower on parts of the roadways where passing opportunities are limited. Steep grades also affect operations at intersections, since starting from a stopped position on an incline is more difficult than on flatter grades.

Presence of Turn Lanes

High numbers of turning vehicles affect capacity if space is unavailable outside the through lanes to decelerate before turning.

Additional roadway conditions are listed in the HCM.

Traffic Conditions

Traffic conditions affect capacity and LOS since the base traffic condition for a facility only contains passenger cars. A mix of vehicle types will cause operations to deteriorate, since in some geometric situations larger vehicles are unable to keep pace with passenger cars. This leads to gaps forming in the traffic stream, which is an inefficient use of roadway space. In addition, larger vehicles occupy more space on the roadway, resulting in a lower number of vehicles on a section of roadway.

Lane and directional distribution of the traffic also affect capacity, service flow rates, and LOS. On multilane facilities, less traffic tends to travel in the shoulder lanes than in other lanes. The ideal directional distribution on a two-lane rural highway is an equal amount of traffic between the two lanes. As flow becomes unbalanced, capacity decreases. Facilities are generally designed for the peak flow rate in the peak direction; therefore, capacity analysis procedures for multilane facilities evaluate one direction of travel only.

Intersection Control and Access Conditions

Capacity is also affected by the type of traffic control and the level of access control. At intersections, control type used significantly affects capacity. For signalized intersections, signal phasing, allocation of green time, cycle length, and adjacent control types play a large role in determining capacity by determining when and for what length of time vehicles are able to move through the intersection. At TWSC intersections, the operation of the minor street depends on the

[11] Iowa Access Management Handbook.

conditions of the major street. Capacity of AWSC intersections can vary greatly, depending on the amount of traffic on each approach. Intersection capacity is also affected by proximity of driveways within the influence area of the intersection.

Capacity of both interrupted and uninterrupted flow facilities depends on other traffic control measures, such as on-street parking, turn restrictions at intersections and driveways, lane use controls, and one-way street routings.

6.6.4 Additional References

This section provides a brief overview of the concepts of LOS and capacity. For additional details on this topic, refer to the materials listed below.

Institute of Transportation Engineers. 1999. Traffic Engineering Handbook. Washington DC.

Transportation Research Board. 2000. Highway Capacity Manual. Washington DC: TRB, National Research Council.

6.7 Operational Features of Freeways and Interchanges

6.7.1 Introduction

The assessment of operational features, such as LOS and safety, is described above. The following operational features of freeways and interchanges also are subject to assessment:

- Lane and route continuity
- Lane balance
- Ramp sequence and spacing
- Signing

6.7.2 Route and Lane Continuity

Route continuity refers to provision of a directional path along and throughout the length of a designated route. The designation pertains to a route number or name of a major highway. Route continuity is an extension of the principle of operational uniformity coupled with the application of proper lane balance and the principle of maintaining a basic number of lanes. It is best if the driver, especially an unfamiliar driver, has a continuous through route on which lane changing is not necessary to continue on the through route.[12]

Where two or more routes follow a single alignment within a corridor, they are referred to as "overlapping routes." When routes overlap, signing is more complicated, and the decision process for the driver is more demanding.

The provision of route continuity through overlapping sections is important. A priority must be established giving one route precedence. All other factors being equal, priority should be assigned to the route that handles the highest volume of through traffic. Once priority for one of the overlapping roadways has been established, basic lanes, lane balance and other principles of interchange design can be applied to the design of the overlapping section. The lower classified facility should enter and exit on the right, thus conforming to the concept of route continuity.[13]

Lane continuity, which relates to route continuity and involves "basic lanes" and lane balance, has been recognized as a key ingredient in safe and efficient operation (FHWA, *Dynamic Design for Highway Safety)*. Some old freeways in urban areas were designed without a continuous or through lane. This requires considerable and unnecessary lane changing, which creates vehicle conflicts, reduces capacity, and increases crash potential.

6.7.3 Lane Balance

Fundamental to establishing the number and arrangement of lanes on a freeway is the designation of the basic number of lanes. A certain consistency should be maintained in the number of lanes provided along any arterial route. The basic number of lanes is the minimum number of lanes designated and maintained over a significant length of a route, irrespective of changes in traffic volume and lane-

[12] AASHTO Green Book—Policy on Geometric Design of Streets and Highways. Washington DC. 2004.

[13] AASHTO Green Book—Policy on Geometric Design of Streets and Highways. Washington DC. 2004

balance needs. Stated another way, the basic number of lanes is a constant number of lanes assigned to a route, exclusive of auxiliary lanes.[14]

To realize efficient traffic operation through and beyond an interchange, there should be a balance in the number of traffic lanes on the freeway and ramps. Lane balance at freeway exits and entrances enhances operational efficiency and flexibility. In the past, facilities rarely were designed with lane balance. Lane balance requirements are as follows:[15]

at freeway entrances: Nc = Nf+ Ne - 1 or Nc = Nf+Ne

at freeway exits: Nc = Nf + Ne - 1

where:

Nc = number of lanes for combined flow beyond an entrance or in advance of an exit.

Nf = number of lanes on freeway upstream of an entrance or downstream of an exit.

Ne = number of lanes on the entrance or the exit. At exits, this relation provides an "extra lane going away," an optional lane in which the driver may proceed on the freeway or on the ramp.

Lane balance at entrances and exits is mandatory in order to achieve smooth operation, reduce lane changes to a minimum, and clarify the paths to be followed. At exits, it is significant that there is always "one more lane going away" and that there is not more than one lane drop at a time. Lane drops, where required, generally apply to auxiliary lanes only.

Lane reductions should not be made between and within interchanges simply to accommodate variations in traffic volume. Instead, auxiliary lanes are added or removed from the basic number of lanes as needed. A reduction in the basic number of lanes may be made beyond a principal interchange involving a major fork or at a point downstream from an interchange with another freeway, but not so far downstream that motorists become accustomed to a number of lanes and are surprised by the reduction.

[14] AASHTO Green Book—Policy on Geometric Design of Streets and Highways. Washington DC. 2004

[15] J. P. Leisch. June 1977. "Systems Approach to Long-Range Freeway Rehabilitation." Presentation at AASHTO Subcommittee on Design Meeting, Hilton Head, SC.

6.7.4 Interchange Spacing and Ramp Sequence

Spacing of interchanges has a pronounced effect on the operation of freeways. In areas of concentrated urban development, proper spacing is usually difficult to attain because of traffic demand for frequent access. Minimum spacing of arterial interchanges (distance between intersecting streets with ramps) is determined by weaving volumes, ability to sign, signal progression, and required lengths of speed change lanes. A generalized rule of thumb for minimum interchange spacing is 1 mile in urban areas and 2 miles in rural areas. In urban areas, spacing of less than 1 mile may be developed by grade-separated ramps or by adding collector-distributor roads.[16]

Ramp sequence also is an important operational feature. If a series of interchanges is being designed, attention must be given to the group as well as to each individual interchange. Interchange uniformity and route continuity are interrelated concepts, and both can be obtained under ideal conditions. It is desirable to provide uniformity in exit and entrance patterns. A dissimilar arrangement of exits between successive interchanges causes confusion, resulting in slowing down on high-speed lanes and unexpected maneuvers. The difficulty of left-entrance merging with high-speed through traffic and the requisite lane-changing for left-exit ramps make these layouts undesirable. Except in special cases, all entrance and exit ramps should be on the right. To the extent practicable, all interchanges along a freeway should be reasonably uniform in geometric layout and general appearance.[17]

6.7.5 Signing

Ease of operation at interchanges (clarity of paths to be followed), safety, and efficiency depend largely on relative spacing, geometric layout and effective signing. The locations of and minimum distances

[16] AASHTO Green Book—Policy on Geometric Design of Streets and Highways. Washington DC. 2004.

[17] AASHTO Green Book—Policy on Geometric Design of Streets and Highways. Washington DC. 2004; J. P. Leisch. June 1977. "Systems Approach to Long-Range Freeway Rehabilitation." Presentation at AASHTO Subcommittee on Design Meeting, Hilton Head, SC.

between ramp junctions depend to a large degree on whether effective signing can be provided to inform, warn, and control drivers. Location and design of interchanges, individually and as a group, should be tested for proper signing.[18] Signs should conform to the Manual on Uniform Traffic Control Devices.

6.8 Documentation

Documentation is an important aspect of a project because it provides information required to support and record project decisions. Documentation should be developed through the course of the project study process, and generally serves the following purposes:

- Builds understanding and agreement of required project analyses and methodologies
- Provides project decisionmakers with relevant data to make technical decisions, allowing the project development process to move forward in a linear manner
- Provides a clear record of project analyses and rationale for project decisions
- Serves as the basis for development of location reports and feasibility reports and aids in the development of environmental documentation

6.8.1 Existing Conditions Report

The Existing Conditions Report provides a comprehensive performance summary of the transportation system in the study area. The analyses of existing facilities should identify the nature, extent, and causes of transportation issues in the project study area. Although specific performance analysis requirements will vary somewhat based on project location and complexity, the following performance issues are typically evaluated and summarized in the Existing Conditions Report:

- Travel performance (existing and projected design year performance) for the existing system
- Crash analysis and safety performance
- Infrastructure condition
- Geometric performance

The report should be prepared in a manner that relates performance issues to one another (i.e., potential safety issues related to undesirable geometry or traffic capacity). Relevant information from technical memorandums that previously developed for individual performance issues (e.g., crash analyses) should be incorporated and summarized in the report.

The Existing Conditions Report serves as the basis for several important building blocks for the location study process. It provides information on system performance required to support development of the project purpose and need. The report also serves as a guide to identifying the character and location of improvement alternatives to be considered.

Exhibits and tables may be included in the Existing Conditions Report. The report should at least include a location map, exhibits depicting the general orientation and layout of the facility on an aerial photo, and tables and graphs summarizing performance characteristics (e.g., geometric deficiencies by type and location, crash summaries by type and location). For complex projects such as urban freeway corridors, it may be helpful to prepare a comprehensive exhibit that helps the reviewer to understand the interrelationship between safety, geometric, and travel performance issues along the corridor.

The Existing Conditions Report is one of earliest major project deliverables. It is prepared at the conclusion of the existing conditions analysis process. The draft report should be reviewed by the Project Manager and PMT. Following review, comments from the Project Manager and PMT should be addressed in the final report.

6.8.2 Technical Memorandums

Technical memorandums should be prepared in a manner that gives readers and reviewers with a comprehensive understanding of the issue at hand. The content should provide information regarding analysis context, methodology and assumptions, findings, and conclusions and recommendations. Typically, technical memorandums will include the following sections:

[18] AASHTO Green Book—Policy on Geometric Design of Streets and Highways. Washington DC. 2004.

- Introduction, providing background project information required to provide the reader with an understanding of the issue under consideration
- Methodology and Assumptions, describing analysis methods, tools, procedures, and assumptions
- Analysis Findings, describing analysis results
- Conclusions and Recommendations, summarizing key study findings and decision recommendations

Technical memorandums typically are reviewed by the Project Manager, with PMT review and input as appropriate. Technical memorandums prepared as part of the existing conditions analysis are described below.

Crash Analysis Memorandum

The crash analysis memorandum summarizes safety analysis procedures and findings for a project. It contains narrative, tables, and exhibits and graphs summarizing the following:

- Crash analysis procedures
- Crash data summary, which identifies crash characteristics (type and location)
- Rate of collisions and high-crash locations
- Relationship of safety performance to other transportation issues in the study area (i.e., traffic congestion and geometric design issues), and potential corrective measures

Traffic Volumes and Projections Memorandum

The planning process relies largely on the definition of current and future transportation demand (i.e., traffic volumes for highway facilities). The traffic volumes and projections memorandum documents procedures and tools used to develop existing (base year) and projected future (design year) travel forecasts in the study area. It contains narrative, tables, and exhibits presenting the following information:

- Travel demand and traffic conditions, including data sources, average daily and peak hour information, and traffic composition (e.g., truck percentages)
- Travel demand forecasting procedures and assumptions
- Projected design year travel forecasts, including average daily and peak hour information, for the No-Build and Build Alternatives

Level of Service Analysis Memorandum

The LOS analysis memorandum summarizes results of capacity and operational analyses for the base condition (No-Build Alternative). It identifies potential capacity and operational issues on the transportation system, including their location and severity. The memorandum should contain narrative, tables, and exhibits addressing the following:

- Traffic analysis procedures, tools, and assumptions
- Project design criteria pertaining to travel performance (i.e., LOS, volume, or capacity ratio)
- Capacity analysis for both existing and projected design year travel forecasts, including a discussion of potential corrective measures to address performance issues (e.g., addition of basic lanes or turn lanes)
- LOS throughout the corridor

NOTES:

Alternatives Development and Evaluation

CHAPTER 7

The development and evaluation of alternatives is the central element of the location process and applies to all the various location and environmental studies completed by OLE (e.g., feasibility studies, location design studies, and NEPA documents). The object of the alternatives development process is to allow consideration of a full range of potential alternatives in the early stages of project development, and to facilitate identification of an optimal and acceptable transportation solution that minimizes impacts to environmental, socioeconomic, and financial resources while providing the best transportation performance. The alternatives development process provides the engineering rationale for identifying the range of reasonable alternatives that can address the project purpose and need, and provides the design definition required to evaluate the relative performance of alternatives.

As depicted in Exhibit 7-1, alternatives generally are considered through three distinct stages:

- *Conceptual Design (PL1)*, which typically includes consideration of alignment concepts, facility types, typical sections, access accommodations, and multimodal transportation options for project concept alternatives. Conceptual design can be performed as part of a feasibility study or in the early stages of the location study process.
- *Functional Design (PL2)*, which establishes general roadway design features (e.g., horizontal and vertical alignment), cross sections, and preliminary construction limits for proposed build alternatives. Functional design typically is performed during the location study process for the identified range of reasonable alternatives.
- *Preliminary Location Design (PL3)*, which refines the design requirements (through step 33 of Iowa DOT's Can-Do Design process) for the Preferred/Recommended Alternative. Typically, early stages of Can-Do Design are completed during the location study process following identification of the preferred alternative.

The alternatives development process (Exhibit 7-1) is iterative and progressive in nature, focusing initially on general design concepts and subsequently on functional design features. It is structured to allow consideration of alternatives in an efficient manner, with a logical progression of design development as required to support the decision at hand.

This chapter focuses on defining the general methodologies, tools and procedures employed by the Location Studies Section in developing and evaluating alternatives. The types of analyses and the level of detail to be developed are discussed for the three design stages. It is important to note that the nature and range of alternatives considered will vary by project and will evolve during the course of project development.

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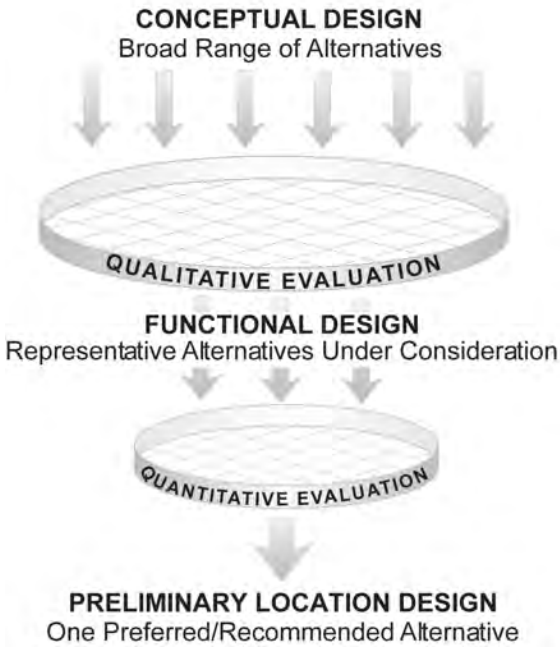
7.1 Naming Conventions and Definitions

When discussing alternatives, it is important to understand the differences between each step of the location study and design development process (conceptual design, functional design, preliminary location design) and the terminology used to refer to alternatives through each stage of the process (conceptual, build, preferred, recommended). This section provides basic descriptions of each step of the location and design development process, as well as general guidance regarding typical alternative naming conventions.

It is important to establish and follow a clear alternatives naming convention for each individual project. Recognizing that the range and characteristics of alternatives vary from project to project, it is not practical to establish a single naming convention. Therefore, the Location Section should establish a project-specific convention with input from NEPA Compliance before initiation of the alternatives development process. The naming convention should satisfy the following objectives:

- Be of a format that can be readily understood by the public and be clearly presented in NEPA documents.
- Provide continuity between alternatives developed during early stages of the location study process (conceptual alternatives) and those carried forward for detailed consideration (build alternatives).

Exhibit 7-1
Alternatives Development Process



- Differentiate between a corridorwide improvement plan and potential variations in design treatments for an isolated element of the corridor (e.g., interchange type).

Table 7-1 includes an example of an alternatives naming convention.

7.2 Alternatives Development Process

Before the project alternatives are developed, a thorough understanding of existing and future transportation needs and project goals and objectives are needed. Chapters 4, 5, and 6 provide information on project goals and objectives, data collection, and existing conditions analysis.

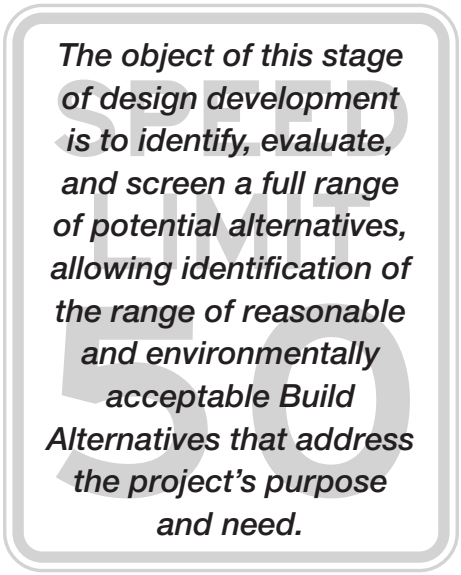
Table 7-1

Alternatives Naming Conventions		
Design Development Stage	**Alternatives Terminology**	**Concurrent NEPA/404 Event**
Concept Design (PL1)	Conceptual Alternatives	Concurrence Points 1 and 2 - Purpose & Need - Alternatives to be Analyzed
Functional Design (PL2)	Representative Build Alternatives (5 to 10% design complete)	Concurrence Point 3—Alternatives Carried Forward
Preliminary Location Design (PL3)	Preferred Alternative (25 to 35% design complete)	Concurrence Point 4—Preferred Alternative

Exhibit 7-2 depicts the alternatives development process from the beginning of a project (data collection) through preliminary location design. Sections 7.3 to 7.5 discuss developing alternatives through each stage of the location process.

7.3 Conceptual Design Process (Alternative Development)

This section describes the methodology used to develop alternatives during the conceptual design phase of a feasibility or location study. The object of this stage of design development is to identify, evaluate, and screen a full range of potential alternatives, allowing identification of the range of reasonable and environmentally acceptable Build Alternatives that address project purpose and need. Alternatives identified and evaluated through the conceptual design stage are advanced in coordination with the NEPA/404 merged process concurrence points No. 2 (Alternatives to be Analyzed) and No. 3 (Alternatives to be Carried Forward).



It is important to remember that the alternatives development process is iterative and varies from project to project. For example, a new highway or highway on new alignment will require that the general location of the alternative be identified before the conceptual design of isolated project features (e.g., interchange types and layout) can be clearly defined. By contrast, the location of a highway corridor to be widened will be fairly well defined, allowing an earlier focus on the conceptual design of isolated project features (e.g., interchanges). Thus, the methodology and procedures for development of alternatives during the conceptual design stage must be tailored to the unique design development needs of each project.

7.3.1 Design Considerations

The level of design detail established during this stage of alternatives development should be adequate to define basic alternative locations and characteristics, to permit an evaluation of the ability of the alternative to address the project purpose and need (while complying with established design and planning guidelines), and to identify any potential human and natural environmental "fatal flaws."

The following basic design features are typically considered and defined with the development of Conceptual Alternatives.

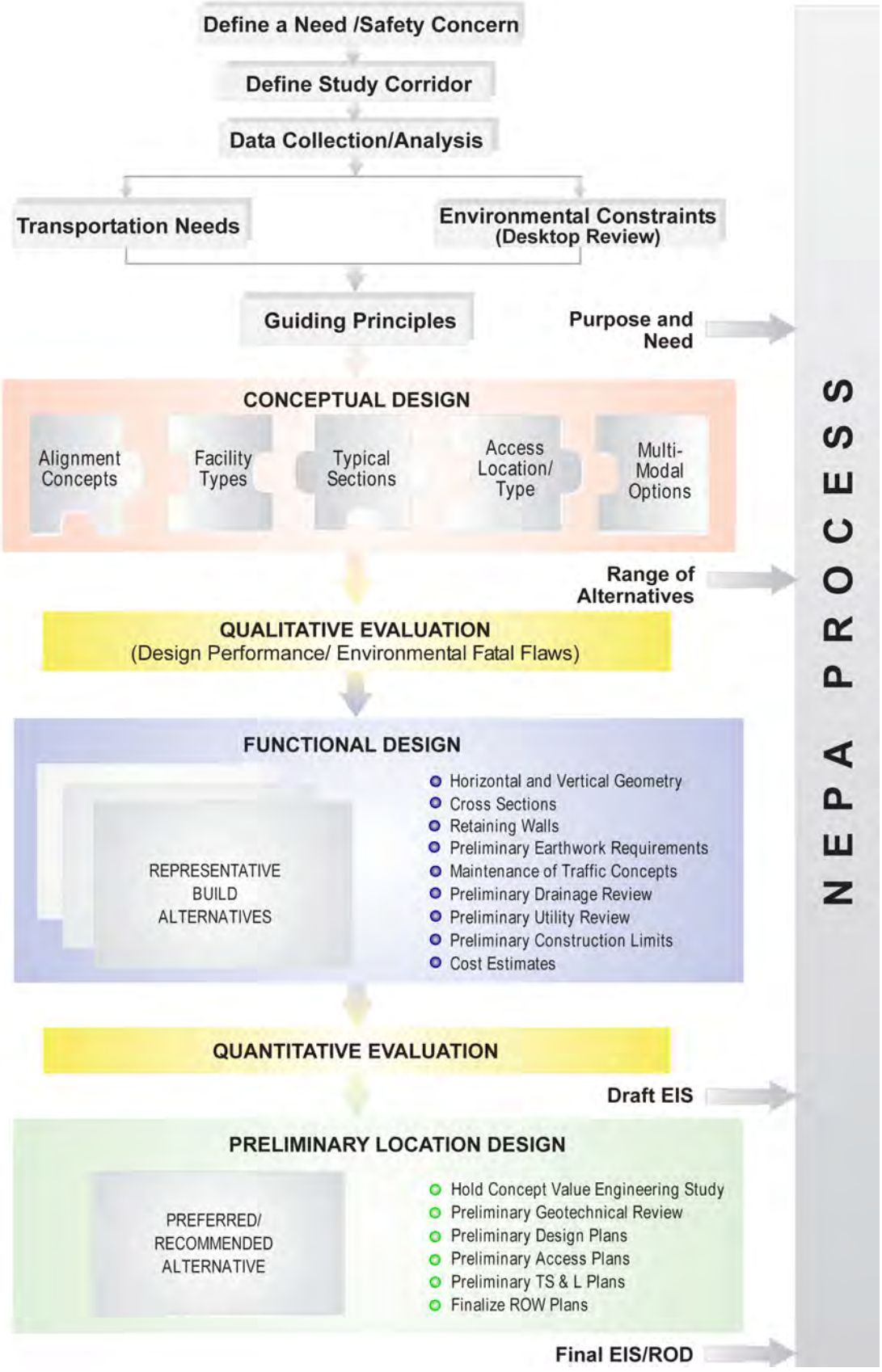
Corridor Location

For new highway corridors or for existing highways on new alignment, multiple corridor locations typically are evaluated to identify locations that address transportation needs while minimizing potential impacts. At this point, corridor locations should be defined as broad "bands" or paths, allowing one to evaluate the transportation performance of the corridor in the context of the connecting transportation system (e.g., Does the corridor location allow for establishment of reasonable access to major highways in the study area?), and to screen the corridor alternate for any potential environmental fatal flaws (e.g., unavoidable impacts to Section 4(f) resources). The width of the alternate corridor locations likely will vary on the basis of the characteristics and constraints of the project area.

Alignment

For proposed improvements to highway corridors, the identification of all potential alignments (existing alignment, alignment shift, bypasses, new alignment) should be considered. Generally, alignment shifts are employed to minimize impacts to adjacent human or natural environment constraints or to address design issues along the existing highway. For example, for projects in urban areas, simple alignment shifts

Exhibit 7-2
Alternatives Development Process



such as widening to only one side of a corridor may preserve critical right-of-way and minimize impacts. At this stage of design development, horizontal and vertical alignments typically are developed only at a conceptual level to verify that the alternative will comply with established design parameters.

Facility Type and Access Location / Type

A full range of potential facility types and access control characteristics (freeway, expressway, etc.) should be developed and considered in the development of conceptual alternatives. The range of facility types to be considered is influenced largely by the level and character of transportation demand, regional mobility considerations, and system planning objectives.

The general location and type of access to be provided with each conceptual alternative should be defined according to the facility type. This includes identifying the location of proposed interchanges and major at-grade intersections. Various access options may need to be considered, including location options (particularly for new highway corridors, where location alternates may afford different access opportunities) and type options (full access versus partial access, preliminary interchange form).

Basic Number of Lanes

The corridor sizing (the number of basic travel lanes) along the corridor should be established. This includes establishing the number of through lanes and the location and type of auxiliary lanes, such as auxiliary lanes on freeway weaving sections and truck climbing lanes. Basic number of lanes should be documented in the guiding principles document and established on the basis of projected traffic demand, level of service (LOS), general travel characteristics in the project area, and on the principles of lane balance.

Typical Cross Sections

Typical proposed cross sections should be established for each distinct section of the project area, and for each facility type under consideration. The typical sections should reflect established design criteria (as identified with the project guiding principles), as well as input from project stakeholders regarding the context of the project area. For projects in urban areas or abutting sensitive natural area, several cross section options may need to be considered.

Grade Separations

The location and approximate sizing requirements (width, length, vertical clearance requirements) for grade separations along the corridor should be identified to permit a reasonable evaluation of relative costs of the conceptual alternatives and to help establish preliminary vertical profile requirements for the corridor.

Multimodal Options

Needs and opportunities for alternative transportation modes and technologies should be evaluated early in the alternatives development process. This may include consideration of transit facilities and services, pedestrian and bike accommodations, transportation demand management strategies, and transportation system management technologies. Multimodal options are often considered as independent, or stand-alone alternatives to address purpose and need, so as to determine whether a nonhighway alternative is able to address transportation needs in the study area. Where appropriate, accommodations for multimodal design features (such as bike trails or sidewalks) and transportation technologies (such as traffic signal progression systems) should be incorporated into project alternatives so as to encourage use of nonmotorized travel modes and maximize the efficiency of the transportation system.

Validate Project Termini

Project termini should be validated on the basis of findings of transportation needs and objectives, independent utility, and the range of alternatives to be considered.

7.3.2 Conceptual Alternatives Development

Conceptual alternatives should be developed in a manner that permits efficient and timely consideration of a full suite of reasonable alternatives.

This should include consideration of alternatives identified in previous studies. The level of engineering development for alternatives should be adequate to answer the question at hand; namely, to establish the general location and character of the reasonable alternatives that address the project purpose and need. To result in an objective comparison of alternatives, all conceptual alternatives for a project should be developed to a consistent level of detail—enough to determine whether the alternative is reasonable for further consideration.

Environmental and community issues must be carefully considered throughout the alternatives development process. Wherever possible, alternatives should be developed to avoid or minimize impacts to sensitive resources. Context sensitive principles and procedures should be integrated throughout to ensure that alternatives respect community values and sensitivities.

The public involvement program should be structured to provide opportunities for meaningful public input in advance of key milestones in the alternatives evaluation process. Where possible, direct stakeholder participation in alternatives development and evaluation is encouraged. This helps ensure that possible alternatives are considered sooner rather than later, encourages consideration of community values, and helps build public understanding and support for proposed solutions.

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The following discussion provides general guidelines regarding design tools, design features, and plan format guidelines to be used for the development and presentation of conceptual alternatives.

Conceptual Design Tools

Computer-aided drafting (CAD) and computer-aided engineering (CAE) software have become standard tools for developing and displaying engineering alignments and conceptual alternatives. Iowa DOT uses MicroStation for CAD and GEOPAK for CAE. Refer to Chapter 10 for more detailed requirements pertaining to use of CAD/CAE tools.

Geographic Information Systems (GIS) has become a common application for planners and environmental engineers to use in maintaining an environmental inventory/database and in creating exhibits. GIS contains powerful data analysis tools that can be used to quantify impacts of alternatives, and develop reports and maps that illustrate the project and alternative impacts. Iowa DOT uses GeoMedia as the preferred GIS package. The data needs of the GIS application and CAD are very similar; therefore, data often are shared or passed between the GIS and CAD platforms. Chapter 10 of this manual describes further the requirements pertaining to the use of GIS.

As a study progresses, roadway details become more refined. GEOPAK may be used to develop functional plans that include horizontal and vertical geometry, cross sections, and need lines. Final products should be delivered as GEOPAK files.

Conceptual Design Features

Horizontal Alignment Concepts / Mainline Geometry

Conceptual geometry developed for the project mainline should include preliminary horizontal alignment, rough vertical profile considerations,

and a conservative roadway footprint. Conceptual geometry should be developed within established guidelines (design criteria) to the level required to demonstrate engineering feasibility. No cross sections are developed at this stage. The following issues typically are considered in establishing conceptual mainline geometry:

- Route continuity and lane balance
- Required number of basic lanes and auxiliary lanes
- Mainline traffic operations, including methods for eliminating mainline weaving sections (such as potential use of collector-distributor roadways)
- Relationship between freeway sections and interchange ramps
- Grade separation requirements

Interchange Concepts

Conceptual geometry for interchanges includes identification of appropriate interchange locations, types, and ramp design requirements (right- versus left-hand ramps, single- versus two-lane ramps, ramp merge and diverge design, ramp/crossroad intersection treatment). This includes the following considerations:

- Evaluation of existing and future travel patterns and demand
- Evaluation of the performance of existing system or service interchanges
- Accessibility to principal transportation corridors and major traffic generators

A broad range of interchange types (diamond, partial cloverleaf, directional) should be considered with the object being to identify interchange forms that provide acceptable operations for projected travel demand, including:

- Improvement requirements on the crossroad within the interchange influence area
- General layout of required grade separations

Side Roads

Conceptual geometry for side roads may be developed during this stage, particularly if they must be improved to accommodate corridor mainline improvements. This could include side roads that intersect the corridor (by interchange or at-grade intersection) or that cross the corridor (by grade separation). At this stage of development, side road design concepts should be developed to identify the typical cross section, preliminary horizontal and vertical geometry, and cross road improvement limits, with consideration for the following:

- Effect of new access points on crossroad operations
- Need for capacity improvements to accommodate projected travel demand
- Effect of new or improved interchanges on adjacent local roadways (road closures, access control requirements, roadway relocation)
- Need for grade separations or intersections with the mainline

Access Control, Access Locations, and Access Type

Conceptual geometry for frontage road systems must consider the following:

- Need to add or eliminate frontage roads based on projected travel patterns and the configuration of the adjacent highway network
- Need to relocate or realign existing frontage roads
- Access control requirements
- One-way versus two-way frontage road operations

Bridges and Structures

Identify the location and approximate sizing requirements (width, length, vertical clearance requirements) for all required grade separations and river crossings along the corridor.

Other Design Features

Where appropriate, incorporate other design features with the conceptual alternatives. This could include features such as transit accommodations and bicycle/pedestrian facilities.

Conceptual Design Plan Format

Various plan and exhibit formats may be used during this early stage of alternatives development. The object is to display the general location and characteristics of conceptual alternatives under consideration. Plans and associated exhibits should be prepared over aerial photography with major environmental features clearly labeled, allowing the reviewer to understand potential constraints associated with various alternatives.

Care should be used to ensure that the exhibits and plans are developed only to the level of detail needed to illustrate the concept. The following general guidelines pertain in this regard:

- Corridor location options should be displayed as bands over aerial photography. The width of the band will depend on the type of roadway cross section being developed and the level of engineering and environmental development. Bands typically are 100 to 500 feet in width. The band does not necessarily represent the proposed right-of-way, but merely a potential location for a corridor. If an access-controlled facility is being considered, potential points of access and potential interchange areas should be depicted.
- Alignment options should be depicted as lines over aerial photography. All alignments under consideration within an area should be shown on one exhibit so that the reviewer can easily see the differences between alignments. Alignments can be developed in MicroStation/GEOPAK in combination with compatible aerial imaging software. This can assist in determining the length of the relative alignments and providing stationing for reference. However, it is not a requirement at this stage.
- Single-line sketches are engineering drawings that reflect horizontal, vertical, and cross section elements. These are often used early in the study process to create and consider a significant amount of ideas in a short amount of time. These are especially useful when considering complex system interchanges.
- MicroStation drawings often are applied over aerial images to depict proposed roadway designs within an established corridor. Plans and exhibits should be developed to depict the basic roadway location and width. Intersection layouts should represent a preliminary layout for any required channelization and turning radii. Exhibits should be labeled with road names, number of lanes, signalized intersection locations, major environmental, and socioeconomic features. Colors can be used to differentiate between freeways and local roads.

7.3.3 Conceptual Alternatives Evaluation and Screening

The alternatives evaluation process should be structured to help decision makers determine which alternatives address project objectives, and to help them understand the key performance determinants. At this stage, the evaluation consists basically of a fatal flaw analysis: one that helps narrow the field of alternatives to a group of two or more representative alternatives that are reasonable based on their:

- Technical performance (ability to address purpose and need and constructability)
- Environmental acceptability (does not result in any environmental fatal flaws or disproportionate levels of impacts as compared with other alternatives)
- Public acceptability (on the basis of input from public officials, stakeholder groups, and the public)
- Financial performance (as compared to the established project budget and relative cost comparison for each alternative)

The development and screening process is iterative in nature and unique to each individual project, although the discussion here is linear. Some projects may require consideration and screening of multiple interchange locations before interchange types and design features can be considered. Others will require consideration of multiple corridor locations before design features for conceptual alternatives can be defined and evaluated. In such

a case, it is advantageous to conduct an iterative evaluation and screening: first of interchange locations, then of interchange type and design features. Thus, the evaluation procedures described herein should be tailored to facilitate efficient and logical decision-making.

The following are general guidelines for the conceptual alternatives evaluation process:

- *Define Responsibilities*—In coordination with the District Engineer, validate decision-making responsibilities and information requirements. It is important to be aware of all parties involved in the decision-making process, including actual decision-makers and all groups/individuals who provide their input to decision-makers. This will ensure that appropriate parties are involved early, and that decision-makers are well informed of the opinions and positions of others when they must make decisions.
- *Develop Evaluation Criteria*—Develop transportation, environmental, socioeconomic, and financial evaluation criteria. The evaluation criteria should be developed in consultation with decision-makers, the Project Management Team (PMT), and other stakeholders (e.g., local officials) as appropriate. This will ensure that the alternatives evaluation is relevant (provides the right information) and comprehensive (considers all key performance issues).

  A combination of qualitative and quantitative evaluation criteria may be used; however, at this stage of development the evaluation will likely be largely qualitative. Samples of qualitative ratings may be "good, fair, poor," "high, medium, low," or "greater or less than Concept A."

  The evaluation of Conceptual Alternatives should be tailored to screen out alternatives with inherent "fatal flaws" and to highlight the major tradeoffs among alternatives. Potential evaluation measures could include the following:

  - Compatibility with other transportation systems
  - Effects on local access and existing street system
  - Potential for positive impacts on affected communities
  - Effects on special traffic generators
  - Traffic operations, including delay and average speed
  - Safety: crash reduction, geometry, typical section (list series of safety considerations separately)
  - Costs
  - Constructability
  - Potential impacts to natural, cultural, and archeological resources
  - Public and resource agency comments
  - Potential land use and community impacts

- *Document Evaluation Findings*—Alternatives evaluation results must be well documented. The documentation serves two principle purposes: communicating key findings to parties involved in the decision-making process, and establishing a record of the technical rationale for early project decisions. This documentation is required to develop the alternatives section of the NEPA document and should provide a logical and consistent administrative record for project technical decisions.
- *Present Evaluation Findings*—Present analysis findings to the project team and others as appropriate and discuss conceptual design findings.

At this stage of development, the evaluation in essence consists of a "fatal flaw" analysis to narrow the field of alternatives to a group of two or more representative alternatives that are reasonable based upon technical performance, environmental acceptability, public acceptability, and financial performance

7.3.4 Refinement of Conceptual Alternatives

The conceptual design process is iterative by nature, often requiring the consideration of refined, new, or combinations of previously developed alternatives. Such refinements may be needed on the basis of public or agency comments, information regarding environmental or community constraints, or results of more detailed engineering analyses. The process should be flexible enough to accommodate such analyses, as this approach leads to the identification of the best performing and acceptable solution.

When appropriate, new or refined conceptual alternatives should be developed and evaluated following the procedures described in the earlier portions of this section. There are several points to be mindful of in this regard:

- Conceptual alternatives should be developed and clearly named to relate the alternative to earlier proposals.
- New or refined conceptual alternatives should be evaluated and documented in a manner consistent with previously developed conceptual alternatives.

7.3.5 Identification of Representative Build Alternatives

The representative Build Alternatives to carry forward for detailed consideration are identified at the conclusion of the location conceptual design stage of the location study process. This represents an important milestone in the location study process—one that correlates directly with the NEPA/404 merger process Concurrence Point No. 3, Alternatives to be Carried Forward. As such, the identification of Build Alternatives to carry forward must be coordinated closely with the Environmental Studies Section.

While there is no specific guidance regarding the number of alternatives to carry forward, one should ensure that appropriate unique and reasonable alternatives to address purpose and need be considered for further development. The alternatives to be carried forward must be determined on the basis of engineering considerations (including the ability to address purpose and need), potential environmental consequences, stakeholder and public input, and financial considerations. When identifying the Build Alternatives, it is helpful to consider the following questions:

- Does the alternative address the project transportation needs and objectives?
- Is the alternative technically feasible, acceptable, and constructible? Does it avoid any potential engineering fatal flaws, does it comply with established engineering policies and practices, and can it be built within reasonable means?
- Is the alternative distinctly different from other alternatives being considered? Does it include unique design characteristics or transportation performance?
- Does the alternative avoid any potential environmental fatal flaws? In other words, is it likely to be environmentally permittable?
- Does the alternative result in lesser or comparable environmental impacts as compared to other reasonable alternatives. If not, consideration should be given to advancing those reasonable alternatives that result in lesser impacts.
- Does the alternative appear to be publicly acceptable?
- Does the alternative comply with project financial constraints and cost-effectiveness? In other words, can it be implemented within the established project budget? Does the alternative represent the least-cost alternative? If not, are the estimated costs comparable with those for other alternatives?

The alternatives to be carried forward for detailed consideration should be identified with input and guidance from the PMT and senior management (through project briefings).

7.4 Functional Design Process (Evaluation of Alternatives)

7.4.1 Development of Build Alternatives

Build alternatives should be developed to a functional design (PL2) level of detail adequate to conduct a comparative analysis of transportation performance,

environmental impacts, and relative costs. The process should be structured to help decisionmakers determine whether alternatives address project objectives and to identify key differences in the performance of alternatives. A combination of transportation, environmental, socioeconomic, and financial factors should be considered in this regard.

During the initiation of functional design, it is appropriate to consider whether the project is ready and suited for a value engineering study. A value engineering study is an organized application of common sense and technical knowledge directed at finding and eliminating unnecessary cost in a project. For some projects, a value engineering study may be a valuable tool for comparing functional design alternatives, while in other cases it may be best conducted later in the process to optimize design performance and cost for the preferred or recommended alternative. The timing and focus of value engineering studies should be established with input from the PMT.

The following discussion provides general guidelines regarding design tools, design features, and plan format guidelines for the Build Alternatives development.

Functional Design Tools

As noted, Iowa DOT's standardized drafting tools (MicroStation and GEOPAK) are the adopted platform for plan development. Functional design plans should be delivered as MicroStation/GEOPAK files in compliance with Iowa DOT standards and file formats. See Chapter 10 regarding CAD and CAE standards.

Functional Design Features

The following discussion provides general guidelines regarding design considerations and methodologies for development of Build Alternatives.

Mainline

Plans and profiles should be developed to define the mainline geometry and to validate design acceptability. This includes the development or refinement of horizontal and vertical alignments, lane requirements, cross sections, and preliminary roadway footprint. At this stage, the roadway design features should be based, wherever practical, on full design standards so as to represent worst case impacts and costs. For example, the roadway vertical alignment should assume generous structure beam depths.

Special consideration should be given to the following during functional design:

- Auxiliary lane requirements
- Ramp merge/diverge geometry
- Median width and treatment
- Grade separation studies, including the analysis of structure reuse versus replacement needs, and structure layout requirements
- Retaining wall studies, including the analysis of general retaining wall location and height
- General drainage design concept for the mainline roadway

Cross sections should be developed to assist in the establishment of preliminary roadway footprint limits. Generally, cross sections should be developed at 100-foot spacing in rural areas and 50-foot spacing in urban areas. The preliminary footprint should be developed using the cross sections as a base and extending the area of impact by a reasonable offset to facilitate construction operations and to accommodate any potential utility relocations. In rural areas, a 50-foot offset may be reasonable at this stage of design development, but in urban areas a narrower offset may need to be applied.

Interchanges

The general layout and lane requirements for interchanges should be clearly established with the functional design process. For interchanges, horizontal and vertical alignments should be developed to define the geometry. Cross sections may also be developed at this stage. Ramp geometry should be developed to demonstrate compliance with applicable design standards and to identify roadway footprint requirements. Alternatives should be developed through the limits of the interchange area.

The following should be considered:

- Auxiliary lane requirements for ramp terminal intersections
- Ramp terminal treatments
- Roadside treatment for ramps
- Mainline and ramp bridge requirements
- Retaining wall studies, including the general retaining wall location and height
- General drainage design concept for ramps

Cross sections for ramps should be developed at this stage to permit identification of the preliminary roadway footprint and to identify potential retaining wall requirements.

Side Roads

Conceptual geometry should be developed for crossroads, including identification of the typical cross section, preliminary horizontal and vertical geometry, preliminary roadway footprint, and crossroad improvement limits. It is important to identify all crossroad improvements required as part of a build alternative. This could include crossroads for which a vertical profile adjustment is required (to provide acceptable vertical clearance), or interchanging crossroads where additional travel lanes are required to provide acceptable interchange operations. Functional design for crossroads should consider the following:

- The effect of new access points on cross road operations
- The potential need for capacity improvements to accommodate projected travel demand
- The effect of new or improved interchanges on adjacent local roadways (road closures, access control requirements, roadway relocation)
- Potential retaining wall locations
- The need for grade separations or intersections with the mainline

Access Roads

Conceptual geometry for frontage road systems should be developed, including consideration of:

- The potential need to add new or eliminate existing frontage roads based on projected travel patterns and the configuration of the adjacent highway network
- The potential need to relocate or realign existing frontage roads
- Access control requirements
- One-way versus two-way frontage road operations

Bridges and Structures / Drainage Design Concepts

Basic geometric and structure requirements should be determined for bridges and structures, with consideration for:

- Vertical clearance at all structure locations
- Structure length
- Basic structure type (culvert versus bridge)
- Beam depth
- General drainage costs needed as a percentage of roadway costs (to account for smaller culverts and pipes)

The Location Section Project Manager should coordinate with the Preliminary Design Section in the Office of Bridges and Structures for input on the above.

Roadside ditches should be accommodated in the cross sections for the mainline and side roads. A vertical profile should be confirmed to ensure that that the ditches have adequate grades to flow and not pond.

Cost

Cost estimates prepared during functional design may include preliminary estimates of earthwork. Costs for pavement and major roadway or structure features may be based on quantities, while percentage costs may be used for miscellaneous items.

Other Design Issues

Where appropriate, functional design plans should incorporate accommodations for various modal options. This could include design treatments to accommodate high-occupancy vehicle (HOV) lanes, transit services, or bicycle/pedestrian accommodations. The following design features should be considered in this regard:

- Location and width of HOV lanes, including separation of HOV versus general use travel lanes
- Transit accommodations, including the location and general layout of potential bus turnouts, ramp bypass lanes, or exclusive transit lanes
- Bicycle and pedestrian trail accommodations, including location and layout of trail systems or crossings.

Approximate right-of-way and horizontal and vertical alignment requirements should be determined for each of the above and incorporated within the cross sections.

Functional Design Plan Format

Functional design plans may be prepared over either aerial mapping or planimetrics. The decision regarding which style to use should be determined on a project by project basis. The plan scale used should be appropriate to see relevant information clearly. Drawings are typically prepared at a scale of 1" =100' for an 11" × 17" report document (1" = 50' full size for a 24" × 36" plan sheet).

Functional plans should contain at least the following information:

Horizontal Plan view (Mainline and Sideroad)

- Planimetrics or aerial background
- Roadway and water body names
- North arrow
- Scale
- Proposed geometrics
- Pavement and curb edges
- Number of lanes
- Intersection channelization
- Location of signalized intersections
- Bridges/structures
- Retaining walls
- Environmental features (if applicable)
- Noise walls (if applicable)
- Existing right-of-way

Profiles (Mainline and Sideroad)

- Existing ground line
- Proposed profile gradeline
- Existing and proposed bridges
- Profile grades
- Vertical curve data

7.4.2 Evaluation and Screening of Build Alternatives

Qualitative Evaluation

Evaluation during the study of the conceptual alternatives is more qualitative in nature because of the flexibility and lower level of detail needed during that stage of the project. During the functional design phase, specific *quantitative* evaluation measures should be established. These may include impact quantification for:

- Right-of-way impacts
- Impacts to cultural and archeological resources
- Land use and community impacts
- Transportation performance measures
- Costs
- Natural resource impacts (threatened and endangered species, wetlands)
- Impacts to regulated materials sites
- Socioeconomic impacts
- Displacements
- Noise impacts
- Water body and water quality impacts
- 4(f) impacts

Some qualitative measures may also be carried through to the functional design evaluation process. Qualitative measures typically are used to compare the performance of alternatives in areas that cannot readily be quantified but that nonetheless are important considerations in the decision process. For example, qualitative measures may be used to compare the constructability of build alternatives.

There is no predetermined methodology for the evaluation of Build Alternatives, as each project has unique design characteristics, environmental issues, and public involvement needs. The evaluation of less complex projects with fewer impacts may be straight forward, but complex projects, particularly those in urban areas or areas with numerous resource issues, may require extensive analysis and coordination. The following discussion includes examples of alternatives evaluation methods that may be employed for more complex projects, particularly those requiring input from multiple stakeholders.

Project Team Review

The PMT and the Project Advisory Team are examples of a multidisciplined approach. The PMT membership, for example, represents Iowa DOT's experts in the various fields of the transportation planning, design, and construction process. These teams should be used to obtain feedback on the importance of different engineering and environmental impacts.

If the project has an advisory group, the group may be used to solicit additional input from the local perspective. It is important to establish an understanding with the advisory group that they are not making decisions about alternatives or the project, but rather providing an understanding of local issues and preferences.

The evaluation process should enable consideration of the regulatory framework—or regulatory restrictions—associated with the choices. This framework includes engineering guidelines and standards as well as environmental regulations related to alternatives decision-making. A CSS approach should be employed throughout both the alternatives development and evaluation phases. The Iowa DOT's approach to CSS is described in Chapter 4 of the *Can-Do Manual.*

The consideration of cost may be part of the decision-making process; however, when environmental impacts are the tradeoff for selecting a lower cost design (even if it is just an element, rather than the whole, of an alternative), one must be careful. Cost, particularly excessive cost, may indeed be an evaluation measure, and so it will be important to document thoroughly that all other lower cost options have been investigated and determined not to be feasible.

The process of developing and evaluating alternatives, as always, is an iterative one. As alternatives are developed and evaluated, if whole alternatives or elements of alternatives are determined to have large impacts or costs, they may be reexamined to identify further means to lessen the impact.

7.4.3 Identification of a Preferred Alternative

The preferred alternative is the alternative that Iowa DOT, in consultation with FHWA, determines would best fulfill purpose and need while giving appropriate consideration to the environmental, socioeconomic, and financial effects of the alternatives considered. The term *preferred alternative* itself is derived from the NEPA process. When identifying a preferred alternative, the range of factors affected by the proposed action must be carefully considered, including socioeconomic resources, natural resources, cultural resources, and engineering needs. The evaluation measures used for the project should reflect this potential range of impacts.

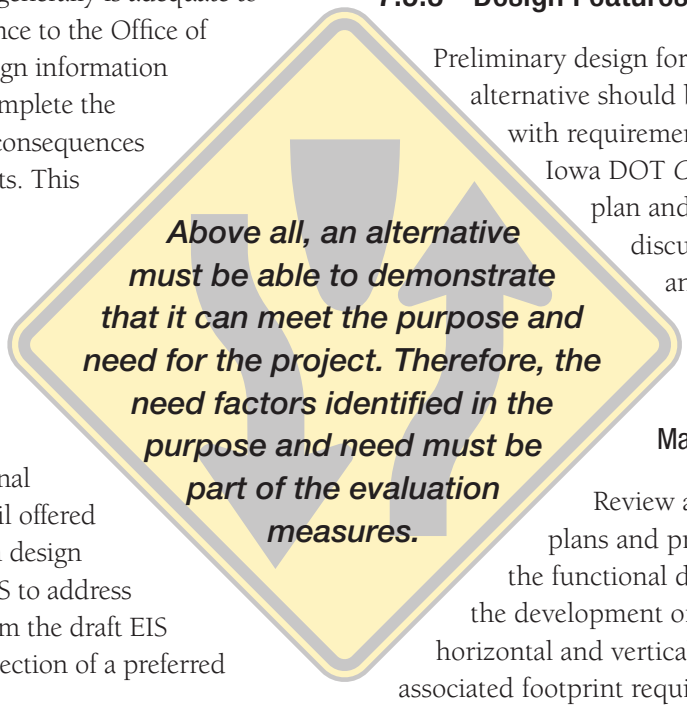
A preferred alternative generally is identified at the recommendation of the PMT, with guidance from the District Engineer and senior highway division staff. The regulations for implementing NEPA presume that by the time a project has reached the Environmental Assessment (EA) or final Environmental Impact Statement (EIS) stage of development, the lead agency has identified a preferred alternative and it must be identified in the Alternatives section (40 CFR 1502.14). The identification (or even

existence) of a preferred alternative does not release Iowa DOT or FHWA from the requirement of preparing a document that is unbiased in its treatment of alternatives and their impacts.

For Iowa DOT projects that do not include an accompanying NEPA document (state-funded projects), a preferred alternative should still be identified before beginning Preliminary Location Design. The same principles for identifying the preferred alternative apply. The Preferred Alternative would then be identified in the engineering report, rather than in a NEPA document.

7.5 Preliminary Location Design Process (Alternative Refinement)

The level of design development performed during the location study process generally is adequate to provide clear design guidance to the Office of Design and to support design information requirements needed to complete the analysis of environmental consequences and mitigation requirements. This typically concludes with a field exam and D2 (25 to 35 percent design complete) event. The preliminary location design process typically begins after the draft EIS is published but before the final EIS is completed. The detail offered by the preliminary location design stage is used in the final EIS to address comments or questions from the draft EIS and to help support the selection of a preferred alternative.



7.5.1 Development

Projects may be advanced to a D2 level of design development during the location study process, both to provide clear guidance to Office of Design regarding design characteristics and to allow a reasonably accurate assessment of costs and of project environmental consequences before the selection of a recommended alternative. In these cases, preliminary location design is consistent with requirements established in the Iowa DOT *Can-Do Manual,* specifically the D2 plan and field exam milestone events.

The following subsections summarize preliminary location design tools, general guidelines regarding design development requirements, and D2 plan format requirements.

7.5.2 Tools

Location design plans should be delivered as Microstation/GEOPAK files in compliance with Iowa DOT standards and file formats. See Chapter 10 for additional detail regarding CAD and CAE standards.

7.5.3 Design Features

Preliminary design for the preferred alternative should be advanced to comply with requirements established in the Iowa DOT *Can-Do Manual* for the D2 plan and field review events. A discussion of design refinement and development advanced with this effort is included below.

Mainline

Review and refine as appropriate plans and profiles developed during the functional design phase. This includes the development of preliminary mainline horizontal and vertical alignment plans with associated footprint requirements. At this stage, the following elements may be considered:

- Horizontal and vertical alignment refinements based on updated survey data, grade separation requirements (including estimated structure depths), and drainage design concepts
- Cross section refinements based on horizontal and vertical geometry updates, drainage design concepts, and potential utility conflicts

Interchanges

Review and as appropriate refine interchange plan and profiles established during the functional design step, including the following considerations:

- Review of proposed lane configuration (mainline, ramp, crossroad) to confirm that the proposed geometry provides acceptable traffic operations in the design year
- Refinements to the ramp geometry (including ramp merge/diverge layout, ramp gore layout, ramp intersection layout) to comply with design standards
- Access control requirements
- Crossroad improvements required to provide acceptable interchange operations and roadway transitions, including proposed crossroad improvement limits and scope.

Crossroads and Frontage Roads

Develop preliminary plans for cross roads or frontage roads. This includes typical cross sections, preliminary horizontal and vertical geometry, preliminary roadway footprint, median treatment, traffic signalization and control requirements, and crossroad improvement limits, with consideration for:

- Effect of new or improved interchanges points on cross road operations
- Potential required capacity improvements to accommodate projected travel demand
- Access control requirements
- Effect of new or improved interchanges on adjacent local roadways (such as road closures, access control requirements, roadway relocation)

Bridges and Structures

The location and scope of structural (bridge and retaining wall) improvements for the preferred alternative should be refined at this stage of design development. The object is to determine which existing structures can be retained and reused and where new structures (bridges and retaining walls) are required. Structure studies should evaluate the structure condition, age, and design characteristics.

At this stage of design development, the following preliminary structure design concepts are typically considered and determined:

- Proposed bridge location and layout, including preliminary superstructure depth, initial span arrangement and length, and cross section
- Preliminary bridge profile grade requirements at stream crossings
- Proposed retaining wall locations, including appropriate studies to justify use of retaining walls (as compared to sloped embankments)

Drainage Concepts and Studies

Drainage patterns and the overall drainage system design should be reviewed at a conceptual level of detail at this stage of the design development process. Areas with potential drainage problems should be evaluated to identify potential corrective actions, such as vertical profile grade improvements or stormwater detention. A preliminary drainage design concept should be developed and incorporated into the development of updated plans, profiles, and cross sections. The level of development of the drainage concept should be adequate to allow identification of potential additional roadway footprint needs (as an example, for potential culvert extensions or for stormwater detention), and to provide input on general drainage costs.

Geotechnical Studies

Subsurface characteristics for the project should be reviewed and analyzed to the level required to support the development of preliminary structural studies described above, and to assess the potential for slope stability issues. Available subsurface data and soil borings should be used to perform these early geotechnical studies. However, it may be appropriate and necessary to collect new soil borings in select locations.

Maintenance of Traffic Concept

A preliminary maintenance of traffic concept and plan should be developed as part of the D2 plans. The object is to demonstrate the general sequence of construction, to validate constructability, and to identify potential road closures or detours.

Preliminary Location Design Plan Format

Location design plans should be prepared over planimetrics. The format and content of the plans should be consistent with D2 plan submittal requirements as established in the Iowa DOT's *Can-Do Manual* and *Design Manual*. Drawings are typically prepared at a scale of 1" =100' for an 11" × 17" report document (1" = 50' full size for a 24" × 36" plan sheet).

NOTES:

Feasibility Studies

CHAPTER 8

This chapter describes the feasibility study process, with a focus on study goals and objectives, study elements and their interrelationships, and study process output. Detailed information regarding elements of the feasibility study methodology, tools, and procedures is contained in associated chapters of this manual. This chapter also describes the correlation among elements of the feasibility study process and subsequent location and environmental studies, because information from feasibility studies often flows directly into location and environmental studies. The following information is discussed in the subsequent sections of this chapter:

- Goals and objectives
- Process and schedule
- Coordination and review requirements
- Data collection and analysis requirements
- Conceptual alternatives development and evaluation process
- Feasibility study documentation requirements

8.1 Goals and Objectives of Feasibility Studies

The goal of the feasibility study is to take an identified need, designate a study corridor, collect data relevant to the natural, social, and economic environment, and identify and evaluate location or modal alternatives that detail possible engineering solutions.

Feasibility studies often are performed in advance of location and NEPA studies, but a NEPA document may be completed as part of a feasibility study. Feasibility studies are typically performed in those situations where the viability or character of a project is not readily apparent (for example, a project for which a broad range of location or modal alternatives may need to be considered).

The objectives of feasibility studies may include the following:

- Establish general transportation needs and objectives for the project.
- Identify and evaluate general location and modal alternatives.
- Evaluate engineering, environmental, and public acceptability of conceptual alternatives at a macro level of detail, focusing on fatal-flaw issues.
- Establish basic project characteristics for further detailed consideration with future location studies and associated NEPA studies, including project termini, a preliminary range of alternatives, and a preliminary cost estimate.

This chapter provides an overall description of the feasibility study process, with a focus on study goals and objectives, study elements and their interrelationship, and study process output.

The level of conceptual alternatives development and analysis typically performed as part of a feasibility study should include the following:

- Define basic alternative features, including location, facility type, and access control characteristics.
- Demonstrate general engineering viability and constructability of the alternative.
- Identify planning level costs.
- Identify potential environmental and community impacts.

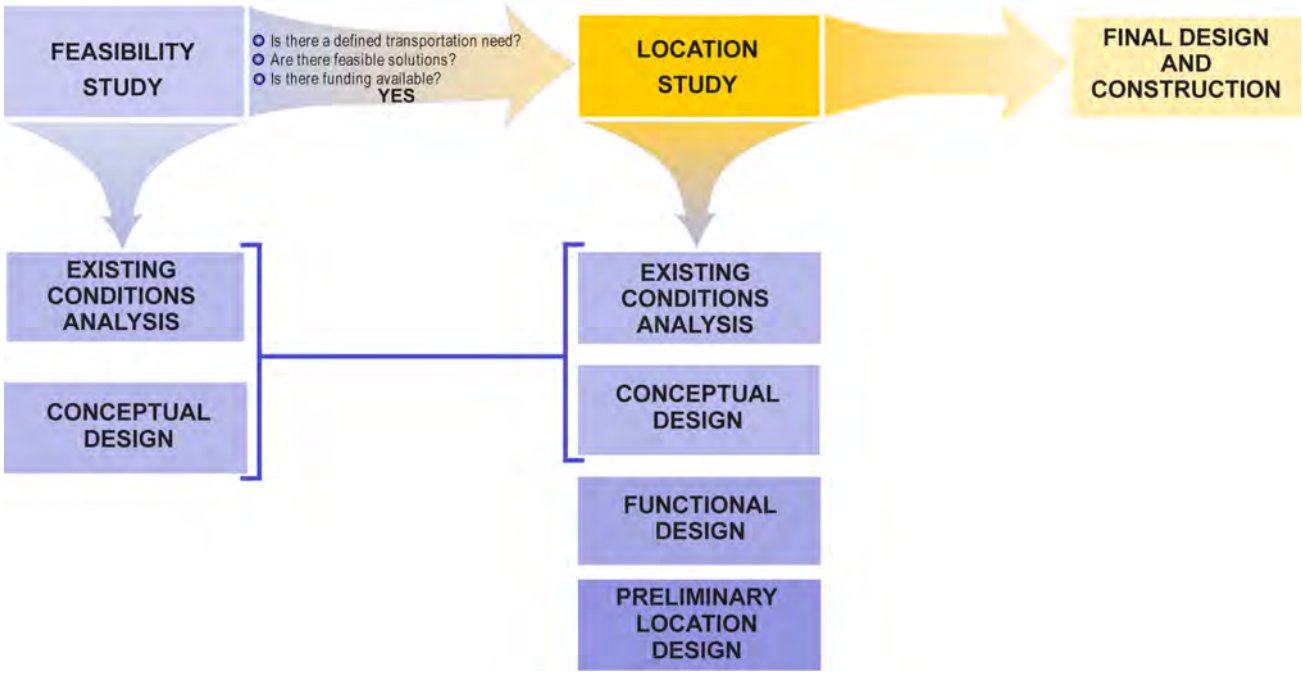
8.1.1 Process

Feasibility studies provide the means to identify transportation issues and evaluate the viability of potential transportation solutions. As compared to subsequent location studies performed for a project, these early studies do not result in design decisions or environmental approvals. Rather, they typically conclude with the identification of viable conceptual alternatives appropriate for further development and consideration with future studies. Feasibility studies must, however, be grounded in an awareness of environmental and community constraints to ensure that study conclusions are valid.

The three basic steps for a feasibility study are: (1) data collection; (2) existing conditions analyses; and (3) conceptual alternatives development and evaluation. While these steps are similar to the early steps of a location study, there are several important distinctions. Conceptual alternatives identified as part of a feasibility study need only be developed to a level of detail to define their general characteristics, evaluate technical viability and constructability, and identify any potential environmental constraints. By comparison, during a location study, alternatives are developed, refined, and evaluated to the level of detail needed to identify a recommended alternative and demonstrate its environmental acceptance. Feasibility studies do not conclude with a recommended preferred alternative because they are not done with a concurrent NEPA product. Exhibit 8-1 illustrates the feasibility study process and its relationship to subsequent phases of project development.

As the feasibility study process serves to begin identifying transportation needs and determining possible solutions, it is important that both engineering viability and environmental and public acceptability of conceptual alternatives be considered. In this regard, one must understand the general environmental and community features

Exhibit 8-1
Feasibility Study Process



and constraints in the study area, as well as the relationship of the project to future transportation and land-use plans. While there are no prescribed public and agency coordination procedures for a feasibility study, coordination with local agencies or individual federal and state regulatory agencies is sometimes appropriate to obtain early stakeholder input to project analyses (see Section 8.4).

8.1.2 Schedule

The typical duration of feasibility studies is 12 to 24 months. The length of the schedule may vary depending on the complexity of the project. Exhibit 8-2 is a typical feasibility study schedule.

8.2 Data Collection and Analyses

Data collection is an early and ongoing element of the feasibility study process. Early data collection efforts focus on information required to develop an understanding of the existing conditions surrounding the study area, identify environmental constraints, evaluate transportation needs, and develop and evaluate conceptual alternatives.

Key transportation issues are identified using preliminary analyses of existing conditions that, at this stage of project development, need focus only on major performance issues that drive the project need (that is, safety and capacity). More comprehensive analyses of the design characteristics and performance of the existing facility are generally performed during the subsequent location study phase. Typical data requirements and existing conditions analyses needs during the feasibility study process are identified in Exhibit 8-3.

The remainder of this section outlines data required to perform feasibility studies, the types of existing conditions analyses performed, and the relevance of data and analyses to the study process.

8.2.1 Data Collection

Data requirements for feasibility studies typically include aerial photography and macro-level engineering and environmental data.

Photography and Mapping

Aerial photography, digital terrain models (DTMs), and other survey information typically are used as the base data for development of conceptual alternatives.

Exhibit 8-2
Feasibility Study Process

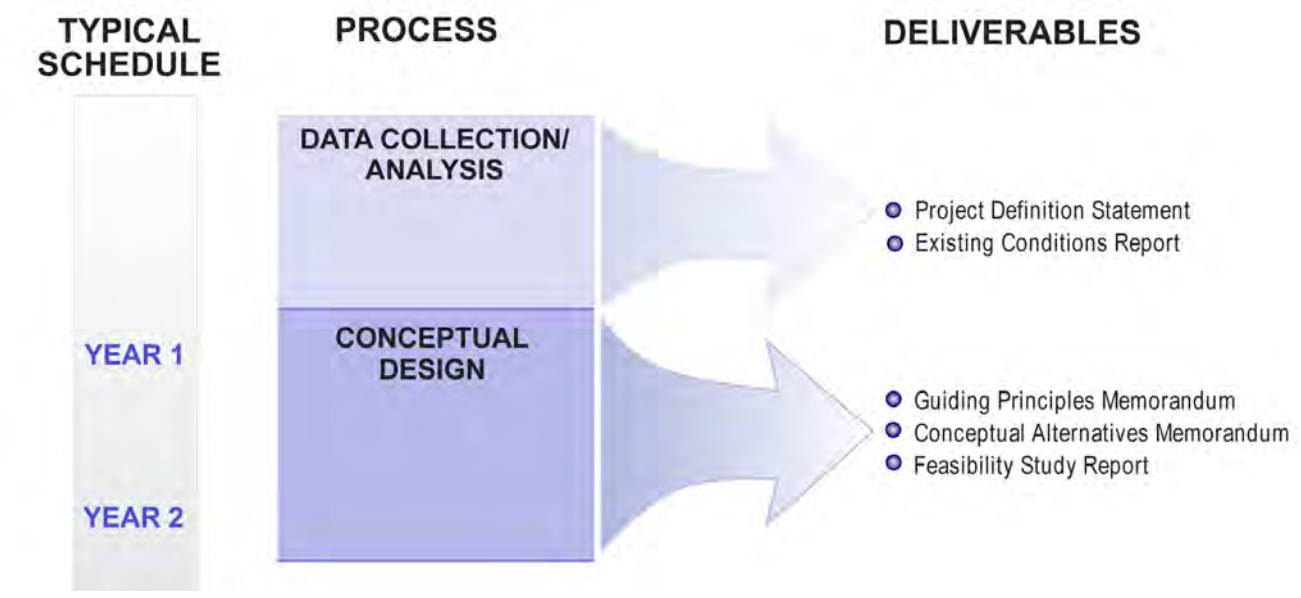
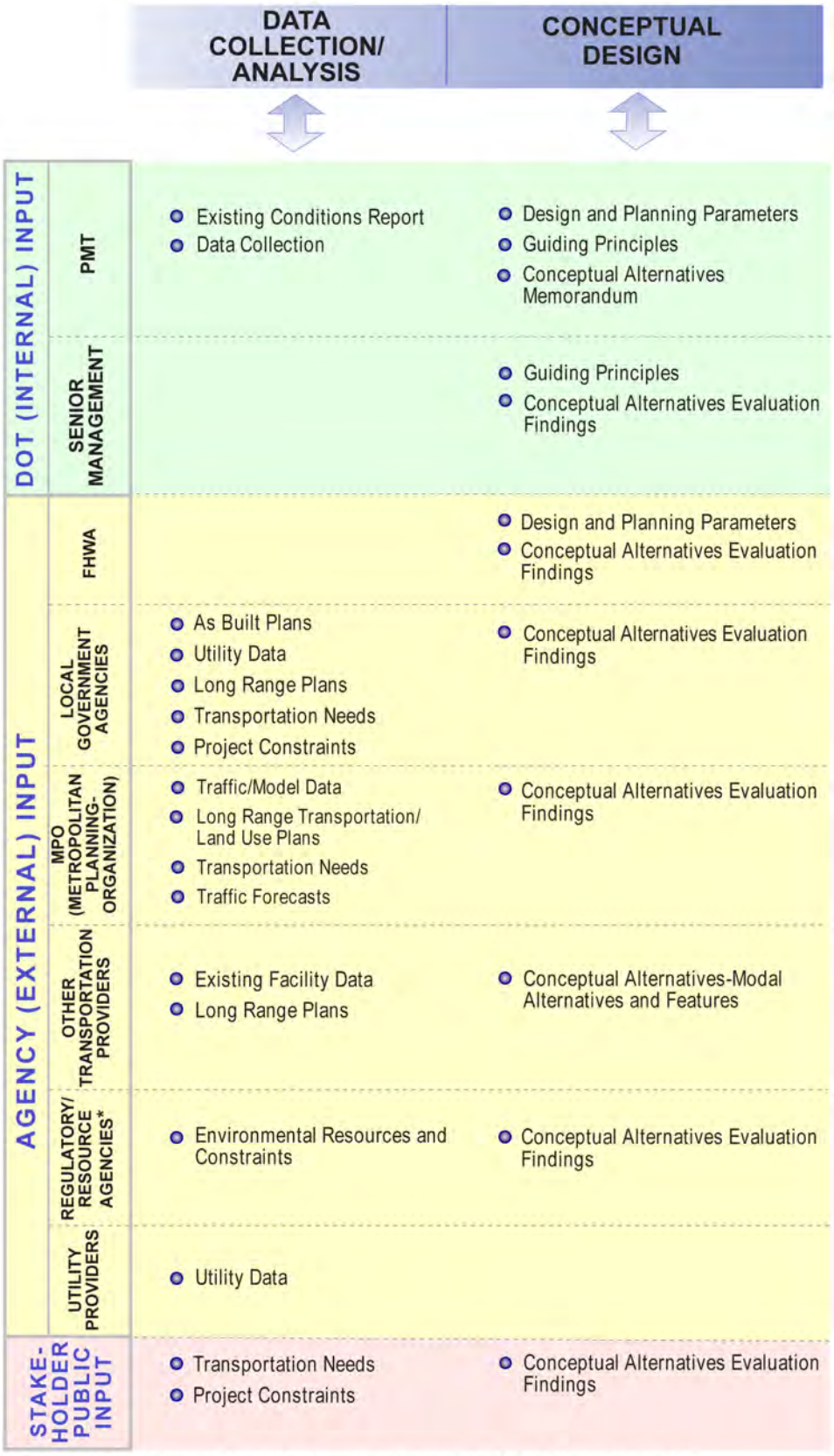


Exhibit 8-3
Typical Data Requirements and Existing Conditions Analyses Needs



* Depending on the project, Regulatory/Resource Agency input is not always required.

The Project Manager, in coordination with the PMT and photogrammetry section engineer, is responsible for determining the type of photogrammetric mapping to be developed for the feasibility study process, including requirements for any associated ground, drainage, property, or hydraulic surveys. This should be established as part of development of the Project Definition Statement or during the project scope development process.

Engineering Data

Various basic engineering data are required to support early engineering analyses and conceptual alternatives development. Engineering data are used to analyze operational, physical, and safety characteristics of the study area, after which they support development of conceptual alternatives.

Data typically required to analyze transportation needs as part of a feasibility study include the following:

- Published transportation programs
- Traffic data (existing and forecasted)
- Crash data
- Existing geometric features (using as-built plans)
- Access management
- Utility information
- Other data as appropriate

Other data that may be needed include the following:

- Pavement conditions
- Origin-destination survey

Early engineering data are used to perform a preliminary review of the condition of the existing transportation system. These analyses include crash analyses, capacity and operational analyses, and an evaluation of potential causes of performance issues. The analyses should be sufficient to establish general transportation issues and needs in the study area.

Note that these analyses will be augmented with a more comprehensive existing conditions analysis if the project advances to the location study phase in the future.

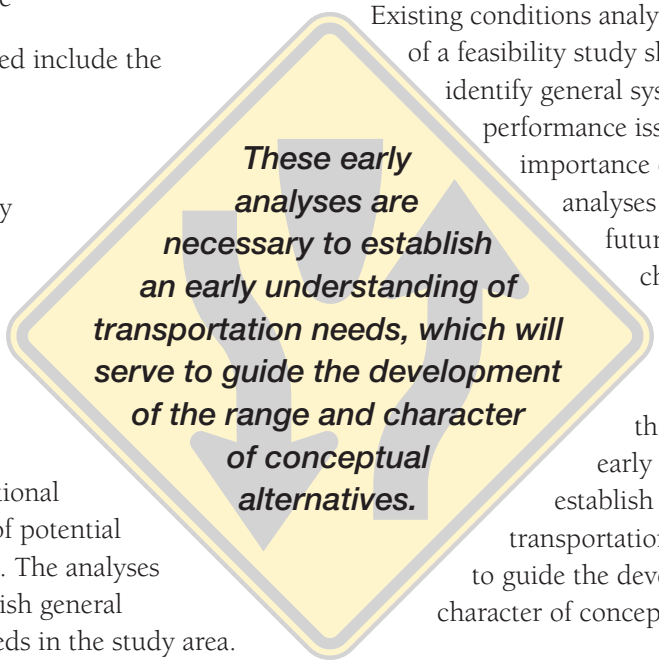
Environmental Data

Information regarding environmental features and constraints is required to ensure that project development begins and evolves with an eye toward avoiding or minimizing potential significant environmental impacts. This could include sensitive habitat areas, threatened and endangered species, wetlands, floodplains and floodways, regulated materials, resources regulated through Sections 4(f) or 6(f) (that is, parklands and historic resources), cultural resources, or sensitive socioeconomic features (existing and planned).

Environmental data compiled during a feasibility study in which multiple conceptual alternatives may be considered in a large geographic area typically are limited to environmental database analyses and windshield surveys and site reviews. This level of data collection may be adequate to identify any potential significant environmental impacts during the development and evaluation of conceptual alternatives.

8.2.2 Existing Conditions Analyses

Existing conditions analyses conducted as part of a feasibility study should be adequate to identify general system mobility or safety performance issues. Of particular importance during this stage are traffic analyses (to identify current and future system operational characteristics) and safety analyses (to identify the character and magnitude of safety issues within the study area). These early analyses are necessary to establish an early understanding of transportation needs, which will serve to guide the development of the range and character of conceptual alternatives.



A set of qualitative and quantitative performance measures should be developed by the project team based on applicable DOT and American Association of State Highway and Transportation Officials (AASHTO) policies and design criteria. The analyses should identify transportation issues and objectives, and consider existing system performance both today and in the project design year. Analyses should be presented in a manner that clearly identifies the location and character of performance issues. The findings from the preliminary existing conditions analysis should be summarized in the Existing Conditions Memorandum.

Elements of the data collection/analysis phase of the feasibility study process are illustrated in Exhibit 8-4.

8.3 Conceptual Design

The conceptual design step of a feasibility study includes the identification, development, and evaluation of a broad range of potential alternatives for a project. Conceptual design begins after project transportation needs and objectives have been defined and accepted, and after the general character and location of environmental constraints have been identified. The procedures for the conceptual design during a feasibility study are similar to those conducted in a location study. However, the location and modal options considered with a feasibility study may be broader, and may serve to narrow the range of alternatives that need to be considered with a subsequent location study.

The conceptual design step of a feasibility study includes the identification, development, and evaluation of a broad range of potential alternatives for a project.

Exhibit 8-5 illustrates elements of the conceptual design step of the feasibility study process. The rest of this section describes the conceptual design objectives and elements, including their relationship to future location studies.

8.3.1 Objectives

The goal of conceptual design for a feasibility study is to identify and evaluate the feasibility of a project's initial range of alternatives. During the subsequent location study, the range of conceptual alternatives will be refined and evaluated in greater detail, serving as the basis for identification of build alternatives that address the project purpose and need.

The project development process should begin with a thorough, well-structured analysis of potential conceptual alternatives. Principal objectives of conceptual design are as follows:

- Clearly establish project design and planning parameters and requirements. This is needed to ensure that conceptual alternatives are founded on appropriate planning and design principles and assumptions, and ultimately technically acceptable.
- Identify and consider a full range of potential solutions (conceptual alternatives) that could address transportation issues, including location, design, and multimodal solutions.
- Encourage early stakeholder input to the conceptual alternatives development and evaluation process. Early stakeholder input is crucial because:
  - Public perspective regarding transportation needs can help shape a solid and defensible purpose and need, and build public understanding and support for the project.
  - Public input regarding the initial range of conceptual alternatives to be considered helps ensure that all possible solutions are explored early, and ultimately helps build public understanding of the rationale for the selection of the initial range of conceptual alternatives.

8.3.2 Conceptual Design

As noted, the goal of conceptual design is to identify the general location and character of the initial range of reasonable alternatives for consideration. At this early stage, design development of each conceptual alternative should proceed only to the level required

to determine overall engineering feasibility and to identify potential significant or unpermittable environmental impacts.

Major elements of the conceptual design process include development of project design and planning parameters; identification of the potential range of alternatives to be considered; development of conceptual alternatives; and analysis of conceptual alternatives. The remainder of this section discusses the individual elements of conceptual design, their significance, and their relationship to subsequent location and environmental studies.

Deliverables

Design and planning parameters typically are identified in the *Feasibility Study Guiding Principles*, which identifies project transportation needs and objectives, explains the context of the corridor in relationship to the broader transportation network and project area, defines the general characteristics of potential improvements (that is, facility type and sizing, bypasses, and multimodal options), and identifies design criteria and principles that will be used to support the development of conceptual alternatives.

Exhibit 8-4
Feasibility Study Considerations-Data Collection

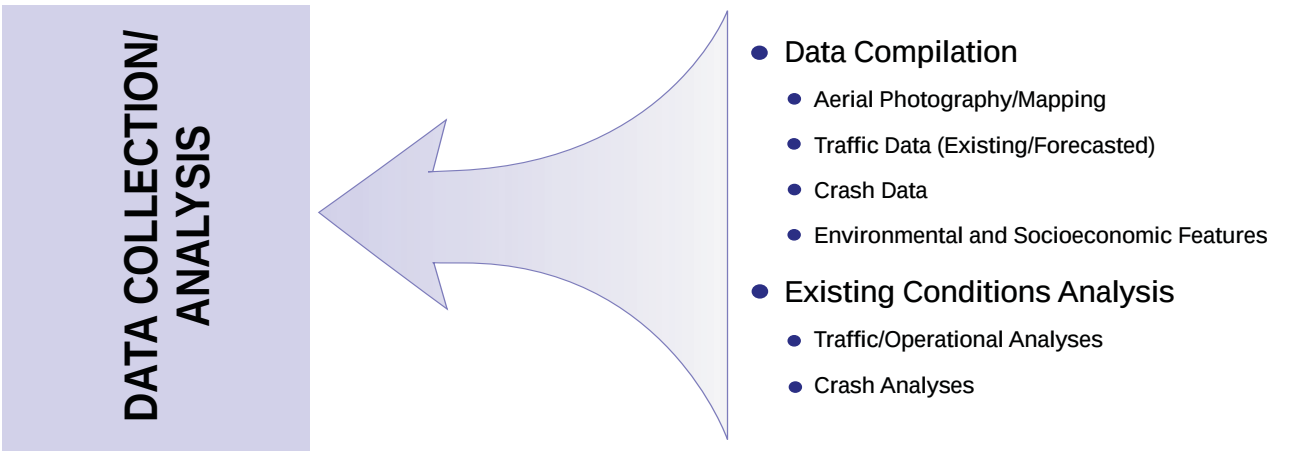


Exhibit 8-5
Feasibility Study Considerations-Conceptual Design

Procedures

Planning and design parameters are developed in consultation with Iowa DOT staff (including senior management), FHWA, and, when appropriate, with other stakeholders (Metropolitan Planning Organizations [MPOs], other state DOTs, etc.). Formal review and endorsement of the *Feasibility Study Guiding Principles* should occur before the development of conceptual alternatives. See Section 8.4 for additional discussion of coordination procedures.

Relationship to Location Studies

The feasibility study begins to establish the general character of transportation issues, or needs, and helps establish the general character and range of potential conceptual alternatives. *The Feasibility Study Guiding Principles* begin to establish general design standards for project alternatives. Design requirements are then expanded, refined, and validated during the location study process.

8.4 Coordination

The feasibility study process should be performed in coordination with project decision-makers (who will be responsible for determining whether the project should advance to the location study phase) and involved external stakeholders (such as local agencies or federal and state regulatory agencies). The Project Manager, in coordination with district staff, is responsible for scheduling work, identifying resource needs, and leading internal and external coordination efforts.

This section identifies internal project team members and external stakeholders who are typically involved in the feasibility study process, and discusses the nature (that is, data and information gathering, reviews, and input), timeframe, and relevance of their involvement. Involved parties include internal Iowa DOT staff (typically, Location Section, Systems Planning, District Planner and other District staff, NEPA Compliance Section); appropriate federal, state, and local agencies; and public stakeholders. Although feasibility studies are performed as a pre-NEPA activity, early stakeholder input helps to guide subsequent alternative studies and build early stakeholder understanding and support for a project.

The object of the feasibility study coordination process is twofold:

- First, to allow early identification of public and agency concerns and issues related to a potential project. At this early stage of project development, public and agency input is typically obtained during targeted agency and stakeholder meetings. This input helps ensure that local perspectives on transportation issues and conceptual alternatives are understood and considered in study analyses.
- Second, to ensure that stakeholder input is considered and reflected in the identification of alternatives to be considered with subsequent studies. This is achieved through regular input of a multidisciplinary technical team (the PMT), and effective coordination with DOT management.

The feasibility study coordination procedures should be tailored to meet the needs and objectives of the individual project. For example, projects in urban areas may require coordination with a broader array of local government and transportation agencies when compared to rural projects. Therefore, project-specific coordination procedures should be identified as part of the project work plan and schedule.

The remainder of this subsection outlines the general period for and objectives of feasibility study coordination activities.

8.4.1 Internal Coordination and Reviews

Internal Iowa DOT coordination and reviews are accomplished by coordinating with the PMT or project briefings.

PMT

Objectives

The function of the PMT at this stage of a project is to provide input to the general project need, and technical and environmental feasibility. The PMT also helps set design standards, review and comment on project deliverables, and manage the overall project schedule.

Procedures

Coordination with the PMT is typically accomplished through PMT meetings and involvement of PMT members in the review of project deliverables.

Responsibility

The Project Manager, in coordination with District staff, is responsible for assembling the project-specific PMT, for scheduling and facilitating any needed meetings, and for involving appropriate members of the PMT in the review of project deliverables. The Project Manager, in coordination with District staff, is also responsible for compiling PMT input and review comments, and ensuring that they are reflected accordingly in the engineering development process.

Project Briefings

Objectives

The function of project briefings is to provide senior management with opportunities for early policy level input to project issues and manage information regarding potential project needs and feasibility.

Procedures

Project briefings should be scheduled in coordination with District management or the OLE Office Director at critical points in the feasibility study process. At a minimum, this should include project briefings to allow policy-level input to the development of project planning and design criteria, and identification of possible conceptual alternatives and feasibility study results. Project briefings are considered working meetings with a smaller group of core project staff (DOT staff only).

Responsibility

The Project Manager, in coordination with District staff, is responsible for scheduling and supporting project briefings, including identifying topics and preparing pertinent presentation materials. Project briefings typically are scheduled as needed; however, project-specific briefings may be scheduled at the request of management.

Project Review Meetings

Objectives

Project review meetings are held to allow discussion of the potential project in relation to DOT processes, policies, and priorities with DOT management. A project is discussed at project review meetings at the request of the District Engineer.

Procedures

Project review meetings should be scheduled at critical points in the feasibility study process. The meetings involve policy-level input to the development of project planning and design criteria, identification of the possible conceptual alternatives, and feasibility study results. They are geared to a wider audience than project briefings and involve multiple offices and FHWA.

Responsibility

The Project Manager, in coordination with District staff, is responsible for scheduling and supporting project review meetings, including identifying topics, and preparing pertinent presentation materials.

8.4.2 Agency Coordination and Reviews

Timely and effective involvement of agencies in the feasibility study process helps ensure that study findings reflect an accurate assessment of potential community and environmental issues. The process gives agencies an opportunity to identify constraints in the study area and to provide input to the acceptability of potential conceptual alternatives.

The following types of agencies may be involved in the feasibility study process: FHWA; local government agencies; MPOs; other transportation providers; and regulatory and resource agencies (U.S. Army Corps of Engineers [USACE], U.S. Environmental Protection Agency [EPA], Department of Natural Resources [DNR], U.S. Fish and Wildlife Service [FWS], Natural Resource Conservation Service [NRCS], local county conservation agencies, etc.). The level and character of involvement of agencies in the feasibility study process will vary by project. For example, a highway project that requires construction in an area with

extensive wetlands and floodplains may warrant early involvement of the USACE to help clarify any potential significant environmental impacts, whereas upgrading an existing highway on existing alignment may not involve the potential for extensive wetland or floodplain impacts, and thus not require early coordination.

FHWA

Objectives

FHWA involvement in the feasibility study process may be appropriate for projects that may require future federal action. Early involvement will help ensure that feasibility study findings adhere to applicable federal policies and guidelines.

Procedures

FHWA involvement may be accomplished through participation of FHWA staff in the PMT, or as needed through various meetings with regulatory and resource agencies. FHWA staff is also involved, as appropriate, in the review of draft project deliverables. FHWA reviews can occur concurrently with or following DOT staff reviews.

Responsibility

The Project Manager is responsible for involving FHWA in the PMT, scheduling and facilitating meetings with FHWA staff, and coordinating FHWA review and input to feasibility study deliverables.

Local Government Agencies (Municipalities, Counties, and Townships)

Objectives

Early involvement in feasibility studies helps to ensure that study analyses and recommendations reflect community issues and sensitivities, as well as local agency opinions regarding potential conceptual alternatives.

Procedures

Local agency involvement during the feasibility study process is typically accomplished through individual agency meetings (that is, staff meetings or council/board meetings) and workshops. Agency involvement should be structured to allow meaningful opportunities for local agency input related to transportation needs, project constraints, and conceptual alternatives considered.

Responsibility

The Project Manager, in coordination with District staff, is responsible for scheduling and facilitating local agency coordination activities, and ensuring that local input is communicated to appropriate DOT management and reflected in the feasibility study development process.

Planning Organizations and Councils of Government (MPOs/Regional Planning Affiliations [RPAs]/ Transportation Management Associations [TMAs]/ Council of Governments [COGs])

Objectives

For projects in metropolitan areas, MPO or COG involvement in the feasibility study process helps ensure that study analyses and recommendations reflect regional long-range transportation plans and policies, and that study traffic analyses are consistent with regional travel demand and socioeconomic forecasts.

Procedures

MPO involvement typically is accomplished through meetings (e.g., staff meetings, transportation or policy committee meetings) scheduled at critical points in the feasibility study process. This should at least include staff meetings to secure early endorsement of project traffic forecasts and gain an understanding of regional long-range transportation and land-use plans, and transportation/policy committee meeting presentations preceding key feasibility study milestones.

Responsibility

The Project Manager, in coordination with District staff, is responsible for scheduling and facilitating MPO coordination activities, and ensuring that MPO input is communicated to appropriate DOT management staff and reflected in the feasibility study development process.

Other Transportation Providers

Objectives

For projects that involve consideration of multimodal alternatives, coordination with other transportation agencies is required. For example, consideration of expanded transit services in an area, or consideration of a multimodal transportation corridor, requires early input from other involved transportation providers.

Procedures

Coordination with other transportation providers typically is accomplished through early project notification letters and one-on-one meetings. This could include correspondence or meetings to collect data regarding existing and planned regional transportation facilities. If project alternatives include consideration of multimodal transportation services, affected transportation providers should be involved in the conceptual alternatives development and evaluation process.

Responsibility

The Project Manager, in coordination with District staff, is responsible for scheduling and facilitating coordination activities with other transportation providers, and ensuring that input is reflected in the feasibility study development process.

8.4.3 Public Coordination

The character and scope of public coordination activities conducted as part of a feasibility study will vary significantly from project to project. For projects that may have a significant effect on a community, it may be appropriate to provide early structured opportunities for public input to the study process. For projects less likely to draw public controversy, an extensive public involvement program may not be appropriate at this early planning stage of a project.

The Project Manager, in coordination with District staff, the PMT, and the Public Involvement Section are responsible for developing a project-specific public involvement plan. This group is also responsible for scheduling and facilitating public involvement activities, and ensuring that public stakeholder input is communicated to appropriate DOT management staff and reflected in the Feasibility Study development process.

Refer to the Iowa DOT *Can-Do Manual,* Iowa DOT's Policy and Procedures Manual, and Chapter 44, *Public Involvement,* of this manual for additional information on the public involvement process.

8.5 Feasibility Study Documentation

This section discusses and summarizes the engineering documentation developed during a feasibility study.

8.5.1 Objectives

Documentation prepared during a feasibility study helps to build understanding and support for the project's transportation issues and overall viability. Specifically, feasibility study documentation:

- Provides project team members with relevant data to make technical recommendations, allowing the project development process to move forward in a linear manner
- Provides an overall view of both engineering and environmental issues identified with this early stage of project development, and serves as a starting point for subsequent location and environmental studies
- Provides a clear record of project analyses and rationale for project recommendations
- Provides guidance for subsequent stages of project development

8.5.2 Documentation Types

Project documentation is developed throughout the feasibility study process to support project development needs and engineering decisions. Documentation is typically prepared in one of these forms:

- Technical memorandums, which are prepared as needed through the feasibility study process. Memorandums may define and explain study methodology and process, or present analysis

findings and recommendations. Technical memorandums prepared during a feasibility study may include a crash analysis memorandum, a traffic volumes and projections memorandum, or a level of service analysis memorandum.

- Technical reports, which document major elements of the project development process. Technical reports prepared during a feasibility study may include an existing conditions report or a guiding principles memorandum.
- Feasibility report, a comprehensive document of the feasibility study process, findings, and recommendations.

8.5.3 Guiding Principles Memorandum

The Guiding Principles Memorandum documents the basic design and planning parameters for a project. This document provides direction to design development so as to ensure that the process is focused on addressing identified transportation needs and objectives, and to ensure that alternatives are developed using accepted design and planning parameters.

The Guiding Principles Memorandum should generally address the following design and planning issues:

- Transportation objectives to be addressed with project alternatives
- Context of the project corridor in relation to the broader transportation network and project area
- General characteristics of potential improvements (i.e., facility type and sizing, bypasses, and multimodal options) and improvement termini.
- Project planning and design criteria, including design year

A variety of exhibits and tables may be included in the Guiding Principles Memorandum. As a minimum, the document should include a location map, exhibit(s) depicting the existing and planned transportation system, exhibit(s) depicting existing and planned land-use and locations with identified sensitive environmental resources, and tables presenting proposed planning and design criteria.

The Guiding Principles Memorandum should be developed before the alternatives development process begins. This document should be developed in consultation with Iowa DOT and FHWA, with input from other key local stakeholders (i.e., MPOs and local elected officials) as appropriate. A formal review and endorsement of the Guiding Principles Memorandum should occur so as to ensure agreement with project development principles. The draft memorandum should be reviewed by the Project Manager and PMT, and when appropriate by the District Engineer and senior management. Following review, comments should be incorporated into the final memorandum.

8.5.4 Conceptual Alternatives Analysis

The development and evaluation of alternative transportation solutions is the core element of a feasibility study process. Documentation of each step of the process serves to build a clear and comprehensive record of the range of solutions considered, as well as the rationale used to screen and refine alternatives.

The Conceptual Alternatives Findings Technical Memorandum summarizes results of the Conceptual Alternatives development and evaluation process and serves to document the rationale for the range of Build Alternatives to be carried forward for further consideration. The memorandum should contain narrative, exhibits, and tables summarizing the following:

- Alternatives development guidelines and procedures, including a summary of design criteria and transportation objectives used to guide the development of alternatives
- Alternatives evaluation procedures, including a summary of evaluation criteria and performance measures
- Conceptual Alternatives considered, including a description of key design features (location, facility type, cross section)
- Conceptual Alternatives evaluation results, including a discussion of relevant transportation, environmental and financial performance issues, and public and community input

- Conceptual Alternatives findings and recommendations, including identification of alternatives recommended for further consideration, and discussion of Conceptual Alternatives considered and dismissed (with the rationale for dismissal)

8.5.5 Feasibility Reports

Feasibility reports summarize the feasibility study process, providing comprehensive documentation of identified transportation issues, alternatives considered, alternatives evaluation findings and recommendations, and public involvement activities. Documentation prepared during the study helps to build understanding and support for the project's transportation issues and overall feasibility.

Feasibility Report Content

The feasibility report should be prepared so as to thoroughly summarize of the major elements of the feasibility study process, and also of study findings and decisions. Specifically, it should provide the following:

- A comprehensive view of engineering and environmental issues identified in the early stages of project development
- A clear record of project analyses, including the range of alternatives considered
- A record of public involvement activities and public input
- Study findings and recommendations, along with rationale for project decisions
- A starting point for subsequent location and environmental studies

Exhibits, tables, and figures should be included to provide the reader with a clear understanding of project issues and potential solutions. As appropriate, technical memorandums or reports prepared during the study should be referenced, or provided as appendixes to the feasibility report.

Report Development Procedures

A feasibility report is compiled near the completion of the feasibility study process. Generally, information from prior technical memoranda and reports prepared through the duration of the study process is summarized and incorporated into this report.

A draft feasibility report should be prepared and submitted for review concurrently with the submittal of alternatives analysis results and recommendations. The document should be reviewed by Iowa DOT, including appropriate members of the PMT. Comments from the DOT will then be incorporated into the final feasibility report. The final feasibility report should be submitted for approval concurrently with the submittal of final engineering recommendations, and reflect review comments from the draft submittal. The document is submitted for acceptance to the District Engineer.

8.6 Materials to be Transmitted to Location Studies Section

If a consultant is completing the feasibility study, the following materials are retained and transmitted to the Location Studies Section upon completion of the study:

- Feasibility report
- Computer Aided Drafting and Design (CADD) files
- Project notebooks
- Conceptual alternatives plans
- All other electronic files (survey, mapping, capacity, and operational analyses, etc.)

All project materials should be saved under the project directory.

NOTES:

Location Studies

CHAPTER 9

This chapter provides an overall description of the location study process, with a focus on study goals and objectives, study elements and their interrelationships, and study process output. Detailed information regarding elements of the location study methodology, tools, and procedures is contained in associated chapters. This chapter also describes the correlation between elements of the location study and environmental study processes. The following information is discussed in the subsequent sections of this chapter:

- Goals and objectives
- Process and schedule
- Data collection and analysis requirements
- Conceptual alternatives development and evaluation process
- Construction staging/phasing considerations
- Coordination and review requirements
- Location study documentation requirements

9.1 Goals and Objectives

The goal of the location study process is to identify a technically preferred, environmentally permittable, and publicly acceptable improvement plan (recommended alternative) for a project. Location studies are performed concurrently with associated environmental studies for projects that could result in measurable changes in transportation mobility or access, or that could have impacts on environmental resources. This may include projects that consider routes on new alignment, roadway widening, facility type changes, or interchange construction. Location studies facilitate early consideration of environmental issues in the design development process and provide the engineering detail required to support an evaluation of environmental consequences and also to secure environmental approvals.

The location study process has the following objectives:

- Define the character, nature, and extent of the project's transportation needs and solutions.
- Define the proposed scope, character, and basic design features (number of lanes, access management) of the proposed improvement plan on the basis of engineering requirements, economic considerations (cost of improvement), environmental considerations, and public input.
- Establish and evaluate a full range of conceptual alternatives.
- Support development of an environmentally sensitive recommended alternative by integrating environmental considerations into the location study process.

This chapter provides an overall description of the Location Study process, with a focus on study goals and objectives, study elements and their inter-relationships, and study process output.

- Through major deliverables (functional plans, preliminary location design plans, location report), provide design guidance for the development of final design plans, specifications, and agreements. The following design elements and project requirements typically are defined with location studies:
  - Basic location and facility type
  - Design criteria (cross section, including number of lanes, edge of pavement, shoulders)
  - Access management characteristics
  - Estimated project costs
  - Estimate of property impacts
  - Interchange justification report (when appropriate)
  - Bicycle and pedestrian features
  - Project management plan for corridors greater than $500 million
  - Preliminary wetland impacts
  - NEPA document
  - Least harmful analysis
  - Cultural and historic properties impacts
  - Environmental commitments (green sheets)

The goal of the location study process is to identify a technically preferred, environmentally permittable, and publicly acceptable improvement plan (recommended alternative) for a project.

9.1.1 Process

The location study process is iterative and progressive in nature. It is a critical step in the project development process leading to decision points regarding the recommended alternative. Thus, the location study process must allow for timely and efficient consideration of environmental and community issues and constraints to ensure design acceptability, project permittability, and public involvement of the recommended alternative.

The general context, scope, and focus of the location study process are typically defined by prior studies and additional analyses which establish the general study area and the basic project concept. Prior studies may include Project Definition Statements, Feasibility Studies, or Major Investment Studies as follows:

- Project Definition Statements define the overall process (feasibility or location), the types of substudies that need to be completed, those who should be included in the study process (and their responsibilities), and the time period for the study.
- Feasibility Studies establish the proposed corridor location or facility characteristics.
- Major Investment Studies establish project transportation objectives and the range of alternatives to be considered.

The location study process consists of four distinct but interrelated steps: Data Collection/Analysis, Conceptual Design, Functional Design, and Preliminary Location Design. Each step includes engineering documentation required to support related elements of the NEPA process. The location study process, major deliverables, and their relationship to the NEPA process are depicted in Exhibits 9-1 and 9-2.

Engineering solutions should consider multiple transportation issues (i.e., safety, geometric design requirements, structural requirements, operational characteristics, context sensitive solutions [CSS], public input, constructability) in order to establish the scope, effectiveness, technical feasibility, and costs of proposed improvements. The development of alternative solutions must be guided both by a clear understanding of environmental and socioeconomic features and constraints, and through effective coordination with stakeholders, officials, and the public.

9.1.2 Schedule

The location study schedule should be directly related to the associated environmental study process to allow concurrent consideration of engineering requirements

and environmental issues. It should also be noted that location study schedules may be related to state or federal transportation programs. In such cases, project schedules must be carefully established to comply with program commitments. Shared milestone events of the location and environmental study process are shown on Exhibit 9-1.

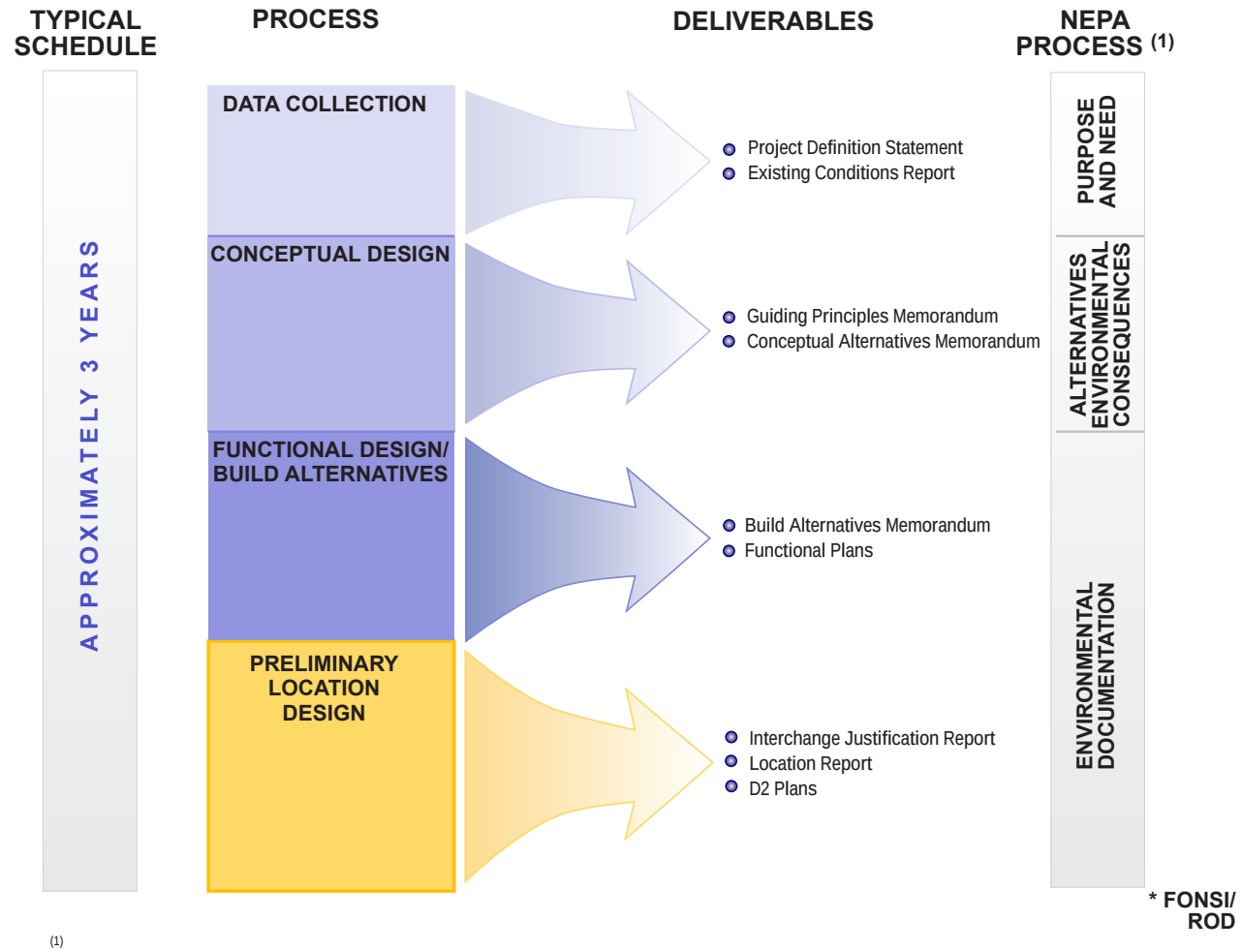
The typical schedule duration for location studies is 18 to 24 months for simple projects, 24 to 36 months for complex projects.

9.2 Data Collection and Analyses

An early and ongoing element of the location study process is data collection. Typically, data collection begins with the initiation of the location study and designation of corridor limits and a study area. Early data collection efforts assist in developing a broad understanding of the conditions surrounding the study area, in identifying environmental constraints, in evaluating transportation needs, and in developing and evaluating conceptual alternatives. Supplemental data may be required following identification of the Build Alternatives to allow development of functional design plans, and a more accurate assessment of project design requirements and associated environmental consequences.

A thorough analysis of the performance of the existing facility is performed in the early stages of a location study. This analysis is critical to building a clear (and defensible) understanding of transportation needs. The analysis also serves as the foundation for the alternatives development process, aiding in identifying the location and character of improvements required

Exhibit 9-1
The Location Study NEPA Process



(1) Environmental documentation completion schedule would generally coincide with the Preliminary Design schedule, if completed as part of the Location Study process

to address transportation performance issues in the study area. Typical data requirements and existing conditions analyses needs during the location study process are identified in Exhibit 9-2.

The remainder of this section outlines data required to perform location studies, the types of existing conditions analyses performed, and the relevance of the data and analyses to the study process.

9.2.1 Data Collection

Data requirements for location studies typically include aerial photography and mapping, engineering data, and environmental data.

Photography and Mapping

Aerial photography and a digital terrain model (DTM) serve as the basis for developing conceptual alternatives, including the conceptual, functional, and preliminary location design plans. Depending on the nature of the project and the level of design development to be completed during the location study process, either a planning DTM or design quality DTM should be obtained.

The Project Manager, in coordination with the PMT and photogrammetry section engineer, is responsible for determining the type of photogrammetric mapping to be developed for the location study process, including requirements for any associated ground, drainage, or hydraulic surveys. This should be established as part of the project definition statement or during the project scope development process.

Engineering Data

Various engineering data are required to support development of engineering analyses and project improvement plans. Generally, engineering data is used to analyze operational, physical, and safety characteristics of the study area, and then to support conceptual alternatives and design development.

Data typically required to analyze transportation needs includes:

- Published transportation programs (Iowa DOT 5-year program, Metropolitan Planning Organization [MPO]/ regional planning affiliation [RPA] Long-Range Transportation Plan [LRTP])
- Traffic data (existing and forecasted)
- Origin-Destination survey (if required)
- Crash data
- Pavement composition and condition data
- Structure condition data and reports
- Existing geometric features (using as-built plans)
- Access management
- Utility information
- S1 and S2 soils reviews
- Other data as appropriate

Early engineering data are used to perform a preliminary review of the condition of the transportation system. This includes crash, geometric design, capacity/operational, and infrastructure condition analyses, and an analysis of the potential causes of performance issues. This information is used to develop an existing conditions memorandum.

Supplemental engineering data may be required to support development of functional design plans or preliminary location design plans. While data needs will vary for each project, they may include geotechnical data, traffic signal system data, additional traffic count/forecast data, or off-system as-built plans (such as those for development of maintenance of traffic concepts).

Environmental Data

Information regarding environmental features and constraints is required to ensure that project development begins and evolves with a goal of avoiding or minimizing environmental impacts. Of particular concern in the early stages of alternatives development are environmental issues of concern from a “fatal flaw” perspective. This could include sensitive habitat areas, threatened and endangered species, wetlands, floodplains/ floodways, resources regulated through Sections 4(f) or 6(f) (parklands, historic resources), cultural resources, regulated

Exhibit 9-2
The Location Study Process

		DATA COLLECTION/ ANALYSIS	CONCEPTUAL DESIGN	FUNCTIONAL DESIGN	PRELIMINARY LOCATION DESIGN
DOT (INTERNAL) INPUT	PMT	• Existing Conditions Report • Data Collection	• Design and Planning Parameters • Guiding Principles • Purpose and Need • Range of Alternatives • Concept Alternatives Memorandum	• Identification of Build Alternatives • Build Alternatives Functional Design • Build Alternatives Memorandum • Interchange/Intersection Design Concepts • Project Schedule and Cost • Identification of Preferred Alternative	• Preliminary Design Plans • Design Field Exam • Interchange Justification Report • Location Report • Project Schedule and Cost • Design Exceptions Approval • Project Schedule and Cost
	SENIOR MANAGEMENT		• Guiding Principles • Conceptual Alternatives Evaluation Findings	• Identification of Build Alternatives • Build Alternatives Evaluation Findings • Preliminary Construction Staging and Schedule • Project Schedule and Cost • Identification of Preferred Alternative	• Preliminary Construction Staging and Schedule • Design Exceptions Approval • Project Schedule and Cost
AGENCY (EXTERNAL) INPUT	FHWA		• Design and Planning Parameters • Purpose and Need • Range of Alternatives • Conceptual Alternatives Evaluation Findings	• Identification of Build Alternatives • Environmental Impact Analyses and Mitigation Plans • Build Alternatives Evaluation Findings • Interchange Design Concepts • Project Schedule and Cost	• Preliminary Design Plans • Design Exceptions Approval • Interchange Justification Report • Preferred Alternative Approval (1) • Finding of No Significant Impact/Record of Decision • Project Schedule and Cost
	LOCAL GOVERNMENT AGENCIES	• As Built Plans • Utility Data • Long Range Plans • Transportation Needs • Project Constraints	• Range of Alternatives • Conceptual Alternatives Evaluation Findings	• Identification of Build Alternatives • Build Alternatives Functional Design • Built Alternatives Evaluation Findings • Local Cost Participation Requirements/Funding • Identification of Locally Preferred Alternative	• Preliminary Design Plans • Identification of Locally Recommended Alternative • Design Exceptions Approval (Local System) • Draft Interagency Agreements
	MPO (METROPOLITAN PLANNING-ORGANIZATION)	• Traffic/Model Data • Long Range Transportation/ Land-Use Plans • Transportation Needs • Traffic Forecasts	• Range of Alternatives • Conceptual Alternatives Evaluation Findings	• Identification of Build Alternatives • Build Alternatives Evaluation Findings • Identification of Locally Preferred Alternative	• Preliminary Construction Staging and Schedule
	OTHER TRANSPORTATION PROVIDERS	• Existing Facility Data • Long Range Plans	• Range of Alternatives • Conceptual Alternatives-Modal Alternatives and Features	• Build Alternative-Modal Design Features • Cost Participation Requirements/Funding	• Preliminary Design Plans-Modal Design Features
	REGULATORY/ RESOURCE AGENCIES	• Environmental Resources and Constraints • Transportation Needs	• Purpose and Need • Range of Alternatives • Conceptual Alternatives Evaluation	• Identification of Build Alternatives • Environmental Impact Analyses and Mitigation Plans • Build Alternatives Evaluation Findings • Identification of Preferred Alternative	• Finding of No Significant Impact/Record of Decision • Permit Drawings
	UTILITY PROVIDERS	• Utility Data		• Build Alternatives Functional Design-Preliminary Utility Conflicts • Cost Participation Requirements	• Preliminary Design Plans-Utility Relocation Plans • Construction Schedule • Draft Utility Agreements
PUBLIC INPUT		• Transportation Needs • Project Constraints	• Purpose and Need • Range of Alternatives • Conceptual Alternatives Evaluation Findings	• Identification of Build Alternatives • Build Alternatives Evaluation Findings • Roadway Footprint Requirements • Preferred Alternative	• Preliminary ROW Requirements • Maintenance of Traffic • Preferred Alternative • Project Schedule and Costs

substances, or sensitive socioeconomic features (existing and planned), including potential environmental justice issues.

Environmental data may be compiled in several stages, particularly for projects that include consideration of multiple conceptual alternatives in a large geographic area. For example:

- Early data collection efforts may be limited to environmental database analyses and windshield surveys/site reviews. This level of data collection may be adequate to identify potential environmental "fatal flaws" during the development and evaluation of conceptual alternatives. These data should be compiled before conceptual alternatives are developed.
- More detailed environmental surveys typically are conducted concurrently with development of functional design for the alternatives retained for detailed study. In addition to field surveys for the environmental issues noted above, this would include noise analyses and soils review. Detailed environmental surveys should be performed at the time when the general character, location, and form of the proposed improvements are defined, allowing efficient use of resources; for example, detailed field studies concentrated only in areas where impacts are likely.

9.2.2 Existing Conditions Analyses

Analyses of existing conditions typically include crash, geometric design, capacity and operational, and infrastructure condition analyses of the transportation system. The object of such analyses is to evaluate potential correlation between performance issues (for example, possible relationships between crash history and geometric design), and to identify potential countermeasures. These early analyses are critical to building a clear understanding of transportation needs that will serve to guide the development of the range and character of suitable alternatives. Thus, these analyses often serve as the basis for development of the project purpose and need, and help to define the character of improvement requirements.

These early analyses are critical to building a clear understanding of transportation needs that will serve to guide the development of the range and character of suitable alternatives. Thus, these analyses serve as the basis for development of the project purpose and need, and help to define the character of improvement requirements.

A set of qualitative and quantitative design standards should be developed by the project team based on applicable DOT and American Association of State Highway and Transportation Officials (AASHTO) policies and design criteria. The analyses should include consideration of existing system performance both today and in the future project design year. Analyses should be presented in a manner that clearly identifies the location and character of performance issues, and that can be adopted for use in presentations and meetings with various agencies, officials, and the public. The analysis of existing conditions should be documented in the existing conditions memorandum.

9.3 Conceptual Design

The conceptual design step consists of identifying, developing, and evaluating a full range of potential solutions (conceptual alternatives) for a project. Conceptual design begins after project transportation needs and objectives have been defined and accepted, and after the general character and location of environmental constraints have been identified.

Elements of the conceptual design step of the location study process are illustrated in Exhibit 9-3. The remainder of this section describes the conceptual design objectives and elements, including their relationship to associated environmental studies.

9.3.1 Objectives

The goal of conceptual design is to identify, in a timely and efficient manner, the set of representative alternatives (Build Alternatives) that address the project

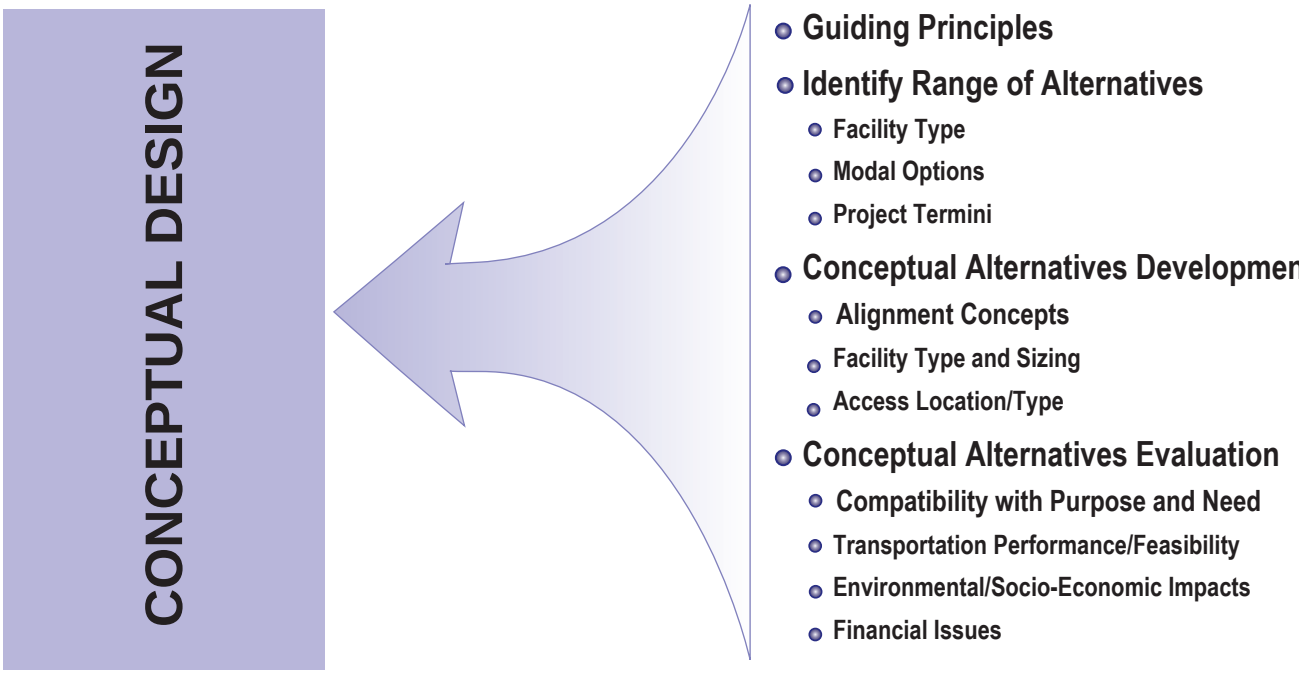
purpose and need, while minimizing adverse impacts. It is at this time the No-Build Alternative is also evaluated. Principal objectives of conceptual design are as follows:

- Identify and consider a full range of potential solutions (conceptual alternatives) consistent with project context, setting, and project design standards that would address the project purpose and need. At this stage, appropriate location, design, and multimodal solutions should be investigated. This minimizes the likelihood of having to change course late in the location study process.
- Ensure that design development stays rooted in the environmental sequencing process (avoidance, minimization, mitigation). In this regard, design refinements should be made where possible to avoid or minimize impacts.
- In compliance with Iowa DOT procedures and guidelines, encourage early stakeholder (public and resource agency) input to the alternatives development and evaluation process. This is perhaps the most critical point in the location study process—the point at which decisions regarding the nature and character of proposed improvements must be made. Early stakeholder input is crucial for the following reasons:
  - The public's perspective regarding transportation needs can help to shape a solid and defensible purpose and need, and build public understanding and support for the project.
  - The public and resource agencies' input regarding the range of alternatives to be considered helps ensure that possible solutions are explored early, and ultimately helps build public understanding of the rationale for selection of the reasonable (build) alternatives.

9.3.2 Conceptual Design Elements

As noted, the goal of conceptual design is to identify the general location and character of reasonable alternatives (Build Alternatives) for detailed consideration. At this early stage, design development of each conceptual alternative should proceed only to the level required to determine its ability to address project purpose and need and to validate its' overall engineering feasibility and associated environmental impacts. The conceptual design process comprises three major elements:

Exhibit 9-3
Location Study Considerations: Conceptual Design



- Development of project design and planning parameters
- Identification of the range of conceptual alternatives to be considered
- Conceptual alternatives development and evaluation
- The remainder of this section discusses the individual elements of the conceptual design process, their significance, and their relationship to the environmental study process.

Procedures

The conceptual design process should be structured to facilitate effective input from internal staff, FHWA, affected resource agencies, and project stakeholders. This should include early and continuing opportunities for stakeholder input regarding the nature, configuration, and performance of alternative solutions.

Formal review and endorsement of the guiding principles should occur before conceptual alternatives are developed. Formal review and acceptance of the range of alternatives to be considered is required from involved regulatory/resource agencies if the project is developed with the NEPA/404 merged process.

Relationship to NEPA

The purpose and need statement should be developed using the existing conditions report as a source of information. The document, together with the Guiding Principles Memorandum and public input, should be used as the basis for identifying and developing the range of alternatives to be considered.

Alternatives should be screened with early environmental research and surveys, and with agency coordination, to determine whether they may have fatal flaws that prevent further investigation.

The conceptual alternatives evaluation results should serve as the basis for the project Build Alternatives. Alternatives retained at this stage should show the ability to meet purpose and need without the potential for encountering unavoidable fatal flaws.

Deliverables

Typically, the design and planning parameters are identified in the guiding principles memorandum, which identifies project transportation needs and objectives, explains the context of the corridor in relationship to the broader transportation network and project area, and defines the general characteristics of potential improvements (facility type and sizing, bypasses, multimodal options). The guiding principles memorandum also identifies design criteria and principles that will be used throughout the design development process.

Guidance regarding conceptual design deliverable requirements is discussed in Section 9.8.

9.4 Functional Design

Functional design begins with the identification of Build Alternatives to be carried forward for detailed consideration. The best performing alternatives (those which address project purpose and need while minimizing adverse impacts) should be identified for detailed study on the basis of project analyses and public input. This should be closely coordinated with the NEPA process for identifying the reasonable alternatives to be considered in detail.

The goals of functional design are to provide sufficient engineering definition (of the Build Alternatives) to allow an evaluation of their environmental and socioeconomic impact, provide engineering guidance for subsequent design development, and support a decision on the preferred alternative or recommended alternative.

Elements of the functional design step of the location study process are illustrated in Exhibit 9-4. The remainder of this section describes functional design objectives and elements and their relationship to the environmental study process.

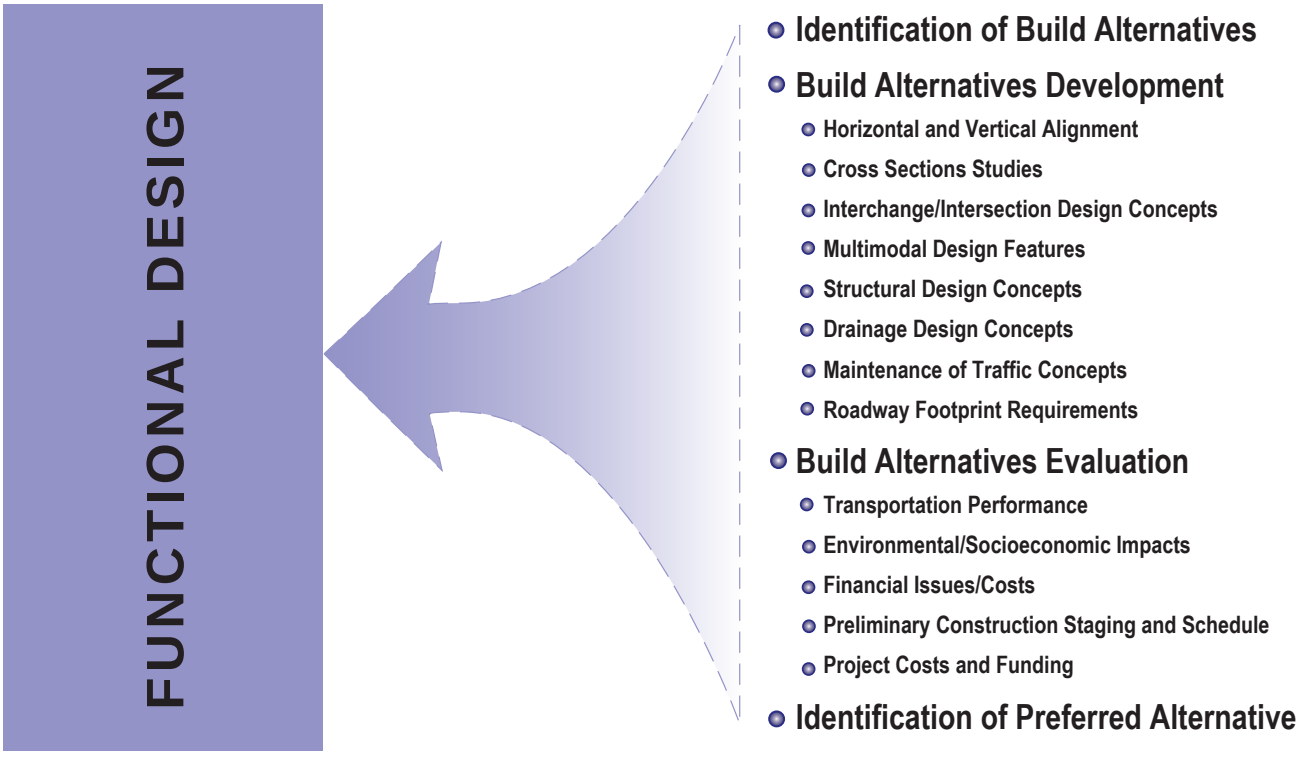
9.4.1 Objectives

The goals of functional design are to provide sufficient engineering definition (of the Build Alternatives) to allow evaluation of their environmental and socioeconomic impacts, to provide engineering guidance for subsequent design development, and to support a decision on the Preferred Alternative or Recommended Alternative.

Principal objectives of functional design are as follows:

- Ensure that design development stays rooted in the environmental sequencing process (avoidance, minimization, and mitigation). In this regard, refine the design where possible to avoid or minimize impacts.
- Ensure that design characteristics of the facility fit within the project's context (e.g., context sensitive solutions).
- Demonstrate an alternative's technical acceptability (i.e., compatibility with design criteria and constructability), and define the geometric, structural, drainage characteristics, and preliminary mitigation needs of the Build Alternatives in order to identify construction footprint requirements and project costs.
- Foster public involvement, and build public understanding and support for project decisions in the following ways:
  - Define potential direct (property acquisitions) and related (aesthetic, permanent, or temporary access modifications) impacts to adjacent properties.
  - Aim public outreach at those directly and indirectly affected by a project. Where appropriate, form working groups to provide the public with a means to communicate with the project team, ensuring that design characteristics and construction methods respect community values.
  - Portray design concepts in a manner that allows the public to readily understand or visualize the proposed improvements.

Exhibit 9-4
Location Study Considerations: Functional Design



9.4.2 Functional Design Elements

The functional design process begins with the identification of Build Alternatives, and includes alternatives development (functional design plan preparation) and evaluation. The remainder of this section includes a discussion of the functional design process and its relationship to the environmental study process.

Issues Considered

At the end of the functional design stage, Build Alternatives typically are developed to a level of detail that provides adequate engineering definition to support identification of the Preferred Alternative (to be advanced to preliminary location design development. Preliminary location design is required to support identification of environmental consequences.

Functional design typically includes development of the following features:

- Geometric design
- Preliminary structural design
- Preliminary drainage design
- Maintenance of traffic
- Environmental footprint

The evaluation of Build Alternatives should include consideration of a combination of transportation, environmental, socioeconomic, and financial factors aimed at evaluating and documenting the relative performance and impacts of the Build Alternatives. Specific evaluation measures could be qualitative or quantitative in nature, and should be developed with input from the project team and involved agencies as appropriate. The evaluation results should be sufficient to support identification of the Preferred Alternative.

Procedures

The functional design process should be structured to facilitate effective input from both internal staff and project stakeholders. This should include continuing opportunities for stakeholder input regarding build alternative design features and their associated impacts. Iowa DOT staff and other involved agencies should participate in the review of the functional design plans and Build Alternatives evaluation findings, as appropriate, before the identification of Build Alternatives.

Relationship to NEPA Decisions

Alternatives identified for functional design are those that would be identified in the environmental document as those "carried forward for further consideration" (Point 3) if the project is placed in the NEPA/404 merged process. A detailed analysis of the environmental impacts of the alternatives undergoing functional design will be required. The conclusion of the functional design phase of project development may coincide with issuing an EA or Draft EIS. Mitigation concepts for impacted environmental resources may also be initiated during this phase.

Deliverables

The location report is the principal engineering document delivered as part of the location study process. Development of the location report should commence at the beginning of the project and continue through to the end of preliminary location design. The report should document the following: transportation issues, alternatives considered, rationale for dismissal of alternatives, and selection of the recommended alternative, project commitments, project cost, agency coordination, and public involvement activities. Information compiled as part of stand-alone technical memorandums is generally summarized and incorporated into the location report. Location reports provide guidance to the preparation of final design plans, right-of-way acquisition, and preparation of interagency agreements. For projects that involve changes in interstate access (as defined by FHWA guidelines), an interchange justification report should be prepared to secure FHWA approval of recommended changes to interstate access. Guidance regarding functional design deliverable requirements is discussed in Section 9.8.

9.5 Preliminary Location Design

Preliminary location design follows the identification of the Preferred Alternative. The purpose of preliminary location design is to advance the functional design of the Preferred Alternative. This level of development will occur during a location study when further refinement of the Preferred Alternative is required. The Preferred Alternative should be advanced to the stage at which all or most of the Field Exam Checklist information is provided (see Office of Design, *Design Manual,* 1D-9 and 1D-10). The following information is required prior to completion of preliminary location design:

- Preliminary TS&L for bridges and larger culverts
- Soils information, preferably completion of S-2
- Signed environmental document

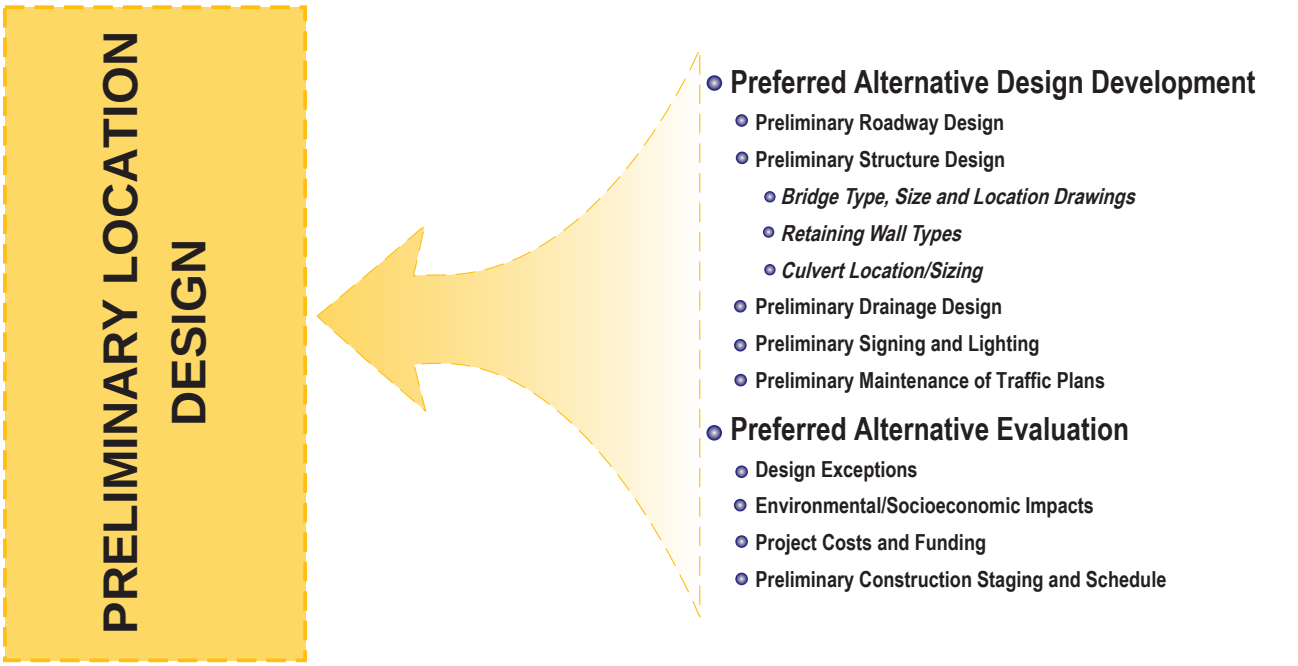
Elements of preliminary location design, which is to be completed with the location study process, are illustrated in Exhibit 9-5. The remainder of this section describes preliminary location design objectives and elements, and their relationship to the environmental study process.

9.5.1 Objectives

The goals of preliminary location design are to provide sufficient engineering definition (of the Preferred Alternative) to allow an evaluation of the environmental and socioeconomic impacts of the recommended alternative, and to provide guidance to future design development efforts.

The goals of preliminary location design are to provide sufficient engineering definition (of the Preferred Alternative) to allow an evaluation of the environmental and socioeconomic impacts of the recommended alternative, and to provide guidance to future design development efforts.

Exhibit 9-5
Location Study Considerations: Preliminary Location Design



Principal objectives of preliminary location design are to continue the following:

- Ensure that design development stays rooted in the sequencing process (avoidance, minimization, and mitigation). In this regard, design refinements should be made where possible to avoid or minimize impacts.
- Ensure that design characteristics of the facility fit within the project's context (i.e., context sensitive solutions).
- Demonstrate an alternative's technical acceptability (i.e., compatibility with design criteria, constructability) and define the geometric, structural, and drainage characteristics of the build alternative in order to identify preliminary construction footprint requirements and project costs.
- Include continued public involvement to build public understanding and support for project decisions. As design requirements are more accurately developed through the preliminary location design process, public outreach should focus on communicating information of direct and indirect impacts to adjacent communities, and on soliciting stakeholder and public input on project design features of interest to the community.

9.5.2 Preliminary Location Design Elements

The preliminary location design process begins with the identification of the Preferred Alternative, and includes development of preliminary location design plans as required to support identification of the recommended alternative. The remainder of this section includes a discussion of the preliminary location design process and relationship to the environmental study process.

Issues Considered

Preliminary location design efforts should be performed to support identification of environmental consequences of the recommended alternative. While the scope of preliminary location design efforts required may vary for individual projects, the following elements of preliminary location design need to be completed during the location study process:

- Preliminary location roadway design
- Preliminary location structure design
- Preliminary drainage design
- Signing and lighting concepts
- Maintenance of traffic concepts
- Preliminary utility conflicts and relocation requirements
- Geotechnical studies
- Preliminary right-of-way requirements/ preliminary construction footprint
- Value engineering studies

Evaluation of the Preferred Alternative is conducted as the completion of preliminary location design is completed. The evaluation should support refinement of environmental impact analyses, and development of project cost and schedule requirements. The evaluation results should be sufficient to support identification of the recommended alternative in NEPA.

Procedures

Preliminary location design should include ongoing input from both internal staff and project stakeholders. Extensive coordination with other offices will be required to complete preliminary location design. For example, the Office of Bridges and Structures will be involved in the structural determinations and TS&L information, the Office of Design may be consulted on interchange geometrics, soils, survey data, and drainage. There should also be continuing opportunities for stakeholder input regarding preferred alternative design features.

Relationship to NEPA Decisions

Preliminary location design development of the Preferred Alternative, with associated engineering documentation, should support completion of the environmental consequence and mitigation plans

evaluation, as required to support a Finding of No Significant Impact (FONSI) or Record of Decision (ROD) for the project. The conclusion of the preliminary location design phase of a project will likely coincide with issuing a FONSI or ROD, if appropriate. At this time, mitigation concepts should be developed and coordinated with appropriate agencies for affected resources.

Deliverables

Several engineering deliverables are developed during the preliminary location design stage. For projects that involve changes in interstate access (as defined by FHWA guidelines), an interchange justification report should be prepared to secure FHWA approval of recommended changes to interstate access. Additionally, a location report should be finalized at the conclusion of the preliminary location design. This should include documentation of identified transportation issues, alternatives considered, alternatives evaluation findings and recommendations, project commitments, agency coordination, and public involvement activities. Preliminary location design plans should be included with the location report document so as to provide guidance to the preparation of final design plans and preparation of interagency agreements. Generally, preliminary location design requirements will be consistent with plan preparation requirements identified in the Field Exam Checklist (see Office of Design, *Design Manual,* 1D-9 and 1D-10). Guidance regarding preliminary location design deliverable requirements is discussed in Section 9.8.

9.6 Construction Staging and Phasing

Construction strategies and procedures should be considered during the location study phase of a project. The nature and level of analyses performed during the location study phase will vary based on the project complexity and size.

A basic requirement for all location studies is an assessment of project constructability. It is important to ensure that recommended improvements can be constructed within physical site constraints using reasonable construction methods and procedures, while maintaining acceptable traffic flow and access through the project area. Constructability should be considered throughout the alternatives development process to help ensure that proposed improvements are feasible and practical.

For more complex corridor studies, the sequence and time period of proposed improvements within the study area should also be considered during the location study phase of the project. Early consideration of potential construction phasing will accomplish the following:

- Provide input to the Iowa DOT 5-year program development process, helping ensure that the project development schedule is compatible with statewide priorities and funding availability.
- Facilitate early consideration of corridor improvement priorities, weighing input from project sponsors and stakeholders.

While construction staging must be considered to some degree for all projects, the remainder of the discussion in this chapter focuses on complex transportation corridors that may involve a sequence, or program, of improvements over a lengthier period of time.

The remainder of this section includes a general discussion of how construction staging is considered during the location study process.

9.6.1 Planning Level Segmentation

Objectives

The first consideration in establishing a potential construction phasing sequence is to identify planning level segments (with independent utility) within the study area. The objective is to identify useable improvement segments that address defined transportation needs.

Issues Considered

Planning level segments will accomplish the following:

1. Connect logical termini (rational end points for a transportation improvement), and be of sufficient length to address constructability matters on a broad scope.
2. Have independent utility (a facility that can function on its own without the need for additional future improvements) or independent significance. (Be usable and also a reasonable expenditure, even if there are no additional transportation improvements in the area.)
3. Avoid restricting the consideration of alternatives for other reasonably foreseeable transportation improvements.
4. Establish preliminary construction sequence or priorities.

Planning Level Segmentation as used herein has a different meaning than Segmentation used in the NEPA sense (23 CFR 771.111(f)) because planning level segments are:

- Included within a larger NEPA corridor study
- Used for constructability, developing staging, and programming needs

By contrast, NEPA segmentation occurs when a transportation need extends throughout an entire corridor, but project sponsors discuss the environmental issues and transportation need of only a part of the entire corridor.

9.6.2 Project Implementation Strategies

Objectives

Project implementation strategies consider the possible sequence and schedule for implementing recommended improvements along the project corridor. The goal of this effort is to establish priority improvement needs from the series of identified planning level segments, and to identify a general order and schedule for full build-out of the improvement plan (Preferred Alternative). This effort provides early guidance to the program development process, and helps ensure that project implementation schedules are coordinated with federal, state, and local transportation programs and priorities.

The goal of this effort is to establish priority improvement needs from the series of identified planning level segments, and to identify a general order and schedule for full build-out of the improvement plan (Preferred Alternative). This effort provides early guidance to the program development process, and helps ensure that project implementation schedules are coordinated with federal, state, and local transportation programs and priorities.

Issues Considered

Project implementation strategies are typically considered once the general character and location of build alternatives has been established and once planning level segments are identified. Issues that should be considered in the development of these strategies include the following:

- Planning level project cost, including construction, right-of-way, and engineering costs.
- Available funding sources (including federal, state, and local funding sources).
- The potential for interim improvements (e.g., intersection channelization), and the possible need for advance improvements (e.g., off-system improvements required in advance of major freeway reconstruction contracts).

- The potential project construction schedule, with associated schedules for engineering and right-of-way acquisition activities. The potential schedule should be developed with an understanding of federal and state transportation programs, project priorities, and funding constraints.
- Cash flow analyses for project implementation scenarios, incorporating early information regarding annual funding requirements for the project.

Procedures

Project implementation strategies should be developed by the project team with input from Iowa DOT management, FHWA, and, as appropriate, local government agencies, including potential funding agencies.

9.7 Coordination

The location study process is guided by coordination and input from both project decision makers and stakeholders. The Project Manager, in coordination with District staff, is responsible for scheduling and prioritizing work, identifying needed resources, guiding the project concept, and taking the lead for coordination with the PMT, general public, and other project stakeholders.

The NEPA section in OLE works with the Project Manager to identify potential resource issues and needed studies and oversees the development of NEPA documentation. He or she is also responsible for coordinating with resource specialists within Iowa DOT and with consultant staff, when applicable.

Project stakeholders generally fall into one of two groups: agencies or government bodies that have approval or permitting authority over some aspect of the project (including U.S. Army Corps of Engineers [USACE], Department of Natural Resources [DNR], and U.S. Fish and Wildlife Service [USFWS]), and members of the surrounding community or interest groups that have a general or personal interest in the project. Stakeholders may be members of the general public or elected officials, such as property owners (those who may be affected directly by the project, or those in the general study area), business organizations, neighborhood associations, special interest groups, state and federal legislators, and city or county officials. Project stakeholders are asked to provide input to the project during key milestone events.

The object of the location study coordination process is threefold:

- First, to allow for timely identification and resolution of public and agency concerns and issues. This is best achieved through a public involvement program that provides meaningful opportunities for public input to project transportation objectives and alternatives, proactively addresses public and agency issues, and ultimately builds public understanding and support for project recommendations.
- Second, to support development of a technically acceptable, financially sound, and implementable improvement plan that complies with applicable legislative requirements, regional needs, environmental policies and regulations, design criteria, and engineering practices. This is achieved through regular input of a multidisciplinary technical team (the Project Management Team [PMT]), and effective coordination with DOT management.
- Third, to provide relevant and accurate data to decision-makers to support improvement recommendations.

The location study coordination procedures should be tailored to meet the needs and objectives of individual projects. For example, projects located in urban areas will require coordination with a broader array of local government agencies and transportation agencies when compared to rural projects. Therefore, project-specific coordination procedures should be identified as part of the project work plan and schedule.

The remainder of this section outlines the objectives of location study coordination activities. The activities are listed in Exhibit 9-2 and described in the following narrative.

9.7.1 Internal Coordination and Reviews

Internal Iowa DOT coordination and reviews occur at two levels: PMT involvement and review, and senior management review and approval of project recommendations.

Project Management Team

Objectives

The fundamental function of the PMT is to guide the development of technically acceptable and implementable improvement plans. The PMT consists of a multidisciplinary team of Iowa DOT and FHWA staff with requisite expertise related to an individual project. A project-specific PMT is assembled at the initiation of the location study process.

Procedures

Coordination with the PMT typically is accomplished through PMT meetings and involvement of PMT members in the review of project deliverables.

Responsibility

The Project Manager, in coordination with District staff, is responsible for assembling the project-specific PMT, for scheduling and facilitating any needed meetings, and for involving appropriate members of the PMT in the review of project deliverables. The Project Manager, in coordination with District staff, is also responsible for compiling PMT input and review comments and ensuring that they are reflected accordingly in the engineering development process.

Project Briefings

Objectives

Project briefings are the PMT's opportunity to discuss project level details with senior management. The purpose of the briefings is to update senior management with timely information about the project or particularly sensitive issues on the project; and to obtain direction from management on issues such as policy, funding, programming, design, or other decisions at critical times within development.

Procedures

Project briefings should be scheduled in coordination with District management or the OLE Director at critical points in the location study process. At a minimum, this should include project briefings to allow for policy-level input to the development of project planning and design criteria; identification of the Build Alternatives and recommended alternative; and to address project cost, scheduling, and implementation issues. Project briefings are small group, internal working meetings designed to update management and seek guidance.

Responsibility

The Project Manager, in coordination with District staff, is responsible for scheduling and supporting project briefings, including identifying topics and preparing pertinent presentation materials. Project briefings are typically scheduled on an as-needed basis; however, project specific briefings may be scheduled at the request of management.

Project Review Meetings

Objectives

The purpose of project review meetings is to update senior management with timely information about the project or particularly sensitive issues on the project and to discuss finding and delivery timelines. A project is discussed at project review meetings at the request of the District Engineer and often addresses major project milestones (i.e., public hearings and a project entering the 5-year program).

Procedures

Project review meetings should be scheduled at critical points in the location study process. These meetings are geared to a wider audience than project briefings and involve multiple offices and FHWA.

Responsibility

The District Engineer, in coordination with the Project Manager, is responsible for scheduling and supporting project review meetings, including identifying topics and preparing pertinent presentation materials.

9.7.2 Agency Coordination and Reviews

Timely and effective involvement of agencies in the location study process is important for project success. The process should allow involved agencies the opportunities for early and meaningful review of project issues, alternatives, and recommendations so as to secure project approval and facilitate project implementation (with subsequent permits and agreements).

The following entities may be involved in the location study process: FHWA; local government agencies; metropolitan planning organizations; other transportation providers; regulatory and resource agencies; and utility providers.

FHWA

Objectives

As lead regulatory agency at the federal level for federal-aid highway improvement projects, FHWA involvement in the location study process is necessary to secure associated engineering and environmental approvals, and to ensure that improvement recommendations adhere with applicable federal policies and guidelines.

Procedures

FHWA involvement may be accomplished through participation of FHWA staff in the PMT, Project Advisory Committees (where appropriate), or as needed through various meetings with regulatory and resource agencies. FHWA involvement also is required in the process of developing interchange justification reports. As necessary, project review meetings may be scheduled with FHWA to discuss design or policy issues.

FHWA staff is also involved, as appropriate, in the review of draft project deliverables. FHWA reviews may be accomplished either concurrently or subsequent to DOT staff reviews.

FHWA level of project involvement will vary by project, based on the facility type (i.e., interstate highway versus rural arterial), associated federal actions (e.g., new interstate access), and project complexity. The level of FHWA involvement and project oversight should be established at the time of project initiation. This should include consideration of the potential need for direct involvement of FHWA Headquarters staff.

Responsibility

The Project Manager is responsible for involving FHWA in the PMT and advisory committees, scheduling and facilitating meetings with FHWA staff, and coordinating FHWA review and input to location study deliverables and recommendations. The NEPA section is responsible for scheduling meetings and reviews associated with the environmental study process and NEPA documentation development.

Local or Adjoining State Government Agencies (Municipalities, Counties, Townships)

Early and ongoing involvement is needed to secure community support, coordinate improvement elements of interest to local agencies, and facilitate development of project agreements.

Objectives

Early and ongoing involvement is needed to secure support, coordinate improvement elements of interest to local agencies, and facilitate development of project agreements. The objectives of the coordination process are to ensure that:

- The communities' view of transportation needs and project constraints are considered in the project development process
- All possible alternatives are explored early in the process
- The recommended alternative respects community issues and concerns, including use of appropriate design features and a construction staging plan that minimize adverse impacts

Procedures

Local agency involvement is accomplished through Project Advisory Committees (as appropriate), individual agency meetings (i.e., staff meetings, or Council or Board meetings), and workshops.

Agency involvement should be structured to provide meaningful opportunities for local agency input related to transportation needs, project constraints, conceptual alternatives considered, and improvement recommendations (preferred alternative). Local agencies also should be involved in the review and approval of any proposed modifications to facilities under local jurisdiction. This could include required modifications to local roadways, stormwater systems, and utilities. This includes the review of build alternative functional design plans.

Responsibility

The Project Manager, in coordination with District staff, is responsible for scheduling and facilitating local agency coordination activities, and ensuring that local input is communicated to appropriate DOT management staff and reflected in the location study development process.

Planning Organizations (MPOs/RPAs/TMAs/COGs)

Objectives

For projects located in metropolitan areas, MPO involvement is required to secure MPO endorsement of recommended improvement plans (Preferred Alternative) in designated TMAs. Coordination is also needed to demonstrate consistency of project traffic forecasts with regional travel demand, socioeconomic forecasts and regional long-range transportation plans.

Procedures

MPO involvement typically is accomplished through Project Advisory Committees (as appropriate) or meetings (i.e., staff meetings, or transportation or policy committee meetings) scheduled at critical points in the location study process. At a minimum, this should include staff meetings to secure early endorsement of project traffic forecasts, gain an understanding of regional long-range transportation and land-use plans, and transportation or policy committee meeting presentations preceding key location study milestones.

Responsibility

The Project Manager, in coordination with District staff, is responsible for scheduling and facilitating MPO coordination activities, and for ensuring that MPO input is communicated to appropriate DOT management staff and reflected in the location study development process.

Other Transportation Providers

Objectives

Early and ongoing involvement of other transportation providers in the project study area, such as transit agencies (bus, rail), freight rail owners and operators, airport authorities, port authorities, or multiuse trail owners and operators, is needed to ensure that the recommended improvement does not conflict with the operation of other transportation services in the area, but rather that it complements or enhances (where possible) those services. Early involvement is also recommended to facilitate the development of project agreements that may be required.

Procedures

Coordination with other transportation providers typically is accomplished through early project notification letters and one-on-one meetings. This could include correspondence or meetings to collect data regarding existing and planned regional transportation facilities. If project alternatives include consideration of multimodal transportation services (e.g., expanded transit services) or affect operations on an adjacent transportation link (e.g., reconstruction of a highway or railroad grade separation), affected transportation providers should be involved in the conceptual alternatives development and evaluation process. This includes review and approval of any proposed modifications to facilities under their jurisdiction.

Responsibility

The Project Manager, in coordination with District staff is responsible for scheduling and facilitating coordination activities with other transportation providers, and for ensuring that input is reflected in the location study development process.

Regulatory / Resource Agencies

Objectives

Early and ongoing involvement of federal and state regulatory and resource agencies is required to provide a thorough understanding of environmental features and constraints, and of associated regulatory requirements. This information is needed to ensure that alternatives development and analysis follows the sequencing process (avoidance, minimization, and mitigation), and that proposed actions are ultimately "permittable."

To be effective, the public involvement program must disseminate accurate information in a timely manner, include outreach efforts to all affected or interested parties, and provide meaningful opportunities for public input in advance of key project decisions.

Procedures

Coordination with regulatory and resource agencies is accomplished through a combination of early project notification letters, individual agency meetings (as required) and NEPA/404 merger meetings. Regulatory and resource agency involvement should be structured to allow meaningful opportunities for input related to transportation needs, environmental constraints, alternatives considered, and improvement recommendations (Preferred Alternative).

The types and level of agency involvement will vary by project, based upon the nature of environmental resources in the project area, and the extent of potential effect upon the resources.

Responsibility

The Water Resources and NEPA sections in OLE, in cooperation with the Project Manager, are responsible for scheduling and facilitating coordination activities with regulatory and resource agencies, and for ensuring that agency input is reflected in the location study development process.

Utility Providers

Objectives

Early involvement of utility providers with facilities within the project area will ensure that improvement plans (preferred alternative) are developed to avoid, where possible, conflicts with major utility facilities. Early involvement also ensures that project design elements—including vertical profile, maintenance of traffic concepts, and footprint or right-of-way requirements—address any utility relocation requirements. This allows early coordination regarding utility relocation responsibilities, allowing affected utility operators lead time to plan for utility relocations.

Procedures

Coordination with utility providers is typically accomplished through early project notification letters, one-on-one meetings, and the District's annual meeting with utilities. In urban areas, it may be beneficial to use subsurface utility engineering (SUE). Coordination should include early data collection regarding existing utility facilities. Ongoing coordination is required with utility providers whose facilities will be affected by the preferred alternative. In these cases, utility providers should be involved in the review of functional design or preliminary location design plans. Project staff should coordinate utility issues with the Local Systems Utilities Coordinator, including review of functional plans and identification of affected utilities.

Responsibility

The District, in coordination with Local Systems, is responsible for scheduling and facilitating coordination activities with utility providers, and for ensuring that input is reflected in the location study development process.

9.7.3 Public Coordination

An effective public involvement program tailored to the anticipated project issues and to the needs of the project stakeholders is important for project success. To be effective, the public involvement program must disseminate accurate information in a timely manner, include outreach efforts to all affected or interested parties, and provide meaningful opportunities for public input in advance of key project decisions. Stakeholders include property owners (those who may be directly impacted by the project and those in the general study area), business organizations, neighborhood associations, and special interest groups.

The level and character of public coordination will vary by project. Project-specific coordination procedures should be identified in the project's public involvement plan.

Refer to the *Can-Do Manual* and Chapter 44 of this manual for additional information on the public involvement process.

Public Stakeholders

Objectives

Early and ongoing involvement is needed to ensure that stakeholder issues and concerns are addressed in the location study process, encourage early public input to the project alternatives, and build public understanding and support for project decisions.

Procedures

A variety of public outreach tools may be used to facilitate public involvement in the project development process. A project-specific public involvement program should be structured based on the character of the project and anticipated public issues. Regardless of the nature of the project, the program should be structured to identify public stakeholders and then to allow meaningful opportunities for public stakeholder input regarding transportation needs, project constraints, alternatives considered, and improvement recommendations (preferred alternative).

Regardless of the nature of the project, the program should be structured to identify public stakeholders and then to allow meaningful opportunities for public stakeholder input regarding transportation needs, project constraints, alternatives considered, and improvement recommendations (preferred alternative)

A variety of public outreach tools may be used to facilitate stakeholder involvement in the project development process. These may include:

- Project mailing list
- Published materials (project website, newsletters, brochures)
- Property owner meetings, small group meetings, and speaker bureau events
- Media coordination and briefings
- Public information meetings and/or public hearings
- Design working groups

Responsibility

The Project Manager, in coordination with District staff, the PMT and the Public Involvement Section is responsible for developing a projectspecific public involvement plan. This group is also responsible for scheduling and facilitating public involvement activities, and ensuring that public input is communicated to appropriate DOT management staff and reflected in the location study development process.

9.8 Location Study Documentation

This section includes a general discussion and summary of the type of engineering documentation developed during the location study process.

9.8.1 Objectives

Documentation of location studies and decisions is an important element of the location study process and is a part of the project's Administrative Record. Documentation prepared during the location study process accomplishes the following:

- Builds understanding and agreement of required project analyses and methodologies
- Provides project decision-makers with relevant data to make technical decisions, allowing the project development process proceed linearly
- Offers an overall view of engineering and environmental considerations made during project development, providing more detailed engineering information then is contained in the related NEPA document
- Provides a clear record of project analyses and rationale for project decisions
- Provides guidance for subsequent stages of project development

9.8.2 Documentation Types

Project documentation is developed throughout the location study process to support project development needs and engineering decisions. Documentation typically consists of one of the following:

- Technical memorandums, which are prepared as needed through the location study process. The purpose of the memoranda could be to define and explain study methodology and process, and present analysis findings and recommendations. Technical memorandums prepared during a location study may include: a crash analysis memorandum, a traffic volumes and projections memorandum, or a level of service analysis memorandum. See Chapter 6 for more details on these memoranda.
- Technical reports, which serve to document major elements of the project development process. Technical reports prepared during a location study may include an existing conditions report, a Guiding Principles Memorandum, or both. See Chapter 6 for more details on existing conditions reports.
- Location reports, which serve as a comprehensive document of the location study process, findings, and recommendations.
- Interchange justification reports (when required) which are prepared in compliance with FHWA requirements, and serve to support FHWA approval of modifications to interstate access. See the Iowa DOT guidance on interchange justification reports for more details on these reports and their requirements.

9.8.3 Guiding Principles Memorandum

The Guiding Principles Memorandum documents the basic design and planning parameters for a project. This document provides direction to design development so as to ensure that the process is focused on addressing identified transportation needs and objectives, and to ensure that alternatives are developed using accepted design and planning parameters.

The Guiding Principles Memorandum should generally address the following design and planning issues:

- Transportation objectives to be addressed with project alternatives
- Context of the project corridor in relation to the broader transportation network and project area
- General characteristics of potential improvements (facility type and sizing, bypasses, multimodal options) and improvement termini
- Project planning and design criteria, including design year

Exhibits and tables may be included in the guiding principles memorandum. The document should at least include a location map, exhibits depicting the existing and planned transportation system,

exhibits depicting existing and planned land uses and locations with identified sensitive environmental resources, and tables presenting proposed planning and design criteria.

The memorandum should be developed before the development of alternatives gets under way. This document should be developed in consultation with Iowa DOT and FHWA, with input from other key local stakeholders (i.e., MPOs and local elected officials) as appropriate. A formal review and endorsement of the Guiding Principles Memorandum should occur so as to ensure agreement with project development principles. The draft Guiding Principles Memorandum should be reviewed by the Project Manager and PMT, and when appropriate by the District Engineer and senior management. Following review, comments should be incorporated into the Final Guiding Principles Memorandum.

9.8.4 Conceptual Alternatives Analysis

The development and evaluation of alternative transportation solutions is an important element of the location study process. Documentation of each step of the alternatives development process serves to build a clear and comprehensive record of the range of solutions considered, as well as the rationale used to screen and refine alternatives.

The Conceptual Alternatives Findings Technical Memorandum summarizes results of the alternatives development and evaluation process and serves to document the rationale for the range of Build Alternatives to be carried forward for further consideration. The memorandum should contain narrative, exhibits, and tables summarizing the following:

- Alternatives development guidelines and procedures, including a summary of design criteria and transportation objectives used to guide the development of alternatives
- Alternatives evaluation procedures, including a summary of evaluation criteria and performance measures
- Alternatives considered, including a description of key design features (location, facility type, and cross section)
- Evaluation results, including a discussion of relevant transportation, environmental, and financial performance issues, and public and community input
- Findings and recommendations, including identification of alternatives recommended for further consideration, and discussion of alternatives considered and dismissed (with the rationale for dismissal)

9.8.5 Build Alternatives Analysis

Similar to the Conceptual Alternatives Findings Technical Memorandum, the Build Alternatives Analysis Memorandum serves to document the results of the development and evaluation of Build Alternatives. The memorandum provides technical background required to support identification of the Preferred Alternative. The memorandum should include the following information:

- Alternatives development guidelines and procedures, including a summary of design criteria and transportation objectives used to guide the development of alternatives
- Alternatives evaluation procedures, including a summary of evaluation criteria and performance measures
- Alternatives considered, including a description of refined design features (including substantive refinements from the development of Conceptual Alternatives), and design variations considered
- Evaluation results, including a discussion of relevant transportation, environmental, and financial performance issues, and public and community input
- Findings and recommendations, including identification of the Preferred Alternative and rationale for the recommendation

9.8.6 Location Reports

Location reports document the location study process, providing comprehensive documentation of identified transportation issues, alternatives considered, alternatives evaluation findings and recommendations, project commitments, agency coordination, and public involvement activities. They describe and support selection of the Preferred Alternative, and provide guidance in preparing final design plans, acquiring right-of-way, and preparing interagency agreements.

Report Content

Location reports should provide a thorough summary of each major aspect of the location study process, support study decisions, and provide guidance to future project development activities. Specifically, the report should provide the following:

- A complete record of the alternatives development process, including alternatives considered, their performance characteristics, and rationale for dismissal of alternatives
- A discussion of geometric studies performed to address specific aspects of Build Alternatives, along with study findings and recommendations
- A description of the Preferred Alternative design features, including roadway and structure improvement features, design exceptions (with appropriate justification), drainage design concepts, estimated construction footprint, maintenance of traffic concepts, potential utility impacts, and estimated costs
- Documentation of public and agency coordination procedures and results, including identification of any project commitments established through the location study process
- Documentation of project compliance with CSS procedures
- Potential project implementation strategies and funding considerations

Exhibits, tables, and figures should be used to clearly articulate project issues and the potential solutions considered. As appropriate, technical memorandums or reports prepared during the location study process should be referenced or included as appendixes to the location report.

Report Development Procedures

The location report is prepared toward the conclusion of the location study process and serves to summarize the key elements and findings of the study. As described in the preceding sections, technical memorandums and technical reports are prepared through the course of the location study process. These documents are summarized, referenced, or included as appendixes to the location report.

A draft location report should be submitted for review concurrently with the submittal of alternatives analysis results and recommendations. It may be beneficial to submit the draft location report at the time of submittal of the draft Environmental Impact Statement (EIS), thus documenting in more detail the technical aspects of project alternatives. The draft location report should be reviewed by the appropriate members of the PMT. Once the draft location report has been reviewed, feedback and comments should be applied to the final location report.

The final location report should be submitted for concurrence and acceptance following DOT identification of a preferred alternative. Typically, the report should be submitted concurrently with the final EIS. The final location report is submitted for review by the PMT and District Engineer.

Acceptance and approval of the final location report (and associated environmental documentation) represents the conclusion of the location study process. At this point, further project development responsibilities generally shift to the Office of Design. If there are substantive design changes to a project in the future, the Location Section should determine whether the preparation of a formal location report addendum is warranted.

9.9 Materials to be Transmitted to Design

The following materials are transmitted to the design section upon completion of the location study process. All project materials should be saved under the project directory.

- Project-specific design criteria
- All technical memorandums and reports
- Interchange justification report
- Functional plans
- D2 plans
- Location report
- Computer-aided design and drafting (CADD) files
- Project notebooks
- All other electronic files (for example, survey, mapping, capacity, and operational analyses)

NOTES:

MicroStation / Geopak® Practices

CHAPTER 10

Computer-aided drafting (CAD) and computer-aided engineering (CAE) have become standard tools in the industry for electronic drawing and design development. These tools enable teams to automate processes and procedures for efficient production of plan drawings. Iowa DOT has selected MicroStation by Bentley Systems as the standard CAD platform and Geopak by Bentley Systems as the standard CAE platform.

Technicians, designers, planners, and engineers typically use MicroStation to render designs, concepts, alternatives, and so on. MicroStation provides an environment in which the user can make drawings using electronic elements (lines, arcs, shapes, and cells) that can be copied, modified, and manipulated. Drawings often are plotted to become exhibits and plan set sheets. Geopak operates within MicroStation and provides the user with tools that automate common plan production procedures (such as creating cross sections, displaying alignments, and creating profiles) and offers tools to automate design and calculations (such as coordinate geometry [COGO], horizontal and vertical alignments, roadway superelevation, and earthwork).

10.1 Office of Design CAD Tools

The Iowa DOT Office of Design has developed standards to ensure consistency in use, exchange, and transfer of CAD information. These standards are documented and detailed in the Office of Design CAD tools.

10.1.1 MicroStation CAD Tools

The Office of Design makes available numerous tools for use with MicroStation. These tools are used to establish a consistent working environment to allow file sharing among project teams and to provide a consistent appearance in the resulting plans. Consultants who need Iowa DOT's tools can obtain them on Iowa DOT's website at http://www.dot.state.ia.us/design/caddtools.htm. All Iowa DOT MicroStation CAD files may be downloaded using the file AllCaddFiles.zip, or they may be downloaded individually from individual directories. Only files that have changed since the last revision may be downloaded as a group by choosing the UpdatedCaddFiles.zip file.

The tools include seed files, which are "template" files used to create new files for the various types of plan sheets. Seed files are copied and used to start files with the correct settings. A full description of plan sheets can be found below and at http://www.dot.state.ia.us/design/caddtools.htm, Chapter 1, *General Information*.

There are two main types of seed files: design seeds and sheet seeds. The purpose of the design seed is to provide a project layout depicting the

CAD and CAE tools enable teams to automate processes and procedures for efficient production of plan drawings.

geometrics of the project. Models are then created later for a specific use, such as a mainline model, side road model, and so on. The models can then be referenced as part of the Geopak sheeting process. Sheet seeds are used to depict actual sheets from the plan set.

- *A Sheets*—Standard notes, layout showing property ownership
- *B Sheets*—Typical cross sections
- *C Sheets*—Quantity tabulation
- *G Sheets*—Reference ties and benchmarks
- *U Sheets*—Standard 500 series, modified standards and special details
- *W Sheets*—Standard cross section sheets for different scales
- *Plan/Profile Seed Files*—Template files used to create new plan and profile sheets for many scales (2D and 3D seed files are included)

Other directories are available in addition to the Seed_Files directory, as described below:

- *Orig_Files*—This directory contains standard border sheets for plan sets.
- *Cell_Libraries*—Cells are element combinations used to represent objects. Cell libraries contain individual cells and are attached to MicroStation files for use.
- *Resource_Files*—Line style and font resource files are attached to MicroStation and provide the user with consistency in representation of lines and fonts.
- *Color_Tables*—These files are used primarily to obtain consistent output for specific purposes during printing.
- *MicroStation Environment Configuration Files*—The basic configuration and interface files give the user a consistent environment in which to operate MicroStation.
- *DgnLib*—This directory is a MicroStation-level library for design files.
- *Macros*—This directory contains standard application Visual Basic Application (VBA) files created by Iowa DOT.
- *Documentation*—This directory contains Microsoft Word documents describing MicroStation XM uses in the Iowa DOT CAD applications.
- *Printing*—This directory includes additional directories that contain files for design scripts, rendering attributes, and other settings files for color or black and white printing/plotting at various design scales.

10.1.2 Models and Leveling Charts

Uniformly established file naming and element placement within CAD files is critical to effectively using the tools in production. The Iowa DOT Office of Design has created MicroStation leveling charts that correspond to established MicroStation file extensions. File extensions and leveling charts for the Location Section are detailed in Table 10-1.

10.1.3 Use of Standards in MicroStation

MicroStation leveling charts are quite complex. Combined with the numerous file types used for Iowa DOT projects, the complexity can be overwhelming for the new and even moderately experienced user. To ease the complexity and to give users the freedom to develop plans without the burden of remembering the standards, Iowa DOT has developed a series of menus that automatically establish standards and settings when commands are selected. The user does not need to remember the level and symbology of specific elements, needs only to select the element type (such as roadway centerline, edge of pavement, or guard rail) from the menu list and the correct symbology is set.

The Geopak Design and Computation (D&C) Manager is used to set all menu bars used by the Office of Design within MicroStation. The D&C Manager sets the attributes for each item to meet Office of Design standards. The menu bars are used to select specific elements to be placed in the file and establish the needed symbology.

Table 10-1

File Extensions and Leveling Charts				
Name	Description	Level Color	Level Style	Level Weight
Plan View: Study Limits				
Linework				
Loc_corridor	Study area	6	3	10
Loc_boundaryinfo	City / County / Area of Potential Affect Boundary	2	3	10
Loc_corridorpreservation	CPZ area	7	0	10
Loc_moratorium	Development moratorium area/info	2	6	10
Loc_photobound	Photogrammetry DTM/Ortho Area of Request	3	1	10
Loc_ROWinfo	Location Right-of-Way Information	4	0	10
Loc_plattinfo	Platt/Property Owner information	4	3	10
Loc_regulatedmatbound	Regulated materials study area	7	1	10
Loc_architecturebound	Architectural study area	15	1	10
Loc_archaeologybound	Archaeology study area	15	1	10
Loc_florafaunabound	Flora/fauna/T&E study area	1	1	10
Loc_wetlandbound	Wetlands/WUS study area	2	1	10
Text				
Loc_corridortxt	Study area text	-	0	6
Loc_boundarytxt	City / County / Area of Potential Affect Boundary text	-	0	6
Loc_corridorpreservationtxt	CPZ area text	-	0	6
Loc_moratoriumtxt	Development Moratorium area/text	-	0	6
Loc_flightrequesttxt	Location flight request area	-	0	6
Loc_photoboundtxt	Boundary text	-	0	6
Loc_ROWtxt	Misc ROW text—preliminary location work	-	0	6
Loc_platttxt	Misc Platt text—preliminary location work	-	0	6
Loc_regulatedmatboundtxt		-	0	6
Loc_architectureboundtxt		-	0	6
Loc_archaeologyboundtxt		-	0	6
Loc_florafaunaboundtxt		-	0	6
Loc_wetlandboundtxt		-	0	6
Plan View: Environmental Constraints				
Linework				
Loc_regulatedmaterialsinfo	Regulated materials information	7	3	10
Loc_architecture	Architectural areas of significance	3	0	10
Loc_archaeology	Archaeology areas of significance	3	3	10
Loc_florafaunainfo	Flaura fauna/T&E information	1	0	10
Loc_noiseinfo	Noise information	7	6	10
Loc_borrowinfo	Borrow information	6	0	10

Table 10-1

File Extensions and Leveling Charts				
Name	Description	Level Color	Level Style	Level Weight
Loc_WetlandWUS	Wetlands/WUS Information	2	0	10
Loc_4finfo	4(f) information	5	3	10
Loc_6finfo	6(f) information	1	3	10
Text				
Loc_regulatedmaterialstxt		-	0	6
Loc_architecturetxt		-	0	6
Loc_archaeologytxt		-	0	6
Loc_florafaunatxt		-	0	6
Loc_noiseinfotxt		-	0	6
Loc_borrowtxt		-	0	6
Loc_WetlandWUStxt		-	0	6
Loc_4ftxt		-	0	6
Loc_6ftxt		-	0	6
Plan View: OLE				
Linework				
Loc_Staginginfo1	Staging Information 1	3	0	10
Loc_Staginginfo2	Staging Information 2	4	0	10
Loc_Staginginfo3	Staging Information 3	6	0	10
Loc_Staginginfo4	Staging Information 4	2	0	10
Loc_Staginginfo5	Staging Information 5	1	0	10
Loc_Staginginfo6	Staging Information 6	5	0	10
Loc_accesscontrol	Access control issues/information	4	6	10
Loc_entrance	Entrance Information	3	6	10
Loc_utilityinfo	Utility Information	15	0	10
Loc_existingroadwayinfo	Existing Roadway information	6	6	10
Loc_existingSRinfo	Existing Side road information	5	6	10
Loc_existingstructureinfo	Existing Structure Information	1	6	10
Loc_sufficiencyinfo	Pavement & Structure Sufficiency Information	15	6	10
Loc_pavementhistory	Pavement History Information	218	6	10
Loc_constructionlines1	Construction Lines 1	4	0	10
Loc_constructionlines2	Construction Lines 2	4	0	10
Loc_publicdisplay1	Public Display Construction Level 1	15	0	10
Loc_publicdisplay2	Public Display Construction Level 2	15	3	10
Text				
Loc_publicdisplay1txt		-	0	6
Loc_publicdisplay2txt		-	0	6
Loc_Staginginfo1txt		-	0	6
Loc_Staginginfo2txt		-	0	6

Table 10-1

File Extensions and Leveling Charts				
Name	Description	Level Color	Level Style	Level Weight
Loc_Staginginfo3txt		-	0	6
Loc_Staginginfo4txt		-	0	6
Loc_Staginginfo5txt		-	0	6
Loc_Staginginfo6txt		-	0	6
Loc_constructionlines1txt		-	0	6
Loc_constructionlines2txt		-	0	6
Loc_accesscontroltxt		-	0	6
Loc_entrancetxt		-	0	6
Loc_sufficiencytxt		-	0	6
Loc_pavementhistorytxt		-	0	6
Loc_utilitytxt		-	0	6
Loc_existingroadwaytxt		-	0	6
Loc_existingSRtxt		-	0	6
Loc_existingstructuretxt		-	0	6

10.2 Office of Design CAE Tools

The Office of Design has developed standards to ensure consistency in use, exchange, and transfer of Geopak information. These standards are documented and detailed in the Office of Design Geopak tools.

10.2.1 Geopak Tools

The Office of Design makes available numerous tools for use with Geopak. The tools are used to establish consistency in working environment, design standards, and display output. They are available on Iowa DOT's website at http://www.dot.state.ia.us/design/geopaktools.htm. All necessary Geopak files may be downloaded by selecting the file AllGeopakFiles.zip, or individual files may be downloaded from individual directories. Only files that have changed since the last revision may be downloaded as a group by choosing UpdatedGeopakfiles.zip

The tools include the following:

- *Design and Computation Manager*—Application within Geopak that controls the graphical display of elements in MicroStation and manages the computational aspects of the elements for quantity purposes.
- *Superelevation Preference Files and Tables*—Tables developed by Iowa DOT that correspond to the Iowa DOT method of superelevation calculation.
- *Geopak Criteria Files*—Files that contain new English and metric "typical" files and descriptions for use in generating cross sections.
- *Cross Section Sheeting Files*—Cross section sheeting library files used to create cross section sheets for various scales along with instructions.
- *Earthwork*—Input files used for earthwork calculations along with instructions and Microsoft Excel files for earthwork tabs.
- *Geotech*—Geopak geotechnical tools preference files.
- *Drainage*—Folder containing a D&C Manager file for drainage work along with a Geopak drainage library file.
- *Plan_Profile*—Folder containing directories and instructions that allow the user to set up and sheet plan and profile sheets with the Geopak plan and profile generator.

- *Site*—Folder containing a preferences file for creating roadway borrow areas with Geopak site.
- *SMD_Files*—Folder containing the Survey Manager Database (smd) files for controlling coordinate geometry visualization and Iowa DOT survey feature codes for MicroStation XM files.
- *Tables*—Folder containing information and preference files to create tables using Geopak.

The Iowa DOT Project Automation Manual contains information on the following:

- *Geopak Point Numbering*—Standard point naming conventions used for Iowa DOT projects.
- *Geopak Element Naming Conventions*—Standard element naming conventions used for Iowa DOT projects.
- *COGO Input*—Procedures for using input files to establish horizontal and vertical geometry.
- *Geopak Road Project Manager and User Preferences Setup*—Standard procedures for accessing Geopak through the project manager interface and user setups.

10.3 Office of Location and Environment Uses

10.3.1 Alternatives Development

There is never a single solution to a roadway problem or need. Multiple alternatives are evaluated through numerous iterations in order to arrive at the Preferred Alternative. NEPA guidance requires that a broad range of alternatives be investigated to fully understand and document all project issues, such as costs, operational issues, and effects on the natural environment. MicroStation and Geopak provide the means to develop and present the alternatives.

Organization and structure of electronic files are critical to obtaining their maximum benefit, including future reuse. The file structure is detailed in the Office of Design CAD Tools. Table 10-2 is an example of the OLE computer file structure for Microstation XM files.

The notion of alternative development is unique to OLE and is not covered in the Office of Design CAD Tools. OLE has a model for XM files. Table 10-3 lists the model files and describes the information in each file. Note that a separate model file should be used for each alternative and that all models will use a 100 scale.

For element naming conventions, refer to the section 12A-9 of the *Design Manual* for general guidelines. Chains should identify multiple alternatives, such as MLxxxA and MLxxxB. An example using U.S. 30 with three alternatives would appear as: ML030A, ML030B, and ML030C. For points, the number followed by the corresponding alternative letter should be applied (using the convention in section 12A-9 of the *Design Manual*). Once the project is turned over to the Office of Design, the letters on the preferred alternative should be removed. Profiles should be named as follows: MLxxxA_e or MLxxxA_p.

Input file names:

- For shape input files, refer to the *Design Manual* (e.g., Shp_chain.inp).
- Chains and Profiles—ChainJob#.iOperatorcode—Horizontal and vertical alignments should be in one input file. There should be a separate input file for the mainline and each side road. For interchanges, all ramps and loops should be combined into one input file. The suggested Operator Codes are defined in Chapter 12 of the *Design Manual*.
- For cross section input files, refer to the *Design Manual* (e.g., XS_chain.inp).
- The operator code for all projects is LS for Location Section.
- Include all alternatives in the Geopak .gpk file.
- Use standard criteria and templates to develop impact footprints. It is typically not necessary to develop detailed criteria to account for independent ditching and slope variability.

Table 10-2

V8 File Structure		
File Name	Model Name	Model Description and Use
Pxxxxxxx.loc	Pxxxxxxx_A	Design File—contain all of the information associated with a SINGLE alternative. There will be a separate model (A, B, C, etc.) for each alternative developed.
	Study Limits	Design File—contains all of the corridor study limits used for requesting photogrammetry, environmental field studies, etc.
	Shapes_A	Design File—contains all of the Geopak superelevation shapes and pattern lines for a single alternative. There will be a separate model (A, B, C, etc.) for each alternative.
	Project	Design File—contains references from all of the other models.
	InDGN	Design File—contains all of the Geopak® criteria variable linework.
	Env_Constraints	Design File—contains environmental constraints information.
	Plotting	Design File—is customizable and can be used by the designer to set up any scroll plots.
Pxxxxxxx.alt	User defined	Alternatives File—is used as a storage location for drawings not currently being used. Each model is given a user-defined name to define what alternative is contained within the model.
Pxxxxxxx.pub	User defined	Public Meeting and Public Hearing File—contains information needed to build a public meeting display. This information is contained in a separate file so that it can remain unchanged after the meeting has occurred.
Pxxxxxxxw01.sht	XS_A	Typical W sheets/mainline cross sections—There will be a separate XS model (A, B, C, etc.) for each alternative.
Pxxxxxxxx01.sht	XS_A_side road name	Typical X sheets/sideroads cross sections—There will be a separate XS model for each side road on each alternative.
Pxxxxxxxy01.sht		Typical Y sheet—Ramps and loops cross sections.

Table 10-3

V8 File and Model Names		
.alt	Alternatives Files	This file will be used as a storage location for any drawing/alignments that are not currently being used.
The user will be able to fill in the model description to describe the old work.		
.loc	Location Files	Contains all work by the location section.
CPN—Model will contain the county, project number, and designer information.		
DRN—Drainage information.		
ENV—Model will contain all environmental constraints information.		
INCH—Model will contain all ramp information. When giving the roadway name, an _A, _B, etc. will need to be added to distinguish between alternatives.		
ML—Model will contain all ML information. When giving the roadway name, an _A, _B, etc. will need to be added to distinguish between alternatives. (This model will include all shapes and in dgn lines.)		
PLT—Model will contain references of all models to be used for scroll plotting.		
Project Overview—Model will contain references of all models to show an overview of the entire project.		
SL—Model will contain all of the corridor study limits used for requesting photogrammetry, field studies, etc.		
SR—Model will contain all information for sideroads. When giving the roadway name, an _A, _B, etc. will need to be added to distinguish between alternatives.		
STG—Model will contain staging information.		
.pub	Public Meeting and Public Hearing File	This file contains any information needed to build a public meeting display. This information is contained in a separate file so that it can remain unchanged after the meeting has occurred. The model name will be user defined to match the event.
.sht	Sheet files for cross sections—w, x, y	When giving the roadway name, an _A, _B, etc. will need to be added to distinguish between alternatives.

10.3.2 Design Continuation and Transfer of Information

Using MicroStation and Geopak for the development of alternatives maximizes the ability to transfer the designs to subsequent design phases. When a project is transferred to the Office of Design, the preliminary designer will reference Location design files. Geometry data stored in the .gpk file and the criteria used will be used as a starting point for further design refinement.

10.4 Guidance Materials

Numerous documents are available that provide guidance on road design procedures and standard practices. These guidance documents include:

- Iowa DOT Design Manuals: ftp://165.206.203.34/design/dmanual/00_START%20HERE_TOC.pdf
- Standard Road Plans: http://www.dot.state.ia.us/design/stdrdpln.htm
- Road Design Details: http://www.dot.state.ia.us/design/desdet.htm
- AASHTO *A Policy on Geometric Design of Highways and Streets* (2004)—Commonly referred to as the "Green Book," this manual has been adopted in whole for the National Highway System (NHS). On the state system, standards will vary between the Green Book and the Iowa DOT *Design Manual*
- Geopak Manuals
- Iowa DOT Geopak and MicroStation instructions: W:\Highway\Design\CADD\Documents\Instructions
- Iowa DOT Office of Design training sessions: W:\Highway\Design\CADD\Documents\WeeklyTraining
- Iowa DOT Automation Newsletters: W:\Highway\Design\CADD\Documents\DesignAutomationNewsletter

These documents are also available on the Iowa DOT local area network (LAN) and as hard copies in the Location Section.

10.5 Methodology

The number of potential alternatives will affect naming conventions. The following examples illustrate a detailed Geopak naming convention for a complex project. Naming convention should be established at the outset to guide the development of alternative alignments.

Segment gpk

Segment A SA SegA_ConX (Concept Number)

Segment B SB SegB_ConX (Concept Number)

Segment C SC SegC_ConX (Concept Number)

Segment D SD SegD_ConX (Concept Number)

Segment E SE SegE_ConX (Concept Number)

Chain and Profile Mainline and Crossroads

XXXX_#A_P

where:

XXXX = Mainline or Crossroad Name

R = Ramp Designation A, B, C, D, E, F, G, or H

= Concept number 1–2

A = Concept Option for a given alignment A–Z

P = Profile, E = Existing, P = Proposed

Mainline with Independent Profiles

XXXD_#A_P

where:

XX = Mainline Route Designation

D = Direction, N (northbound etc)

= Concept number 1–2

A = Concept Option for a given alignment A–Z

P = Profile, E = Existing, P = Proposed

Ramps

For ramps only, the second underscore will need to be removed to add an additional character after the concept number due to addition of the ramp designation character.

XXXX_#RAP

where:

XXXX = Crossroad Name

\# = Concept number 1–2

R = Ramp Designation A, B, C, D, E, F, G, or H

A = Concept Option for a given alignment A–Z

P = Profile, E = Existing, P = Proposed

SI_#DRA_P

where:

SI = System Interchange BR (Broadway), W (west), E (east)

\# = Concept number 1–2

DR = Direction, EN (eastbound to northbound etc)

A = Concept Option for a given alignment A–Z

P = Profile, E = Existing, P = Proposed

SI#CD1A_P & SI#FR1A_P

where:

SI = System Interchange BR (Broadway), W (west), E (east)

\# = Concept number 1–2

CD / FR = Collector Distributor Road/Frontage Road

1 = Beginning Stationing 1000+00

A = Concept Option for a given alignment A–Z

P = Profile, E = Existing, P = Proposed

10.6 Deliverables

Electronic plans submitted by consultants or local agencies to Iowa DOT for letting shall conform to the following file specifications. Plans submitted according to these specifications will be accepted by Iowa DOT in lieu of paper copy submittals.

All electronic plans will be submitted in Adobe Acrobat Portable Document Format (PDF). Iowa DOT recommends submitting PDF files that are Version 1.4 or higher. This file version can be produced using the Adobe Acrobat Standard software, version 5.x or higher. However, earlier PDF file versions will be accepted.

In addition to the project PDF files, all Geopak COGO input files containing the horizontal and vertical alignments should be included with the submittal.

10.7 Additional References

Office of Design Contact List: http://www.dot.state.ia.us/.

Design Manuals: ftp://165.206.203.34/design/dmanual/.

Design Bulletins: ftp://165.206.203.34/design/.

Iowa DOT office of Design Geopak page: http://www.dot.state.ia.us/.

Iowa DOT office of Road Design Details: http://www.dot.state.ia.us/.

Western Federal Lands Highway Division—Complete Knuckleheads Guided Tour of Geopak 2004: http://www.wfl.fhwa.dot.gov/.

Central Federal Lands Highway Division—Tips and Tricks: http://www.cflhd.gov/.

NOTES:

Corridor Management Tools

CHAPTER 11

Highway corridor management has two distinct but related meanings. One is the management of the right and type of access to a corridor or highway facility directly from adjacent properties and side roads. The ability to control access has a bearing on both safety and congestion levels in the corridor. The other meaning relates to the long-term management of corridors. Iowa DOT performs corridor studies well in advance of the need for construction. When such studies are conducted and a corridor is identified, it is necessary to protect or preserve the corridor for its future transportation use. Such preservation allows local governments to plan appropriate land uses near the corridor and to reduce future costs by allowing Iowa DOT to control development within the corridor itself. Working with developers early in the planning process will benefit the project because it will reduce potential problems with noise issues, land-use conflicts, and displacements.

This chapter provides an overview of the tools available to Iowa DOT to manage access to highway corridors and discusses procedures for preserving corridors. Design issues that affect access management are noted, but the reader is also referred to the appropriate guidance for more detail on those topics. This chapter is not intended to provide design criteria or guidelines.

The topics in the chapter are segregated into two main sections:

- Access Management and Priority
- Corridor Preservation

11.1 Access Management and Priority

Access management is the control of the spacing, location, and type of access points to highways or roadways under Iowa DOT jurisdiction. The goal of access management is to ensure a smooth and safe flow of traffic along a facility while maintaining the ability to access adjacent properties by a means appropriate for the facility type. For example, interstate highways are high-type, free-flow facilities, the primary purpose of which is to move traffic through the corridor at a high rate of speed with few interruptions; thus, access is provided only infrequently at grade-separated interchanges.

Lower-level arterial roadways, in contrast, provide more frequent access to adjacent properties. The safe and efficient movement of traffic is always a goal of Iowa DOT. Drivers, however, expect direct access to lower-level arterial roadways from adjacent parcels and have a lower expectation of uninterrupted and faster travel on such roadways.

This chapter provides an overview of the tools available to manage access to highway corridors and discusses procedures for preserving corridors.

As part of managing access on Iowa highways and determining appropriate design guidelines, roadways are classified by access priority (see Table 11-1).

Iowa DOT's Access Management Policy may be obtained at www.dot.state.ia.us/traffic/sections/itsauwz/pdf/access_policies.pdf. Contact Iowa DOT's Office of Traffic and Safety for further information regarding access management along primary highways.

11.1.1 Authority / Applicable Regulations

Iowa Code Chapter 306A—Controlled-Access Highways

Chapter 306A of the Iowa Code establishes the authority for state and local highway authorities to plan, map, construct, and maintain roadways with the right to control access to and from the facility.

11.1.2 Access Management Tools and Options

Evaluation Considerations

Access management considerations and analyses frequently are related to safety and congestion. They may also be dictated by category of roadway (such as interstate facilities), in which case the type of facility predetermines the access control priority. Access priority, under both current and proposed conditions, is one of the initial determinations made in a route study. Is the route currently, or is it becoming, one to serve commuter or commercial traffic? If so, it may warrant more access management or a greater level of access priority than currently assigned.

Tools to Manage Access and Traffic Flow

Two broad categories of tools are available for managing access to state highways in Iowa: design tools and land-use tools. Design tools may be implemented during the location process and carried through to design. This section notes the range of design options available but does not discuss design criteria in detail. The *Access Management Handbook* (2000), prepared by the Center for Transportation Research and Education (CTRE), is a good source for further elaboration.[1] The handbook may be obtained at: http://www.ctre.iastate.edu/Research/access/amhandbook/AMhandbook.pdf. The following design issues constitute a set of "tools" that may be applied to help manage access.

- *Land Use*—Land-use tools should be developed in coordination with the local government jurisdiction in which the project is located. Since Iowa DOT does not have jurisdiction over land-use planning beyond the state highway right-of-way, support of the local governments is crucial to the development of consistent zoning.
- *Design*—For any new or existing roadway or corridor, various considerations regarding its design elements must be taken into account. These include specifics about the design of the roadway (lane width, median type) and also broader considerations about the corridor (frontage roads, intersection types).

Table 11-1

Classification of Access	
Classification	**Description**
1	Access is allowed only at interchanges (i.e., Interstate system).
2	Access points are spaced at a minimum distance of 2,640 feet (1/2 mile).
3	Access points are spaced at a minimum distance of 1,000 feet in rural locations, 1/4 mile desirable.
4a	Access points are spaced at a minimum distance of 600 feet in rural locations.
4b	Access points are spaced at a minimum distance of 300 feet in urban locations.
5	Iowa DOT has acquired minimum access rights.
6	Iowa DOT has not acquired access rights.
Source: Iowa Code Relevant to Access Management. The Iowa Primary Road Access Management Policy implements Code of Iowa, 1997, Chapter 306A, Appendix C.	

[1] Center for Transportation Research and Education. Iowa Access Management Handbook. October 2000.

- *Sight Distance*—Sight distance is the length of roadway visible to a driver. Safe sight distance is the distance the driver needs to confirm visually that the roadway is clear for safe travel. A driver on an arterial or one exiting a driveway or street needs safe sight distance to verify that the road is clear and to avoid conflicts with other vehicles. Guidelines for a safe sight distance are discussed in A Policy on Geometric Design of Highways and Streets, commonly referred to as the American Association of State Highway and Transportation Officials (AASHTO) Green Book.
- *Acceleration and Deceleration Lanes*—An acceleration lane enables a vehicle entering a roadway to increase speed to a rate at which it can merge safely with traffic. A deceleration lane enables a vehicle to exit the through lane of traffic at a speed equal to or slightly less than the through lane speed, allowing it to decelerate to a stop or make a slow turn.
- *Access Point, Intersection, and Driveway Spacing*—Wide spacing between driveways is the single most important step in ensuring safety and traffic carrying capacity of arterials. It can be accomplished by establishing minimum distances between intersections and driveways and establishing corner clearance standards that separate driveways from the critical approach areas of intersections.[2] To provide safe access and improved traffic flow, driveway spacing guidelines for arterials should be set at minimum distances based on roadway speed, functional class of the arterial, cross section, and development density. For arterials with driveways or intersections with separations less than the minimum spacing (usually providing access to older development), there are a few techniques to correct this condition. The application of front and back access roads is one access management technique that can be applied to older development where driveway spacing is an issue. Also, driveway consolidation is a cost-effective technique to reduce the number of driveways along a roadway and increase the spacing between driveways. Arterials with a lower density of driveways typically have fewer rear-end and turning-related collisions, whereas arterials with a high density of driveways have increased opportunities for crashes because of the greater number of conflict points per mile. Greater distance between driveways along an arterial minimizes the number of access points a driver must monitor while traveling the corridor.
- *Grades of Driveways and Side Roads*—Driveway slopes should not be too steep, as a steep slope creates additional risk to the turning vehicle and to through traffic. Steep driveway grades slow the speed of vehicles turning into and out of the driveway. The slope of a driveway can dramatically influence its operation. Use by large vehicles may have a tremendous effect on operations if slopes are too steep. The profile or grade of a driveway should be designed to provide a comfortable and safe transition for those using the facility and also to accommodate the stormwater drainage of the roadway. Driveways may need to be designed in compliance with Americans with Disabilities Act (ADA) guidelines if sidewalks are present. Driveway profile grades typically range from 2 to 4 percent at or near the roadway. This relatively flat grade extends roughly 25 to 100 feet to provide a storage platform. The length of the platform varies depending on vehicle queues and driveway type (residential or commercial). Beyond the platform, driveway grades can be as steep as 14 percent.
- *Driveway Throat Length*—Driveway throat length is the length that vehicles need to clear or enter the roadway (and enter/exit the driveway) at a safe speed. Throat length should be determined on a case-by-case basis, but generally it depends on the number of trips generated by land use.[3]
- *Driveway Width*—Driveway width is that which is appropriate for safe and efficient operation of driveways. If driveway width and turn radii are overemphasized, the resulting driveway area may be unsafe to drivers, who may have difficulty deciding where to position themselves, and

[2] Michigan DOT.

[3] Iowa State University Access, CTRE. Management Handbook

also to pedestrians attempting to cross a large paved area.[4] If the driveway is too narrow, access speed to and from it will be slow, impinging on through traffic.[5]

- *Turn Lanes*—Exclusive left-turn lanes provide improved safety by removing vehicles making left turns from the through traffic. Left-turn lanes can reduce the number of left-turn and rear-end related collisions and increase the capacity of roadways. Continuous two-way left-turn lanes (TWLTLs) usually are used as the center lane of a 3- or 5-lane roadway to allow left turns for vehicles from both directions. TWLTLs are the result of older undivided arterials (from the 1950s to 1970s) that had capacity problems; therefore, a TWLTL was added in the center. Continuous TWLTLs should be used along roadways where traffic levels are moderate with a high volume of left turns and a low density of driveways.[6] Although undesirable, it is frequently necessary to use TWLTLs to accommodate high density access rather than acquiring right-of-way or consolidating access points. Likewise, exclusive right-turn lanes provide improved safety by removing vehicles making right turns from the through traffic. Right-turn lanes can reduce the number of rear-end related collisions and increase the capacity of roadways.
- *Front and Back Access Roads*—Front or back access roads usually run parallel to the public road to which they provide access. Such roads help to reduce driveways directly accessing an arterial by consolidating them along the access road. Because of the space that access roads require within the cross section, they are not always practical in urban areas. Where they are proposed and a corridor will be preserved, the project manager should ensure that space for the access road is accommodated within the preserved corridor.
- *Medians*—Depending on the type of median and roadway environment, there are numerous benefits to nontraversable medians versus traversable medians. Nontraversable, or raised, medians are best with regard to safety along urban arterials because they restrict left-turn movements resulting in fewer left-turn related collisions. They may be controversial because business owners along a roadway may feel their businesses could be affected adversely. However, studies have shown no decline in sales following the installation of raised medians. A study conducted by CTRE surveyed 162 businesses before and after the application of access management treatments in several metropolitan areas. Only 9 of the businesses surveyed reported sales losses, with only 5 locations involving raised medians.[7]
- *Traffic Signal Spacing*—Preserving the quality of flow and safety along arterials requires spacing of traffic signals that ensures continuous, progressive movement. This normally entails uniform spacing of traffic signals and sufficient distance between signals to allow vehicles to travel at reasonable speeds. Spacing standards for signalized intersections should achieve these objectives.[8]
- *Off-system Access Control*—Consideration should be given to extending access control along side road and interchange connections to prevent multiple intersections in a tight area (such as several access points to a single access point). Problems occur when private and commercial entrances and crossroads—including entrances along crossroads—are too close. The accumulation of entrances and intersections, with vehicles turning, accelerating, decelerating, and attempting through movements, creates conflicts and slows the flow of traffic. By extending the access control line along the crossroad itself, smoother flow of traffic is achieved nearer to the intersection, and safety is also increased. Similarly, frontage road connections should be set far enough back to provide adequate storage and reduce potential conflicts.

[4] Florida DOT. Florida Access Management CD Library.

[5] Iowa State University Access, CTRE. Management Handbook.

[6] Iowa State University, CTRE. Access Management Toolkit: Answers to Frequently Asked Questions.

[7] David Plazak. "The Impacts of Access Management on Business Vitality Along Corridors." Presented at the 38th Annual Transportation Research Board Workshop on Transportation Law. Seattle, Washington. July 20, 1999.

[8] Access Management Guidelines for Activity Centers, NCHRP Report 348, 1992.

Planning studies should strive to achieve the highest level of access control feasible and appropriate. Design exceptions typically occur later in the development process. It may be reasonable to allow one low-volume, limited use (private) entrance to avoid or minimize property impacts, to reduce costs associated with constructing new, more lengthy and costly access, and to be sensitive to the needs of property owners. For example, in rural locations, it may be cost-effective to allow a single farm field access point directly from the roadway, whereas providing other means of access would require frontage roads or significant adverse travel for the landowner.

For further information on the design tools noted in this section, see the AASHTO *Green Book*, Iowa DOT's *Design Manual*, the Transportation Research Board *Access Management Manual*, and the *Iowa Primary Road Access Management Policy*.

Property Impacts Associated with Access Management

When planning a roadway improvement or the preservation of a future corridor, it is important to remember not only that access management changes can have physical impacts to properties, but also that changes in access to individual properties may be considered impacts. Complete loss of access to a property is often considered a property acquisition, even if the proposed work does not require an easement or right-of-way directly from the property.

A significant but not complete loss of access to a property may result in property acquisition or warrant compensation. Increased difficulty of access (through more circuitous means) typically is not considered a taking as long as other suitable access options exist. Damages are judged by the estimated reduction in current or future property value related to loss of access. In cases where access is completely removed and the parcel landlocked, the entire parcel may be purchased. Coordination with the Office of Right-of-Way helps to determine the impacts to properties total acquisition or partial acquisition.

Economic Impacts of Access Management

Access management solutions concerning business impacts have been controversial. In many cases, business owners feel that a raised median in front of their business or fewer driveways to provide access might affect their business adversely. A study of nine access management corridors in Iowa examined the economic impacts of access management, particularly on businesses.[9] The study found that access managed routes had lower business turnover compared to other routes in the same communities. Some business owners indicated that sales were stable or had actually increased following access management treatment. The number of business owners who reported no negative impacts or found it beneficial to their business outweighed businesses that reported a loss in sales.

11.2 Corridor Preservation

11.2.1 Iowa Code 306

Corridor preservation is a legal process provided for in the Code of Iowa at 306.19(5) that allows the state to protect the right-of-way needed for future highway improvements from conflicting development. By working with the local government that has jurisdiction over land use, zoning, and building permits, it is possible to allow local development that is compatible with future transportation needs.

Corridor preservation implementation typically is initiated at the request of the District Engineer, with approval from the Highway Division Director. A commission order authorizing condemnation may be required if the project is not funded in the 5-year program. A Staff Action is prepared by the District to document the implementation of Corridor Preservation.

11.2.2 When to Consider a Corridor Preservation Zone

The preservation of a corridor for future transportation use is considered when the need is long-term but the area is developing quickly. With such development pressures, the early identification

[9] Iowa State University, CTRE. Access Management Toolkit: Answers to frequently asked questions.

of a corridor allows appropriate land-use planning to occur adjacent to the corridor.

The synchronization of land-use planning and transportation planning is a beneficial practice because it allows for the designation of transportation corridors in advance of the development, thus optimizing the potential for more harmonious coexistence of transportation and development.

11.2.3 Benefits and Purpose of Corridor Preservation

Benefits of corridor preservation include the following:

- Costly and conflicting development within future highway right-of-way is prevented.
- Future roadway projects can be delivered more cost-effectively.
- Local government bodies have knowledge of transportation corridors.
- Property owners have knowledge that allows them to make informed decisions regarding property improvements, etc.
- Corridor preservation does not place a restriction on buying or selling of a property, only on improvements to the property.
- Implementation of corridor preservation is not a property taking. Acquisition will not occur until after the DOT has been notified by the city or county of an application for a building permit, subdivision plat or change in zoning and the DOT subsequently notifies the city or county of the decision to acquire the property.
- Notification of corridor preservation is valid for 3 years. Notice may be refiled for additional 3-year periods.

11.2.4 Corridor Preservation Analysis

The corridor preservation process begins with the identification of corridors that experience, or that are expected to experience, adverse impacts in traffic patterns, land use, or development. High priority corridors commonly are those experiencing development so rapid that transportation infrastructure is not adequate to meet the needs of future traffic. Such corridors experience pressure from sprawl, particularly from commercial development that generates high daily traffic volumes.

Access management is another indicator of roadways in need of corridor preservation for future improvements. Access management characteristics such as driveway density and spacing, front and back access roads, median type (traversable versus nontraversable), and traffic control devices can indicate the importance and need of right-of-way acquisition for preservation.

Exhibit 11-1 depicts the corridor preservation analysis process for location studies. Corridors to be studied and preserved are first identified as part of Iowa DOT's transportation plan and may also be shown in the area MPO's plan.

- *Identify Corridor Preservation Zone*—After the need for corridor preservation has been determined, a corridor preservation zone needs to be identified. The preservation zone is the area in which right-of-way may be needed or acquired for future transportation improvements.

Exhibit 11-1
Corridor Preservation Process

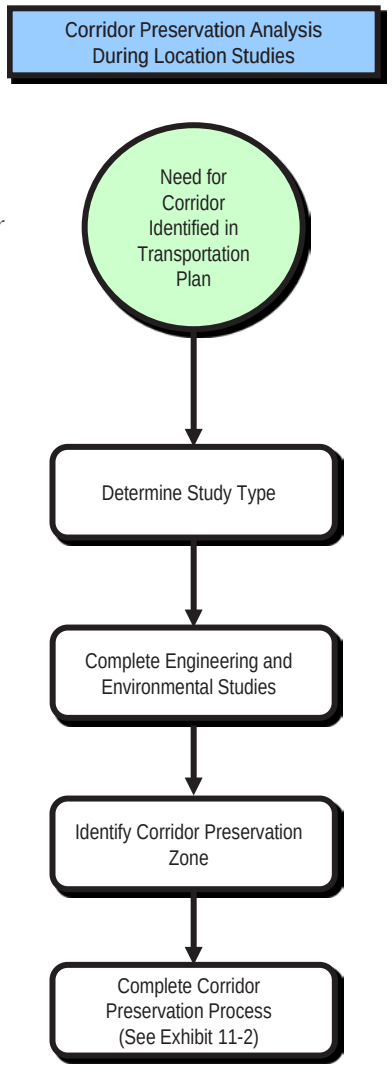


Exhibit 11-2 discusses the corridor preservation process.

- *Obtain Division Director Approval*—Once a corridor preservation zone has been identified, Division Director approval is needed to initiate corridor preservation. If the project is not in Iowa DOT's 5-year program, commission approval may be needed. A Staff Action is

Exhibit 11-2
Typical Corridor Preservation Process

STEP	*DESCRIPTION*
1.	Obtain Division Director approval to initiate corridor preservation and confirm the availability of Right-of-Way funds. (District and/or OLE-Location) Prepare a Staff Action to document the decision to implement Corridor Preservation. (District)
2.	Establish corridor preservation limits and prepare a map showing the corridor preservation zone. Obtain project number if not already assigned. (District and/or OLE-Location*)
3.	Provide OLE with appropriate City/County officials contact list. (District)
4.	Written notification of the Corridor Preservation Plan is sent to applicable City/County officials. (OLE-Public Involvement [PI] Section)
5.	Within 7 days after notifying the appropriate City/County officials, a Corridor Preservation notice and map is published in local newspapers. (OLE-PI Section)
6.	City/County officials notify the Department of Transportation of any application for building permit, subdivision plat or change in zoning proposed within the corridor preservation zone (CPZ). (District)
7.	The IA DOT reviews and notifies City/County officials within 30 days regarding the building permit, subdivision plat or proposed change in zoning within the CPZ. If a decision to acquire the property is made the City/County shall not issue the building permit, approve the subdivision plat, or change the zoning. (District)
8.	If a decision to acquire the property is made, Iowa DOT will notify the City/County in writing and begin negotiations with the affected property owner. This could involve partial or complete acquisition. (District)
9.	Iowa DOT shall begin the process of acquiring property or property rights from affected persons within 10 days of the written notification of intent to the City/County. If agricultural land is involved in the acquisition, and condemnation is anticipated, the public hearing requirements of Iowa Code Chapter 6B may need to be implemented. (District/Right-of-Way)
10.	The Corridor Preservation Public Notice must be re-filed after 3 years time if the CPZ is to remain in effect. The District is responsible for monitoring the CP expiration date and coordinating with the Division Director to determine whether or not CP will be renewed. (District and OLE-PI Section) Prepare a Staff Action to document the decision to renew Corridor Preservation. (District/ROW)

* If a project is developed in OLE, the Location Project Manager will be responsible for describing the CPZ, preparing a CPZ map and obtaining a project number. If CP is initiated by the District or Design/Bridge, the initiating office has the responsibility to identify the CPZ limits, develop a map, and obtain a project number.

prepared by the District to document the implementation of Corridor Preservation.

- *Develop Map of Corridor Preservation Zone*—Iowa DOT may notify the local government with authority over land use of its intent to improve or construct a roadway and that additional right-of-way may be acquired. The corridor preservation zone should be shown on a map. The map of preservation, created by or in conjunction with Iowa DOT, is based on state and local plans for future transportation facilities. It should include the area of alignment for future right-of-way and any details upon the completion of an engineering study. The notice to the local government is valid for a period of 3 years from the date of notification. Iowa DOT must refile the notice every 3 years in order to maintain the corridor preservation.
- *Newspaper Advertisement*—Within 7 days of filing a notice with the local government, Iowa DOT must publish a legal notice with a description of the corridor preservation zone and map of the area in a local newspaper. The advertisement should note potential restrictions to be applied with respect to the granting of building permits, approving of subdivision plats, or zoning changes within the area.
- *Notification of Building Permits and Zoning Changes*—The local government must notify Iowa DOT if any of the following are proposed to properties within the corridor preservation zone: (1) an application for a permit for building construction valued at $25,000 or greater; (2) submittal of a subdivision plat; or (3) a proposed change in zoning. Notification must occur at least 30 days before granting any of the above. Within the 30-day period, Iowa DOT may elect to acquire all or part of the property or property rights subject to the permit, plat, or zoning change. If the property is to be acquired, Iowa DOT must begin negotiations with the property owner within 10 days of notifying the local government of its intent. Iowa DOT may request an extension of the 30-day period, which following a public hearing, may be extended by an additional 60 days.
- If the acquisition of the property results in the use of eminent domain, and the property to be acquired is agricultural land, the public hearing and notification requirements established in Iowa Code chapter 6B may need to be completed before condemnation authority can be granted. See Chapter 44, *Public Involvement* for additional information.

11.2.5 Public Involvement

When Iowa DOT decides to implement corridor preservation, it is often advantageous to conduct a public information meeting to inform the public of the Department's intentions. This allows Iowa DOT staff to explain the benefits of corridor preservation (see 11.2.3) to the public and to address any questions that they may have. Public meetings, meetings with homeowner associations and neighborhood groups, and one-on-one meetings with property owners are examples of possible public involvement techniques. See Chapter 44 of this manual and the *Can-Do Manual* for additional public involvement information.

11.2.6 Authority / Applicable Regulations

23 CFR 710.501 Early Acquisition

This regulation establishes guidelines for the early acquisition of real property, including property acquired before the completion of NEPA studies.

23 CFR 710.503 Protective Buying and Hardship Acquisition

States must request FHWA agreement to provide reimbursement for advance acquisitions to prevent imminent development and increased costs on the preferred location, or to alleviate hardship to a property owner on the location.

23 CFR Part 450 Planning Assistance and Standards

This regulation authorizes and provides guidelines for states and metropolitan planning organizations to identify, prioritize, and preserve a corridor for future transportation use.

Iowa Code 306.19 Right-of-Way—Access—Notice

In order for Iowa DOT to implement corridor preservation, it must abide by Iowa Code 306.19(5). The procedure includes cooperation between the DOT and jurisdictions in the project area.

Iowa Code 306.19(5) includes the following items:

- The department will notify a city/county that a road under jurisdiction or control of the department, which may require additional right-of-way for a future highway improvement, may be protected by implementing corridor preservation.
- The city/county should notify the department of an application for a building permit for construction valued at $25,000+, the submission of a subdivision plot, or of a proposed zoning change within the area at least 30 days prior to approval of the request.
- The department reviews and notifies the city/county within 30 days regarding the request. Within the 30-day period the department may apply for a 30-day extension.
- If a decision is made to acquire the property, the department will notify the city/county in writing and the city/county shall not approve the request.
- The department shall begin the process of acquiring property/property rights within 10 days of written notification of intent to the city/county.

11.2.7 Hardship Acquisition

It is Iowa DOT's and FHWA's policy to positively consider any properly documented and justifiable request for a hardship acquisition. Iowa DOT will use the FHWA criteria in 23 CFR 710.503 when evaluating a request for hardship acquisition. It is Iowa DOT's general policy not to use eminent domain authority to acquire a hardship parcel.

Iowa DOT typically becomes aware of hardship when the District Engineer receives a request from an individual or family. If the request is incomplete, the District Engineer will return the request with comment. If the request is complete, the District Engineer will notify the Highway Division Director in writing and forward a copy to the offices of Right-of-Way and OLE. The District Engineer or Office of Right-of-Way will schedule a meeting with the District, Right-of-Way, OLE, Design, and key Project Management Team (PMT) members. The purpose of the meeting is to determine two things:

1. If there is a reasonable expectation that the property will be affected by the project under consideration.
2. If Highway Division management approves funds for the possible acquisition. Assuming all criteria are met, the Office of Right-of-Way will begin negotiations. If criteria are not met, the District Engineer will notify the requestor of Iowa DOT's decision.

11.3 Public Involvement and Corridor Management Tools

For both access management and corridor preservation, a good, active public involvement program could be beneficial in gathering data, identifying and eliminating potential opposition, and informing the public about the project. Chapter 44 discusses traditional tools available to Iowa DOT, such as newsletters, public meetings and hearings, media briefings, and small group meetings. Additional information regarding public involvement is available in Iowa DOT's Project Development Public Involvement Plan and the *Can-Do Manual*.

11.4 Additional References

Center for Transportation Research and Education. *Access Management Handbook:* http://www.ctre.iastate.edu.

Transportation Research Board Committee ADA70 (Access Management) DVD Library.

Iowa Code 306.19(5).

Iowa DOT, Office of Traffic and Safety http://www.dot.state.ia.us/.

Iowa DOT. *Can-Do Manual*.

Iowa DOT, Office of Right-of-Way. "Highways and Your Land." January 2006. Iowa Primary Road.

Iowa DOT Policy 510.02, Project Development Public Involvement Plan.

Access Management Policy. December 2002. http://www.dot.state.ia.us/.

NCHRP Report 348. *Access Management Guidelines for Activity Centers.*

Transportation Research Board. Access Management Manual. 2003. http://trb.org/.

Transportation Research Board Committee ADA70, Access Management website http://www.accessmanagement.gov/index.html.

23 CFR 710.501 Early Acquisition.

23 CFR 710.503 Protective Buying and Hardship Acquisition.

23 CFR Part 450 Planning Assistance and Standards.11.2 Access Management and Priority.

NOTES:

CHAPTER 12

Reserved for Future Expansion





PART III

Environmental Documentation and Special Analyses

NEPA and the Iowa DOT Project Development Process

CHAPTER 13

Chapter 13 is the first section of Part III of the OLE Manual. Part III will focus on the environmental process at the Iowa DOT, including fundamental project development issues, such as identifying a project purpose and need, developing and evaluating alternatives, and the mechanics of preparing environmental documentation.

This chapter provides an overview of the National Environmental Policy Act (NEPA) process as applied by the Iowa DOT and discusses several key issues to be considered on projects involving NEPA studies. These key issues include defining logical termini and independent utility, developing the project's purpose and need, and identifying and evaluating alternatives. This chapter also provides basic information about the different types of NEPA documentation and helps the reader understand how the appropriate type of NEPA documentation is determined.

13.1 Legislation, Regulations, and Guidance

This chapter contains multiple references to several key regulations or guidance, particularly FHWA Technical Advisory (TA) T6640.8A, 23 CFR Part 771, 23 CFR Part 774, 40 CFR Parts 1501–1508, and the Council on Environmental Quality (CEQ's) 40 Questions. The backgrounds of these documents are discussed below. To assist the users of this manual in researching specific topics, specific subsections of these regulations and guidance documents are referenced within Chapter 13. Internet links for online references to these regulations and guidance documents are located at the end of the chapter.

13.1.1 Federal Regulations and Guidance

ⓘ ***40 CFR Parts 1500–1508, Regulations for Implementing NEPA.*** The regulations in this section of the Code of Federal Regulations were issued by the CEQ in 1978. These rules, which were amended once in 1986, set forth requirements for the implementation of NEPA, with the directive that individual federal agencies must develop regulations for implementing NEPA that are specific to the mission of the particular agency.

ⓘ ***23 CFR Part 771, FHWA Environmental Impact and Related Procedures.*** As noted above, individual federal agencies were directed to develop regulations to implement NEPA within the context of the agency's mission. This section of Title 23 establishes the requirements for FHWA projects.

Part III will focus upon the environmental process at Iowa DOT, including fundamental project development issues, such as identifying a project purpose and need, developing and evaluating alternatives, and the mechanics of preparing environmental documentation.

ⓘ ***23 CFR Part 774, Parks, Recreation Areas, Wildlife and Waterfowl Refuges, and Historic Sites (Section 4[f]).*** Provides final rule on procedures for granting Section 4(f) approvals.

ⓘ ***CEQ's Forty Most Asked Questions Concerning CEQ's NEPA Regulations (40 Questions).*** While 40 Questions does not have the same legal standing as CEQ's NEPA regulations, this document is perhaps the next best source of information regarding NEPA implementation. *40 Questions* was issued by the CEQ as a means to address the most frequently asked questions regarding 40 CFR 1500 - 1508.

ⓘ ***FHWA TA T6640.8A, Guidance for Preparing and Processing Environmental and Section 4(f) Documents.*** FHWA TA T6640.8A and subsections within it are heavily referenced throughout the environmental portions of this manual. This document, issued October 30, 1987, contains a wealth of information about the content and format of environmental documentation on FHWA projects, including Section 4(f) Statements. While FHWA TA T6640.8A is not a regulatory document, it is a critical guidance document for all projects developed under FHWA jurisdiction.

FHWA TA T6640.8A delineates the basic content and processing requirements of NEPA documentation for the Iowa DOT. Wherever applicable, this manual refers to appropriate sections of the technical advisory. Deference should be made to the TA whenever questions arise regarding content and processing.

ⓘ ***Section 4(f) Policy Paper (Revised March 2005).*** Provides answers to many frequently asked Section 4(f) questions.

ⓘ ***Section 4(f) Final Rule (March 2008).*** The final rule modified the procedures for granting Section 4(f) approval.

ⓘ ***23 U.S.C. 139 (November 2006) SAFETEA-LU Environmental Review Process.***

Additional references used by the Iowa DOT staff include *NEPA Law and Litigation* by Mandelker, *The NEPA Book: A Step-By-Step Guide on How to Comply With the National Environmental Policy Act* by Bass, et. al for interpretation and guidance, and the Practitioner's Handbooks at AASHTO's Center for Environmental Excellence. (See Section 13.5 *Additional References,* for a bibliographical reference.)

13.2 Overview of the National Environmental Policy Act (NEPA)

Through the use of federal funding or the need for a federal approval or permit, many Iowa DOT projects will be required to comply with NEPA. As users reference this manual during the development of an Iowa DOT project, understanding NEPA and the role it plays in the project development process is critical.

NEPA (42 USC 4321, et seq.) was passed by Congress in 1969 in response to the increasing national concerns over the deterioration of the natural environment. These concerns led to the realization that the long-term quality of the environment is dependent on today's actions and decisions. NEPA is the national charter for environmental planning that declares the nation's policy to encourage harmony between human development and the environment. Most importantly, NEPA establishes a process for federal agency decision-making. The process established by NEPA requires that for federal actions having the potential to significantly impact the environment, agencies must:

1. Identify and analyze environmental consequences of proposed federal actions in comparable detail to economic and operational analyses
2. Assess reasonable alternatives to agency proposed actions
3. Document the environmental analysis and findings
4. Make environmental information available to public officials and citizens before agency decisions are made

First and foremost, NEPA is a tool used by decision-makers to make informed decisions on proposed federal actions, which include federally-funded Iowa DOT actions. NEPA requires that the effects (impacts) of federal actions on the environment are considered equally with economic, technical, and other factors associated with the proposed action (project).

Administratively, NEPA also establishes the CEQ, which is responsible for overseeing NEPA and for reporting to the President and Congress on the status, condition, and management of the Nation's environment. The CEQ is also responsible for developing the "Regulations for Implementing NEPA" (40 CFR 1500-1508). The CEQ regulations require agencies to categorize each of their actions as normally requiring one of the following levels of environmental analysis and documentation:

- Categorical Exclusion (CE)
- Environmental Assessment (EA)
- Environmental Impact Statement (EIS)

The NEPA document types are defined later in this chapter. The chapters immediately following this one are devoted to explaining the mechanics, or steps, for developing these documents. In general, however, all NEPA documents address the following:

- *Purpose of and Need for Action*—All NEPA documents should include a concise statement of general project goals (the purpose), as well as additional data and discussion of the underlying details that make the project necessary (the need).
- *Alternatives*—A NEPA document should address a wide range of potential alternatives, of which a "reasonable few" are generally identified as practical and economically and technically feasible, thus warranting detailed analysis. For complex projects, it is critical to have a credible process to identify a full range of alternatives early and to provide documented justifications for eliminating some. Therefore, the analysis of alternatives—more than any other part of project development—requires the integrated work of both corridor development and NEPA practitioners.
- *Affected Environment, Environmental Consequences, and Mitigation (Environmental Analysis)*—The current conditions in the general project area, with emphasis on the most relevant resources, must be discussed. The level of detail and bulk of such information should correspond to the magnitude of the proposed action and resulting potential impacts. In general, very basic background information is needed for a CE and more comprehensive information may be needed for an EIS. The NEPA document also includes impacts to the affected environmental resources and possible mitigation measures.
- *Comments, Coordination, Preparers, and Distribution*—Additional sections of NEPA documents identify persons involved in the document's development and preparation.

Details about the organization and content of each type of document are provided in Chapters 14, 15, and 16 of this manual and in FHWA's TA T6640.8A.

13.3 Classes of Action and Types of NEPA Documentation

ⓘ ***23 CFR 771.115, Classes of Action.***

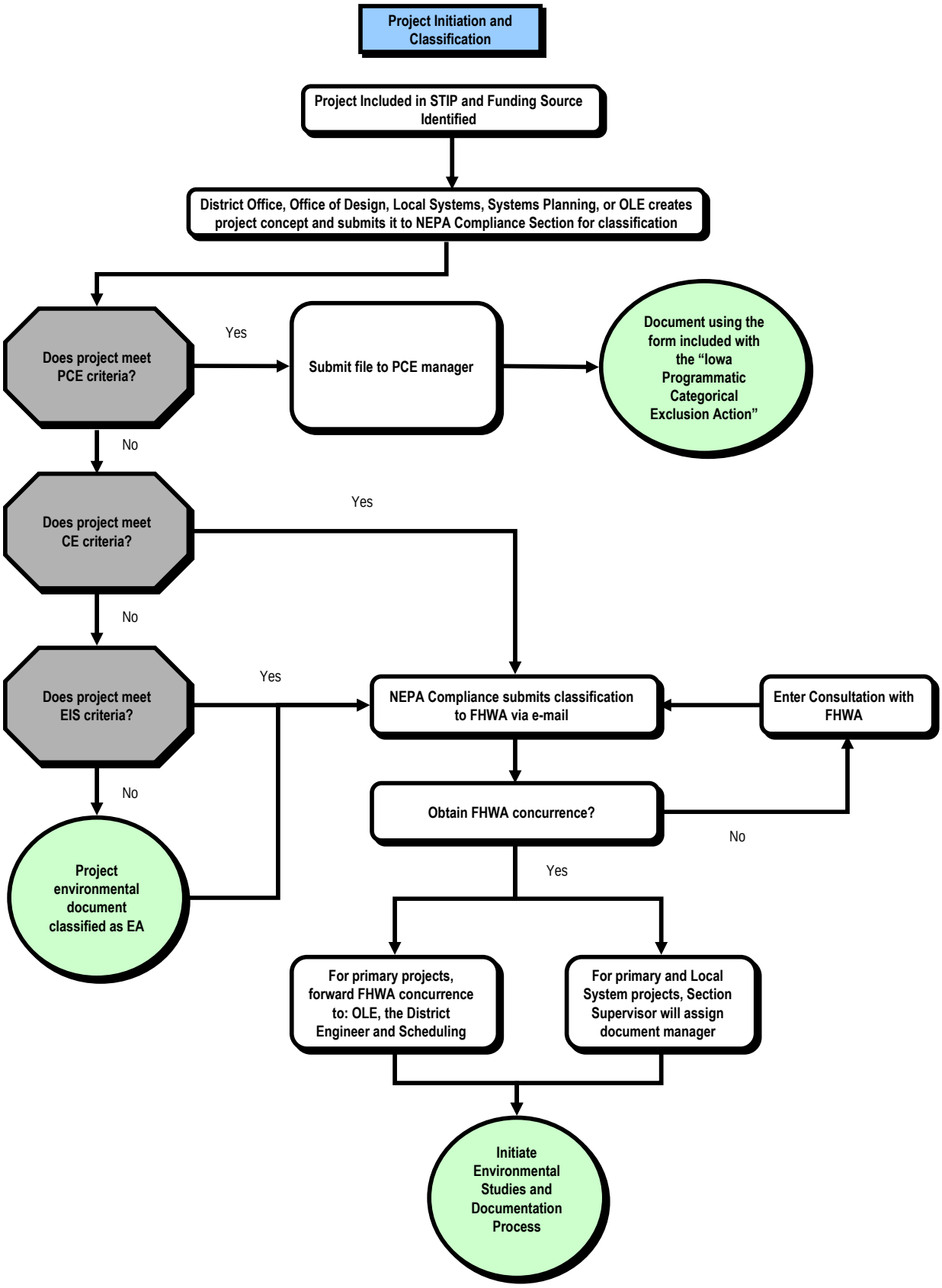
ⓘ ***FHWA TA T6640.8A, Guidance for Preparing and Processing Environmental and Section 4(f) Documents.***

One of the first steps in developing an Iowa DOT project is to determine the project classification and appropriate documentation category. This process is described in this section and illustrated in Exhibit 13-1.

For projects developed by the Iowa DOT or under its jurisdiction (including those projects requiring Iowa DOT approval), the issue of whether the project requires federal action is the determining factor in whether the project is subject to the requirements of NEPA. "Federal actions" are generally defined as those actions that are (1) new or continuing federal activities that are either funded, assisted, conducted, or approved by a federal agency; (2) new or revised agency rules, regulations, plans, policies, or procedures; or (3) legislative proposals. The actions may be adoption of policies, rules, and regulations;

Exhibit 13-1

Project Initiation and Classification Process



adoption of plans and programs; or approval of specific projects that either receive federal funding or that require federal approval through permits or regulations.[1]

Once it has been determined that a project is a federal action and is subject to NEPA, the project's class of action must be determined. FHWA regulations implementing NEPA established classes of action for highway projects. In determining these classes of action, FHWA evaluated the nature of projects that are undertaken by state highway agencies (SHA) and reviewed them for their potential to impact the environment. From this review, FHWA determined that there are essentially three classes of action within which SHA projects could be categorized.

Each class of action is related to a documentation and analysis requirement. These classes of action, which are defined in *Classes of Action*, 23 CRF 771.115, are:

- *Class I (EIS)*—Actions that significantly affect the environment.
- *Class II (CE)*—Actions that do not individually or cumulatively have a significant environmental effect.
- *Class III (EA)*—Actions in which the significance of the environmental impact is not clearly established.

The basis for categorizing projects is an assessment of their potential for having significant impacts on the environment. CEs, for example, represent a class of action that has been determined not to have potential for significant impact on the environment. Accordingly, these actions are categorically excluded from requiring an EIS. By contrast, projects that do require an EIS have been determined to have a potential for significant impact. The third class of action, which results in the preparation of an EA, are those projects where it is unclear whether they may result in a significant impact, and therefore require a more comprehensive analysis than a CE project, but less comprehensive than an EIS project.

[1] Bass, Ronald E. and Albert I. Herson. *Mastering NEPA: A Step-by-Step Approach*. Point Arena, California: Solano Press Books. 1993.

The classification type should be determined as early in the project development process as possible. This determination is often made prior to selecting and negotiating with a consulting firm, if one is to be used. Project NEPA classification is an Iowa DOT function in consultation with FHWA. This activity is never delegated to the city/county on local system level projects. As noted earlier, part of the basis for classification is significance, which includes consideration of the intensity of the potential impacts and the setting in which the project is located.

Once a project has been identified in the statewide transportation improvement program (STIP) and funding has been identified to begin study, a project concept is developed by the Location Section, Office of Design, or the local sponsor and District, as appropriate. It is submitted to the OLE NEPA Compliance Section for coordination regarding the type of environmental document processing required for the project. To facilitate this process, the NEPA Compliance Section should be provided with the following (preferably in electronic format):

- Route name, project limits, county name, project number or funding source, and proposing agency (if other than Iowa DOT)
- The Project Concept Statement form provided by the Office of Local Systems
- A brief narrative description of the proposed work
- An 8.5- by 11-inch map or aerial photo of the project area
- Ground-level photos of any unique features in the project area
- A description and/or mapping of any known resource issues (e.g., wetlands, historical, known points of controversy)

NEPA Compliance will first compare the project concept to the Iowa DOT/FHWA Programmatic CE agreement. If the project meets the requirements for the programmatic agreement, the project is classified as a programmatic CE and documented as such. See Chapter 14, *Guidance for Preparing Categorical Exclusions*, for more detail regarding the programmatic agreement. If it does not meet the programmatic CE

requirements, the NEPA Compliance Section makes a recommendation about the appropriate documentation level to the FHWA Iowa Division office by e-mail.

For projects with unusual circumstances, unique features, or the potential for a high degree of controversy, advance coordination with FHWA may be warranted prior to submittal of a proposal for NEPA classification. Examples could be projects with important or unique historic structures or Section 4(f) sites, presence of a large minority or low income population, or pristine natural features.

Once a NEPA classification is determined, FHWA provides its concurrence. The NEPA Compliance Section will forward the concurrence information to the district, scheduling, local sponsors, and other OLE sections within Iowa DOT, as appropriate.

13.3.1 Categorical Exclusions

Proposed actions that do not typically have significant environmental impacts, based on the experience of FHWA, may be eligible for processing as CEs. CEs are divided into two groups—programmatic CEs and documented (or individual) CEs—and must meet the requirements of 23 CFR 771.113. Chapter 14, *Guidance for Preparing Categorical Exclusions*, discusses the documentation requirements for projects that have been classified as CEs. The two classification groups require differing levels of documentation.

13.3.2 Environmental Assessments

EAs are prepared for Class III actions. This class of action involves a proposed action for which it is not clear whether there is potential for a significant impact. Typical projects that may be processed as EAs include:

- Adding through lanes to an existing roadway
- Constructing a two-lane community bypass
- New interchanges
- Bridge replacements
- Projects that have the potential for controversy on environmental grounds
- Rural four-lane routes

FHWA TA T6640.8A discusses the purpose and intent of preparing an EA. It purports that:

The primary purpose of an EA is to provide enough information to determine whether an EIS is warranted.

- Content should be directed toward only those resources or features that have the potential to be significantly impacted.
- The EA should be a concise document that does not provide lengthy descriptions of studies and analyses, but rather focuses upon clearly written summaries.

To help highlight and emphasize the resource impacts caused by a project, Iowa DOT, in conjunction with FHWA, has developed a process for streamlining EAs. This process, which is further described in Chapter 16, *Guidance for Preparing Environmental Assessments,* uses checklists to focus studies and coordination efforts on the resources that are present in the project area and impacted by the proposed improvement. Those that are not present or are not impacted are clearly identified as such and not discussed further.

13.3.3 Environmental Impact Statements

An EIS does more than just disclose the environmental effects of a proposed action, although disclosure is an important function of an EIS.[2] An EIS is used to both facilitate and document the decision-making process where federal actions and federal agencies are involved.

An EIS is a full disclosure document that addresses the direct, indirect, and cumulative effects of a proposed action. Whereas with an EA the focus is on preparing a concise document that focuses on the resource issues for which there is potential for a significant impact, an EIS is more comprehensive. Using this approach, the length of an EIS may reach 200 to 300 pages, in addition to appendices and exhibits.

[2] Bass, Ronald E. and Albert I. Herson. *Mastering NEPA: A Step-by-Step Approach.* Point Arena, California: Solano Press Books. 1993.

The major sections of an EIS discuss the purpose of and need for the proposed action; affected environment; alternatives considered to avoid and minimize impacts, including the No-Build Alternative and those considered and eliminated; the environmental effects (both adverse and beneficial) of the proposed action; and the results of coordination with federal, state, and local agencies and the public.

Under FHWA regulations, an EIS is considered a Class I action. An EIS shall be prepared for projects that are defined under 23 CFR 771.115, or for which FHWA has determined individually that an EIS is required. Some examples of the types of projects normally requiring the preparation of an EIS include:

- Proposed construction of new access-controlled freeways
- A highway project of four or more lanes on a new location
- New construction or extension of fixed rail transit facilities
- New construction or extension of a separate roadway for buses or high occupancy vehicles not located within an existing highway facility

The process and format for developing an EIS for a transportation project are clearly delineated in FHWA TA T6640.8A and 23 CFR 771.123 - 127. An EIS has two major divisions, the draft EIS and the final EIS, to maximize the potential for public and agency input in the process.

13.3.4 State-Only Funded Projects

Projects with state-only funding should be coordinated with the OLE to confirm that the project does not have the potential for significant impacts or to screen the project for federal actions or involvement.

13.3.5 Relationship of CE, FONSI, and ROD

It should be noted that, although they may be applied to drastically different project types, there is a relationship among CEs, Findings of No Significant Impact (FONSIs), and Records of Decision (RODs). In each case they provide documentation of the NEPA decision as well as documentation of the completion of the NEPA process. They explain the basis for the decisions made as a result of the studies and the public and agency coordination. They also form the basis for approval of the expenditure of federal funds on the project.

13.3.6 Adoption of Iowa DOT Environmental Documents by Other Agencies

ⓘ ***40 CFR 1506.3, Adoption of EIS.***

ⓘ ***Question 30, CEQ's 40 Questions Adoption of EIS by Cooperating Agency.***

For purposes of fulfilling their own NEPA requirements, other federal agencies may elect to adopt Iowa DOT NEPA documents. The most likely scenario for such adoptions would occur for projects where the adopting federal agency has been a cooperating agency on a document and has a permit or approval function related to an Iowa DOT project. In addition, most often agencies will reference the document in a permit notice.

13.4 Project Development Process Guidance

The following section discusses several key analyses or process functions for Iowa DOT projects and environmental documents. These issues are "cross document" in the sense that they may apply whether the environmental document is an EA or EIS. The importance of a well-defined purpose and need, for example, is beneficial not only for having a good NEPA document, which follows the NEPA process well, but also for defining basic goals for a project and its alternatives.

13.4.1 Proposed Action (or Definition of "the Project")

ⓘ ***23 CFR 771.107(b), Definition of Action.***

ⓘ ***23 CFR 771.111(f), Logical Termini, Independent Utility, Effect on Other Projects.***

ⓘ ***40 CFR 1502.4(a), Scope of Proposal(s) Covered in Environmental Document.***

ⓘ ***40 CFR 1508.23, Definition of Proposal.***

FHWA regulation 23 CFR 771.111(f) outlines three general principles that should be used to frame a highway project. The regulation states that in order to ensure meaningful evaluation of alternatives and *to avoid commitments to transportation improvements before they are fully evaluated*, the action evaluated in each environmental document shall do the following:

- The action shall connect logical termini and be of sufficient length to address environmental matters on a broad scope.
- The action shall have independent utility or independent significance, i.e., be usable and be a reasonable expenditure even if no additional transportation improvements in the area are made.
- Consideration of alternatives for other reasonably foreseeable transportation improvements shall not be restricted.

Along with the purpose and need, the proper definition of the proposed action is one of the most important factors in project development. It is not the same as the preferred or selected alternative (always write a description of the proposed action to avoid a commitment to a particular type of transportation improvement or alternative). The proposed action is most appropriately defined during the development of the annual, multi-year, and long-range programs (for example, the STIP or other project programming efforts).

13.4.2 Logical Termini

ⓘ ***23 CFR 771.111(f), Logical Termini, Independent Utility, Effect on Other Projects.***

ⓘ ***FHWA Technical Memorandum. Guidance on the Development of Logical Project Termini. 1993.***

Background

Logical termini are the beginning and ending points of a transportation project and serve to define the limits of the initial study area. These points should enhance good planning and serve to make the proposed improvement usable. The rationale used to determine project termini must be explained and supported in the project's purpose and need statement.

When establishing logical termini, FHWA's 1993 Technical Memorandum "Guidance on the Development of Logical Project Termini" suggests that a "project should satisfy an identified need." Furthermore, it defines logical termini as "(1) rational end points for a transportation improvement, and (2) rational end points for a review of the environmental impacts," with the latter frequently covering "a broader geographic area than the strict limits of the transportation improvements."[3]

In the past, the most common termini have been points of major traffic generation, especially intersecting roadways, because traffic generators usually determine the size and type of facility being proposed. However, there are cases where the project improvement is not primarily related to congestion due to traffic generators, and the choice of termini based on these generators may not be appropriate (e.g., cases where the project need is mostly based on deterioration of physical conditions).

In developing a project concept that can be advanced through the stages of planning, environment, design, and construction, the project sponsor (whether Iowa DOT or a local entity) needs to consider a "whole" or integrated project. This project should satisfy an identified need (or needs), such as safety, rehabilitation, or capacity improvements, and should be considered in the context of local area socioeconomics and topography, future travel demand, and other infrastructure improvements. Without framing a project in this way, proposed improvements may miss the mark by only peripherally satisfying the need or by causing unexpected side effects, which require additional corrective action. A problem of segmentation (the division of a project into smaller

[3] "Transportation Project Development and NEPA." http://www.fhwa.dot.gov/environment/alts.htm - http://www.mdta.state.md.us/i95mps/i95mps-pnu-dlt2.html

pieces between two termini) may also occur where a transportation need extends throughout an entire corridor but environmental issues and transportation needs are inappropriately discussed for only a segment of the corridor.[4]

Choosing a corridor of sufficient length to look at all impacts need not preclude staged construction. Therefore, related improvements within a transportation facility should be evaluated as one project, rather than selecting termini based on what is identified in the Iowa DOT's improvement program as short-range improvements. Construction may be staged or programmed for shorter sections or discrete construction elements as funding permits.[5]

For most highway projects, the choice of logical termini will be obvious and noncontroversial. For those few major projects where other considerations are important, the termini chosen must be such that environmental issues can be treated on a sufficiently broad scope to ensure that the project will function properly without requiring additional improvements elsewhere, and the project will not restrict consideration of alternatives for other reasonably foreseeable transportation improvements.[6]

Approach

Any effort to determine the rationality of project endpoints should consider the following questions:

- Does this section connect logical termini?
- Are endpoints consistent with the project's purpose and need?
- Does this section allow consideration of environmental matters on a broad scope?
- Does this section restrict future alternatives or require future improvements outside the termini?

If project endpoints are rational, proposed highway projects will be more defensible against litigation claims of irrational project segmentation, and decision-makers and the public will have a clearer picture of the transportation requirements in the project area and a better understanding of the project's purpose and need.

13.4.3 Importance of Purpose and Need

ⓘ ***40 CFR 1502.13, Purpose and Need.***

ⓘ ***FHWA Memorandum, "Purpose and Need" in Environmental Documents, Revised July 23, 2003.***

ⓘ ***FHWA TA T6640.8A, Guidance for Preparing and Processing Environmental and Section 4(f) Documents.***

ⓘ ***AASHTO Practitioner's Handbook, "Defining the Purpose and Need and Determining the Range of Alternatives for Transportation Projects" (August 2007).***

The purpose and need establishes a wide range of criteria for a proposed action:

- It defines the proposed action.
- It defines the goals the project is to accomplish—its "purpose."
- It delineates the reasons that action is being proposed—the "need" for the project.

A solid purpose and need will establish why the expenditure of funding is necessary, justify why the environmental impacts of the project are necessary, and help to limit the range of alternatives by providing specific goals. Considering the focus placed on defining the goals of the proposed action, the purpose and need should also conversely demonstrate what will happen if the action is not taken and the goals are not achieved.

The purpose and need helps establish which alternatives are practicable, prudent, and feasible. In particular, Section 4(f) and the Executive Orders on wetlands and floodplains require a strong purpose and need.

[4] "Transportation Project Development and NEPA." http://www.fhwa.dot.gov/environment/alts.htm. Also, "The Development of Logical Project Termini."

[5] "Transportation Project Development and NEPA." http://www.fhwa.dot.gov/environment/alts.htm.

[6] "Transportation Project Development and NEPA." http://www.fhwa.dot.gov/environment/alts.htm.

By establishing why there is a proposed action (the need) and what that action is to accomplish (the purpose), the purpose and need lays the groundwork for defining the range of alternatives. Alternatives that do not have potential to meet the purpose and need are not required to be discussed in the course of the NEPA document, thus reducing the amount of study required.

Perhaps the best way to approach writing a purpose and need statement for an Iowa DOT project is to focus on "telling the story" that is based on technical and analytical justifications. The purpose and need should present a narrative that is easy to read, has a clear, logical flow, and provides enough background to support the proposed action. A compilation of facts, figures, and miscellaneous data alone will not present a clear picture of why a project is needed, nor will it help to define solutions (alternatives) to meet the need and serve the purpose. A purpose and need statement should be both comprehensive and specific. All issues surrounding the proposed action need to be brought out in the narrative, and each must include defensible and quantifiable supporting details.

Typical purpose issues for Iowa DOT projects include, but are not limited to:

- Improving safety
- Reducing congestion
- Improving travel reliability (especially as might relate to emergency access)
- Improving intermodal relationships
- Land-use considerations and economic conditions, including sustaining and providing opportunities for economic development (although not typically the sole purpose issue for a project)
- Providing system linkage and route continuity

Related need issues and measures include:

- Traffic volumes
- Congestion measures
- Structural condition of the infrastructure (Bridge Condition Reports, pavement analysis, etc.)
- Life cycle costs and cost/benefit analyses
- Accident rates/safety information
- Land-use planning plans and data
- Ridership on mass transit systems
- Level of service at design
- Construction limitations (e.g., maintain traffic)
- Legislative mandates/special funding (if any)

For large projects, such as proposals for constructing routes on new alignment, the purpose and need statement may refer to other planning efforts that assist in establishing the framework for the proposed action. These other planning efforts may include local, regional, and statewide land-use planning studies. Additionally, planning efforts with a more singular transportation focus, such as corridor studies, should be considered. Many of these studies contain information and data on the potential range of alternatives that have been considered by planning officials, particularly where mass transit opportunities may exist.

As with all sections of NEPA documents, the language in the purpose and need statement should be written in a manner that is understandable to the public and avoids the use of technical terms. Iowa DOT's preference is to keep the length of the purpose and need statement reasonable, with supporting data and analyses referenced.

The purpose and need and range of alternatives require informal concurrence by FHWA during project development.

13.4.4 Alternatives

ⓘ ***23 CFR 771.125(a)(1), Identification of Preferred Alternative in final EIS.***

ⓘ ***40 CFR 1502.14, Alternatives Including the Proposed Action.***

ⓘ ***FHWA TA T6640.8A, Guidance for Preparing and Processing Environmental and Section 4(f) Documents.***

ⓘ ***Questions 1 through 3, CEQ's 40 Questions Evaluation of Alternatives.***

ⓘ ***Questions 4 through 6, CEQ's 40 Questions Identification of Preferred Alternative and Environmentally Preferable Alternative.***

ⓘ ***AASHTO Practitioner's Handbook, "Defining the Purpose and Need and Determining the Range of Alternatives for Transportation Projects" (August 2007).***

ⓘ ***SAFETEA-LU Environmental Review Process Final Guidance (November 2006).***

As discussed in 40 CFR Part 1502.14, the Alternatives chapter is the "heart of the environmental impact statement." It should provide a comparable level of detail for the proposed alternatives in order to form a basis for comparison of the impacts of the alternatives. The discussion should comparatively present and document the impacts of the proposed alternatives. Per 40 CFR Part 1502.14, this section should:

- "Rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated.
- Devote substantial treatment to each alternative considered in detail including the proposed action so reviewers may evaluate their comparative merits.
- Include reasonable alternatives not within the jurisdiction of the lead agency.
- Include the alternative of no-build.
- Identify the agency's preferred alternative or alternatives, if one or more exists, in the draft EIS and identify such alternative in the final statement unless another law prohibits the expression of such a preference.
- Include appropriate mitigation measures not already included in the proposed action or alternatives."

Although the material in 40 CFR Part 1502.14 is directed at EISs, the same principles should be considered when preparing an EA. Additional information about the development of alternatives for feasibility and location studies may be found in Chapter 7, *Alternatives Development and Evaluation,* in Part II of this manual.

Alternatives Development (What is an Alternative?)

A strong purpose and need statement should drive alternatives identification and development. The purpose and need statement establishes what the alternatives should strive to accomplish and also measures how the alternatives' performance is judged. Therefore, in addition to helping to define an alternative, the purpose and need statement will also play a role in the evaluation process, as discussed later in this section.

Only a reasonable number of alternatives must be developed and evaluated for a proposed action. As discussed in CEQ's *40 Questions*, some proposals may have an infinite number of variations. For highway projects, the most commonly applied example is that of a highway on new alignment, for which an infinite number of alignments may be drawn between the two terminus points. Using the purpose and need statement as a basis, screening criteria that consider both transportation benefits and potential impacts should be developed.

In determining the reasonable range of alternatives, consideration should also be given to identifying alternatives that are "representative" of the range of potential alternatives and not just reasonable in number. For example, while an alignment relocation may indeed allow the consideration of an infinite number of potential alignment alternatives, when screening potential alignments, care should be given to ensure that the alternatives to be evaluated in the environmental document are not only reasonable in number, but also are representative of the different locations in which an alignment could be drawn.

In developing an alternative, known environmental features should be considered as early as possible to ensure avoidance and minimization are inherent to the alternatives from the beginning. A constraint analysis may be used in evaluating early alternatives to determine which alternatives are "reasonable" to

carry forward for detailed evaluation. Often referred to as "show stoppers," constraints are typically engineering or environmental impacts that are technically infeasible, not likely to be accepted by the agency with jurisdiction, or could represent impacts unacceptable by the local government and residents.

Documenting the process used to identify alternatives and the considerations given to resource issues is a critical element of identifying alternatives. As the project develops and the NEPA documentation is prepared, it is important to discuss the measures that were taken to avoid constraints or avoid and minimize impacts to resources which require sequencing. Likewise, the methodology and sources of information used while developing the alternatives should be documented. In addition, a technical memorandum describing the alternatives development process is usually completed and summarized in the environmental document.

For Iowa DOT projects, it is important to consider what is and is not truly an alternative. It is common in project development to treat design variations as distinct alternatives. As alternatives are further developed and refined during the course of project studies, alternatives should be constantly tested to determine whether the changes affect the impacts or the transportation performance of the alternative; in other words, whether they still meet the purpose and need. Alterations of an alternative that do not substantially affect either of these factors may not represent a new alternative, but rather a refinement of the existing alternative.

When projects are being developed in urban locations and an approved transportation or land-use plan exists from an Metropolitan Planning Organization (MPO), the urban transportation planning process may be used to establish reasonable modes and broad locations for proposed improvements. In some cases, this may also include a definition of capacity needs for a given project area.

No-Build Alternative

ⓘ ***Question 3, CEQ Questions and Answers About the NEPA Regulations.***

The No-Build Alternative must be included in EAs and EISs prepared for Iowa DOT, and is used as the basis of comparison to other alternatives. While the term "no-build" would seem to imply that no work would occur under that alternative, "no-" may actually include routine maintenance and upkeep of the existing facility. These activities may have impacts associated with them, which may include both environmental impacts (e.g., water quality impacts from runoff, vegetative impacts from ditch cleaning, etc.) and transportation impacts resulting from the No-Build Alternative's ability (or lack thereof) to meet the project's purpose and need.

Alternatives Evaluation and Documentation

Alternatives evaluation must always be based on the measures included in the purpose and need statement. A well constructed purpose and need statement should not only define the project's needs, but also the measures to be used for defining which alternatives meet the project's purpose and need. These measures may include capacity requirements, safety measures, mobility measures, etc. Just as a good purpose and need is necessary to justify unavoidable impacts to resources, it is also necessary to use the purpose and need measures when evaluating the alternatives.

A consistent and comparable level of detail should be developed for all reasonable alternatives under consideration. This comparable level of detail should be maintained unless sufficient information is present to clearly dismiss an alternative from further consideration, either based on impacts or transportation performance, and at which point the alternative no longer represents a "reasonable alternative" by not meeting the purpose and need.

A screening process may be used to evaluate alternatives as they are being developed. The factors used in the screening process may depend on the project's purpose and need as well as the existing environmental conditions of the project setting. This process would add resources and details to the evaluation as it progresses. For example, the evaluation may begin with an assessment of the constraints (engineering or environmental) of the alternatives. The

Project Management Team (PMT) would determine resource and engineering issues, which, if impacted, would render an alternative "unreasonable." This multi-step process economizes study efforts and may help to narrow the range of alternatives.

A careful screening process and diligent efforts to include resource information as early as possible in the process will lessen the potential that an alternative may be reconsidered. However, during the course of project development additional information may become available that makes a previously dismissed alternative appear reasonable or cause a preferred alternative to be dismissed.

Cost may be included as an evaluation factor; however, cost should not be used to determine where impacts may occur (i.e., selection of any alternative) unless the cost of an avoidance or minimization alternative is determined to be of an unacceptable magnitude through coordination with agencies and the public.

As with the process for identifying alternatives, the alternatives evaluation process should be documented. Whether this is documented in the same technical memorandum as the process for identifying and developing the alternatives or in a separate one will depend on the size and complexity of the project and is at the discretion of Iowa DOT. The environmental document should summarize the content of the memorandum(s).

For alternative considerations related to the Section 4(f) process or the NEPA/404 merger process, refer to Chapter 19, *Section 4(f) Evaluations* and Chapter 18, *NEPA/404 Concurrent Process*.

Preferred Alternative

The preferred alternative is referred to as the "agency's preferred alternative" in CEQ regulations and CEQ's *40 Questions*. It is the alternative that the lead agency believes would best fulfill the purpose and need's goals while giving appropriate consideration to the environmental and socioeconomic effects of the alternatives considered. When a joint lead agency is involved, coordination between the agencies is required and if the agencies disagree on the preferred alternative under their joint authority, they must come to an agreement or the project will not be able to progress.

When identifying a preferred alternative, the range of factors affected by the proposed action must be carefully considered, including socioeconomic resources, natural resources, cultural resources, and engineering needs. Identification of the preferred alternative provides the public and agencies with jurisdiction or special expertise an understanding of the "lead agency's orientation" (Question 4a, CEQ's *40 Questions*).

Selection of a preferred alternative is generally made at the recommendation of the PMT. If a preferred alternative exists at the draft EIS stage of project development, it should be identified in the Alternatives section in the draft EIS. The regulations presume that by the time a project has reached the final EIS stage of development, the agency has identified a preferred alternative and it must be identified in the Alternatives section of the final EIS (40 CFR 1502.14). Similarly, if a preferred alternative exists at the time an EA is circulated, it should be identified in the document. The identification of (or even existence of) a preferred alternative does not release Iowa DOT or FHWA from the requirement of preparing a document that is unbiased in its treatment of alternatives and their impacts.

Selected Alternative

Following the circulation of the final EIS or EA, the alternative that is recommended for implementation will become known as the "selected alternative." This recommendation is made by the Iowa DOT in consultation with FHWA after the project has been presented to the Iowa DOT Commission for review and program support. This alternative may be the same as the preferred alternative, if one was previously identified, or it may be another alternative, identified based on public and agency comment during the circulation of the environmental document. The selected alternative should be clearly identified in the ROD or FONSI for the project.

13.5 Additional References

NEPA Law and Litigation, by Daniel R. Mandelker, 2d ed. Deerfield, Ill.: Clark Boardman Callaghan, 1993.

The NEPA Book: A Step-By-Step Guide on How to Comply With the National Environmental Policy Act by Ronald Bass, Albert Herson, Kenneth Bogdan, April, 2001.

Regulations for Implementing NEPA, 40 CFR Parts 1500–1508: http://ceq.eh.doe.gov/.

FHWA Environmental Impact and Related Procedures, 23 CFR Part 771: http://environment.fhwa.dot.gov/.

CEQ's *Forty Most Asked Questions Concerning CEQ's NEPA Regulations (40 Questions)*: http://www.nepa.gov/.

Guidance for Preparing and Processing Environmental and Section 4(f) Documents, FHWA TA T6640.8A: http://www.fhwa.dot.gov/.

FHWA Section 4(f) Policy Paper (Revised June 1989): http://www.fhwa.dot.gov.

FHWA Paper "Alternatives Selection Process for Projects Involving Section 4(f) of the DOT Act" (November 15, 1989): http://www.environment.fhwa.dot.gov.

AASHTO Practitioner's Handbook, "Using the SAFETEA-LU Environmental Review Process" (January 2008).

AASHTO Practitioner's Handbook, "Defining the Purpose and Need and Determining the Range of Alternatives for Transportation Projects" (August 2007).

AASHTO Practitioner's Handbook, "Responding to Comments on an Environmental Impact Statement" (July 2006): http://environment.transportation.org/.

NOTES:

Guidance for Preparing Categorical Exclusions

CHAPTER 14

This chapter discusses the content, format, and processing requirements for Categorical Exclusions prepared for Iowa DOT projects. The material in this section is based on FHWA TA T6640.8A and FHWA's Iowa Division Office procedures, and is adapted to the needs and preferences of Iowa DOT. The Iowa DOT's website has forms and templates that are useful for practitioners working Categorical Exclusion projects. When working on a Categorical Exclusion (CE), please check the website to obtain the latest version of these documents.

14.1 Categorical Exclusions

ⓘ *23 CFR 771.115(b), Class II (CE) Action Definition.*

ⓘ *40 CFR 1508.4, Categorical Exclusion Definition.*

ⓘ *FHWA, Iowa DOT, Programmatic CE Agreement.*

ⓘ *FHWA TA T6640.8A, Part I, Categorical Exclusion.*

As noted in 23 CFR 771.117(a) CEs are actions that meet the definition in 40 CFR 1508.4, and, based on FHWA's past experience, do not have significant environmental effects. They are actions that do not induce significant impacts to planned growth or land use; do not require the relocation of substantial numbers of people; do not have a significant impact on any natural, cultural, recreational, historical, or other resource; do not involve significant air, noise, or water quality impacts; do not have significant impacts on travel patterns; and do not otherwise, either individually or cumulatively, have any significant environmental impacts.

The CEs are divided into two groups, Programmatic and Countersigned, based on the action's potential for impacts. The level of documentation necessary for a particular CE depends on the group under which the action falls. Because the level of CE documentation varies, it is important to understand the relationship between the various actions and the required documentation.

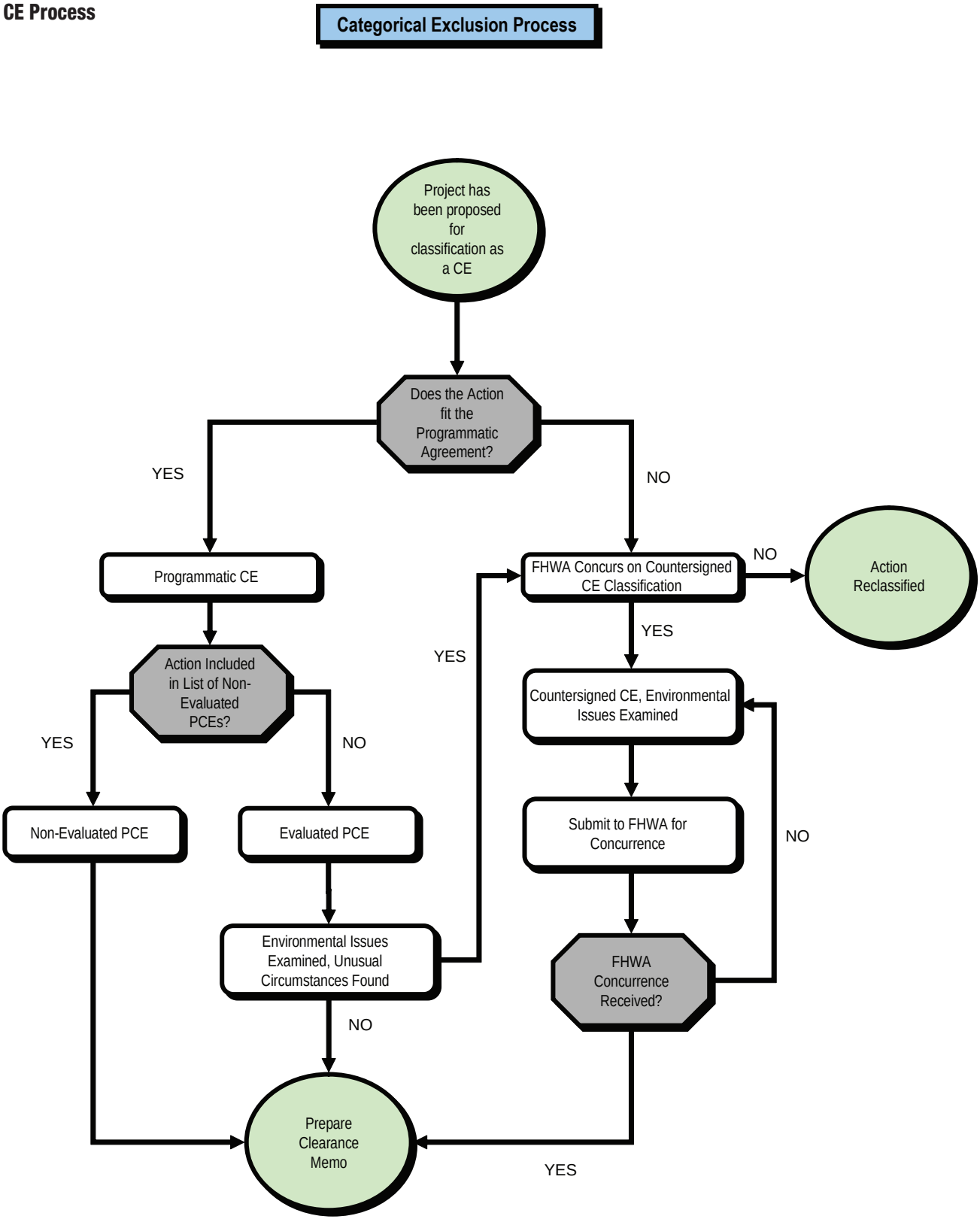
The CE process is shown in Exhibit 14-1.

14.2 Programmatic Categorical Exclusions

Iowa DOT and the FHWA Iowa Division Office have developed and implemented an agreement for processing certain types of CEs as programmatic actions, based on a process review of past CE projects. The agreement, *Programmatic Categorical Exclusion Action,* FHWA and Iowa DOT, October 2004, is found in Appendix 14a. The agreement identifies two types of CE actions that Iowa DOT can process without FHWA involvement:

CEs are actions that, based on FHWA's past experience, do not have significant environmental effects.

Exhibit 14-1
CE Process



- *Non-Evaluated Programmatic CE*—Action types that have No Potential for Significant Environmental Effect. The action types, which are listed in Attachment A of the agreement in Appendix 14a, are non-construction actions, construction projects within previously disturbed right-of-way, or actions that transfer the use rights of a property, and
- Evaluated Programmatic CE—Action types listed in 23 CFR 771.117 (c) and (d), but not included as a Non-Evaluated Programmatic CE.

To determine whether a project qualifies as a Non-Evaluated Programmatic CE, a brief project description should be prepared and sent to OLE for review. If the OLE determines the project is among those listed in Attachment A, OLE staff will prepare a notification memo advising of the completion of the environmental review process and noting that the project may continue toward letting.

If the project is among those listed in 23 CFR 771.117 (c) and (d), but not listed as a Non-Evaluated Programmatic CE in Attachment A, OLE staff must complete the Project Summary form on the back of Attachment A. If the responses to the form do not indicate the need to complete an individual categorical exclusion, the environmental process will conclude when OLE staff signs the Project Summary.

14.3 Countersigned Categorical Exclusions

Unlike Programmatic CEs, a Countersigned CE is an action that meets the criteria for a CE in the CEQ regulations (40 CFR 1508.4 and 23 CFR 771.117(a), that requires FHWA approval. Projects that could qualify as Countersigned CEs would include those that qualify as a CE defined in 23 CFR 771.117(a), but are not listed in sections 117(c) or (d). In addition, Countersigned CEs could include projects listed in 23 CFR 771.117(c) or (d) if those project involve unusual circumstances as defined in section 117(b). Examples of unusual circumstances would include potential impacts to Section 4(f) resources or protected species, acquisition of more than a minor amount of right of way, or impacts to more than a minimal amount of wetlands. OLE will make the decision as to whether a project fits the Countersigned CE category after reviewing the project concept statement and comparing the project's potential impacts to the criteria in the Project Summary form mentioned above.

14.3.1 Format and Content of Documentation

Iowa DOT has developed a CE memo form that must be completed to demonstrate to OLE staff and FHWA that a proposed action meets the criteria for a CE and that significant environmental effects will not result.

While Iowa DOT's *Guidance for Preparing CEs* suggests the level of environmental analysis required to complete each resource topic, there may be unusual circumstances on Countersigned CE projects that also influence the level of analysis. 23 CFR 771.117 (b) notes that, "Any action which normally would be classified as a CE, but could involve unusual circumstances, will require the Administration, in cooperation with the applicant, to conduct appropriate environmental studies to determine if the CE classification is proper." Such unusual circumstances include:

1. Significant environmental impacts
2. Substantial controversy on environmental grounds
3. Significant impact on properties protected by section 4(f) of the DOT Act or section 106 of the National Historic Preservation Act
4. Inconsistencies with any federal, state, or local law requirement or administrative determination relating to the environmental aspects of the action

The level of consideration, analysis, and documentation should be commensurate with the action's potential for significant impacts, controversy, or inconsistency with other agencies' environmental requirements. While agency coordination and public involvement are not required as part of Countersigned CE projects, it would not be unusual to engage in both activities.

Following the resolution of all outstanding resource issues and review and approval of the Countersigned CE memo form by Iowa DOT and FHWA, the environmental review process concludes after Iowa DOT issues an *Environmental Clearance E-mail Memo* to the project sponsor and the groups listed in the NEPA Compliance Section database.

14.4 Circulation Requirements

There are no public and agency circulation requirements for CE projects. However, as noted this does not preclude required coordination and consultation on project issues related to resource impacts when warranted.

NOTES:

Guidance for Preparing Environmental Impact Statements

CHAPTER 15

This chapter discusses the content, format, and processing requirements for Draft and Final Environmental Impact Statements (EISs) and Records of Decision prepared for Iowa DOT projects.

This chapter discusses the content, format, and processing requirements for draft and final Environmental Impact Statements (EISs) and Records of Decision (RODs) prepared for Iowa DOT projects. The material in this section is based on FHWA TA T6640.8A and FHWA's Iowa Division Office procedures, but is adapted to the needs and preferences of Iowa DOT.

Iowa DOT's website (OLE, NEPA Home) has numerous templates and forms for activities such as developing a coordination plan, agencies to consider for notification of scoping meeting, distribution lists, the Iowa DOT's Determination of Effect form and the U.S. Department of Agriculture's form AD-1006, etc. When working on an EIS, please check the website to obtain the latest version of these documents.

15.1 EIS Basics

An EIS is a full disclosure document describing the potential effects of a project on the environment, as described in the regulations of the U.S. Council on Environmental Quality (40 CFR Parts 1500-1508). "Environment" is defined as the natural and physical environment and the relationship of people with that environment. This means that the environment considered in an EIS includes land, water, air, structures, living organisms, environmental values at the site, and social, cultural, and economic aspects. An "impact" is a change or consequence that results from an activity. Impacts can be positive or negative or both, and can be direct, indirect, and cumulative. An EIS describes impacts, as well as ways to mitigate impacts. The ultimate purpose of the EIS is to assist in decision-making—"to help public officials make decisions that are based on understanding environmental consequences, and take actions that protect, restore, and enhance the environment" (43 CFR 55990 Section 1500.1, CEQ Regulations).

An EIS, which is classified as a Class I action by FHWA, is the most thorough and comprehensive level of NEPA documentation. It is prepared when Iowa DOT, in consultation with FHWA, determines that the action is likely to cause significant impacts on the environment. In determining the significance of an action, the human environment, the affected region, and the interests of the local area must be analyzed. Both short- and long-term effects must be taken into account. Per 23 CFR 771.115, some examples of the types of projects typically requiring the preparation of an EIS include:

- Proposed construction of new access-controlled freeways;
- A highway project of 4 or more lanes on a new location;
- New construction or extension of fixed rail transit facilities; and
- New construction or extension of a separate roadway for buses or high-occupancy vehicles not located within an existing highway facility.

The basic steps for preparing an EIS are shown in Exhibit 15-1.

15.2 Draft Environmental Impact Statements

ⓘ ***23 CFR 771.123, Draft Environmental Impact Statements.***

ⓘ ***23 CFR 771.125, Final Environmental Impact Statements.***

ⓘ ***23 CFR 771.127, Record of Decision (ROD).***

ⓘ ***FHWA TA T6640.8A, Part V, Environmental Impact Statement—Format and Content.***

ⓘ ***AASHTO Practitioner's Handbook, "Responding to Comments on an Environmental Impact Statement," (July 2006).***

15.2.1 Early SAFETEA-LU Activities

The Safe Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) establishes a new environmental review process for transportation projects developed as EISs. All EISs for which the Notice of Intent (NOI) was published in the *Federal Register* after August 10, 2005, must follow SAFETEA-LU's requirements. The requirements are intended to promote efficient project management by lead agencies and enhanced opportunities for coordination with the public and with other federal, state, local, and tribal government agencies during the project development process.

SAFETEA-LU broadened the range of agencies that have the ability to influence the NEPA process by creating the designation "participating" to give state, local, and tribal agencies a formal role and rights in the environmental process. The category of participating agency joins the designations of lead agency and cooperating agency that have long been a part of the NEPA process. The section discusses the activities that initiate the environmental review process, provides an explanation of lead, cooperating and participating agency roles, and sets the stage for preparing the draft Environmental Impact Statement.

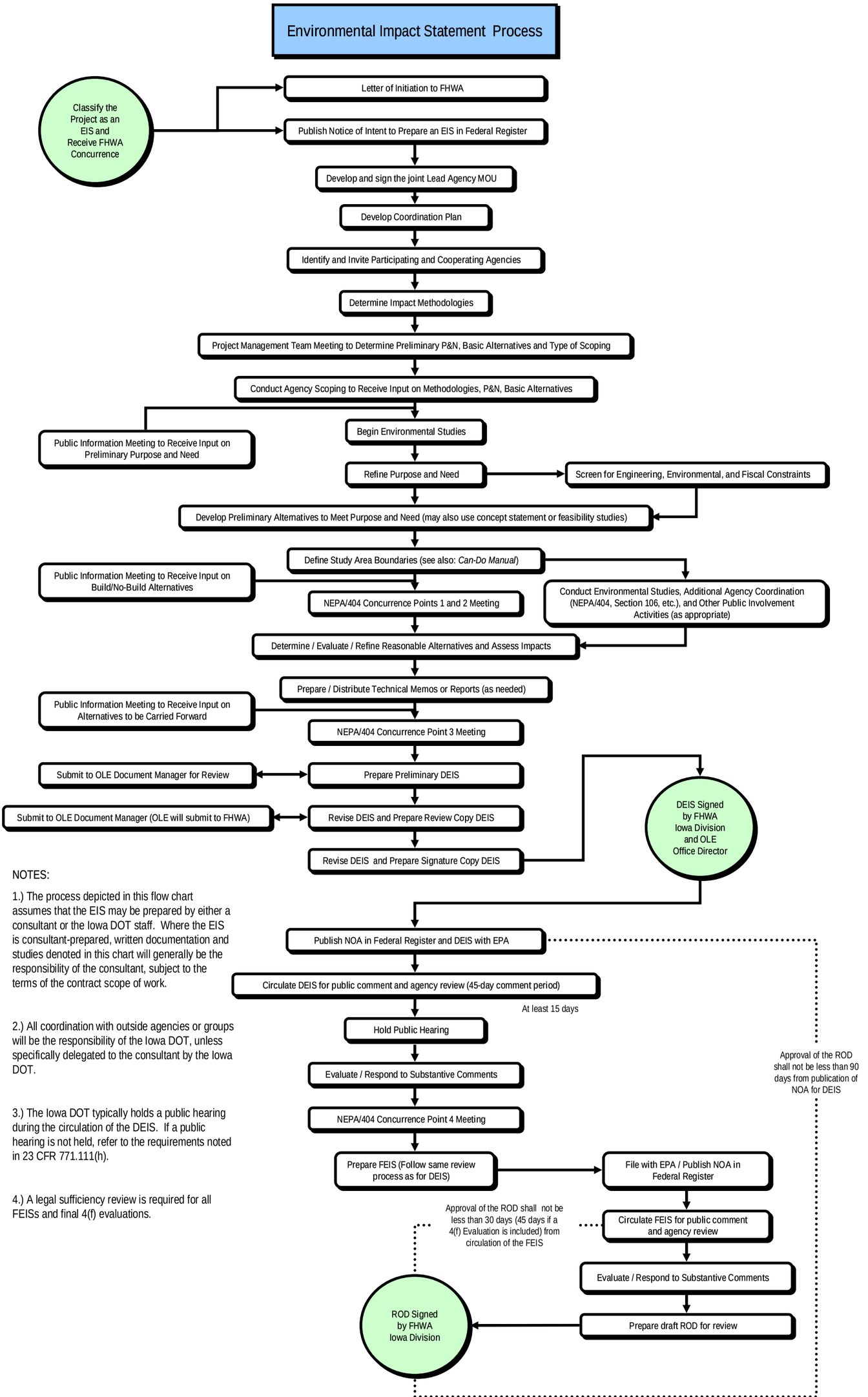
Letter of Intent

To initiate the environmental review process for a transportation project using the Section 6002 process, SAFETEA-LU requires that Iowa DOT (or the project sponsor for a local project) prepare a Letter of Initiation (LOI) notifying U.S. DOT about the type of work, termini, length, and general location of the proposed project. The LOI must also provide a list of any other federal approvals (e.g., Section 404 permits) anticipated to be necessary for the proposed project. The LOI also should indicate the timeframe within which the environmental review process should be started. The information required to initiate the environmental review process may be generated by the metropolitan or statewide planning processes, or by such other means as corridor planning studies, traffic studies, or congestion or pavement management systems. The notification can be provided in the form of a letter or through a programmatic document such as the State Transportation Improvement Program (STIP) that meets the informational requirements in Section 6002.

Notice of Intent

Concurrent with preparing the LOI, Iowa DOT or its consultant should also assemble a NOI to prepare an EIS. All EISs where the NOI was published in the *Federal Register* after August 10, 2005, must follow SAFETEA-LU's requirements. OLE (or their consultant) will prepare the NOI for FHWA. The NOI must provide a description of the proposed action, the alternatives under consideration, and the scoping process. The NOI must also provide contact information for individuals with questions about or interest in the proposed action. The NOI should be submitted to FHWA electronically. Appendix B of FHWA TA T6640.8A discusses the format, content, and processing of an NOI in more detail. An example NOI is found in Appendix 15a.

Exhibit 15-1
EIS Process



NOTES:

1.) The process depicted in this flow chart assumes that the EIS may be prepared by either a consultant or the Iowa DOT staff. Where the EIS is consultant-prepared, written documentation and studies denoted in this chart will generally be the responsibility of the consultant, subject to the terms of the contract scope of work.

2.) All coordination with outside agencies or groups will be the responsibility of the Iowa DOT, unless specifically delegated to the consultant by the Iowa DOT.

3.) The Iowa DOT typically holds a public hearing during the circulation of the DEIS. If a public hearing is not held, refer to the requirements noted in 23 CFR 771.111(h).

4.) A legal sufficiency review is required for all FEISs and final 4(f) evaluations.

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Lead Agency

- ⓘ ***23 CFR 139, Efficient Environmental Reviews for Project Decision-making.***
- ⓘ ***23 CFR 771.109, Applicability and Responsibilities.***
- ⓘ ***40 CFR 1501.5, Lead Agencies.***
- ⓘ ***40 CFR 1508.16, Lead Agency.***
- ⓘ ***Question 14, CEQ's 40 Questions Coordination Between Lead and Cooperating Agencies.***
- ⓘ ***Question 22, CEQ's 40 Questions State and Federal Agencies as Joint Lead Agencies.***

At least one federal agency must be designated as the lead agency with the responsibility to manage and prepare the NEPA document, identify and involve participating agencies; develop coordination plans; provide opportunities for public and participating agency involvement in defining the purpose and need and determining the range of alternatives; and collaborate with participating agencies in determining methodologies and the level of detail for the analysis of alternatives. In addition, lead agencies must provide increased oversight in managing the process and resolving issues. For Iowa DOT projects, FHWA will typically be the lead federal agency and Iowa DOT will be the applicant. Under the provisions of 23 CFR 771.109, Iowa DOT, as an agency with statewide jurisdiction (or in conjunction with a local authority acting through Iowa DOT), has been delegated the responsibility of the environmental document with the input and guidance of FHWA.

Joint Lead Agency Memorandum of Understanding

When other agencies may be receiving federal funds for a project being developed by or in conjunction with the Iowa DOT, they may be invited to participate as a joint lead agency. When a joint lead agency is involved, the term "lead agency" refers to a collaboration of all joint lead agencies in making a decision or performing a task. The lead agencies are able to perform tasks and make decisions jointly, or they may choose to distribute their joint responsibilities and authorities among themselves by mutual written agreement. If the lead agencies disagree on something under their joint authority, then they must come to a conclusion among themselves or the project will not be able to progress. The purpose of a Joint Lead Agency Memorandum of Understanding is to establish respective roles and responsibilities on the proposed project. The memorandum formalizes the commitments among the parties to coordinate project development activities and the proposed project. See Chapter 2, *Project Management,* for additional information about multijurisdictional agreements.

Coordination Plan

SAFETEA-LU requires that the lead agencies establish a plan for coordinating public and agency participation and comment during the environmental review process. Lead agencies may find that the best results occur when they consult with the participating agencies on the coordination plan, because key elements of the coordination plan may be setting expectations that require a commitment of resources by the participating agencies. The purposes of the coordination plan are to facilitate and document the lead agencies' structured interaction with the public and other agencies and to inform the public and other agencies of how the coordination will be accomplished. SAFETEA-LU allows the lead agencies to decide how detailed the coordination plan should be. The coordination plan has the potential to expedite and improve the environmental review process by clearly establishing interactions and expectations, but its success will depend on the lead agencies exercising common sense and good faith to make it work.

The coordination plan should outline (1) how the lead agencies have divided the responsibilities for compliance with the various aspects of the environmental review process, such as the issuance of invitations to participating agencies, and (2) how the lead agencies will provide the opportunities for input from the public and other agencies, in accordance with applicable laws, regulations, and policies. The plan also should identify coordination points, such as:

- Notice of intent publication and scoping activities
- Development of purpose and need

- Identification of the range of alternatives
- Collaboration on methodologies
- Completion of the draft EIS
- Identification of the preferred alternative and the level of design detail
- Completion of the final EIS
- Completion of the ROD
- Completion of permits, licenses, or approvals after the ROD

In addition, the coordination plan may establish a schedule of regular meetings and may identify which persons, organizations, or agencies should be included for each coordination point. The plan may set timeframes for input by those persons, organizations, and agencies. The coordination plan should be updated as necessary during the project development process. The lead agencies can incorporate the coordination plan into a Memorandum of Understanding (MOU) that is applicable to a single project or to a category of projects.

The NEPA Compliance Section will be responsible for developing the Coordination Plan, in conjunction with the Public Involvement Section and the Location Section.

Cooperating and Participating Agencies

ⓘ ***23 CFR 139, Efficient Environmental Reviews for Project Decision-making.***

ⓘ ***23 CFR 771.109, Applicability and Responsibilities.***

ⓘ ***23 CFR 771.111, Early Coordination, Public Involvement, and Project Development.***

ⓘ ***40 CFR 1501.6, Cooperating Agencies.***

ⓘ ***40 CFR 1508.5, Definition of Cooperating Agency.***

ⓘ ***FHWA, Guidance on Cooperating Agencies.***

ⓘ ***23 CFR 139, Efficient Environmental Reviews for Project Decision-making.***

The federal code of regulations, 40 CFR 1508.5, defines a cooperating agency as "any federal agency other than a lead agency which has jurisdiction by law or special expertise with respect to any environmental impact involved in a proposal (or a reasonable alternative) for legislation or other major federal action significantly affecting the quality of the human environment." Generally, cooperating agencies are federal agencies (other than FHWA) with jurisdictional authority over an element or resource involved in a proposed improvement (e.g., permit approval). Under CEQ regulations, a lead agency must request that any other federal agency with jurisdiction by law or special expertise be a cooperating agency. The roles and responsibilities of cooperating agencies are discussed in 40 CFR 1501.6.

For projects in Iowa, the FHWA Iowa Division Office Manual identifies three federal agencies for consideration as a cooperating agency in the development of an environmental document (typically an EIS or EA), the U.S. Army Corps of Engineers, the U.S. Coast Guard, and the Federal Transit Authority, when appropriate. Other federal, state, or local agencies, and Native American tribes with jurisdictional authority or special expertise (such as U.S. Department of Fish and Wildlife Service) are considered on a project-by-project basis to participate as either a cooperating or participating agency (see participating agency definition below) in the environmental review process.

SAFETEA-LU legislation (23 USC 101, (Public Laws 109–59109–59, § 1(a)) defines a participating agency as "any other federal and non-federal agencies that may have an interest in the project." Participating agencies are typically agencies or organized groups with special expertise relevant to the proposed improvement. Nongovernmental organizations and private entities cannot serve as participating agencies.

Participating agencies are encouraged to become involved in the NEPA process and provide input at key decision points. However, participating agencies may choose to opt out of the process. The roles and responsibilities of participating agencies include, but are not limited to:

- Participating in the NEPA process starting at the earliest possible time, especially with regard to the development of the purpose and need statement, range of alternatives, methodologies, and the level of detail for the analysis of alternatives.
- Identifying, as early as practicable, any issues of concern regarding the project's potential environmental or socioeconomic impacts. Participating agencies also may participate in the issue resolution process described later in this guidance.
- Providing meaningful and timely input on unresolved issues.
- Participating in the scoping process. The scoping process should be designed to identify agencies with an interest in the project. These agencies should be given the opportunity to provide input as the project develops.

Early in the project development process, the OLE, in coordination with the District Engineer and Project Management Team (PMT), identifies the agencies or groups that will be invited to participate in a project including identification of their respective role as a cooperating or participating agency. The identified agencies and groups will be added to each project's mailing list (typically by the Iowa DOT Public Involvement Section, District Office, or consultant staff).

Cooperating / Participating Agency Invitation, Tribal Notification

The NEPA Compliance Section sends a letter to each prospective agency requesting either cooperating agency or participating agency participation in the NEPA process. The invitation should clearly define the roles and responsibilities and request a response either accepting or declining the role. A response deadline of no more than 30 days is suggested. For many projects this request is combined with the correspondence requesting participation in the scoping process. Native American tribes are an exception to this, however. Any materials and/or information initially sent to Native American Tribes must be approved by Cultural Resources Management Section of OLE and printed on Iowa DOT letterhead.

Potential cooperating agencies have the option to decline involvement in the role of cooperating agency, based on other program or financial commitments. When this occurs, a copy of the potential cooperating agency's reply is submitted through the FHWA Division office to FHWA headquarters, which determines whether it will be submitted to the CEQ. If a federal agency declines the invitation to serve as a cooperating agency, that agency should be treated as a participating agency unless its declination indicates that the agency (1) has no jurisdiction or authority with respect to the project, (2) has no expertise or information relevant to the project, and (3) does not intend to submit comments on the project. SAFETEA-LU specifies that federal agencies that do not decline the invitation to be a participating agency in writing are by default considered participating agencies. SAFETEA-LU also states that non-federal agencies that do not provide written acceptance are not considered participating agencies.

Scoping

Scoping is an open, public process intended to gather and collect information from the public, agencies with jurisdiction or special expertise, or other project stakeholders about the range of issues to be discussed in an EIS. SAFETEA-LU states that the lead agencies must give the public the opportunity for involvement during the development of the purpose and need statement and the identification of the range of alternatives to be considered.

Before scoping begins, however Iowa DOT must send letters to the applicable Native American tribes and agencies inviting them to serve as cooperating or participating agencies. In addition, the Iowa DOT must prepare the project's coordination plan. After the lead agencies (normally Iowa DOT and FHWA) have concurred on the plan, it is distributed to participating/cooperating agencies. Also before scoping, a plan should be developed describing the methodologies the project team will use to assess impacts.

Scoping during an EIS project is an early opportunity for agency involvement that helps determine what should be included in the environmental analysis both in terms of extent and level of detail. The information obtained through the scoping process is used to help

determine the purpose and need for the project, alternatives to be evaluated, methods of analysis, and the range of issues to be examined in the EIS. The scoping process should seek input from federal, state, and local agencies with jurisdiction over resources in the study area and/or special expertise.

To initiate the scoping notification process, the Iowa DOT distributes an early coordination letter (scoping) and information packet to resource agencies and stakeholders. The letter introduces the proposed action and requests early input to the project relative to the entity's expertise. The letter is produced on Iowa DOT letterhead, and signed by the Iowa DOT Project Manager.

The NEPA Compliance Section maintains a list of agencies and groups that typically receive an early coordination (scoping) letter and information packet. The list is sorted by geographic location within the state. For each project, the Document Manager should be contacted to request a list for the project area. Chapter 5.4.2 of the *Can-Do Manual* provides guidance on identifying stakeholders and the public.

15.2.2 Preparing the Draft EIS

The draft EIS is prepared to address the significant issues determined in the scoping process. It includes input from cooperating agencies, participating agencies, stakeholders, resource/regulatory agencies, the public, etc., and must comply with FHWA and CEQ guidance for preparing an EIS.

An EIS discusses the physical, biological, and social elements in the project's environment. The major sections of an EIS discuss the purpose and need for the proposed action; existing conditions; affected environment; alternatives considered to avoid and minimize impact, including the No-Build Alternative as well as alternatives considered and eliminated; the environmental effects (both adverse and beneficial) of the proposed action; and the results of coordination with federal, state, and local agencies and the public. The format and content requirements for an EIS are described in the CEQ regulations, FHWA regulations, 23 CFR 771, and FHWA's TA T6640.8A.

Content

FHWA TA T6640.8A establishes the following structure for the sections of an EIS:

- Cover sheet/Policy Statement
- Summary
- Table of contents
- Purpose and need for action
- Alternatives
- Environmental Analysis (Affected Environment and Environmental Consequences)
- Comments and coordination
- Index
- Appendices
  - List of preparers
  - List of agencies, organizations, and persons to whom copies of the statement are sent

Cover Sheet/Policy Statement

The cover sheet should be limited to the information required by FHWA TA T6640.8A. The cover should not contain photos, graphics, or logos (including a consulting firm's logo, if a consultant is used to prepare the EIS). The cover sheet should be printed on colored cardstock.

Two side-by-side signature blocks should be centered on the cover sheet with a single line for the date of approval directly below. (A third signature block will be included for the appropriate city/county official for Local Systems projects.) The draft EIS (and final EIS) cover sheet must be signed by representatives of FHWA and Iowa DOT OLE. The OLE Office Director will sign for Iowa DOT. On Local Systems projects the signature(s) of the designated official for the responsible city and/or county should also be included.

The cover page will include the following statement immediately above the signature lines:

> *The signatures are considered acceptance of the general project location and concepts described in the environmental document unless otherwise specified*

by the approving officials. However, such approval does not commit to approve any future grant requests to fund the preferred alternative.

A sample cover sheet is included in Appendix 15b.

Summary

Following the cover sheet, the draft EIS should include a brief summary of the proposed project. The summary describes the proposed action, its location and termini, alternatives considered, environmental analysis (for major impacts), and public and agency involvement activities to date. The length of the summary typically should not exceed 15 pages.

Table of Contents

The table of contents is provided for all major sections and subsections within the draft EIS. It contains a list of tables and figures.

Purpose and Need for Action

The purpose and need establishes a wide range of criteria for a proposed action:

- It defines what the proposed action is;
- It defines the goals the project is to accomplish—the "purpose" of the project; and
- It delineates the reasons that action is being proposed—the "need" for the project.

A solid purpose and need will establish why the expenditure of funding is necessary, justify why the environmental impacts of the project are necessary, and help to limit the range of alternatives by providing specific goals. With all of the focus placed on defining the goals of the proposed action, the purpose and need should also help demonstrate what will happen if the action is not taken.

For some resources with these requirements, the purpose and need establishes which alternatives are practicable, prudent, and feasible. In particular, Section 4(f) and the Executive Orders on wetlands and floodplains require a strong purpose and need.

By establishing why there is a proposed action (the need) and what that action is to accomplish (the purpose), the purpose and need lays the groundwork for defining the range of alternatives. Alternatives that do not have potential to meet the purpose and need are not required to be discussed in the course of the NEPA document, thus reducing the amount of study required.

Perhaps the best way to approach writing a purpose and need statement for an Iowa DOT project is to focus on telling a story that is based on technical and analytical justifications. The purpose and need should present a narrative that is easy to read, has a clear, logical flow, and provides enough background to support the proposition. A compilation of facts, figures, and miscellaneous data alone will not present a clear picture of why a project is needed, nor will it help to define solutions (alternatives) to meet the need and serve the purpose. A purpose and need statement should be both comprehensive and specific. Iowa DOT's preference is to keep the length of the purpose and need statement reasonable with supporting data and analyses referenced in appendices. All issues surrounding the proposed action need to be brought out in the narrative, but each must have defensible and quantifiable supporting details included.

Typical purpose issues for Iowa DOT projects include, but are not limited to:

- Improving safety
- Reducing congestion
- Improving travel reliability
- Improving intermodal relationships
- Land-use considerations and economic conditions, including sustaining and providing opportunities for economic development
- Providing system linkage and route continuity

Related need issues and measures may include:

- Structural condition of the infrastructure (Bridge Condition Reports, pavement analysis, etc.)
- Life cycle costs and cost/benefit analyses
- Land-use planning

- Level of service at design
- Construction limitations (e.g., maintain traffic)
- Legislative mandates /special funding (if any)

For large projects, such as proposals for constructing routes on new alignment, the purpose and need statement may refer to other planning efforts that assist in establishing the framework for the proposed action. These other planning efforts may include local, regional, and statewide land-use planning studies. Additionally, planning efforts with a more singular transportation focus, such as corridor studies, should also be considered. Many of these studies contain information and data on the potential range of alternatives that have been considered by planning officials, particularly where mass transit opportunities may exist.

The purpose and need will be informally reviewed and approved by FHWA prior to any publication, including concurrence point meetings. This informal review process will be completed by the NEPA Compliance Section in consultation with FHWA.

Alternatives

The alternatives section should rigorously explore and objectively evaluate all reasonable alternatives, including the proposed actions, and discuss why other alternatives were eliminated from further analysis. All reasonable alternatives must be given equal treatment during analysis. In many cases, analysis will conclude that there may be several sub-options to any or all of the alternatives. For every project, the No-Build Alternative must be analyzed.

According to FHWA TA T6640.8A, the following alternatives should be discussed in the alternatives section:

- No-Build Alternative—The No-Build Alternative must be included in the EIS, and is used as the basis of comparison to other alternatives. While the term "no-build" would seem to imply that no work would occur under that alternative, "no-build" may actually include routine maintenance and upkeep of the existing facility. These activities may have impacts associated with them, which may include both environmental impacts (e.g., water quality impacts from runoff, vegetative impacts from ditch cleaning, etc.) and transportation impacts resulting from the No-Build Alternative's ability (or lack thereof) to meet the project's purpose and need.
- Transportation System Management (TSM) Alternative—The TSM alternative includes those activities which maximize the efficiency of the present system such as fringe parking, ridesharing, high-occupancy vehicle (HOV) lanes on existing roadways and traffic signal timing optimization. This limited construction alternative is usually relevant only for major Iowa DOT projects.
- Mass Transit—This alternative includes those reasonable and feasible transit options (bus systems, rail, etc.) even though they may not be within the existing FHWA funding authority. Where applicable, cost-effectiveness studies that have been performed should be summarized in the EIS.
- Build Alternative—Both improvement of existing highway(s) and alternatives on new location should be evaluated. A representative number of reasonable alternatives must be presented and evaluated in detail in the draft EIS.

Each alternative should be described using maps or other visual aids to help explain the various alternatives. The material should provide a clear understanding of each alternative's termini, location, costs, and the project concept (number of lanes, right-of-way requirements, median width, access control, etc.). To avoid duplication between the Alternatives section and the Environmental Analysis section, the Alternatives section should be devoted to describing and comparing the alternatives.

Alternatives Development and Documentation

Only a reasonable number of alternatives must be developed and evaluated for a proposed action. In determining the reasonable number of alternatives, consideration should be given to identifying alternatives that are "representative" of the range of potential alternatives and not just reasonable in number. For

example, when screening potential alignments, care should be given to ensure that the alternatives to be evaluated are representative of the different locations in which an alignment could be drawn.

Documenting the process used to identify alternatives and the considerations given to resource issues is a critical element of identifying alternatives. As the project develops and the NEPA documentation is prepared, it is important to discuss the measures that were taken to avoid and minimize impacts to resources. Likewise, the methodology and sources of information used while developing the alternatives should be documented. In addition, a technical memorandum describing the alternatives development process is usually completed and summarized in the environmental document.

Alternatives Evaluation and Documentation

All alternatives under consideration (including the No-Build Alternative) should be developed to a comparable level of detail in the draft EIS so that their comparative merits may be fairly evaluated. This comparable level of detail should be maintained until there is sufficient information to clearly dismiss an alternative from further consideration based on impacts, transportation performance, and/or an inability to meet the purpose and need.

A careful screening process and diligent efforts to include resource information as early as possible in the process will lessen the potential that an alternative may be reconsidered. However, during the course of project development additional information may become available that makes a previously dismissed alternative appear reasonable.

Development of more detailed design for some aspects (e.g., Section 4(f), USACE permits, noise, wetlands, etc.) of one or more alternatives may be necessary in the draft EIS to evaluate impacts or to address issues raised by agencies or the public. However, care should be taken to avoid unnecessarily specifying features that preclude cost-effective final design options. As with the process for identifying alternatives, the alternatives evaluation process should be documented and the contents summarized in the draft EIS. A table or matrix should be provided to compare the alternatives. The range of alternatives will be informally reviewed and approved by FHWA prior to any publication, including concurrence point meetings. This informal review process will be completed by the NEPA Compliance Section in consultation with FHWA.

Preferred Alternative

The preferred alternative is referred to as the "agency's preferred alternative" in CEQ regulations and CEQ's *40 Questions*. It is the alternative that Iowa DOT and FHWA believe would best fulfill the purpose and need while giving appropriate consideration to the environmental and socioeconomic effects of the alternatives considered. Selection of a preferred alternative is generally made at the recommendation of the Project Management Team (PMT).

In those situations where Iowa DOT has officially identified a preferred alternative based on its coordination with agencies and environmental studies, it will also be indicated in the draft EIS. In these instances, the draft EIS should include a statement indicating that the final selection of an alternative will not be made until the alternative's impacts and public hearing comments on the draft EIS have been fully evaluated.

Where a preferred alternative has not been identified, the draft EIS should state that all reasonable alternatives are under consideration and a decision will be made after the alternatives' impacts and public hearing comments on the draft EIS have been fully evaluated.

For the final EIS, the agency is required to specify the preferred alternative. The environmentally preferred alternative may also be identified in the final EIS, and must be identified in the ROD. The environmentally preferred alternative is considered the one that would cause the least damage to the biological and physical environment. It means the alternative that best protects, preserves, and enhances historic, cultural and natural resources.

The final EIS must identify which recommendation was selected and why. The "why" should be explained in a concise manner using public hearing results and comments received on the draft EIS to support the selection.

The term "selected alternative" should not be used interchangeably with "preferred alternative" in the final EIS. More information about the selected alternative, which is a term used in the ROD, is found in Chapter 7.

Environmental Analysis—Combined Affected Environment and Environmental Consequences

Iowa DOT's current practice is to combine the discussions of affected environment, environmental consequences and measures to minimize harm into one chapter. With the combined format, this section's discussion must be organized by resource topic (wetlands, floodplains, etc.) rather than by alternative. Note that the affected environment text for each applicable resource category is followed by the environmental consequences text. The environmental consequences topics of construction impacts, irreversible and irretrievable commitment of resources, and permits will not have corresponding sections in the affected environment text.

Background Information

FHWA TA T6640.8A states that the affected environment text should provide a concise description of the existing social, economic, and environmental setting for the area affected by all alternatives presented in the alternatives chapter.

For each applicable resource, the environmental consequences text should clearly identify the direct social, economic, and environmental impacts, measures to minimize harm, indirect impacts, mitigation. More information about indirect impacts is found in Chapter 21. The measures to minimize harm/mitigation text should identify mitigation measures for the range of impacts of the proposed action, regardless of whether the resources impacted would individually be considered significant. For Iowa DOT projects, discussion of mitigation measures should consider the following:

- Alternatives that would avoid the impact
- Alternatives that would minimize the impact or design treatments of an alternative that would minimize the impact
- The type of mitigation being proposed at a conceptual level (e.g., replacement-in-kind, relocation assistance, enhancement of another site, etc.)
- The location of proposed mitigation, if a physical replacement
- The agency with jurisdiction to implement the mitigation, if other than the Iowa DOT
- Performance measures that the mitigation must meet to be considered successful
- The timing of the implementation of the mitigation

These mitigation considerations should be coordinated with the PMT, the appropriate district office, the Office of Design, and the OLE. The mitigation measures discussion in the draft EIS should identify possible mitigation measures for each reasonable alternative. The final EIS should identify, describe, and analyze all proposed mitigation measures for the preferred alternative.

Following the discussion of all resource topics, there should be a separate discussion of the project's potential cumulative impacts. Cumulative impacts "result from the incremental consequences of an action when added to other past and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR 1508.7). Selecting the resource topics that will be discussed in the cumulative impacts text should be done in coordination with the Iowa DOT's Document Manager. As noted in the CEQ's publication *Considering Cumulative Effects Under the National Environmental Policy Act* (January 1997), "Cumulative effects analysis should count what counts, not produce superficial analyses of a long laundry list of issues that have little relevance to the effects of the proposed action or the eventual decisions." More information on cumulative impacts is found in Chapter 22.

Note that a project's effects can be beneficial and adverse. The environmental consequences text should have sufficient scientific and analytical substance to provide a basis for evaluating the comparative merits of the alternatives under consideration. As noted in FHWA TA T6640.8A, in describing an impact, the term "significant" should not be used.

Content

The list of topics below will be discussed in the Environmental Analysis section for most projects. The list is not all-inclusive, and on specific projects there may be other impact areas that should be included.

- Land-use impacts
- Farmland
- Environmental Justice
- Parks and Recreational Areas
- Social
- Relocation
- Economic
- Air Quality (including MSATs)
- Noise
- Water Quality
- Water Resources
- Woodlands, Natural Areas, and Wildlife Habitat
- Floodplain
- Threatened and Endangered Species
- Historic and Archeological Sites
- Hazardous Material
- Visual/Aesthetics
- Construction/Traffic Maintenance
- Relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity
- Irreversible and irretrievable commitments of resources

The specific content for each of these resource areas is discussed in detail in Part IV of this manual, *Resource Studies*. The draft EIS should summarize technical studies completed for resources and refer to the appropriate technical reports. Note that properly documenting potential impacts to threatened and endangered species and farmland may require the completion of Iowa DOT's Determination of Effect form and the U.S. Department of Agriculture's form AD-1006.

Comments and Coordination

The EIS should document early and continuing coordination with various government agencies and the public. Public and agency involvement is required by a variety of regulations, including those of the CEQ and FHWA, which implement NEPA. It is recommended that the section begin with the following statement:

> *The public involvement process was open to all residents and population groups in the study area and did not exclude any people because of income, race, color, religion, national origin, sex, age, or handicap.*

The public involvement text should summarize the highlights of public information meetings, technical committee meetings, interest group meetings, and other activities used to keep the public informed about the progress of the project.

The agency coordination text should indicate when the NOI to prepare the draft EIS was published in the *Federal Register*. It should also summarize the agency scoping/coordination activities. The section should not include newspaper articles or random correspondence.

Index

The index should contain page references for important subjects discussed within the document, major categories of impacts, and agencies or individuals discussed in the text.

Appendices

Appendices should be included when needed to support information in the EIS. One appendix should be reserved for agency correspondence. The List of Preparers and List of Agencies, Organizations, and Persons to Whom Copies of the Statement are Sent are also typically included as appendices.

In determining the need for other potential appendices, note that Iowa DOT's preference is that information, such as technical memoranda, be included by reference, where possible, rather than included in an appendix. References should include

the location of the specific document. Consideration should be given to the importance of and controversy surrounding the information potentially to be included in an appendix. For example, where there may be substantial controversy over noise impacts, it may be appropriate to include the noise technical memorandum in an appendix. However, although such technical reports should not be included as a matter of general practice, their availability in project files should be documented.

List of Preparers

ⓘ ***40 CFR 1502.17, List of Preparers.***

ⓘ ***FHWA TA T6640.8A, Paragraph V.H., List of Preparers.***

The List of Preparers should include a list of all personnel, whether federal, state, local, or consultant, who were responsible for preparing the EIS or for performing environmental studies. For example:

John Doe: Responsible for natural resource field studies and technical analyses.

The list of preparers may be organized alphabetically or by organization/affiliation.

If the EIS has been prepared by a consultant, the list should note the consultant's Environmental Lead, as well as the leads assigned by Iowa DOT and FHWA.

List of Agencies, Organizations, and Persons to Whom Copies of the Statement are Sent

ⓘ ***23 CFR 771.125(g), Recipients of Final EIS.***

ⓘ ***FHWA TA T6640.8A, Paragraph V.I., List of Agencies, Organizations, and Persons to Whom Copies of the EIS Are Sent.***

For a draft EIS, list all entities from which comments are being requested (federal and state agencies, elected officials, and local units of government/ interest groups).

For a final EIS, identify those entities that submitted comments on the draft EIS and those receiving a copy of the final EIS.

15.2.3 Iowa DOT and FHWA Review Process

For consultant-prepared environmental documents, there are three distinct review submissions for a draft EIS: the preliminary draft EIS, the review copy draft EIS, and the signature copy draft EIS. If a Section 4(f) Statement is being prepared as part of the project, it will follow the same review process.

Preliminary Draft Environmental Impact Statement

The preliminary draft EIS is a rough, working draft of the draft EIS. A Microsoft Word document of the preliminary draft EIS should be e-mailed to Iowa DOT or placed on an ftp site. If a subconsultant is preparing the EIS, the subconsultant should coordinate with the Iowa DOT document manager to determine whether hard copies of the preliminary draft EIS are also needed. Portions of the text and graphics may be incomplete at this point, as elements of the project may still be under development.

The point of this submission is to provide OLE staff with an opportunity for an early review while time remains to make changes to the document without impacting the project's schedule.

Preliminary copies usually go only to the OLE's NEPA Document Manager. The Document Manager will review the document and return it with or without comments.

Review Copy Draft Environmental Impact Statement

The formal review copy draft EIS should have complete text and graphics. Two hard copies and a Microsoft Word file will be submitted to Iowa DOT. Iowa DOT's NEPA document manager will transmit the formal review copy draft EIS to the appropriate Iowa DOT district office, appropriate individuals within OLE, and FHWA. FHWA has agreed to three weeks for their review.

In most cases, OLE staff will provide electronic review comments. FHWA typically provides a typed list of their comments. At the discretion of the OLE Document Manager, a meeting may be held with the consultant, appropriate OLE staff, and FHWA to discuss comments on more complex documents.

Note: The draft EIS may go through more than one round of comments.

Signature Copy Draft Environmental Impact Statement

The signature copy is the final submission of the draft EIS following the completion of the review cycle by Iowa DOT and FHWA. This submission includes two separate signature pages. The signature page is a clean, white copy of the front cover.

Two copies of the draft EIS should be submitted, one each for OLE and FHWA. When FHWA signs the draft EIS signature page, an original of the signature page will be returned to the consultant, along with directions for printing and distribution. The two signature version copies of the draft EIS will remain with FHWA and Iowa DOT as suspense copies until the final printed version is presented to Iowa DOT.

For complex or controversial projects, additional reviews may be required. When such situations arise, OLE staff will provide guidance on the number of copies, quality of printing, and degree of document completion required for the additional reviews.

15.2.4 Circulation / Notification Requirements

Distribution of Draft Environmental Impact Statements

- ⓘ ***23 CFR 771.123, Environmental Impact Statements.***
- ⓘ ***40 CFR 1502, Environmental Impact Statement.***
- ⓘ ***40 CFR 1503, Commenting.***
- ⓘ ***40 CFR 1506, Other Requirements of NEPA.***
- ⓘ ***FHWA TA T6640.8A, Guidance for Preparing and Processing Environmental and Section 4(f) Documents.***

Once the FHWA and Iowa DOT have both signed the cover sheet of the draft EIS, copies of the draft EIS should be printed and distributed as follows:

- The OLE sends a minimum of seven copies of the signed draft EIS to the FHWA Iowa Division Office, which will submit five documents to the EPA with a request that an NOA be published in the *Federal Register.* The EPA, Office of Federal Activities, will publish an NOA in the *Federal Register*. The number of copies may be increased on an individual project basis (e.g., if the project involves coordination with a bordering state). The NOA should state the preferred alternative, if known at this time. In addition, for Iowa DOT primary highway projects, the Public Involvement Section must ensure that a NOA for a public hearing is published in the newspaper.
- The OLE (or consultant, at the direction of the OLE Document Manager) sends a copy of the document to participating and cooperating agencies, all other federal, state, and local government agencies expected to have jurisdictional responsibility, interest, or expertise in the proposed action; state and federal land management entities that may be affected by the proposed action or any of the alternatives; public officials; private interest groups; and members of the public known to have an interest in the proposed action or the draft EIS (40 CFR 1502.19 and 1503.1). See the OLE website for a distribution list). This action satisfies the requirements of the Iowa Intergovernmental Review system. The OLE NEPA Document Manager should be contacted to provide a copy of the most up-to-date distribution list.
- A copy of the draft EIS is made available for public inspection at OLE, Iowa DOT District Office, FHWA Iowa Division Office, and at institutions such as local government offices, appropriate libraries, and schools.
- Distribution of the draft EIS must be made no later than the time the document is filed with EPA for *Federal Register* publication and must allow for a minimum 45-day review period (40 CFR 1506.9 and 1506.10). See the following section, Document Comment Period, for additional information.
- When an individual Section 4(f) Statement has been prepared, the OLE shall send a copy (or copies) of the draft EIS to the appropriate jurisdictional resource agencies pursuant to the NEPA Section 4(f) requirements (see Chapter 18).

- When an individual permit is required from the U.S. Army Corps of Engineers (i.e., Section 404 or Section 10) or from the U.S. Coast Guard (i.e., Section 9), a copy (or copies) of the draft EIS shall be distributed to the involved agency in accordance with the U.S. DOT/U.S. Army Corps of Engineers MOA, the NEPA/404 Concurrent Merger Process, or the FHWA/U.S. Coast Guard MOU, respectively (see Chapter 28 *Waters of the United States, Including Wetlands*, for additional information).
- One copy each should be provided to other Iowa DOT offices and sections, as appropriate. These may include Design, Right-of-Way, Bridges and Structures, etc. The OLE Document Manager should be contacted for the number of copies needed.
- The same process is followed if a supplement to a draft EIS is developed.

Typically 100 to 150 copies of a draft EIS are printed for distribution and/or delivery to Iowa DOT. The OLE website identifies the agencies that typically receive the document. This distribution should include an electronic format on CD. The appropriate file structure and format is communicated by the Document Manager. The format will be provided to the consultants to ensure compatibility with the Electronic Records Management System (ERMS).

Document Comment Period

ⓘ ***23 CFR 771.123, Environmental Impact Statements.***

ⓘ ***40 CFR 1503, Commenting.***

ⓘ ***FHWA TA T6640.8A, Guidance for Preparing and Processing Environmental and Section 4(f) Documents.***

Following completion of the draft EIS, the Public Involvement Section will prepare a public hearing notice, including the NOA. The draft EIS shall be available at the hearing and for a minimum of 15 days in advance of the hearing. Comments on the draft EIS need to be submitted in writing to OLE or the FHWA Iowa Division Office during the 45-day comment period following publication of the NOA. The comment period may be extended by the lead agency. Information about public hearing requirements can be found in Chapter 44, *Public Involvement*.

15.3 Final Environmental Impact Statement

ⓘ ***FWHA TA T6640.8A, Part VI, Options for Preparing Final EISs.***

Once the comment period for the draft EIS is complete, the agency may begin preparing the final EIS, which must contain the lead agency's responses to comments received on the draft EIS and must identify the preferred alternative. This section discusses the content, format, and processing requirements for final EISs prepared for Iowa DOT projects. The material in this section is based on FHWA TA T6640.8A, but adapted to the needs and preferences of the Iowa DOT.

CEQ regulations and FHWA guidance create three different options for the format of a final EIS: the traditional approach, a condensed final EIS, and an abbreviated version of the final EIS. The criteria for applying these options and detail about their content can be found in FHWA TA T6640.8A. The NEPA Compliance Section will determine, in consultation with FHWA, the appropriate format.

15.3.1 Traditional Approach

In the traditional approach, changes and modifications are made to the draft EIS to address comments, changes in the project area, or modifications to the proposed action made as a result of public and agency comment. If this approach is used, a "mark revisions" function should be used to track the changes and make them apparent to the reader.

15.3.2 Condensed Final Environmental Impact Statement

The condensed final EIS approach incorporates the draft EIS by reference. Information in the draft EIS that has not changed should be summarized but

not detailed. The text in the final EIS should reflect changes in the proposed action, impacts, mitigation, or project setting. The final EIS must also identify a preferred alternative. The format of the sections of a condensed final EIS should mirror that of a draft EIS.

15.3.3 Abbreviated Version of the Final Environmental Impact Statement

This approach should only be used when the changes to the draft EIS are minor, typically consisting of factual corrections and an explanation of why the comments received on the draft EIS do not require additional responses. See Part VI, Paragraph C, of FHWA TA T6640.8A for information regarding the content of the abbreviated version of the final EIS.

15.3.4 Content

Regardless of the format, a preferred alternative must be identified in the final EIS and the basis for its selection must be discussed. If a preferred alternative was identified in the draft EIS, any changes to it or its impacts that have occurred following the circulation of the draft EIS should be identified. The final EIS must include discussion of final mitigation plans, including any efforts to further refine or develop mitigation plans discussed in the draft EIS. The Project Management Team and OLE must confirm the commitments discussed in the final mitigation plans. It must also identify agencies or individuals who submitted comments on the draft EIS, list those agencies or individuals receiving copies of the final EIS, and summarize comments submitted on the draft EIS, made at the public hearing or at other public involvement activities. The final EIS should include a copy of comments from each cooperating agency and other commenters on the draft EIS. The OLE will review all comments made on the draft EIS and Section 4(f) Statement, if included, and respond to each substantive comment in the final EIS. If comments are voluminous, they may be summarized. If the EIS was changed in response to comments, changes should be referenced in the responses. The final EIS will also summarize the public hearing results and any public involvement activities following the public hearing. Any Memoranda of Agreement required for the project should be finalized, signed, and included in the final EIS.

The final EIS should document compliance with applicable environmental laws and Executive Orders. These include, but are not limited to, the Wetlands Finding, the Floodplains Finding, and Title VI of the Civil Rights Act. To the extent possible, all environmental issues should be resolved prior to the submission of the final EIS.

15.3.5 Iowa DOT and FHWA Review Process

Iowa DOT and FHWA review process for a final EIS shall be the same as for a draft EIS, with the following exceptions:

- Concurrence from FHWA headquarters may be required if the final EIS meets any of the categories specified in 23 CFR 771.125 (c) (also see the FHWA memorandum dated November 1987, Processing final EISs). Typically, this occurs if there are national/regional policy issues, inadequate coordination with other federal agencies, or unresolved major issues.
- One copy of the final EIS is submitted to the FHWA Iowa Division Office for a legal sufficiency review by the Resource Center (RC) Legal Council.

If the project involves cooperating agencies, refer to Chapter 13, *NEPA and the Iowa DOT Project Development Process,* for a discussion of the role of these agencies in the review process.

Following the legal sufficiency review, and prior to concurrence, a copy of the document is sent to the FHWA Iowa Division Office for approval. If FHWA is in agreement, they will sign the cover sheet of the final EIS and return it to OLE for distribution. Appendix 15c is a sample final EIS cover sheet for FHWA signature.

Note: If a 4(f) Statement is included, FHWA will also sign the 4(f).

15.3.6 Circulation / Notification Requirements

Distribution of Final Environmental Impact Statement

ⓘ ***23 CFR 771.125, Final Environmental Impact Statements.***

ⓘ ***40 CFR 1502, Environmental Impact Statement.***

ⓘ ***40 CFR 1503, Commenting.***

ⓘ ***40 CFR 1506, Other Requirements of NEPA.***

ⓘ ***FHWA Memorandum Processing Final EISs (November 1987).***

ⓘ ***FHWA TA T6640.8A, Guidance for Preparing and Processing Environmental and Section 4(f) Documents.***

Once the FHWA and Iowa DOT have both signed the cover sheet of the final EIS, copies of the final EIS should be printed and distributed as follows:

- The OLE sends seven copies of the signed final EIS to the FHWA Iowa Division Office. The FHWA Iowa Division Office will submit 5 copies to the EPA with a request that an NOA be published in the *Federal Register*. EPA, Office of Federal Activities, will then publish the NOA in the *Federal Register*.
- A copy of the final EIS is made available for public inspection at the Iowa DOT District Office, OLE, and the FHWA Iowa Division Office. A copy of the document should also be available for public review at appropriate institutions such as local government offices, libraries, and schools.
- The OLE sends a copy of the document to any persons, organizations, or agencies that made substantive comments on the draft EIS, or requested a copy, including a copy to each cooperating agency.
- The final EIS must be distributed no later than when the document is filed with EPA.
- When an individual Section 4(f) Statement has been prepared, OLE shall send a copy (or copies) of the final EIS to the appropriate jurisdictional resource agencies pursuant to the NEPA Section 4(f) requirements (see Chapter 19).
- When an individual permit is required from the U.S. Army Corps of Engineers (i.e., Section 404 or Section 10) or from the U.S. Coast Guard (i.e., Section 9), a copy (or copies) of the final EIS shall be distributed to the involved agency in accordance with the U.S. DOT/U.S. Army Corps of Engineers MOA, the Concurrent NEPA/404 Merger Process, or the FHWA/U.S. Coast Guard MOU, respectively (see Chapter 28 *Waters of the United States, Including Wetlands*, for additional information).
- The same process is followed if a supplement to a final EIS is developed.

Typically 100 to 150 copies of a final EIS are printed for distribution and/or delivery to the Iowa DOT. This distribution should include an electronic format on CD. The appropriate file structure and format is communicated by the Document Manager. The format will be provided to the consultants to ensure compatibility with ERMS.

Document Comment Period

The comment period for a final EIS is 30 days, unless a Section 4(f) Statement is included, in which case the comment period is 45 days.

15.4 Record of Decision

ⓘ ***23 CFR 771.127, Record of Decision.***

ⓘ ***40 CFR 1505, NEPA and Agency Decision-making.***

ⓘ ***FHWA TA T6640.8A, Guidance for Preparing and Processing Environmental and Section 4(f) Documents.***

A ROD is the document in which FHWA and Iowa DOT record their decision on a proposed action. The ROD will identify the selected alternative, address any comments received during the circulation of the final EIS, and contain commitments regarding mitigation.

A draft ROD should be prepared by OLE or the consultant and submitted to the FHWA Iowa Division Office no sooner than 30 days after the submission of the final EIS (45 days if a Section 4(f) is included) to accommodate the comment period for the final EIS. There should be a minimum of 90 days between the publication of the NOA for the draft EIS and the issuance of the ROD. An electronic submittal of the draft ROD may be acceptable. Appendix 15d shows a sample ROD. Iowa DOT will coordinate with agencies on completion of necessary permits following the completion of the ROD.

The format of the ROD is described below.

15.4.1 A Statement of the Decision (Selected Alternative)

Following the circulation of the final EIS, the alternative that is recommended for implementation will become known as the selected alternative. This alternative may be the same as the preferred alternative, if one was previously identified, or it may be another alternative, identified based on public and agency comment during the circulation of the environmental document. The selected alternative should be clearly identified in the ROD.

15.4.2 Alternatives Considered

All alternatives considered must be summarized in the ROD, and the reasons for not selecting certain alternatives must be explained. The discussion must identify the environmentally preferred alternative(s), i.e. the alternative(s) that causes the least damage to the biological and physical environment. If the selected alternative is other than the environmentally preferred alternative, the ROD should clearly state the reasons for not selecting it. Similarly if the lands protected by Section 4(f) were a factor in the selection of a preferred alternative, the ROD should clearly explain how it influenced the decision.

All values (social, economic, environmental, cost-effectiveness, safety, traffic, service, community planning, etc.) that were important factors in the decision-making must be clearly identified. The ROD should reflect the manner in which these values were considered in arriving at the decision.

15.4.3 Section 4(f) Statement

Summarize the basis for any Section 4(f) approval when applicable. The discussion should include the information supporting such approval. Where appropriate, this information may be included in the alternatives discussion and referenced in this paragraph to reduce repetition.

15.4.4 Measures to Minimize Harm

CEQ guidance states that the discussion of mitigation and monitoring in a ROD must be more detailed than a general statement that mitigation is being required, but not so detailed as to duplicate discussion of mitigation in the EIS. The ROD should contain a concise summary of the mitigation measures which the agency has committed itself to adopt.

The ROD should mention whether all practicable means to avoid or minimize environmental harm from the alternative selected have been adopted, and if not, why they were not (40 CFR 1505.2(c)).

15.4.5 Monitoring or Enforcement Program

The ROD should include a section or matrix that summarizes all the environmental commitments made in the final EIS. If the section is voluminous it can be included in the ROD as an appendix. Sometimes the funding of the project may be contingent on mitigation measures employed. Any such measures that are adopted must be explained and committed to in the ROD.

CEQ Guidance Section 1505.3 states that the lead agencies "shall include appropriate conditions (including mitigation measures and monitoring and enforcement programs) in grants, permits or other approvals" and shall "condition funding of actions on mitigation."

The ROD must identify the mitigation measures, monitoring, and enforcement programs that have been selected and plainly indicate that they are adopted as part of the agency's decision. If the proposal is to be carried out by the (46 FR 18037) federal agency itself, the ROD should delineate the mitigation and monitoring measures in sufficient detail to constitute an enforceable commitment, or incorporate by reference the portions of the EIS that do so.

Comments on the final EIS

All substantive comments received on the final EIS should be identified and given appropriate responses. Other comments should be summarized and responses provided where appropriate.

15.4.6 Circulation / Notification Requirements

After FHWA signs the ROD, they will send copies of the signed document to the EPA with a request that a NOA be published in the *Federal Register.* The EPA, Office of Federal Activities, will publish the NOA in the *Federal Register.* The OLE website identifies agencies that should receive copies of the signed ROD from Iowa DOT or local sponsor. The signed ROD should be sent to those who received a copy of the final EIS. Although it is not required, it would be good practice to announce in local newspapers the availability of the signed ROD for review.

Notes: (1) Send a copy of the ROD to any cooperating agencies.
(2) Send a copy of the ROD to those who received copies of the final EIS.

At the time of the completion of the ROD, a CD version of the draft EIS, final EIS, and ROD shall be provided to OLE, along with the requested number of hard copies of the ROD. The CD should contain documents compatible with ERMS. When the documents have been prepared by a consultant, the consultant should coordinate with the Document Manager on the specific CD format and content. (Refer to Chapter 2, *Project Management,* for further information.)

15.5 Reevaluations of Environmental Impact Statements

ⓘ ***23 CFR 771.129, Re-evaluations.***

A reevaluation is a written assessment of the validity of information contained in a draft EIS, final EIS, or ROD. A draft EIS or final EIS generally will remain valid for 3 years without federal action following the publication of the NOA. A review conducted in coordination with the FHWA is required to determine whether a written reevaluation of an EIS may be necessary.

15.6 Supplemental Environmental Impact Statements

ⓘ ***23 CFR 771.130, Supplemental Environmental Impact Statements.***

ⓘ ***40 CFR 1502.9, When to Prepare a Supplemental EIS.***

ⓘ ***FHWA TA T6640.8A, Part XII, Supplemental EISs.***

A Supplemental EIS (SEIS) is a detailed written statement that documents changes in conditions surrounding a proposed action that were not discussed in the draft EIS or final EIS. When an SEIS is required, a supplement to a draft EIS will be prepared and then a final EIS will be prepared. An SEIS may be prepared between the draft EIS and final EIS, following the final EIS, or following the ROD. An SEIS may be prepared when there have been changes to the proposed action, changes in environmental conditions in the project area, or the introduction of new information not previously known to Iowa DOT, which may have new effects upon, or changes to, significant impacts.

15.7 Tiering of Environmental Impact Statements

ⓘ ***23 CFR 771.111, Early coordination, public involvement, and project development.***

ⓘ ***23 CFR 771.135, Section 4(f) (49 U.S.C. 303).***

ⓘ *40 CFR 1502.20, When to Use Tiering.*

ⓘ *40 CFR 1508.28, Tiering.*

ⓘ *Questions 24b and 24c, CEQ's 40 Questions.*

The concept of tiering was introduced in the 1978 CEQ regulations, with the intent of encouraging agencies "to eliminate repetitive discussions and to focus on the actual issues ripe for decision at each level of environmental review." Tiering of EISs refers to the process of addressing a broad, general program, policy or proposal in an initial EIS (Tier I) and then analyzing a site-specific project element of the broader plan in a subsequent EIS, EA, or CE (Tier II).

Tiering is useful for projects where the geographic scope is large and the study may result in the identification of several smaller projects, each with logical termini, but not needing to be implemented in the same time frame. Examples could include sub-area studies involving a multitude of access considerations or improvement studies of longer routes across a broader reach of the state.

Tiering allows for the preparation of new, more narrowly focused environmental documentation in Tier II without duplicating relevant parts of previously prepared, more general, or broader Tier I documents. The more narrowly focused environmental document refers to the general discussions and analysis contained in the broader document, but concentrates its discussion on the issues and impacts of the project that were not specifically covered in the broader document (see the following link for more information: http://ceq.eh.doe.gov/nepa/regs/1983/1983guid.htm.

The general procedures for preparing tiered EISs are the same as those for a regular EIS. If an environmental document is a follow-on action to a previous EIS, material already covered in the previous EIS should not be repeated, but the environmental document should simply state that it is being "tiered" to the previous EIS. The new environmental document must identify the document to which it is tiered, and indicate where the earlier document is available. Both documents must be available for public review. The new environmental document must also briefly summarize relevant portions of any document to which it is tiered to the extent necessary for understanding the relationship between the two documents.

The level of detail involved in the alternatives development and the impact analysis will, in many cases, be different for Tier I and Tier II documents. Generally, the first tier will look at a larger area or more global issues (such as a program of improvements) and the data and surveys may be less detailed than a traditional project-level EIS. Subsequent second tier documents may use more traditional study/impact assessment methodologies.

When a tiered process is applied, it is possible that the second tier document(s) may not be an EIS. In some cases, more than one second tier document may be generated (particularly where the first tier examined an improvement program), for each specific improvement element. Each of the proposed improvements should be evaluated to determine the appropriate document category, which may be an EIS, EA, or CE. Even where there is only one second tier document, a determination should be made, based on the findings of the first tier EIS, as to whether it is appropriate to continue with an EIS classification for the second tier.

15.8 Formatting and Style

The following text provides guidance on representation of specific formatting and style issues within Iowa DOT EISs.

15.8.1 References/Citations

References, footnotes, and citations should follow the styles used in the *Chicago Manual of Style,* unless otherwise specified by the Document Manager.

15.8.2 Binding Type

Final, printed versions of EISs should be bound with a comb or spiral-style binding. Staples, binder clips, paper clips, and rubber bands are not acceptable. If the document is so large that it becomes necessary

to split it into multiple volumes, each volume shall contain a table of contents for the entire set of project volumes and shall clearly label the contents of individual volumes on their covers.

15.8.3 Section / Page Numbering

Sections in the document should be numbered. The purpose and need will generally be Section 1 and begin with page 1, with any preceding pages (e.g., an executive summary) numbered with lower case Roman numerals. Page numbering within the sections may be either consecutive throughout the document or by section (e.g., page 1-1, 1-2, etc. for Section 1; page 3-1, 3-2, etc. for Section 3).

15.8.4 Table / Figure Naming and Numbering

Tables and figures should be numbered consecutively within a section (e.g., Table 3-1, 5-1, etc.). Each table or figure should be labeled. Titles should be placed above tables and below figures.

15.8.5 Number of Copies

The number of copies of an EIS to be printed for circulation should be discussed with the OLE's Document Manager. While the number of draft EIS and final EIS review copies are generally the same, the number will vary for each project, depending on the project's scope, size, location, and potential for controversy. Normally, Iowa DOT will furnish the draft and final EIS free of charge. However, with FHWA concurrence, the party requesting the EIS may be charged a fee not more than the actual cost of reproducing the copy or the party may be directed to the nearest location where the statement may be reviewed. CEQ regulations also allow, in the case of unusually lengthy documents, for the OLE to provide an alternative circulation process, such as the circulation of a summary document. See 40 CFR 1502.19, Circulation of Environmental Impact Statement, for more information.

Iowa DOT is aware of the resources used and cost to reproduce an EIS. To increase the public distribution of EISs, OLE will consider the appropriateness of distributing a CD version of the document (see below). Placing the document on Iowa DOT's website would also increase the availability of EISs to the public. For consultant-prepared environmental documents, the contractual scope of work should reflect an estimate of the number of copies expected to be printed for budgeting purposes.

15.8.6 Electronic / CD Versions

More than one electronic format of environmental documents may be required or applicable. When an EIS is consultant-prepared, the Document Manager should be consulted to determine the appropriate electronic format. Electronic versions of EISs delivered to Iowa DOT for their records should be compatible with ERMS.

For public distribution of electronic versions of EISs, the files should be presented in Adobe Acrobat PDF format. Individual sections of the EIS should be created as separate Acrobat PDF files, and a table of contents file should be created to provide links to each of the other sections.

Electronic resource data gathered or created during the course of project study and exhibits or figures created to represent environmental features should be delivered to Iowa DOT in GIS format, where applicable. Chapter 46, *Geographic Information Systems,* discusses GIS requirements for OLE.

Design information developed during the course of the project study should be delivered to Iowa DOT in MicroStation format. Chapter 10, *Microstation/Geopak Practices,* discusses MicroStation requirements for OLE.

15.8.7 Graphics and Exhibits (GIS and CADD)

Graphics and maps should be used throughout the EIS, particularly where a graphic may convey information more efficiently or effectively than would narrative. All EISs, at a minimum, should include project location maps developed using GIS.

Color may be used in graphics, but the expense of reproducing color graphics should be considered. Graphics presented as separate pages should

generally be 8.5 by 11 inches. Graphics on 11- by 17-inch pages are also acceptable, but should be z-folded, bound within the document, and the title should be placed on the lower right-hand side of the page where it can be seen even when z-folded. Pull-out graphics are not generally acceptable. Smaller graphics may be placed on the page with the text that refers to it. All maps should include titles, scales, north arrows, and legends; and graphics should be referenced appropriately in the text.

If a consultant is developing the project, they may include their company logo on graphics and maps, and on the back cover of the environmental document. As previously noted, the consultant shall not place their company logo on the front cover of the EIS, nor should the consultant logo be larger than the Iowa DOT's logo.

15.8.8 Locations of Graphics in Documents

It is FHWA's preference that all graphics be placed at the end of their corresponding sections.

15.8.9 Acronyms

The first time an acronym is used in the text, it should be spelled out with the acronym in parentheses following the full wording. Thereafter, the acronym alone may be used. For EISs, it is appropriate to also include a list of acronyms, usually after the table of contents.

NOTES:

Guidance for Preparing Environmental Assessments

CHAPTER 16

This chapter discusses the content, format, and processing requirements for Environmental Assessments (EAs) prepared for Iowa DOT projects. The material in this section is based on FHWA TA T6640.8A and FHWA's Iowa Division Office procedures, but it is adapted to the needs and preferences of Iowa DOT. Iowa DOT's website (OLE, NEPA Home) has many forms and templates that are useful for practitioners. When working on an EA, please check the website to obtain the latest version of these documents.

16.1 Environmental Assessment Basics

ⓘ *23 CFR 771.119, Environmental Assessments.*

ⓘ *40 CFR 1501.3, When to Prepare an Environmental Assessment.*

ⓘ *40 CFR 1501.4(b), When to Prepare an Environmental Assessment.*

ⓘ *CEQ, 40 Questions.*

ⓘ *FHWA TA T6640.8A, Part II, Environmental Assessment.*

ⓘ *How to Prepare Environmental Assessments (Iowa Department of Transportation Guide).*

According to the FHWA Technical Advisory, "The primary purpose of an EA is to help the FHWA decide whether or not an Environmental Impact Statement (EIS) is needed." While Council on Environmental Quality (CEQ) originally created the EA primarily to be used when there is not enough information to decide whether the proposal may have significant impacts, it is now common for the EA to be used to aid in an agency's compliance with NEPA.

An EA should be prepared if:

- An action is not listed as a CE; or if the action is not listed as an action normally requiring an EIS and a decision to prepare an EIS has not been made.
- Additional analysis and public input is needed to know whether the potential for significant impact exists.
- Preliminary analysis indicates there is no scientific basis to believe significant impacts would occur, but some level of controversy over the use of one or more environmental resources exists.

An EA, which is a Class III action type (23 CFR 771.115[c]), must lead to a Finding of No Significant Impact (FONSI) or a Notice of Intent (NOI) and an EIS. If during the course of preparing an EA it becomes apparent that the project has a potentially significant impact, FHWA should be contacted and a decision made whether an EIS should be prepared. Conversely, if the

This chapter discusses the content, format, and processing requirements for Environmental Assessments (EAs) prepared for Iowa DOT projects.

EA does not uncover a significant impact, the NEPA process would be concluded by preparing a FONSI. The EA process is shown in Exhibit 16-1.

The Technical Advisory notes that an EA's content should be directed toward only those resources or features that have the potential to be significantly impacted. The EA should be a concise document that does not provide lengthy descriptions of studies and analyses, but rather focuses on clearly written summaries. The emphasis of the FHWA Technical Advisory is on brevity, but it should not be at the risk of omitting important information needed to determine whether the project may result in significant impacts. Although page limits have not been established by regulation, the CEQ suggests that EAs should not exceed 15 pages.

16.2 Iowa DOT Streamlined Environmental Assessment Process

In March 2003, Iowa DOT, in conjunction with the FHWA Iowa Division Office, initiated a process for streamlining EAs prepared for Iowa DOT projects. This process will be implemented on EAs developed by Iowa DOT.

The intent of this process is to allow an EA to focus solely on the issues that apply to a given project; in other words, those resources or issues that actually affect decision-making. Rather than expending effort studying and discussing resources that are either not present in a project area or are clearly not impacted, the streamlined process directs the content of the EA toward resources that are present and are potentially impacted by an alternative. It is the resources in this category that have a bearing on the decision-making process.

While focusing the EA on impacted resources better delineates the decisions to be made and reduces wasted effort studying and documenting unaffected resources, it is still important to provide documentation that the unaffected resources were properly identified and considered before being dismissed. The streamlined EA process provides a record-keeping function for resources in this category that provides the needed documentation while still keeping the focus on key resources and issues.

At the outset of the streamlined process, either the NEPA Compliance Document Manager or the Project Consultant, in consultation with Iowa DOT, will complete the Document Manager's EA Worksheet. The Document Manager's EA Worksheet is used to determine the appropriate content of the EA, and where applicable, will help to define the appropriate scope of work for a Project Consultant. The worksheet is a working document and will provide a record of the decisions made throughout the environmental review/study process. The content of the resource discussions in the subsequent EA will concentrate on the resources and issues that have been identified on the worksheet as having a known or potential "quantifiable" impact. Appendix 16a shows the Document Manager's EA Worksheet.

The Document Manager's EA Worksheet contains two sections: a check sheet and a resource summary section. The resource summary section will reference the technical documents and other sources used in the environmental review process.

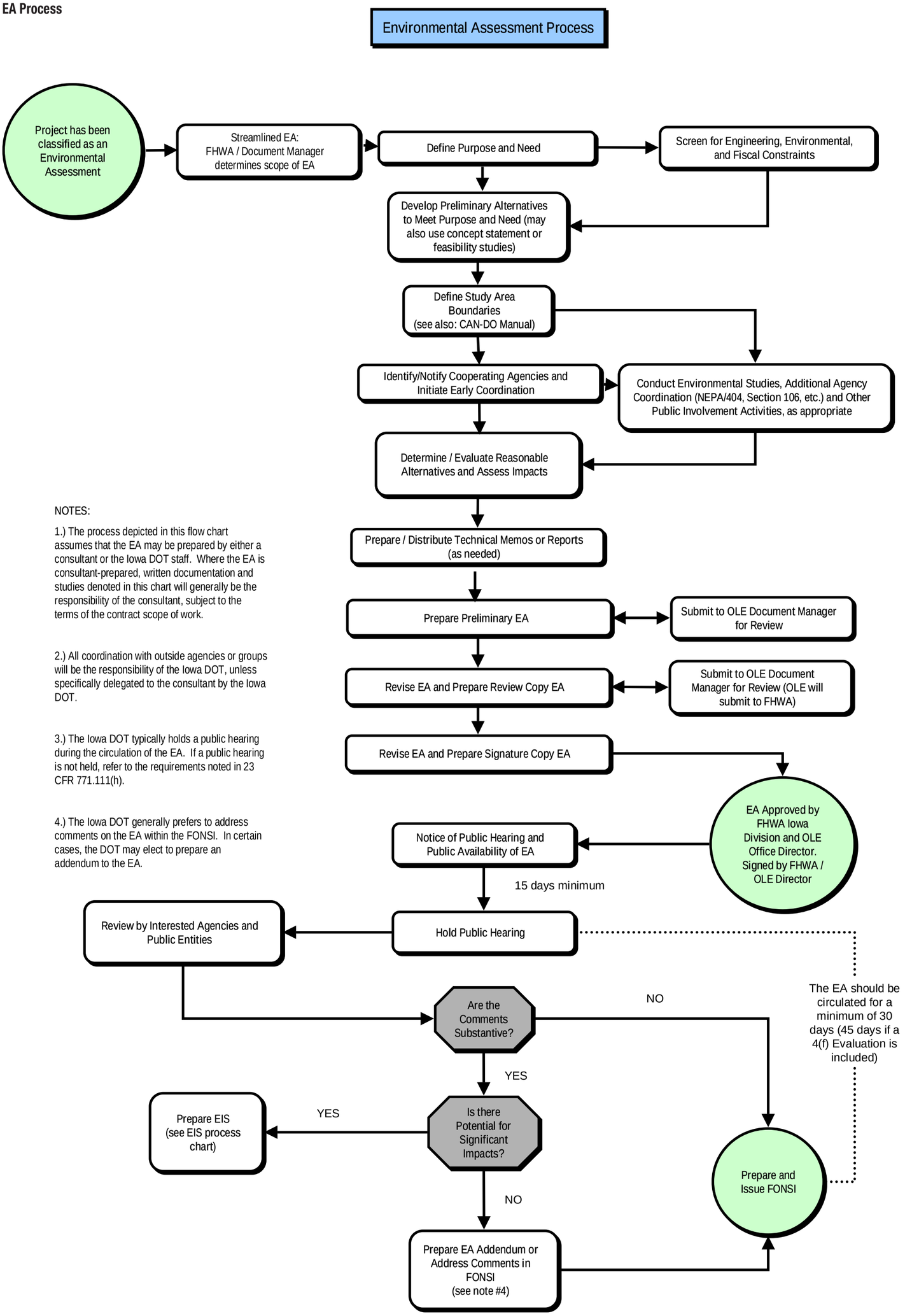
16.2.1 Instructions for Completing the Worksheet

1. Once it has been confirmed that the EA classification is appropriate for the project, the status of the resource issues should be noted on to the Document Manager's EA Worksheet. This represents the starting point of the environmental studies and points to which resources will require additional field studies or analysis.

2. As resource studies are completed and alternatives are refined, the check sheet portion of the Document Manager's EA Worksheet should be updated. This process should be ongoing and continuous throughout the development of the EA.

3. Resources that have either not been identified in the project area or have been identified as not being impacted should be noted in the resource

Exhibit 16-1
EA Process



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summary section of the worksheet. In the spaces provided for the resource, record the evaluation and date, the source of the data consulted to make the determination, and the name of the individual who made the determination.

4. The NEPA Compliance Document Manager or the Project Consultant, in consultation with the DOT, will delete the fields in the resource summary section for those resources that will be discussed in the EA.

If new information becomes available during the course of the study, a revision of the scope and content of the EA may be required.

16.2.2 Early Coordination

Per 23 CFR 771.19 (b) [Environmental Assessments], Iowa DOT conducts early coordination activities to notify federal, state, and local agencies of its intent to prepare an EA and to solicit agency comments regarding the proposed project as it relates to the agency's area of expertise. The key to a successful NEPA project is to coordinate with all agencies that can provide data and information that will yield a comprehensive environmental document. One of Iowa DOT's early coordination activities is to prepare an early coordination letter describing the project, and to send it to applicable agencies. Iowa DOT will also complete a Tribal Notification form and send it to Native American representatives for the county in which the project is located. Any materials or information initially sent to Native American tribes must be approved by Cultural Resources Management Section of OLE and printed on Iowa DOT letterhead.

Although it is unlikely, Iowa DOT and FHWA may decide that as a result of information received during early coordination activities, the EA process would benefit from following the Section 6002 provisions of the Safe Accountable, Flexible, Efficient Transportation Equity Act (SAFETEA-LU). Information about the SAFETEA LU Section 6002 process is found in Chapter 15.

16.2.3 Content of Streamlined EAs

Iowa DOT recommends the following format and content for EAs:

- Cover sheet
- Preface/Table 1 – Resources Considered
- Table of Contents
- Description of Proposed Action
- Project History
- Purpose and Need for Action
- Alternatives
- Environmental Analysis
- Disposition
- Comments and Coordination
- Appendix A Streamlined Resource Summary
- Appendix B Agency and Tribal Coordination
- Other Appendices (as needed, e.g. Farmland Protection Form)

A Section 4(f) Statement, if required, is a stand-alone document that will be bound at the back of the EA. A description of the content that Iowa DOT recommends for each of the above sections is found below.

Cover Sheet

Per FHWA TA T6640.8A, there is no required format for an EA cover; however, the EIS cover sheet format recommended by FHWA TA T6640.8A is used by Iowa DOT with the following exceptions:

- A document number is not necessary.
- A due date for comments is not necessary unless the EA is being circulated for comments.

The EA's cover should be printed on colored cardstock. The cover should reflect the information required for an EIS listed in FHWA TA T6640.8A, as noted above. It should not contain a project summary, photos or other graphics, or consultant logos.

For consultant-prepared EAs, the consultant should ensure that names, addresses, and phone numbers of Iowa DOT and FHWA staff are correct. Phone

numbers included on covers of (or within) EAs should be the main phone numbers for the agency offices, not direct extensions.

Two side-by-side signature blocks should be included on the cover sheet. A single line for the date of approval should be located below the signature blocks and centered on the page. The cover sheet will be signed by representatives of FHWA and Iowa DOT OLE. The OLE Office Director will sign for Iowa DOT. (See Appendix 16b for an example.) On Local Systems projects the signature(s) of the designated official for the responsible city or county shall also be included.

The cover page should include the following statement immediately above the signature lines:

The signatures are considered acceptance of the general project location and concepts described in the environmental document unless otherwise specified by the approving officials. However, such approval does not commit to approve any future grant requests to fund the preferred alternative.

Preface and Table 1 (Resources Considered)

The preface and shell for Table 1 are on page one. The preface language and the shell for the table are the same for all EAs. The boxes checked in the Table 1 should be coordinated with the NEPA Document Manager to ensure there is consistency with the Document Manager's EA Worksheet.

Table of Contents, Lists of Figures, and Tables

A table of contents and lists of the figures and tables incorporated in the EA should be included following the preface and table.

Description of Proposed Action

This section describes the project location, length, termini, access control, proposed improvements, etc. The description should specifically describe the proposed alternative, if one has been identified. Clearly labeled figures and diagrams of the project location should be included to better illustrate the project.

Project History

Briefly summarize the history of the project, including early planning stages, agency involvement, and a brief account of public or agency meetings. If the proposed project is part of a larger corridor project, this should be discussed briefly with a description of how the proposed project fits into the larger, overall project.

Purpose and Need for Action

The purpose and need statement should identify and describe the problem(s) that the proposed action is designed to correct (i.e., provide system continuity, alleviate traffic congestion, correct safety or roadway deficiencies, economic development, traffic safety, and local access). It should be clearly written so the need can be understood by readers unfamiliar with the project. Include needs that are clearly measurable and will be defendable in a court of law.

This section should be shared with the Iowa DOT NEPA Document Manager and FHWA before the preliminary EA is written.

Alternatives

When a preferred alternative exists, the EA should discuss the proposed alternative and identify any other alternatives considered, as well as the No-Build Alternative. If a preferred alternative has not been identified, the discussion should be on all alternatives under consideration. The EA does not need to evaluate in detail all reasonable alternatives for the project, and may be prepared for one or more build alternatives. This section should start with a summary paragraph like the one below:

> *This section will discuss the alternatives investigated to address the project's purpose and need. A range of alternatives was developed, including slight variations to the road's alignment. The Build Alternative, the alternatives considered but dismissed, and the Proposed Alternative are discussed below.*

Environmental Analysis

In an Iowa DOT EA, the section on impacts combines both affected environment and environmental consequences information. The proposed project could have either a negative or positive impact on a particular resource. This section should discuss any social, economic, and environmental impacts resulting from the alternative(s) being considered. The No-Build Alternative should be used as a basis of comparison with the proposed alternatives.

Not all of the topics listed in the Resources Considered table will be discussed in a streamlined EA. Only the impacted resources will be discussed. Indirect and direct impacts should be discussed in this section.

Start the section with the standard paragraph below, which reiterates the streamlined EA process:

> *This section will describe the existing socioeconomic, cultural, natural, and physical environments in the project corridor that will be affected by the proposed alternative. The resources with a check in the second column on Table 1, located at the beginning of the document, are discussed below.*

The socioeconomic, natural resource, cultural, and physical resource topics commonly encountered on Iowa highway projects are listed in Part IV of the manual . The methodology for studying and documenting each of these resource areas is also covered in Part IV of the manual.

Disposition

This section informs the reader of the status of the process and whether the next appropriate step should be to prepare an EIS or a FONSI. The following paragraph should be used if the project will have no impacts:

> *This streamlined EA concludes that the proposed project is necessary for safe and efficient travel within the project corridor and that the proposed project meets the purpose and need. The project will have no significant adverse social, economic, or environmental impacts of a level that would warrant an environmental impact statement. Alternative selection will occur following completion of the public review period and public hearing.*
>
> *Unless significant impacts are identified as a result of public review or at the public hearing, a FONSI will be prepared for this proposed action as a basis for federal-aid corridor location approval.*

This section should also include a list of any permits that will be required and include the project's statewide transportation improvement program/transportation improvement program (STIP/TIP) status.

Comments and Coordination

This section reports on agency and tribal coordination, the project's NEPA/404 merger coordination process, if used, and the public involvement process. The agency and tribal coordination text should describe early coordination efforts, including a list of all federal, state, local, and tribal agencies contacted as part of early coordination, and an indication of which agencies responded. This could be done in a table format. Early coordination response letters should be placed in Appendix B. Important issues from the responses should be summarized in this section and addressed as necessary in other parts of the EA. The agency and tribal coordination text should also describe early coordination efforts completed by the metropolitan planning organization/transportation management area (MPO/TMA) to satisfy NEPA and Transportation Planning (23 CFR 450.212 and 450.318) requirements.

If the NEPA/404 merger coordination process was implemented on the project, provide dates the meetings were held, a brief description of the concurrence point meetings and comments received at those meetings.

This section should include a brief summary of public comments and concerns generated as part of any public information meetings and the dates and locations the meetings were held.

Appendices

For streamlined EAs, Appendix A will be the completed Streamlined Resource Summary table, which will contain only the resources not discussed in the text of the EA and the reasons why the resources were not discussed. Appendix B will include correspondence documenting the project's agency and tribal coordination. Additional appendices should be added as needed for information such as the farmland protection form and technical material that supports information in the body of the EA.

List of Preparers, Index, and Acronyms (Not Included in an EA)

A list of preparers and an index should not be included with an EA unless requested by OLE's Document Manager. A list of acronyms should not be included either; however, acronyms should be spelled out the first time they are used.

16.3 Iowa DOT and FHWA Review Process

For consultant-prepared environmental documents, there are three distinct submissions related to the review process for an Iowa DOT EA: the preliminary EA, the review copy EA, and the signature copy EA. When a Section 4(f) Statement is being prepared for circulation with the EA, its review process should follow the EA review process. See Chapter 19, *Section 4(f) Statements*, for additional information about Section 4(f).

16.3.1 Preliminary Environmental Assessment

The preliminary EA is a rough, working draft of the EA. A Microsoft Word document of the preliminary EA should be e-mailed to Iowa DOT or placed on an ftp site. If a subconsultant is preparing the EA, the subconsultant should coordinate with the Iowa DOT Document Manager to determine whether hard copies of the preliminary EA are also needed. Portions of the text and graphics may be incomplete at this point, as elements of the project may still be under development.

The purpose of this submission is to provide OLE staff with an opportunity for an early review while time remains to make changes to the document without impacting the project's schedule.

Preliminary copies go only to the OLE's Document Manager. The OLE will review the document and return it with or without comments. Typically, only 1 copy must be submitted at this time.

16.3.2 Review Copy Environmental Assessment

The formal review copy EA, which should have complete text and graphics, will be sent to Iowa DOT electronically as a Microsoft Word document. Iowa DOT's NEPA document manager will transmit the formal review copy EA to the District Engineer, the resource specialists within OLE, and FHWA. FHWA has agreed to complete its review within 3 weeks whenever practicable. For longer documents, providing 2 copies to FHWA may expedite review times. If a subconsultant is preparing the EA, the subconsultant should coordinate with the Iowa DOT NEPA Document Manager to determine whether hard copies of the formal review copy EA are also needed.

Typically, OLE staff will provide electronic review comments. FHWA typically provides a typed list of their comments.

On more complex projects, a formal meeting between OLE's Document Manager and the consultant (with others as needed) may be necessary to review comments.

16.3.3 Environmental Assessment Signature Copy

The signature copy is the final submission of the EA. This submission includes two separate signature pages. The signature page is a clean, white copy of the front cover.

Two copies of the EA should be submitted, one each for OLE and FHWA. When FHWA signs the EA signature pages, one original of the signature

page will be returned to the consultant, along with directions for printing and distribution. The two signature version copies of the EA will remain with FHWA and Iowa DOT as suspense copies until the final printed version is presented to Iowa DOT.

If a Section 4(f) Statement is being circulated with the EA, separate signature pages for that document should be also included. The signature page is the final page in the Section 4(f) Statement.

16.4 Circulation / Notification Requirements

16.4.1 Distribution of Environmental Assessments

ⓘ ***23 CFR 771.119, Environmental Assessments.***

ⓘ ***FHWA TA T6640.8A: Guidance for Preparing and Processing Environmental and Section 4(f) Documents.***

Once FHWA and Iowa DOT have both signed the EA's cover sheet, copies of the EA should be printed and distributed as follows:

- One copy of the EA with a transmittal letter is sent to each cooperating or contributing agency.
- One copy of the EA is available for public inspection at both the Iowa DOT District Office and the FHWA Iowa Division Office. The FHWA should receive an additional copy for their files. Iowa DOT will place an additional copy in the agency library.

A Notice of Availability (NOA) for an EA need not be published in the *Federal Register*, as in the case of an EIS, but a notice about the availability of the document and an advertisement for a public hearing should be published in the local newspaper. For DOT projects (primary projects), the NOA will be prepared and published by the Public Involvement Section in coordination with the OLE NEPA Compliance Section. For Local Systems projects the NOA is prepared by the local government in coordination with the NEPA Compliance Section. The NOA should be a hardcopy document, submitted either alone or with the public hearing notice. The OLE website identifies the agencies that typically receive notification of the document.

- Although only a NOA is required, the OLE will send a copy of the EA with the NOA to the federal, state, and local government agencies likely to have an interest in the proposed action, special expertise or knowledge of issues addressed in the EA (see the OLE website for the distribution list). Generally, the agencies noted in the Iowa DOT database will be used for distribution, as this should be the most up-to-date listing. The author of the document should work with the OLE Document Manager to identify the appropriate recipients.
- When an individual Section 4(f) Statement has been prepared, the OLE will send a copy of the EA and Section 4(f) Statement to the appropriate jurisdictional resource agency pursuant to the Section 4(f) requirements (see Chapter 19), as well as other internal Iowa DOT offices as may be required.

Typically a total of 59 copies of an EA are printed, some for distribution and some for delivery to Iowa DOT. This number should be verified, however, with the OLE Document Manager. This distribution should include 6 copies of the EA in electronic format on CD. Adobe Acrobat PDF should be used for the file format on the CD. An electronic version compatible with the Iowa DOT's Electronic Records Management System (ERMS) standards should also be delivered to the OLE Document Manager. (See Chapter 2, *Project Management*.)

16.4.2 Document Comment Period

ⓘ ***23 CFR 771.119, Environmental Assessments.***

ⓘ ***40 CFR 1503, Commenting.***

ⓘ ***FHWA TA T6640.8A, Guidance for Preparing and Processing Environmental and Section 4(f) Documents.***

Following completion and distribution of the EA, the Public Involvement Section, in conjunction with the District, and the NEPA Compliance Section determines the appropriate public hearing date. The Public Involvement Section includes the NOA in the public hearing notice. The EA shall be available at the hearing and for a minimum of 15 days in advance of the hearing. Comments on the EA need to be submitted in writing to the OLE or FHWA Iowa Division Office within 30 days of the NOA, unless FHWA determines, for good cause, that a different comment period is warranted. Verbal comments may be submitted during the hearing.

When a public hearing is not held, the Public Involvement Section places a notice in a newspaper(s) similar to a public hearing notice, advising the public of the availability of the EA and where information concerning the project may be obtained. The notice invites comments from all interested parties. Comments need to be submitted in writing to OLE or FHWA Iowa Division Office within 30 days of the publication of the notice unless the FHWA determines, for good cause, that a different period is warranted (23 CFR 771.119).

16.5 Finding of No Significant Impact

A FONSI is a brief document with a signature sheet and a discussion of the comments and coordination related to the EA, important events since the EA was made available, special conditions necessary for location approval, and any errata related to the EA. The FONSI signature sheet is printed on cardstock paper as the FONSI cover and bound on top of the EA.

If no significant impacts are identified following the comment period for the EA, then a FONSI may be prepared.

Although a brief document, the FONSI should summarize both the public involvement and circulation aspects of the EA. It should summarize the comments received on the EA, including responses to comments, if any, and also state the date the EA was made available, the length of review period, and when the review period ended. If a public meeting or hearing was held, it should note the date, time, location, and attendance of the meeting/hearing, and relevant comments received. The document should include a reference to the meeting/hearing transcript and where it can be found.

Any changes in the project concept or content of the EA as a result of comments received on the EA or at the hearing should be included as EA errata. An addendum/supplement typically would not be prepared unless there were major changes or important new information that the public had not seen.

If the nature of the changes noted in the errata are considerable, coordination may be necessary with the FHWA Iowa Division Office, and an addendum to the EA may be required. For consultant-prepared EAs and FONSIs, a review of the comments received on the EA and at the public hearing is necessary with OLE staff prior to beginning preparation of the FONSI.

Iowa DOT also includes a section in the FONSI that discusses any commitments made to mitigation, permitting, or other agency coordination that remain to be fulfilled as part of the approval to expend federal funds. These items should also be noted in the project's Green Sheets (see Chapter 23, *Mitigation, Commitments, and Green Sheets)*.

For consultant-prepared FONSIs, two copies of the FONSI should be submitted to OLE for review, one of which OLE will send to FHWA. A separate FONSI signature sheet should be included with the submittal for FHWA's signature. (A signature sheet for the Section 4(f) Statement will be required if a Section 4(f) Statement was prepared.) If FHWA signs the FONSI, OLE will provide the original signature sheet to the consultant, along with instructions for distribution.

See Appendix 16c for an example FONSI.

FONSIs are bound on top of the EA/4(f) Statement for distribution. The FONSI should be the first document in the package and be bound within the same binder as the EA. FONSIs should not be attached to the EA with staples, binder clips, or rubber bands, etc.

16.5.1 Distribution of FONSIs

ⓘ ***23 CFR 771.121, Finding of No Significant Impact.***

ⓘ ***FHWA TA T6640.8A, Guidance for Preparing and Processing Environmental and Section 4(f).***

Following FHWA signature of the FONSI (concurrence on the proposed action), OLE typically will send an NOA of the FONSI to federal, state, and local government agencies likely to have an interest in the proposed action (23 CFR 771.121(b)). The OLE website identifies the agencies that typically receive notification of the document.

Although formal distribution of a FONSI is not required by law, OLE will send a copy of the FONSI to agencies who are party to the NEPA/404 Merger Agreement, who commented on the EA, or who requested to be advised of the project decision, with the disposition of their comments.

An electronic copy of the FONSI shall be provided to the Iowa DOT Project Manager at this time, along with necessary hard copies. All electronic copies shall be complete and conform to standards provided by the NEPA Section Manager. Electronic versions must be compatible with ERMS.

Note: If Section 4(f)/6(f) is part of the document, distribute 7 copies of the final document to the U.S. Department of the Interior. If the Section 4(f) resource is a historic structure, send copies to the State Historical Society.

In contracting for NEPA work, an EA should be specified if the project has been classified as such during coordination with FHWA. The EA task in the scope of work should not automatically assume a FONSI will be prepared. A FONSI may be scoped, but included as a separate task order.

16.6 Formatting and Style

The following text provides guidance on representation of specific formatting and style issues within Iowa DOT EAs.

16.6.1 References/Citations

References, footnotes, and citations should follow the styles used in the *Chicago Manual of Style*, unless otherwise specified by the Document Manager.

16.6.2 Binding Type

Final, printed versions of EAs should be bound with a comb or spiral binding. Staples, binder clips, paper clips, and rubber bands are not acceptable. If the document is so large that it becomes necessary to split it into multiple volumes, each volume shall contain a table of contents for the entire set of project volumes and shall clearly label the contents of individual volumes on their covers.

16.6.3 Table / Figure Naming and Numbering

Tables and figures should be numbered consecutively within the EA. Each table or figure should be labeled. Titles should be placed above tables and below figures.

16.6.4 Electronic / CD Versions

When an EA is consultant-prepared, the Document Manager should be consulted to determine the appropriate electronic format. Electronic versions of EAs delivered to Iowa DOT for their records should be compatible with ERMS.

16.6.5 Graphics and Exhibits (GIS and CADD)

Graphics and maps (GIS and CADD) should be used throughout the EA, particularly where a graphic may convey information more efficiently or effectively than would narrative. All EAs shall include project location maps, at a minimum.

Color may be used in graphics, but the expense of reproducing color graphics should be considered. Graphics presented as separate pages should generally be 8.5 by 11 inches. Graphics on 11- by 17-inch pages are also acceptable, but should be z-folded, bound within the document, and the title should be placed on the lower right-hand side of the page where it can be seen even when z-folded. All maps should include scales, north arrows, and legends.

If a consultant is developing the project, they may include their company logo on graphics and maps, and even on the back cover of the EA. The consultant should not place their company logo on the front cover of the EA, nor should the consultant's logo be larger than Iowa DOT's logo.

16.6.6 Locations of Graphics in Documents

In an EA, full-page graphics may be intermixed with the text (placed immediately following the first page where referenced). For larger EA projects, full-page graphics must be placed at the end of their corresponding sections.

NOTES:

Agency Coordination

CHAPTER 17

This section identifies the general procedures and Iowa DOT guidance that direct agency coordination in the project development process. More detailed procedures for resource-specific coordination (e.g., permit application materials) are discussed in the respective resource chapters in Part IV of this manual and in Chapter 18, *NEPA/404 Concurrent Process*. Templates or sample documents referenced in this chapter can be found on the OLE website.

17.1 Legislation, Regulations, and Guidance

This section provides a summary of the legislation that may apply to agency coordination for a project. This list, while not all-inclusive, provides an introduction to coordination requirements. For the regulatory requirements of a specific resource, see the appropriate chapter in Part IV.

17.1.1 Federal Legislation and Regulations

ⓘ ***23 USC 101 (Public Laws 109–59109–59, § 1(a), Aug. 10, 2005, 119 Stat. 1144)*** Safe Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). SAFETEA-LU builds on the foundation of Intermodal Surface Transportation Efficiency Act, supplying the funds and refining the programmatic framework for investments needed to maintain and grow the nation's vital transportation infrastructure.

ⓘ ***42 USC 4321, National Environmental Policy Act of 1969, as amended.*** NEPA establishes a national environmental policy and provides a framework for environmental planning and decision-making by federal agencies. The NEPA process consists of a set of fundamental objectives that include interagency coordination and cooperation and public participation in planning and project development decision-making.

ⓘ ***40 CFR Parts 1500 – 1508, Regulations for Implementing NEPA.*** The regulations in this section of the Code of Federal Regulations were issued by the Council on Environmental Quality (CEQ) in 1978. These rules were amended once in 1986. This section sets forth requirements for the implementation of NEPA, with the directive that individual federal agencies must develop regulations for implementing NEPA that are specific to the mission of the particular agency.

ⓘ ***23 CFR Part 771, FHWA Environmental Impact and Related Procedures.*** As noted above, individual federal agencies were directed to develop regulations to implement NEPA within the context of the agency's mission. This section of Title 23 establishes the requirements for FHWA projects.

This section identifies the general procedures and Iowa DOT guidance that direct agency coordination in the project development process.

ⓘ ***23 CFR 774, March 12, 2008, Section 4(f) of the DOT Act.*** Section 4(f) stipulated that the Federal Highway Administration (FHWA) and other DOT agencies cannot approve the use of land from publicly owned parks, recreational areas, wildlife and waterfowl refuges, or public and private historical sites unless the following conditions apply: there is no feasible and prudent alternative to the use of land, and the action includes all possible planning to minimize harm to the property resulting from use. See Chapter 19 for more information.

ⓘ ***16 USC 460-4 to –11, (P.L. 88-578), Section 6(f).*** The Land and Water Conservation Fund (LCWF) Program, Section 6(f) under legislation 16 USC 460-4-11, was established in 1965 and provides matching funds to states or municipalities for planning, improvement, or acquisition of outdoor recreational lands. The LWCF program is intended to increase the net quantity of public, outdoor recreational space. See Chapter 20 for more information.

ⓘ ***16 USC 470 et seq, (P.L. 89-665) The National Historic Preservation Act of 1966, as amended.*** The National Historic Preservation Act, first passed in 1966, established the U.S. policy of preserving history, while balancing that preservation with concerns for current, efficient use of property. See Chapter 42 for more information.

ⓘ ***36 CFR 800, Advisory Council on Historic Preservation, Section 106—Protection of Historic Properties.*** The Advisory Council on Historic Preservation amendments to the regulations that implement Section 106 of the National Historic Preservation Act. See Chapter 41 for more information.

ⓘ ***33 CFR 325 and 327, Department of the Army Permit Action.*** The application and public hearing requirements of the Department of the Army for a permit action or federal project, administered by the U.S. Army Corps of Engineers. See Chapter 42 for more information.

ⓘ ***33 CFR 115.60 Bridge locations and clearances; administrative procedures.*** Identifies the procedures of the U.S. Coast Guard for applications for bridge construction permits. See Chapter 19 for more information.

ⓘ ***16 USC 661-666(C) Fish and Wildlife Coordination Act.*** Provides for early coordination in project development with the U.S. Fish and Wildlife Service (USFWS) and State Fish and Wildlife Agency on conservation, maintenance, and management of wildlife resources. See Chapter 30 for more information.

ⓘ ***33 USC 1251 Federal Water Pollution Control Act (1972), as amended by the Clean Water Act (1977 & 1987) Section 402.*** The primary goal of the Clean Water Act is to restore and maintain the chemical, physical, and biological integrity of the nation's waters. Section 402 of the Clean Water Act prohibits the discharge of any pollutant to waters of the U.S. without an authorized National Pollutant Discharge Elimination System (NPDES) permit. See Chapter 25 for more information.

ⓘ ***Executive Order 11988, Floodplain Management (projects with significant floodplain encroachments).*** Seeks to avoid to the extent possible the long and short term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative. See Chapter 29 for more information.

ⓘ ***Executive Order 11990, Protection of Wetlands (projects affecting wetlands).*** Seeks to avoid to the extent possible the long and short term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative. See Chapter 28 for more information.

17.1.2 State Legislation and Regulations

ⓘ ***Iowa Code, Chapter 6B (Procedure under Eminent Domain)—See Chapter 40 for more information.***

ⓘ ***Iowa Administrative Code, Section 761 (Transportation Department).***

17.1.3 Interagency Memoranda of Understanding

ⓘ ***Statewide Implementation Agreement, NEPA and Clean Water Act Section 404 Concurrent NEPA/404 Processes For Highway Projects in Iowa (August 2001).*** Implements a concurrent NEPA/404 process for highway projects in Iowa. See Chapter 18 for more information.

17.1.4 Guidance Documents

ⓘ ***FHWA TA T6640.8A, Guidance for Preparing and Processing Environmental and Section 4(f) Documents.*** This document, issued October 30, 1987, contains a wealth of information about the content and format of environmental documentation on FHWA projects, including Section 4(f) Statements. While FHWA TA T6640.8A is not a regulatory document, it is a critical guidance document for all projects developed under FHWA jurisdiction.

ⓘ ***SAFETEA-LU Environmental Review Process (Public Law 109-59) November 15, 2006.*** This section of SAFETEA-LU prescribes changes to existing FHWA and Federal Transit Administration (FTA) procedures for implementing NEPA, as amended, and for implementing the regulations of CEQ, 40 CFR parts 1500 through 1508. These changes are the result of efforts to make the environmental review process more efficient and timely, and to protect environmental and community resources. This should result in expedited approvals of urgently needed transportation improvements such as those identified by U.S. DOT's congestion initiative. Section 6002 of SAFETEA-LU describes the roles of the project sponsor and the lead, participating, and cooperating agencies; sets new requirements for coordinating and scheduling agency reviews; broadens the authority for states to use federal funds to ensure timely environmental reviews; and specifies a process for resolving interagency disagreements.

17.2 Resource / Regulatory Agencies

A fundamental element of Iowa DOT project development is coordination of project issues, both with the public, as discussed in Chapter 44, *Public Involvement,* and with agencies that have jurisdiction over resources. The agencies with which coordination may be necessary represent a wide range of interests, backgrounds, and authorities. Among these are federal agencies charged with implementing federal legislation and regulations as well as local government bodies with jurisdiction over the management of parks within a community.

By involving and coordinating with these diverse agencies at early points in project development, resource issues can be identified early enough to allow the greatest opportunity to avoid and minimize impacts. Such early identification and coordination also encourages the most efficient use of schedule and study funding. Early identification of resources and potential constraints can save time and effort by limiting development of alternatives which may not be valid from a resource impact perspective. Table 17-1 contains a list of potential resource and regulatory agencies with jurisdiction over resources that may be involved in a proposed action. The list is not intended to be all-inclusive. Agency coordination follows through the entire project, including the construction phase for resources that require mitigation.

Coordination with the FHWA Iowa Division office is also required. The FHWA has an oversight role on projects using federal funds or requiring a federal approval under the jurisdiction of the FHWA. The FHWA is the lead agency when a NEPA document is being prepared. Specific points of coordination with the FHWA are also noted in Parts II and III of this manual.

17.2.1 The Role of Agencies in the Coordination Process

The role of a local, state, or federal agency in the NEPA process depends on the agency's expertise and relationship to the proposed undertaking. The key to a successful NEPA process is to coordinate with all agencies that can provide data and information that will yield a more comprehensive environmental document. It is also good NEPA practice to coordinate with agencies who request information about the project regardless of the information they can provide the project.

Table 17-1

List of Potential Resource/Regulatory Agencies and Possible Reasons for Involvement	
Agency	When Involved and Why
Advisory Council on Historic Preservation	Agency should be consulted early in process on resources under its jurisdiction, such as historic sites, buildings, structures, and objects significant in American architecture, archeology, and culture.
Federal Emergency Management Agency	Agency should be consulted early in the project to provide input on resources under their jurisdiction, such as floodplains and floodways.
FHWA Iowa Division Office	Coordination with the FHWA will be required throughout the project development process when federal funds are being used or a federal permit under FHWA jurisdiction is required.
National Park Service (U.S. Department of the Interior)	Agency should be consulted early in process to provide input on resources under their jurisdiction, such as historical and archeological preservation, land and water usage.
Natural Resources Conservation Service	Agency should be consulted early in process to provide input on resources under their jurisdiction, such as agriculture and wetlands.
U.S. Army Corps of Engineers	Agency should be consulted early in process to provide input on resources under their jurisdiction, such as floodplains, wetlands, and navigable waters.
U.S. Environmental Protection Agency	Agency should be consulted early in process to provide input on resources under their jurisdiction, such as wetlands, regulated substances, and air quality.
U.S. Coast Guard	Agency should be consulted early in process to provide input on resources under their jurisdiction, such as navigable waters.
U.S. Department of Housing and Urban Development	Agency should be consulted early in process to provide input on resources under their jurisdiction, such as socioeconomics.
U.S. Federal Railroad Administration	Agency should be consulted early in process to provide input on resources under their jurisdiction, such as railroads.
U.S. Federal Transit Administration	Agency should be consulted early in process to provide input on resources under their jurisdiction, such as public transportation facilities.
U.S. Fish and Wildlife Service	Agency should be consulted early in process to provide input on resources under their jurisdiction, such as fish and wildlife, and threatened and endangered species.
Iowa Department of Agriculture and Land Stewardship	Agency should be consulted early in process to provide input on resources under their jurisdiction, such as agriculture.
Iowa Department of Natural Resources (Iowa DNR)	Agency should be consulted early in process to provide input on resources under their jurisdiction, such as wetlands, regulated substances, air quality, sovereign lands, and floodplains.
Metropolitan Planning Organizations/Regional Planning Agencies	Agencies should be consulted early in the process to provide information on existing conditions in a project area.
Native American Tribes	Tribes should be consulted early in the process to provide input on land and resources under their jurisdiction.
State Historical Society of Iowa	Agency should be consulted early in process to provide input on resources under their jurisdiction, such as historic sites, buildings, structures, and objects significant in architecture, archeology, and culture.
Local municipalities/county agencies	Agencies should be consulted early in the process to provide information on existing conditions in a project area.

The number of agencies involved in a project and their levels of involvement will vary in response to the type and level of project impacts. While there are no firm rules on the agencies that will be involved in Iowa DOT projects, it is generally true that there will be a greater level of agency involvement in projects requiring an Environmental Impact Statement (EIS) (rather than an Environmental Assessment [EA] or Categorical Exclusion [CE]) simply because of the range and potential significance of project impacts. The following section explains Iowa DOT's agency coordination process in the NEPA process.

17.2.2 Resource Studies Coordination

Some special studies and/or environmental permits require agency and public coordination. Following is a list and a brief explanation of typical coordination and/or public outreach activities. These activities are discussed in detail in other sections of this manual, see noted references. For a complete list of federal agencies with jurisdiction by law or special expertise, see Appendix II of the CEQ regulations (49 CFR 49750).

- *Existing Conditions*—Information to better understand the existing conditions of the project area is typically obtained through coordination with the regional Metropolitan Planning Organization (MPO), county planning agencies and local governments. See Chapter 31 for more information.
- *Historic Structures/Archaeology*—The National Historic Preservation Act requires Iowa DOT coordination with the State Historical Preservation Officer (SHPO), Advisory Council on Historic Preservation, Native American tribes, local historical societies, and other interested parties as appropriate for consultation and concurrence. The National Historic Preservation Act of 1966, as amended (Section 106) (16 USC 470 et seq.) establishes a program for the preservation of additional historic properties throughout the nation. Public involvement is recommended at each major step in the Section 106 process and required for projects with an adverse effect. Public involvement is also recommended when a property is being considered for inclusion on the *National Register*, for designation as a National Historic Landmark or for nomination to the World Heritage List.
- Regulated Materials—Information on regulated materials in a project area is typically obtained through coordination with the U.S. Environmental Protection Agency (EPA) and Iowa Department of Natural Resources (Iowa DNR). See Chapter 41 for information about this process.
- *Bridge Permit*—The U.S. Coast Guard (USCG) bridge permit requires a public notice, public hearing, and comment period. The public hearing can either be held by the USCG or joined with the Iowa DOT's public hearing, if applicable (see Chapter 44). If a joint public hearing is held, the USCG takes the lead on publishing the public notice and establishing the comment period.
- *Surface Waters/Water Quality*—The Federal Water Pollution Control Act (1972), as amended by the Clean Water Act (1977 & 1987) requires coordination with U.S. Army Corps of Engineers (USACE), EPA, designated State Water Quality Control Agency, designated State Non-Point Source Pollution Agency, as appropriate, for any discharge of a pollutant into waters of the U.S. See Chapter 26 for information about this process.
- *Environmental Justice*—Executive Order 12898 of 1994 concerning Environmental Justice for minority and low-income populations requires that the public, including minority and low-income populations, have adequate access to information about federal-aid projects and their effects. It also requires that opportunities be provided for public input, which includes improving the accessibility of meetings and access to information. See Chapter 33 for more information about this process, as well as information on the Limited English Proficiency requirements, if applicable.
- *Section 4(f)*—The Department of Transportation Act of 1966, Section 4(f) requires coordination with the owners of 4(f) land, Department of the Interior, SHPO and, as appropriate, with the Advisory Council on Historic Preservation and the U.S. Departments of Housing and Urban

Development and Agriculture. See Chapter 19 for more information about this process.

- *Section 6(f)*—As part of road improvement planning, 6(f) properties are inventoried, described, and depicted in project-related documentation. Section 6(f) requires coordination with the Iowa DNR and the U.S. Department of the Interior, as appropriate. See Chapter 20 for more information about this process.
- *Farmland*—The Natural Resources Conservation Service (NRCS) AD 1006 Form Process requires Iowa DOT coordination with the local NRCS office located in the county where the project is located. This coordination should occur early in the project to determine and assess potential farmland effects. See Chapter 40 for more information about this process.
- *Airports*—Coordination with the Federal Aviation Administration is required when a project is located near an airport to ensure that airway-highway clearances are adequate for the safe movement of air and highway traffic.
- *Railroads*—Coordination with the Federal Railroad Administration is required when a project is located near a railroad line to maintain the safe movement of railroad and highway traffic.
- *Floodplains and Wetlands*—Coordination with the Federal Emergency Management Agency (FEMA) and Iowa DNR is necessary when a project is in or affecting floodplains. FEMA has delegated regulatory authority to Iowa DNR, who issues Floodplain Development Permits in Iowa. In many cases, this coordination involves securing appropriate mapping that identifies floodplains and floodways. Also, Executive Order 11988 (projects with significant floodplain encroachments) and Executive Order 11990 (projects affecting wetlands) require public involvement. Coordination with USACE and Iowa DNR is necessary when a project could potentially affect wetlands. See Chapters 28 and 29 for more information.
- *Threatened and Endangered Species*—Section 7 of the Endangered Species Act requires coordination with the U.S. Fish and Wildlife Service in the event that federally listed protected species will likely be affected by a proposed project. Coordination will determine whether the proposed activity will jeopardize the continued existence of a listed species or result in destruction or adverse modification of critical habitat. See Chapter 30 for more information.

17.2.3 NEPA / 404 Concurrent Process

The NEPA 404 Concurrent Process (i.e., Statewide Implementation Agreement, NEPA, and Clean Water Act Section 404 Concurrent NEPA/404 Processes For Highway Projects in Iowa) integrates compliance with NEPA and the requirements of Section 404 of the Clean Water Act. The process requires concurrence with signatory agencies to develop the project, and at several points in the NEPA process (Purpose and Need, Alternatives to be Considered, Alternatives to be Carried Forward, and Preferred Alternative). The intent of these concurrence points is to preclude the routine revisiting of decisions that have been agreed to earlier in the process and encourage early substantive participation by the agencies. See Chapter 18, *NEPA/404 Concurrent Process,* for more information about this process.

17.3 Format and Content of NEPA Document Discussions

The results of coordination with federal, state, and local agencies during the project development process are documented in the project's environmental document. This would include a summary of all the coordination activities that transpired. Typically this information is contained in a separate chapter or section of the document. The document should also contain federal, state, and local agencies' comments on the environmental documents as well as responses to those comments by Iowa DOT and FHWA. See Chapters 15 and 16 for more information on the content of EAs and EISs.

17.4 Continued Work in Design and Construction

Agency coordination will continue for several resource areas after completion of the environmental document and planning phase of project development, customarily to complete permit applications or for resources that require mitigation. Two examples include, following issuance of a Record of Decision (ROD) or Finding of No Significant Impact (FONSI) Iowa DOT would continue to coordinate with USACE and Iowa DNR on Section 404 and 401 permits, or continue to coordinate with the Iowa DNR when a National Pollution Discharge Elimination System (NPDES) or floodplain permit is involved.

17.5 Additional References

FHWA's SAFETEA-LU Environmental Review Process (Public Law 109-59), Final Guidance, November 15, 2006. http://www.fhwa.dot.gov/.

AASHTO Practitioner's Handbook 09, Using the SAFETEA-LU Environmental Review Process, January 2008. http://environment.transportation.org/.

Public Involvement in Environmental Permits, A Reference Guide, U.S. Environmental Protection Agency, EPA-500-R-00-007. See Appendix 17a.

Iowa Department of Transportation, *Can-Do Manual*:

- Chapter 2—Can-Do Scheduling.
- Chapter 7—Statewide Implementation Agreement to Merge the NEPA and Section 404 Processes.

The Iowa Department of Transportation's Project Development Public Involvement Plan.

Consultation with Native American tribes contained in the Programmatic Agreement and Procedures for Implementation of Section 106 Requirements: http://www.iowadot.gov/.

NOTES:

NEPA/404 Concurrent Process

CHAPTER 18

The NEPA/404 concurrent process was initiated to streamline project decision-making on federal-aid highway projects requiring an Individual Section 404 Permit. Conducting the NEPA and Section 404 permit processes concurrently enables expeditious project decision-making by executing one overall federal public interest decision for a federal-aid project.

18.1 Legislation, Regulations, and Guidance

ⓘ ***Statewide Implementation Agreement, National Environmental Policy Act and Clean Water Act Section 404 Concurrent NEPA/404 Processes for Highway Projects In Iowa (dated August 2001).*** Federal Highway Administration (FHWA); Department of the Army, U.S. Army Corps of Engineers, Rock Island District; U.S. Environmental Protection Agency (EPA); U.S. Fish and Wildlife Service (USFWS); Natural Resources Conservation Service; Iowa Department of Natural Resources (DNR), and Iowa DOT.

ⓘ ***Applying the Section 404 Permit Process to Federal-aid Highway Projects.*** May 1, 1992. Endorsed methods to integrate compliance with NEPA and the requirements of Section 404 of the Clean Water Act.

ⓘ ***Iowa Local Operating Procedures for Integrating NEPA/404.*** July 31, 1996. FHWA; Department of the Army, U.S. Army Corps of Engineers, Rock Island District; EPA; USFWS; Natural Resources Conservation Service; and Iowa DOT. Provided basic agreements on the mutual goal of merging the NEPA and 404 processes.

ⓘ ***Iowa Department of Transportation Can-Do Manual, Chapter 7 and Appendix C.***

18.2 Applicability

The NEPA/404 concurrent process is designed to improve the efficiency of the FHWA NEPA process, using early and active interagency coordination to focus efforts on reaching an environmentally sound project. The merger process is managed by the OLE Water Resources Section and applies to Iowa DOT projects, but not local systems projects.

For projects involving the placement of fill into Waters of the U.S., including wetlands, the U.S. Army Corps of Engineers is responsible for issuing a permit that assesses whether the action is appropriate. The requirements for that permitting process are under Section 404 of the Clean Water Act. Several federal and state agencies are involved in the Section 404 permitting process, including:

The NEPA/404 concurrent process was initiated to streamline project decision-making on federal-aid highway projects requiring an Individual Section 404 Permit.

- U.S. Army Corps of Engineers
- USFWS
- EPA, Region 7
- Natural Resources Conservation Service
- Iowa DNR

The NEPA/404 concurrent process was initiated to streamline project decision-making on federal-aid highway projects requiring a Section 404 Permit. The rationale for conducting the NEPA and Section 404 permit processes concurrently is to help expedite project decision-making by executing one overall federal public interest decision for a federal aid project, rather than separate decisions at various points in time which could require that one agency revisit its decision based on another agency's decision. The effective combination of the two processes is logical, as both are federal actions and involve evaluation of alternatives and assessment of effect on environmental resources against the purpose and need for a project.

The concurrent NEPA/404 process applies to all projects in Iowa that require:

- FHWA action under NEPA, and
- A U.S. Army Corps of Engineers permit under Section 404 of the Clean Water Act.

Generally, projects that are being processed as an Environmental Assessment (EA) or an Environmental Impact Statement (EIS) and require a 404 Permit are included in the merger process. Projects being processed as Categorical Exclusions (CEs), but which require a Permit, may require specific coordination with the resource agencies to determine their inclusion in the process.

To formalize the concurrent process of NEPA and Section 404 in Iowa, the Statewide Implementation Agreement (SIA) was approved on August 24, 2001. Iowa DOT's SIA is based on the following goals:

- "Improve cooperation and efficiency of governmental operations at all levels, thereby better serving the public
- Expedite construction of necessary transportation projects, with benefits to mobility and the economy at large
- Enable more transportation projects to proceed on budget and on schedule
- Protect and enhance the waters of the United States and wetlands in Iowa which will benefit the State's aquatic ecosystems and the public interest"

However, the concurrent merger process may not be invoked during the project's development if it is determined that the project's impacts are limited in their extent. Conversely, the concurrent process may be initiated or reinitiated if it is determined as the project develops that more significant impacts may be present than initially thought.

18.3 Implementation

The SIA contains detailed procedures for implementing the concurrent process in Iowa. Those procedures are summarized in this section. For a more detailed description of the SIA implementation requirements, refer to the SIA in Appendix 18a and to the Iowa DOT Memorandum titled "Standard Procedures for Environmental Concurrence Meetings."

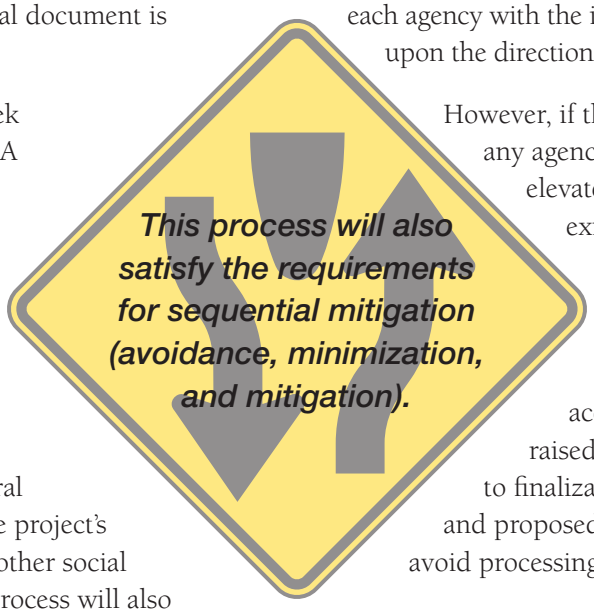
For projects developed by Iowa DOT, the SIA requires that:

- Potential impacts to waters of the U.S. and wetlands in Iowa will be considered at the earliest practical time in project development
- Adverse impacts to such waters will be avoided to the extent practicable and unavoidable adverse impacts will be minimized and mitigated to the extent reasonable and practicable
- Interagency cooperation and consultation will be diligently pursued throughout the integrated NEPA/404 process to ensure that regulatory and resource agency concerns are properly considered and that those agencies are involved at key decision points in project development

18.3.1 Concurrence Points

The procedures established in the SIA introduced four concurrence points when the agencies are asked to provide concurrence on specific stages of project development. These are strategic points in time when Iowa DOT may present updated project development information to the resource agencies. These concurrence points are perhaps the most important element of the concurrence process, as they provide the opportunity for the agencies to provide input at critical points as the project develops, rather than waiting until the environmental document is circulated.

FHWA and Iowa DOT will seek concurrence from the other SIA signatories regarding four concurrence points during Iowa DOT's project development process. Upon review of the information, the agencies will provide concurrence that Iowa DOT is properly considering and addressing any potential natural resource impacts related to the project's development in balance with other social and economic impacts. This process will also satisfy the requirements for sequential mitigation (avoidance, minimization, and mitigation). The goal is to identify and address agency concerns throughout the development process, while precluding the routine revisiting of decisions that have been agreed to earlier in the process.



The four concurrence points are:

- Purpose and need
- Alternatives to be analyzed
- Alternatives to be carried forward
- Preferred alternative

Specific timing issues and informational requirements for each concurrence point can be found in the SIA in Appendix 18a. In addition, refer to the *Can-Do Manual.*

18.3.2 Non-concurrence

The assumption is that concurrence at each of the above points will usually be achieved. However, the NEPA/404 process may continue at the discretion of FHWA whether attempts to reach concurrence among the agencies are successful or not. The probability of non concurrence does increase in more controversial projects. In these instances, dispute resolution will consist of informal efforts to reach a general consensus among the participating agencies. Attempts will be made to resolve issues at the lowest possible level in each agency with the involved agencies agreeing upon the direction for resolution.

However, if the dispute remains unresolved, any agency in non concurrence can elevate its concerns through existing, formalized dispute elevation procedures. The result is that all participating agencies are encouraged to carefully consider and accommodate the concerns raised by the resource agencies prior to finalization of the NEPA/404 process and proposed issuance of the permit to avoid processing delays.

18.3.3 Concurrence Meetings and Documentation

At appropriate points during the project development process, the OLE will schedule quarterly concurrence meetings with the signatory agencies to the SIA. OLE Water Resources Section staff will be responsible for the logistical arrangements for the meeting and/or packet of meeting materials, unless assigned to a consultant. For additional information, refer to Chapter 17, *Agency Coordination.*

One month prior to the meeting, Iowa DOT will provide the agencies with a packet containing the meeting materials necessary for determining the appropriate concurrence point. This packet may contain some or all of the following items, depending on their availability and the stage of project development at the time of the meeting. For some

projects, one meeting may be sufficient and the initial packet will contain all of the following materials. For others, several meetings may be necessary, and the packets may contain a combination of these items.

- Transmittal/invitation letter (to be on Iowa DOT letterhead, signed by the OLE Office Director)
- Location map of the proposed project
- Information regarding the NEPA/404 merger process
- Summary of the project's purpose and need (only for the first concurrence point)
- Drawings and descriptions of the proposed alternatives
- Evaluation criteria for the alternatives
- Summaries of public involvement activities and materials
- Minutes of previous concurrence meetings on the project
- At least a summary of field data collected since the last meeting
- Staff recommendations (if any) for additional field studies

18.3.4 Documentation of Concurrence

Minutes will be taken at the meeting to document coordination with agencies and concurrence.

NOTES:

Section 4(f) Statements

CHAPTER 19

This section focuses on documentation and regulations required by Section 4(f) of the United States Department of Transportation (U.S. DOT) Act. It discusses the content, format, and processing requirements for conducting and writing Section 4(f) evaluations for Iowa DOT projects. The Iowa DOT's website has forms and templates that are useful for practitioners working a Section 4(f) Statement. When working on a Section 4(f) Statement, please check the website to obtain the latest version of these documents.

19.1 What is Section 4(f)?

The intent of Section 4(f) and the policy of the U.S. DOT, including procedural guidelines outlined in the FHWA Iowa Division Office's *Environmental Document Procedures Manual* (May 2001), is to protect publicly-owned parks, waterfowl and wildlife refuges, recreational areas, and both public and private historic sites from use by transportation agencies. Transportation agencies using federal funds are prohibited from using such resources unless (1) there is no feasible or prudent alternative to such use, and (2) the project includes all possible planning to minimize harm to the protected resource. A Section 4(f) document describes the studies and information required by the Secretary of Transportation to determine whether to use Section 4(f) resources for a project.

Section 4(f) applies only to U.S. DOT federally-funded projects and only if the park, recreation area, or waterfowl or wildlife refuge is significant, publicly-owned, and open to the public. Significant historic sites and archaeological sites meriting preservation in place that are eligible for the National Register of Historic Places (NRHP) are also covered under Section 4(f) without regard to whether the site is owned by a public agency or private party. The only time "no involvement" of a Section 4(f) resource occurs is when there is literally no use of Section 4(f) lands. For example, the owner of a park may stipulate that the park is not a significant component of the recreational system of the community. If FHWA concurs with such a statement, the park would not be subject to the procedures of Section 4(f); however, mitigation for impacts to the park could still occur.

19.1.1 Federal Regulations and Guidance

Under the Department of Transportation Act of 1966 (now codified at 49 USC 303, 23 USC 138) and 23 CFR Part 774, Section 4(f) legislation provides protection for publicly-owned parks, recreation areas, historic sites (regardless of ownership), and wildlife and/or waterfowl refuges from conversion to a transportation use. Section 4(f) regulations are exclusive to transportation projects that are federally- funded or require an action (such

Section 4(f)
applies only to U.S. DOT federally funded projects and only if the park, recreation area, or waterfowl or wildlife refuge is significant and publicly owned. Significant historic and archaeological sites are covered under Section 4(f) without regard to whether the site is owned by a public agency or private party.

as an approval) by the U.S. DOT, including FHWA. Projects that are completely locally-funded and do not require FHWA or other U.S. DOT approval are exempt from Section 4(f). On March 12, 2008, FHWA and the Federal Transit Administration (FTA) published a Section 4(f) Final Rule in the *Federal Register* to help clarify the Section 4(f) approval process and simplify its regulatory requirements (see http://edocket.access.gpo.gov/2008/E8-4596.htm). The Final Rule moved the Section 4(f) regulation to 23 CFR 774.

Section 6009(a) of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users of 2005 (SAFETEA-LU) amended the Section 4(f) legislation to simplify the processing and approval of projects that have de minimis (minimal) impacts on Section 4(f) properties. See FHWA's memorandum *Guidance for Determining De Minimis Impacts to Section 4(f) Resources* (December 13, 2005) and Section 19.3 in this chapter for more information.

FHWA's Technical Advisory T6640.8A contains information about the content and format of Section 4(f) Statements. While the Technical Advisory is not a regulatory document, it provides critical guidance for all environmental documents developed under FHWA jurisdiction. The FHWA's Section 4(f) Policy Paper (March 1, 2005) is also a resource to be consulted.

The U.S. Department of the Interior's (DOI's) *Handbook on Departmental Review of Section 4(f) Evaluations* was developed by DOI without coordination with U.S. DOT. It should not be considered the policy of U.S. DOT, FHWA, or Iowa DOT on Section 4(f) issues, but it provides valuable insights into the DOI Section 4(f) process and priorities. The handbook can be found at http://www.doi.gov/oepc/handbook.html.

The FHWA Iowa Division Office has compiled its guidance for the Section 4(f) analyses and decision process, programmatic Section 4(f) determinations, and negative declarations in *FHWA Iowa Division Office, Environmental Document Procedures Manual,* (May 2001, or updates).

19.1.2 Related Regulations

Section 6(f)

The Land and Water Conservation Fund (LWCF) Program, Section 6(f) (established in 1965), provides additional protection for outdoor recreational lands. Section 6(f) is a separate process from Section 4(f); however, the two processes (if necessary) typically run concurrently. A concurrent Section 6(f) evaluation should be recognized in the Section 4(f) evaluation as part of the agency coordination. More information on the Section 6(f) process is provided in Chapter 20, *Section 6(f)*.

Section 106

Projects with federal action require a review of possible impacts to cultural resources. This review process is often referred to as the Section 106 process, in reference to Section 106 of the National Historic Preservation Act (NHPA) of 1966. Many of the resources reviewed in the Section 106 process will overlap with resources reviewed in a Section 4(f) Statement. When a Section 106 "adverse effect" determination is made, the action typically will require Section 4(f) documentation. Chapter 42, *Cultural Resources*, provides detailed information about other relevant federal and state legislation, regulations, and guidelines that pertain to cultural resources.

19.1.3 Resources Protected by Section 4(f)

The Section 4(f) process should address the specific eligible resources that cannot be avoided or that are used by any of the project alternatives. There are four primary categories for Section 4(f) properties: (1) archaeological, (2) historic/architectural, (3) public waterfowl and wildlife refuges, and (4) public parks and recreation areas.

The following subsections provide guidance on the applicability of Section 4(f) to various types of land to determine which locations should be avoided when alternatives are developed. More detail on the following information, including application to other types of resources, is available in FHWA's *Section 4(f) Policy Paper* (March 1, 2005).

Public Parks, Recreational Areas, and Wildlife/ Waterfowl Refuges

A publicly-owned land is considered to be a park, recreation area, or wildlife and waterfowl refuge when it is open to the public and (1) the land has been officially designated as such or (2) the federal, state, or local officials having jurisdiction over the land determine that one of its major purposes or functions is for use as a park, recreation, or refuge. The final decision on applicability of Section 4(f) to a particular property is made by FHWA, but FHWA normally relies on the official agencies having jurisdiction over the land to identify the kinds of activities or functions that take place.

Historic and Archaeological Sites

Historic buildings, districts, objects (such as monuments), historic bridges, and sites with significant buried historic/prehistoric artifacts are considered Section 4(f) resources, regardless of ownership. Generally, historic properties must be listed on or eligible for listing on the NRHP, as determined by the State Historic Preservation Office (SHPO) under the provisions of Section 106 of the NHPA. There can be exceptions, where a locally-significant site can be considered a Section 4(f) property even if it is not on the NRHP. Section 4(f) does not apply to archaeological sites where FHWA, after consultation with the SHPO, determines that the archaeological resource is important chiefly because of what can be learned by data recovery and has minimal value for preservation in place. It does apply to archaeological sites on or eligible for inclusion on the NRHP that warrant preservation in place.

Historic Bridges and Highways

Rehabilitation, repair, or improvement of historic bridges and highways is not considered a Section 4(f) use if the historic integrity is not adversely affected by the actions. Therefore, Section 4(f) would apply only if a historic bridge or highway is demolished or if SHPO determines its historic integrity (the criteria for which the bridge was designated historic) is adversely affected because of the proposed improvement (see Section 19.4.6, *Programmatic Section 4(f) Agreements*, later in this chapter).

Bikeways

Section 4(f) applies to a bikeway if the purpose of the bikeway is primarily recreational. Section 4(f) does not apply if the major purpose of the bikeway is to function as a transportation facility and connect destinations within the local transportation system.

If a bikeway serves as a link in the transportation network, rather than as primarily recreational, the bikeway is protected under 23 USC 109(m) (Protection of Nonmotorized Transportation Traffic) and not under Section 4(f). The 23 USC 109(m) requirement precludes the approval of any project that will result in the severance or destruction of an existing major route for non-motorized transportation traffic, unless the proposed project provides a reasonable alternative route.

To illustrate, assume there is a recreational trail that is an oval loop. Along this oval, there are several other loops, some of which provide access to destinations (e.g., a beach and shelters), and some of which serve as recreational trails. A highway project is proposed that would cut off one of the loops. To determine if the trail falls under Section 4(f) or 23 USC 109(m), it is necessary to make a determination regarding whether the trail functions primarily for recreational purposes or if it serves as a link in the transportation network. If the result of severing the loop is simply a reduction in the overall length of the trail and bikeway users are still able to access destinations, then Section 4(f) applies. If a specific destination is associated with the loop and that destination will no longer be accessible as a result of the proposed highway project, then 23 USC 109(m) applies. For procedural or regulatory purposes, one of these two regulatory frameworks—not both—must be selected to describe the impact and resolve project development and impact/mitigation issues.

Trails

Trails designated as scenic and recreational under the National Trails System Act are subject to Section 4(f) if they are on publicly-owned land. Section 4(f) can also be applied to trails on privately-owned land if there is a public easement permitting the public to use the trail or in cases where abandoned rail beds (not rail banked) have been converted to recreational trails, described previously.

Multiuse Areas, Open Space, and Some Common Interpretations

With the exception of historical or archaeological resources, Section 4(f) requires that the property be publicly-owned. Furthermore, the publicly-owned lands must be used for recreational or wildlife/waterfowl refuge purposes. These are often the key factors for determining applicability for multiuse or other types of outdoor recreational facilities. For example, some golf courses are on publicly-owned lands while others are owned and maintained privately. This does not mean that impacts to privately-owned golf courses are of no consequence, but this at least clarifies that Section 4(f) does not automatically apply to all golf courses. Another fairly common example might be vacant lands associated with an airport or a municipal industrial park. While such lands may be publicly-owned and even used informally for dispersed recreation, it is generally accepted that their primary and ultimate purpose is for airport or industrial use, not recreational use; therefore, in such cases, Section 4(f) typically will not apply.

The key lesson to take from these and other examples is that the interpretations of Section 4(f) applicability can sometimes enter into some gray areas. Close consultation between project analysts and specialists at Iowa DOT and FHWA are very important when there are any such questions.

19.1.4 "Use" of a Section 4(f) Property

There are different levels of impact or "use" as defined by FHWA regulations (23 USC 138). Examples of each type follow:

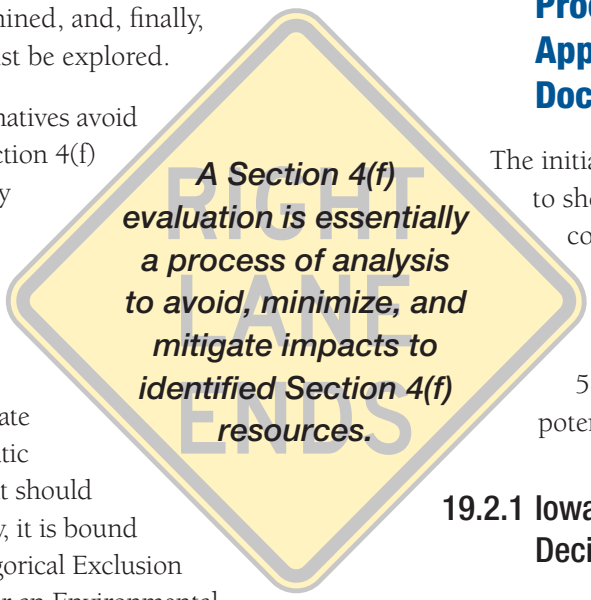
- Permanent Use
  - A permanent incorporation of right-of-way from a Section 4(f) resource into the transportation project
  - A permanent easement is acquired, such as for drainage or bridge maintenance
- Temporary Occupancy
  - The project temporarily affects the property during construction, such as minor temporary construction impacts (that can be restored) or temporary access restriction during construction
- De Minimis Use
  - The project incorporates a small portion of a Section 4(f) property but does not affect the activities, features, and attributes that qualify the property for protection under Section 4(f).
- Constructive Use
  - A constructive use may occur when there is no acquisition of Section 4(f) land, but proximity impacts of the transportation project are so great that the purposes for which the Section 4(f) site exists are substantially impaired. An example would be the proximity of the roadway project impairs the resource, such as impacts caused by noise, vibration, ecological intrusion, or access restriction

The determination of a constructive use is infrequent, however, it must still be considered; see 23 CFR 774.15 at http://www.fhwa.dot.gov/legsregs/directives/fapg/cfr0771.htm for additional information and a complete list of examples of what is and is not considered a constructive use. FHWA must make the determination on whether any use would occur, including constructive use, as described in Section 19.2.1, *Iowa FHWA Division Office: 5-Step Decision Process*. Input from the agency with jurisdiction over the Section 4(f) resource is sought and sometimes the agency with jurisdiction seeks public input as well. Because constructive use determinations are rare and precedent setting, when

Iowa DOT and the FHWA Division Office believe a project may have a constructive use, coordination is required with FHWA Headquarters in Washington. If FHWA Headquarters makes a constructive use determination, the draft Section 4(f) document must be approved by Washington Headquarters prior to circulation. Project Managers should allow sufficient time in the project schedule to account for additional coordination with the FHWA Division Office and FHWA Headquarters in completing a constructive use Section 4(f) Statement.

19.1.5 Avoid, Minimize, and Mitigate

A Section 4(f) evaluation is essentially an analysis process for the purpose of avoiding, minimizing, and mitigating impacts to identified Section 4(f) resources. One of the requirements of Section 4(f) is to demonstrate the consideration of avoidance alternatives—or alternatives that avoid the use of Section 4(f) resources. When alternatives that avoid the Section 4(f) resource cannot be shown to be reasonable in the draft Section 4(f) Statement (or prudent and feasible, in the final Section 4(f) Statement), alternatives that minimize the impact must be examined, and, finally, mitigation efforts must be explored.

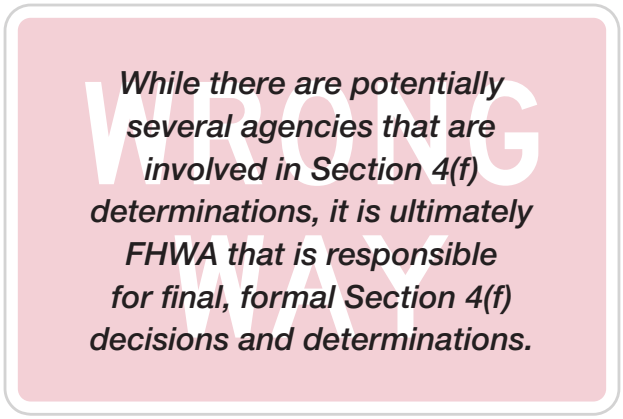


A Section 4(f) evaluation is essentially a process of analysis to avoid, minimize, and mitigate impacts to identified Section 4(f) resources.

If all reasonable alternatives avoid the potential for a Section 4(f) use, then it is typically sufficient to declare that finding in the NEPA document. If there is potential for a Section 4(f) use, however, a separate formal or programmatic Section 4(f) Statement should be prepared. Typically, it is bound to the back of a Categorical Exclusion (CE) memorandum or an Environmental Assessment (EA) as a separate, stand-alone document. The formal Section 4(f) Statement typically is included as a separate chapter in an Environmental Impact Statement (EIS).

19.1.6 Agency with Jurisdiction over Section 4(f) Determinations

While there are potentially several agencies that are involved in Section 4(f) determinations, it is ultimately FHWA that is responsible for final, formal Section 4(f) decisions and determinations. The final Section 4(f) Statement is reviewed by FHWA for legal sufficiency and ultimately approved by FHWA.



While there are potentially several agencies that are involved in Section 4(f) determinations, it is ultimately FHWA that is responsible for final, formal Section 4(f) decisions and determinations.

19.2 Iowa DOT Section 4(f) Statement Development Process—Procedures for Review and Approval of Section 4(f) Documentation

The initial Section 4(f) review requirements are to show that all potential resources have been correctly identified and that reasonable alternatives to avoiding Section 4(f) use have been studied. The following is a summary of the FHWA Iowa Division's 5-step decision process used to evaluate potential Section 4(f) impacts.

19.2.1 Iowa FHWA Division Office: 5-Step Decision Process

To structure the review, Iowa DOT NEPA Compliance Section Managers use a Section 4(f) Questionnaire (see the FHWA Iowa Division Office, *Environmental Document Procedures Manual,* [May 2001]). The questionnaire outlines the 5 basic steps involved in the Section 4(f) decision process. FHWA concurrence

is required at the end of each of the 5 steps. The steps are also shown in Exhibit 19-1, the Section 4(f) Decision Process Flowchart, and in the Section 4(f) Decision Process memorandum on OLE's website. At the discretion of Iowa DOT and FHWA, the 5 basic steps may be completed and FHWA concurrence provided once on the complete analysis. The steps help determine the following:

1. Is the property a Section 4(f) resource (determination of applicability—FHWA) (see Section 19.4 for additional discussion regarding the methodology for determining applicability of Section 4(f)). It is helpful to complete Step 1 (determination of whether Section 4(f) applies to properties) early in project development. The earlier this is completed, the easier it will be to complete the analyses required for a Section 4(f) Statement.
2. Is there a potential "use" of the Section 4(f) property (include consultation with property owner and Iowa DOT OLE).
3. If there is a potential use of the Section 4(f) property, can it be avoided (provide a range of alternatives; include consultation with OLE, Office of Design, and the appropriate Iowa DOT district).
4. If there are unavoidable impacts to the Section 4(f) resource, can they be minimized. If not, mitigation plans should be developed (include consultation with OLE Location Studies Section and the property owner).
5. What type of documentation is needed? This portion of the analysis is completed by OLE.

The 5-step process helps facilitate the development of avoidance alternatives. As noted, each step is concluded with a "Concurrence Point" at a meeting (or by e-mail) with FHWA, and decisions relative to each step are documented. The 5-Step Decision Process also shows where FHWA concurrence should be sought and obtained.

To structure the review, Iowa DOT NEPA Compliance Section Managers typically use a Section 4(f) Questionnaire.

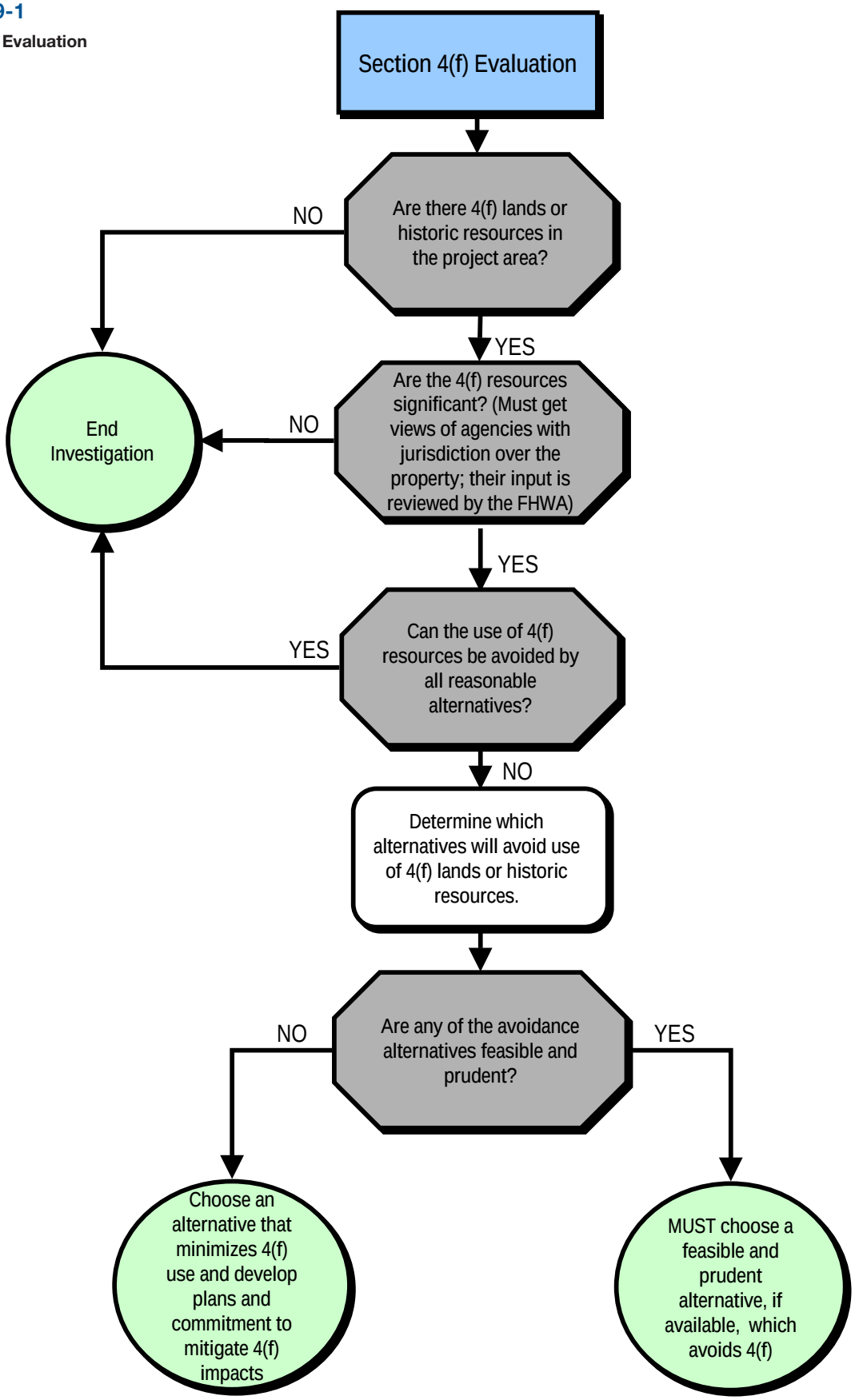
Each step of the Section 4(f) evaluation and decision process is concluded with an FHWA "Concurrence Point."

19.2.2 Section 4(f) Evaluation Concurrence with NEPA Documentation

As described in Section 19.4, *Section 4(f) Documentation*, a formal Section 4(f) Statement is typically developed in conjunction with a proposed project's NEPA environmental documentation and will have draft and final versions. For CE projects, the Section 4(f) Statement must be circulated and approved prior to the approval of the CE. For EA and EIS projects, the Section 4(f) Statement will be included in and approved with the EA or EIS. The Section 4(f) Statement is similar in organization to a portion of the NEPA document in that it describes the proposed action and the existing environment prior to the discussion of uses (i.e., impacts) and ways to avoid or minimize impacts. In that sense, there will likely be opportunities to summarize or refer the reader to portions of the NEPA document, if circulated together; however, the Section 4(f) Statement differs from the NEPA document in content and process. Section 4(f) Statements are completed to meet substantive law requirements, including prescribing an outcome to avoid, minimize, or mitigate Section 4(f) resources. When there are no feasible and prudent alternatives that avoid Section 4(f) resources, the Section 4(f) Statement must demonstrate that the preferred alternative is a feasible and prudent alternative with the least overall harm after considering mitigation to the Section 4(f) resource. (It is noteworthy that this process is also very similar to the process that is used to document wetland and threatened and endangered

Exhibit 19-1

Section 4(f) Evaluation



species impacts). Conversely, NEPA documentation is procedural in nature. The NEPA document declares and discloses the magnitude of impacts to resources.

The Section 4(f) Statement must contain enough information to serve as a stand-alone document. Section 4(f) resources warrant special consideration and documentation separate from a NEPA document in order to:

- Review project purpose and need, and alternatives
- Address avoidance measures
- Address why Section 4(f) impacts are (or may be) necessary and justify choice with reference to other impact categories

The Section 4(f) Statement is similar in organization to a portion of the NEPA document, however, the Section 4(f) Statement differs from the NEPA document in content and process.

19.3 De Minimis Evaluations

The provisions of 23 CRF 774 Section 4(f) allow the U.S. DOT to determine that certain uses of Section 4(f) land will have no adverse effect on the protected resource. When this is the case, and the responsible official(s) with jurisdiction over the resource agrees in writing, compliance with Section 4(f) is greatly simplified. When FHWA determines that a transportation use of Section 4(f) property, after consideration of any impact avoidance, minimization, and mitigation or enhancement measures, results in a de minimis impact on that property, no further Section 4(f) analysis is required.

In determining that a project will have a de minimis impact, FHWA considers the proposed action, the nature of the property affected, and all measures proposed to minimize harm. Under the de minimis provisions, an analysis of avoidance alternatives is not required. However, as noted, the FHWA must obtain concurrence from the officials having jurisdiction that the project will have minimal impact.

If the Section 4(f) property is a recreational area, wildlife refuge, or waterfowl refuge, a public notice of the proposed action and opportunity for public review and comment is also required. If the NEPA document is not published (such as a CE), a separate public notice may be required for the Section 4(f) action. The format and method of the public notice should be coordinated with the FHWA Division Office.

More information about the de minimis process can be found in FHWA's document *Questions and Answers on the Application of the Section 4(f) De Minimis Impact Criteria* (http://www.fhwa.dot.gov/hep/qasdeminimus.htm) and FHWA's memorandum Guidance for Determining De Minimis Impacts to Section 4(f) Resources (December 2005) (http://www.fhwa.dot.gov/HEP/guidedeminimis.htm).

The presence of resources eligible for Section 4(f) review (or the lack of such resources) should be documented within the body of the NEPA document (EIS, EA, or CE). This means, at minimum, that any nearby eligible resource should be briefly described in the body of the environmental document.

19.4 Section 4(f) Documentation

FHWA provides specific guidance on Section 4(f) Statement contents in Section IX of FHWA's Technical Advisory T6640.8A. The following section discusses the various ways in which a Section 4(f) analysis can be documented, from the case of a more thorough review of resources (with a formal draft and final evaluation) to instances where minor amounts or certain types of Section 4(f) resources are used, or used temporarily (programmatic). These types of

documentation are listed in Table 19-1. Once the type of documentation is determined, a Section 4(f) Statement must be completed.

19.4.1 Individual Section 4(f) Statement

Individual Section 4(f) Statements are prepared for any impacts that do not meet the criteria of one of the programmatic evaluations or the de minimis standard. Like the EIS process, there is a draft Section 4(f) Statement and a final Section 4(f) Statement that is circulated for public and agency comment. The draft Section 4(f) Statement is prepared following the preliminary coordination, analysis of alternatives, and development of measures to minimize harm. Draft Section 4(f) Statements may undergo legal sufficiency review, but the final evaluation must undergo legal sufficiency review. Following FHWA's legal sufficiency review, the draft is circulated to the officials having jurisdiction of the affected Section 4(f) resource, National Park Service, U.S. Department of Housing and Urban Development (HUD), and other agencies as appropriate. The draft Section 4(f) Statement may be circulated for public and agency review as a stand-alone document, but it is more common for public and agency review to occur in conjunction with the NEPA document.

Following the circulation of the draft evaluation and receipt of public and agency review comments, a final Evaluation is developed that incorporates all of the draft document information, responses to comments received, and a conclusion. If any issues are raised by the reviewing agencies, followup coordination must be undertaken to resolve the issues. If reasonable efforts to resolve the issues are not successful, but the issues are disclosed and receive good faith attention from the decision maker, then FHWA has satisfied the procedural obligation under Section 4(f) to consult with and obtain comments from the agency. Section 4(f) does not require concurrence, although that is the goal.

19.4.2 Draft Section 4(f) Statement

Iowa DOT recommends the following format and content for the draft Section 4(f) Statement. The listed information should be included in the Evaluation, as applicable.

Description of Proposed Action

Much of this section can be referenced and drawn from the NEPA document. At a minimum, include a summary. It is important to summarize the purpose and need for the project to establish the basis for analyzing feasible and prudent alternatives.

Description of Section 4(f) Resources

Section IX(A)(2) of FHWA's TA T6640.8A lists the information that should be included in the description of each Section 4(f) property. Use of a GIS database may help to facilitate this process. A tabular format may be appropriate to adequately summarize the properties described in the statement.

Description of Impacts

The Section 4(f) process requires that any impact from use of a park, recreation area, historic site, or wildlife or waterfowl refuge for highway purposes

Table 19-1

Type of 4(f) Documentation	Summary
Draft Section 4(f)	Describes & inventories: all Section 4(f) properties that may be used for any project alternative, avoidance and mitigation options, and agency coordination. Also lays out the argument for the use of a Section 4(f) resource.
Final Section 4(f)	Prepared after the Draft Section 4(f) comment period to document reasons for Section 4(f) uses and methods to minimize impacts.
Programmatic Section 4(f)	Allowed when impacts to Section 4(f) properties do not exceed certain thresholds; reduces amount of interagency coordination (and often streamlines documentation), but does not excuse the use of the process.
Temporary Occupancy of Section 4(f)	Used in cases when temporary use of a Section 4(f) resource is required for construction purposes.

be evaluated in context with the proposed highway improvement activity. An inventory of properties of these types is completed on the basis of a review of the project alternatives and impacts on (use of) Section 4(f) properties. All potentially impacted properties should be included and described. On the basis of the initial inventory, modifications are considered to avoid all Section 4(f) properties.

FHWA does not provide detailed guidance on how the description of impacts should be formatted. Impacts should be quantified when possible; otherwise, a qualitative analysis of impacts to a property should be provided. When multiple resources are being discussed, tables describing each alternative's impact (or lack of, in the case of an avoidance alternative) on the Section 4(f) resources can help summarize the impacts.

Avoidance Alternatives

Avoidance alternatives must meet the "feasible and prudent" standard that is laid out in the regulations. Where an alternative would use land from more than one Section 4(f) property, the analysis needs to evaluate alternatives that avoid each and all properties. The design alternatives should be in the immediate area of the property and consider minor alignment shifts, a reduced facility, retaining structures, and so on, either individually or in combination, as appropriate. The Section 4(f) document need not repeat detailed discussions of alternatives in an EIS or EA, but should reference and summarize them. When alternatives that would avoid the Section 4(f) properties have been eliminated from the detailed study in the NEPA document, the discussion in the Section 4(f) Statement should explain whether these alternatives are feasible and prudent and, if not, the reasons why.

The discussion of the alternatives considered in a Section 4(f) Statement will typically parallel a similar discussion found in the EA or EIS for the same project, but may include less detail.

Measures to Minimize Harm and Mitigation

Minimization of harm entails both alternative design modifications that lessen the impact on Section 4(f) resources and mitigation measures that compensate for residual impacts. Minimization and mitigation measures should be determined through consultation with the official of the agency owning or administering the Section 4(f) resource. Neither the Section 4(f) statute nor regulation requires the replacement of Section 4(f) resources used for highway projects, but this option is appropriate under 23 CFR 710.509 (Right of Way and Real Estate, Functional replacement of real property in public ownership) as a mitigation measure for direct project impacts. Detailed discussions of mitigation measures in the EIS or EA may be referenced and appropriately summarized in this section rather than repeated. This section may not be fully developed at the time the draft Section 4(f) Statement is prepared.

Least Overall Harm Analysis

A least overall harm analysis must be included in a draft Iowa DOT Section 4(f) Statement. Information about the least overall harm analysis is found in Section 19.4.3.

Coordination Activities

It is important to coordinate with the agencies that have jurisdiction over public lands and historic properties early enough in the project so that Section 4(f) properties can be considered in the development of project alternatives. Iowa DOT's Section 4(f) Letter of Jurisdiction, which is found on OLE's website, is an example of a coordination tool that should be used early in the project. The draft Section 4(f) Statement must include evidence of coordination with the agency with ownership or jurisdiction over the Section 4(f) resource, such as Iowa DNR, a park board, the city council, or SHPO.

Agencies with a legally mandated review of Section 4(f) Statements include the U.S. Department of the Interior (DOI), and as appropriate, the Department of Agriculture, HUD (whenever a project uses Section 4(f) land for/on which HUD funding had been used), and Native American tribal land (only in projects where archaeological sites are involved). Section 4(f) Statements in Iowa are also sent to the Advisory Council on Historic Preservation (ACHP), the SHPO, and the National Trust for Historic Preservation when historic properties are affected. Despite the review function of these other agencies, ultimately, FHWA is the agency responsible for Section 4(f) decisions and determinations.

The draft Section 4(f) Statement does not include conclusion that there are no feasible and prudent alternatives. Such a conclusion is made only after the draft Section 4(f) Statement has been circulated and coordinated, and any identified issues have been adequately evaluated.

19.4.3 Final Section 4(f) Statement

After the draft Section 4(f) public review period, the final Section 4(f) Statement can be prepared, either as a separate document or incorporated into the Finding of No Significant Impact (FONSI)/ final Environmental Impact Statement (FEIS) (Iowa typically circulates the documents together). The FHWA Iowa Division Office will conduct a legal sufficiency review of the final Section 4(f) Statement to determine that all comments received during the review period have been addressed. The final Section 4(f) Statement must contain:

- All the information from the draft Section 4(f) Statement generally following the same outline presented in the draft document.
- A discussion of the basis for concluding that there are no feasible and prudent alternatives for the use of the Section 4(f) resource(s). The supporting information must demonstrate that the alternative has"severe problems of magnitude that substantially outweighs the importance of protecting the Section 4(f) property." (23 CFR 774.17). This language should appear in the document with supporting information. This discussion is a repeat of the Avoidance Alternatives text in the draft Section 4(f) Statement with any refinements necessary as a result of public and agency comments on the draft evaluation.

The draft Section 4(f) Evaluation normally does not include a statement concluding that there are no feasible and prudent alternatives. Such a conclusion is made only after the draft Section 4(f) Evaluation has been circulated and coordinated, and any identified issues have been adequately evaluated.

- A discussion of the basis for concluding that the proposed action includes all possible planning to minimize harm to the Section 4(f) resource. When there are no feasible and prudent alternatives that avoid the use of the Section 4(f) resource, the final Section 4(f) Statement must demonstrate that the preferred alternative has the least overall harm to Section 4(f) after considering mitigation to the Section 4(f) resources. This discussion would be placed in the "Least Overall Harm Analysis" section." More information about the least harm analysis is found below.

The FHWA's 2005 Section 4(f) Policy Paper, Examples of the Alternatives Selection Process, has three example projects that provide guidance on comparing feasible and prudent alternatives that affect a Section 4(f) resource and selecting the preferred alternative. Because most Iowa DOT final Section 4(f) Statements will evaluate two or more alternatives that affect a Section 4(f) resource, example projects 2 and 3 would be the guidance most often used. Example projects 2 and 3 both call for analysis to be performed, at a minimum. As noted in the Section 4(f) documentation under AASHTO's Center for Environmental Excellence website, the "least overall harm" is determined by balancing the following list of factors:

- The ability to mitigate adverse impacts to each Section 4(f) property (including any measures that result in benefits to the property);
- The relative severity of the remaining harm, after mitigation, to the protected activities, attributes, or features that qualify each Section 4(f) property for protection;
- The relative significance of each Section 4(f) property;
- The views of the official(s) with jurisdiction over each Section 4(f) property;
- The degree to which each alternative meets the purpose and need for the project;
- After reasonable mitigation, the magnitude of any adverse impacts to resources not protected by Section 4(f); and
- Substantial differences in costs among the alternatives.

Although it may not occur very often, it is also possible that the comparison of feasible and prudent alternatives that affect a Section 4(f) resource will show that the net harm to Section 4(f) resources in all the alternatives is equal. In that situation, FHWA may select any one of the alternatives because there is no alternative that would cause the least overall harm. See the Section 4(f) Policy Paper, Prudent and Feasible Standard, for more information.

The Measures to Minimize Harm and Mitigation text should reflect any additional details on the minimization and mitigation measures that developed since the publication of the draft Section 4(f) Statement.

The coordination text would repeat information in the draft Section 4(f) Statement and coordination since publication of the draft Section 4(f) Statement. In addition, this section should include copies of all formal agency coordination comments received on the draft evaluation, a summary of other relevant Section 4(f) comments received, and an analysis and response to any questions raised. Where new alternatives or modifications to existing alternatives are identified and will not be given further consideration, the document should provide the basis for dismissing these alternatives supported by factual information. Where Section 6(f) land is involved, the National Park Service (NPS) position on the land transfer should be documented.

In a separate section a concluding statement should be added as follows: "Based on the above considerations, there is no feasible and prudent alternative to the use of land from the [identify Section 4(f) property here] and the proposed action includes all possible planning to minimize harm to [Section 4(f) property] resulting from such use." Below the statement, a date of approval line and signature line should be added, and FHWA should sign the approved version of the final Section 4(f) Statement.

19.4.4 Review Process

Preliminary Draft (or Review Copy)

The appropriate NEPA Compliance Section Document Manager must review and approve preliminary Section 4(f) Statements before submitting them to FHWA reviewers. The Section 4(f) Statement preliminary draft corresponds in timing with the review copy of a NEPA document. The early reviews should occur in a collaborative manner as project facts and alternatives are being assembled and evaluated. Early consultations and team coordination efforts are very important, because any reasonable opportunities to avoid Section 4(f) use must be explored. If some or all of the reasonable project "build" alternatives involve a Section 4(f) use, then a preliminary Section 4(f) Statement should be prepared. The appropriate Iowa DOT NEPA Compliance Section Document Manager will determine how best to involve FHWA reviewers in the process and document reviews.

After receipt of 2 copies of the preliminary draft Section 4(f) Statement, the FHWA Iowa Division Office will begin a 3-week review period. An Environmental Document Review Sheet will be returned to the document authors (OLE NEPA Compliance Section) with a review of the document's regulatory compliance, overall content, and quality. Comments from FHWA will be consolidated and included in the review sheet.

Draft

After all comments have been incorporated into the preliminary draft, FHWA will review the document to ensure comments have been addressed. The process up to this point will be repeated if necessary to obtain an acceptable draft Section 4(f) Statement. Prior to signing the draft Section 4(f) document, a legal sufficiency review may be conducted by the FHWA Resource Center Legal Council. The review typically takes 30 days. Upon verification of the acceptability and legal sufficiency (if applicable) of the document, the FHWA will sign the signature sheet and return it to OLE.

Final

The FHWA Iowa Division Office will review the final Section 4(f) Statement to determine that all comments received during the review period have been addressed.

Depending on the type of Section 4(f) property affected, measures to minimize harm may be described in a memorandum of agreement (MOA) among Iowa DOT, FHWA, and the agency with jurisdiction over the affected resource. If there is an MOA, it would normally be signed by all parties before FHWA signs the final Section 4(f) Statement.

Prior to signing the final Section 4(f) Statement, a legal sufficiency review is conducted by the FHWA Resource Center Legal Council. This review typically takes 30 days. Upon verification of the acceptability and legal sufficiency of the document, FHWA will sign the final Section 4(f) document.

19.4.5 Circulation / Comment Period

For projects processed with an EIS or EA, the individual Section 4(f) Statement should be included as a separate section at the back of the document. The FONSI and Section 4(f) Statement are placed before the EA text and bound as one document. The individual Section 4(f) Statement should be a separate document Section 4(f) for projects processed as CEs.

Iowa DOT will distribute copies of the signed draft Section 4(f), often in conjunction with distribution of the concurrent environmental document (EA or EIS), for a public review period (a minimum of 45 days for an EA or an EIS). When the Section 4(f) Statement is circulated with EIS or EA send 12 copies of the Draft EIS/4(f) or EA/4(f) and 7 copies of the Final EIS/4(f) or FONSI/4(f) to DOI instead of the number listed on the EA and EIS distribution lists.

If the draft Section 4(f) Statement is circulated separately, contact DOT's document manager or consult the OLE website for a list of the agencies that should receive the draft evaluation and the number of copies required for each agency. The comment period for a Section 4(f) Statement circulated separately is also a minimum of 45 days, and the availability of the document would be noticed in the *Federal Register*. In addition the availability of the Section 4(f) Statement for public review would be noticed locally.

Table 19-2

	Draft	Final
FHWA Iowa Division (Distributed by Document Manager)	2	2
U.S. Department of Interior	7	7
U.S. Department of Housing and Urban Development – Regional Office (if HUD $ is involved)	1	1
SHPO (IDOT Cultural Section)*	1	1
National Trust for Historic Preservation*	1	1
Advisory Council for Historic Preservation*	1	1
Owner of Property / Agency with jurisdiction	1	1
Total	14	14

*When historic properties are involved, send a copy of 4(f) or EIS/4(f), EA/4(f), & FONSI/4(f) to these agencies.

Iowa DOT will develop the transmittal letter (see the FHWA Iowa Division Office's *Environmental Document Procedures* notebook for example distribution letters) and distribute copies of the signed final Section 4(f) Statement.

19.4.6 Programmatic Section 4(f) Agreements

FHWA has developed five nationwide programmatic agreements (PAs) for projects that have minor or beneficial impacts to Section 4(f) properties. The benefit of qualifying for one of the PAs is that they streamline the documentation and approval process, as well as the amount of interagency coordination that is required. They do not require draft and final statements to be prepared or an FHWA legal sufficiency review. Unlike an individual Section 4(f) Statement, which FHWA ultimately approves, the qualification of the project under any of these PAs requires only the concurrence of the officials having jurisdiction over the affected Section 4(f) property and not concurrence from DOI, U.S. Department of Agriculture, or HUD (unless the federal agency has a specific action to take, such as DOI approval of a conversion of land acquired using LWCF/6(f) funds).

Independent Walkway and Bikeway Construction Projects

The Independent Walkway and Bikeway Construction Projects PA is applicable to independent bikeway or walkway construction projects that require the use of recreation and park areas that are established and maintained primarily for active recreation, open space, and similar purposes, and are consistent with the designated use of the property.

Historic Bridges

The Historic Bridges PA applies to the rehabilitation of bridges that are on or eligible for inclusion on the NHRP and are an integral part of a modern transportation system. For the purpose of this PA, a proposed action will "use" a bridge that is on or eligible for inclusion on the NRHP when the action will impair the historic integrity of the bridge either by rehabilitation or demolition. Rehabilitation that does not impair the historic integrity of the bridge as determined by procedures implementing the National Historic Preservation Act of 1966, as amended, is not subject to Section 4(f).

This PA may be applied by the FHWA to projects that meet the following criteria:

- The bridge is to be replaced or rehabilitated with federal funds
- The project will require the use of a historic bridge structure that is on or is eligible for listing on the NRHP
- The bridge is not a national historic landmark
- The FHWA Division Administrator determines that the facts of the project match those set forth in the sections of the PA labeled Alternatives, Findings, and Mitigation
- Agreement among the FHWA, the SHPO, and the ACHP has been reached through procedures pursuant to Section 106 of the NHPA
- The following alternatives avoid any use of the historic bridge:
  - No action (do nothing)
  - Build a new structure at a different location without affecting the historic integrity of the old bridge, as determined by procedures implementing the NHPA
  - Rehabilitate the historic bridge without affecting the historic integrity of the structure, as determined by procedures implementing the NHPA

This list is intended to be all inclusive.

The PA applies only when the FHWA Division Administrator:

- Determines that the project meets the applicability criteria set forth above
- Determines that all of the alternatives set forth in the Findings Section of the PA have been fully considered
- Determines from the Findings Section of the PA that there are no feasible and prudent alternatives to the use of the historic bridge is clearly applicable

- Determines that the project complies with the Measures to Minimize Harm Section of the PA
- Assures that measures to minimize harm are implemented
- Documents in the project file that the PA applies to the project for which it is to be used

Minor Involvement with Historic Sites

This type of PA applies to projects that improve existing highways and use minor amounts of land from historic sites that are adjacent to existing highways.

Minor Involvements with Parks, Recreation Areas, and Waterfowl and Wildlife Refuges

Under this PA, applicable projects would improve existing highways and use minor amounts of publicly-owned parks, recreation lands, or wildlife and waterfowl refuges that are adjacent to existing highways.

Net Benefit

Designation under this PA would apply to transportation improvement projects on existing or new alignments that will use a portion of a Section 4(f) property and result in a net benefit to the Section 4(f) property, such as improved access to it.

Iowa DOT has developed a form for each of FHWA's five nationwide programmatic agreements that Iowa DOT or its consultant must complete to obtain the programmatic approval. The forms, which are located on OLE's website, require a brief project description, a justification for dismissing the No-Build Alternative, a justification for dismissing the improvement that avoids using Section 4(f) land, evidence that all possible planning to minimize harm has occurred, and documentation from the agency with jurisdiction over the Section 4(f) property concurring with the project. When the completed form is signed by FHWA and the director of OLE, the programmatic Section 4(f) process is completed.

19.5 Temporary Occupancy of Section 4(f) Property

Temporary occupancy of land from a Section 4(f) resource for construction purposes, including actual construction platforms and equipment storage, may be exempt from Section 4(f). The agency with jurisdiction over the resource must agree that the impacts to the resource are inconsequential and temporary. 23 CFR 774.13(d) addresses temporary occupancy of Section 4(f) property (including those resulting from a right-of-entry, construction and other temporary easements, and other short-term arrangements) of publicly-owned parks, recreation areas, wildlife or waterfowl refuges, or any historic site when the following conditions are satisfied:

- Duration must be temporary, i.e., less than the time needed for construction of the project, and there should be no change in ownership of the land;
- Scope of the work must be minor, i.e., both the nature and the magnitude of the changes to the Section 4(f) resource are minimal;
- There are no anticipated permanent adverse physical impacts, nor will there be interference with the activities or purpose of the resource, on either a temporary or permanent basis;
- The land being used is fully restored, i.e., the resource must be returned to a condition that is at least as good as that which existed prior to the project; and
- There must be documented agreement of the appropriate federal, state, or local officials having jurisdiction over the resource regarding the above conditions.

When the above conditions are met in the case of a temporary occupancy, an official Section 4(f) Statement similar to those described above in this section is not necessary. However, adequate documentation of these conditions must be available as part of the project records. A template letter available from the document manager should be completed and signed by the administrator of the Section 4(f) resource.

19.6 Other Section 4(f) Considerations

19.6.1 Late Designation

A portion of land already purchased for a transportation project that is designated as a Section 4(f) resource (e.g. park and recreation lands, wildlife and waterfowl refuges, and historic sites) late in the development of a proposed project may not be subject to the requirements of Section 4(f), based on FHWA review and approval. While the property may meet the criteria for Section 4(f), this would be considered a late designation (relative to project development). As described in the *Section 4(f) Policy Paper,* such a property does not need to be considered in the Section 4(f) Statement, provided the land was purchased for transportation purposes prior to the designation or prior to a change in the determination of significance; and if adequate effort was made to identify properties prior to land acquisition. It is notable that archaeological resources receiving late designation status may be subject to the requirements of Section 4(f).

19.6.2 Joint Development

As with the case of late designation described above, there may be cases where it is necessary to document coordination regarding properties that do not have a Section 4(f) designation. For example, Section 4(f) requirements typically are not applicable to a planned public park that would include use of some land already within highway corridor right-of-way. However, measures to jointly develop the highway and the park must be documented in the project records.

19.7 Environmental Decision

The Section 4(f) approval is not necessarily the last step before FHWA's environmental decision (ROD, FONSI, or CE). Although FHWA cannot typically make the environmental decision while a Section 4(f) Statement is pending, FHWA may be able to sign a re-evaluation even though the Section 4(f) approval is pending.

19.8 Additional References

23 CFR 771.135. http://www.fhwa.dot.gov/legsregs/directives/fapg/cfr0771.htm

23 CFR 771.774

FHWA TA T6640.8A, Guidance for Preparing and Processing Environmental and Section 4(f) Documents: http://www.environment.fhwa.dot.gov/.

Section 4(f) Policy Paper (Revised March 2005) Provides answers to many frequently asked Section 4(f) questions: http://www.environment.fhwa.dot.gov/.

Programmatic Section 4(f) Evaluations and Approval for FHWA Projects that Necessitate the Use of Historic Bridges (July 5, 1983): http://www.environment.fhwa.dot.gov/.

Final Nationwide Section 4(f) Evaluation and Approval for Federally Aided Highway Projects with Minor Involvement with Public Parks, Recreation Lands, and Wildlife and Waterfowl Refuges (December 23, 1986): http://www.environment.fhwa.dot.gov/.

Final Nationwide Section 4(f) Evaluation and Approval for Federally Aided Highway Projects with Minor Involvement with Historic Sites (December 23, 1986): http://www.environment.fhwa .dot.gov/.

Negative Declaration/Section 4(f) Evaluation for Independent Bikeway or Walkway Construction Projects (May 23, 1977): http://www.environment.fhwa.dot.gov/.

Section 6(f)

CHAPTER 20

Section 6(f) properties are publicly-owned lands that were purchased or improved with funding from the Land and Water Conservation Fund (also known as LAWCON funds). As part of road improvement planning, 6(f) properties are inventoried, described, and depicted in project-related documentation. Many aspects of Section 6(f) are similar to Section 4(f) discussed in Chapters 15, 19, and 20 of this manual, except that Section 6(f) is more rigorous in its requirement for "in kind" mitigation. This typically means the substitution of other recreational properties of equal fair market value and relatively equal usefulness and location.

20.1 Legislation, Regulations, and Guidance

20.1.1 Federal Legislation and Regulations

ⓘ ***16 USC 460 4 – 11, (P.L. 88-578), Section 6(f).*** The LWCF Program, Section 6(f) under legislation 16 USC 460-4-11 was established in 1965 and provides matching funds to states or municipalities for planning, improvement, or acquisition of outdoor recreational lands. The LAWCON program is intended to increase the net quantity of public, outdoor recreational space.

Section 6(f)(3) of the Land and Water Conservation Act states that, "No property acquired or developed with assistance under this section shall, without the approval of the Secretary (Department of the Interior), be converted to other than public outdoor recreation uses." Conversion of LAWCON fund-assisted parkland to non-outdoor recreational use is allowed only when:

- All other alternatives have been thoroughly explored,
- The conversion is in accord with the Statewide Comprehensive Outdoor Recreation Plan (SCORP) (see Section 20.5, *Additional References*), and
- Replacement land of at least the same fair market value and reasonably equivalent usefulness and location is assured.

20.1.2 Guidance Documents

ⓘ ***FHWA Technical Advisory T6640.8A, Section IX.*** Provides guidance for documenting 6(f) coordination within Section 4(f) Evaluations.

ⓘ ***Iowa DNR, Post Completion Responsibilities and 6(f)(3) Conversions: A Manual for Local Sponsors.*** This manual provides guidance on responsibilities of local sponsors of 6(f) lands, and the conversion process. The document is located in Appendix 20a of this manual.

Section 6(f)
properties are publicly owned lands that were purchased or improved with funding from the Land and Water Conservation Fund (also known as LAWCON funds).

ⓘ ***Iowa DNR, Section 6(f)(3) Conversion Checklist.*** This checklist should be consulted when there is the possibility of converting the use of a Section 6(f) land (See Appendix 20b). Chapter 19, *Section 4(f) Statements,* of this manual includes additional discussion.

ⓘ ***FHWA, Letter to U.S. Department of the Interior (DOI), Office of Environmental Project Review on Disagreements Between DOT and Interior, October 1987.*** Letter from FHWA to DOI detailing areas of disagreement on the application of Section 4(f) policy.

20.2 Methodology for Conducting a Section 6(f) Evaluation

Any property that was planned, purchased, or improved with LAWCON money is considered a 6(f) property. Section 6(f) is a separate process from Section 4(f); however, if both processes are necessary, they will typically run concurrently, and should be recognized in the Section 4(f) evaluation as part of the agency coordination.

In the State of Iowa, Iowa Department of Natural Resources (Iowa DNR) is responsible for oversight of the conversion process of 6(f) lands and coordination with federal agencies, including DOI in cases where a project may impact LAWCON lands. The locations of 6(f) properties may be determined through early coordination efforts with Iowa DNR, who maintains a database with the locations of 6(f) properties within Iowa.

Coordination is initially conducted with Iowa DNR. Provided Iowa DOT, FHWA, and Iowa DNR reach agreement on the alternatives analysis and, if applicable, the mitigation approach, coordination will be concluded through the Iowa DNR process. However, should Iowa DOT, FHWA, and Iowa DNR not reach agreement, the consultation may be elevated to DOI at the request of FHWA and Iowa DOT.

As an additional reference, a comprehensive web-based database of Section 6(f) properties, searchable by state, county, municipality, or Congressional District, is available. It provides property name, location, and amount of funding received per year for all Section 6(f) properties in an area. (See link in Section 20.5).

Exhibit 20-1 depicts the Section 6(f) evaluation process.

20.3 Mitigation for Impacts to 6(f) Lands

Mitigation for Section 6(f) lands impacted by a project must include replacement with land of at least the same fair market value, and reasonably equivalent usefulness and location relative to the impacted land. For additional information on acceptable mitigation for converted 6(f) lands, see Appendix 20a.

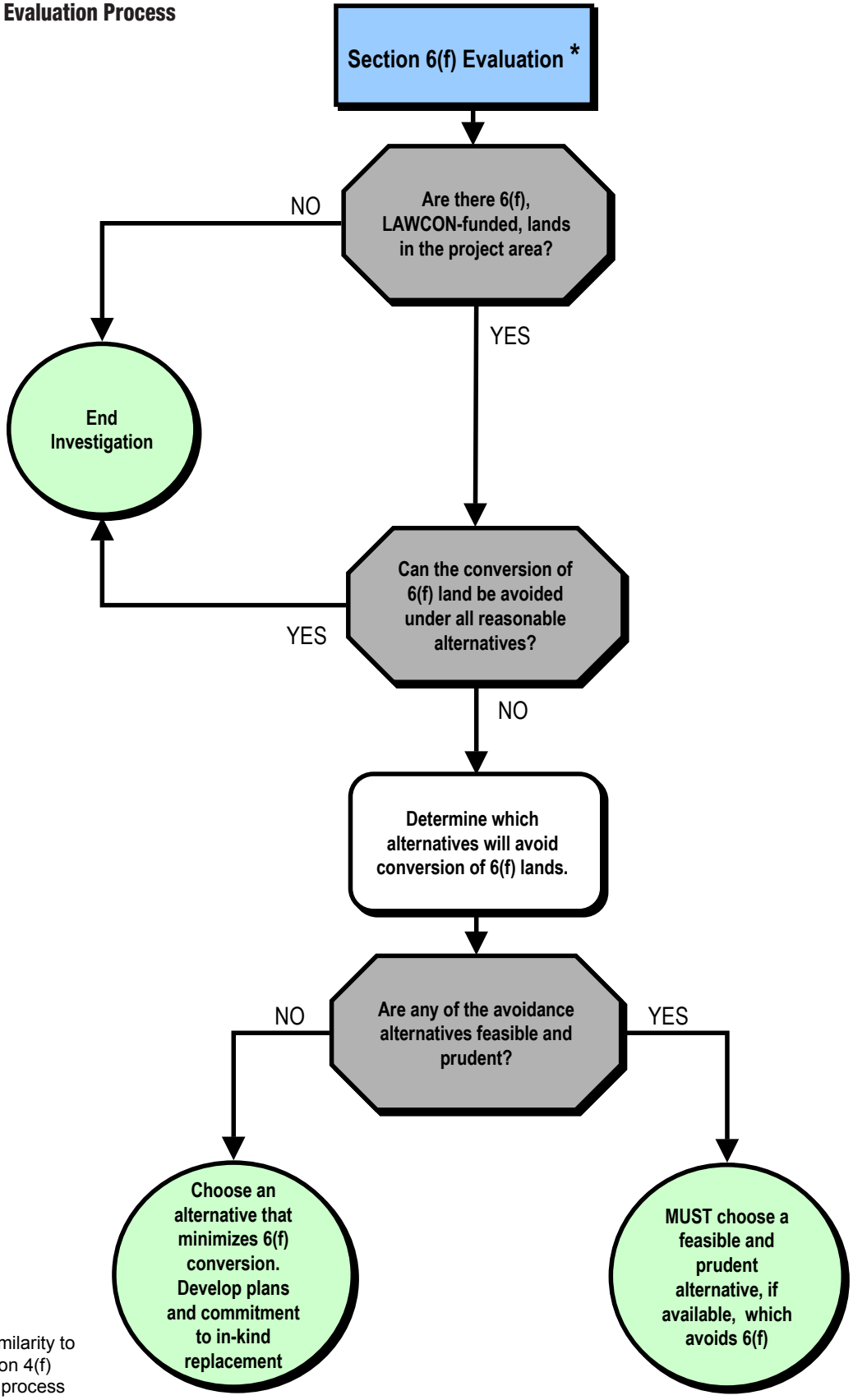
20.4 Documentation of 6(f) Resources

The presence of land eligible for Section 6(f) review (or the lack of such land) should be discussed within the body of the NEPA document. This means, at minimum, that any nearby eligible 6(f) land (e.g., a public park in which LAWCON funds were used) should be briefly described in the Section 6(f) resource area of the Environmental Analysis section. If all reasonable alternatives avoid the potential for Section 6(f) conversion, then it is typically sufficient to declare this finding within the environmental consequences discussion.

If there is potential for Section 6(f) conversion the environmental consequences discussion should provide documentation of measures taken to avoid, minimize, and mitigate impacts to Section 6(f) properties. The results of agency coordination between Iowa DOT, Iowa DNR, FHWA, and DOI, regarding the potential conversion of Section 6(f) lands and proposed mitigation should also be discussed.

Iowa DNR's *"Post Completion Responsibilities and 6(f)(3) Conversions: A Manual for Local Sponsors"* (see Appendix 20a) and the *Section 6(f)(3) Conversion Checklist* (See Appendix 20b) provide other guidance on issues to cover and useful graphics for the Section 6(f) documentation.

Exhibit 20-1
Section 6(f) Evaluation Process



* Note similarity to Section 4(f) review process

Although Section 6(f) is a separate process from Section 4(f), Section IX of FHWA TA T6640.8A allows the two processes (if necessary) to be combined into one single document. This approach should be approved by the Project Management Team and Iowa DOT OLE staff. If the evaluations are completed separately, some Section 6(f) property may also need to be discussed in the Section 4(f) Evaluation, as the resource may be considered both a Section 4(f) and 6(f) property.

At the discretion of the OLE NEPA Compliance Section, a separate Section 6(f) evaluation technical memorandum may be prepared to document the Section 6(f) investigations and study efforts. This would typically only be undertaken in particularly complex conversion situations as a means to summarize the study efforts. If prepared, the material contained in this document would form the basis for the discussion included in the environmental document.

20.5 Additional References

National Park Service LAWCON Database: http://www.nps.gov/.

NOTES:

Indirect Impacts

CHAPTER 21

A proposed action's potential direct and observable effects are part of the basis for environmental and project location decisions by FHWA and state highway agencies. However, NEPA also directs agencies to examine effects that are not easily recognized and may be generally categorized as indirect (or "secondary") effects. Although "indirect" and "secondary" are synonymous, Iowa DOT prefers to use "indirect."

The requirement for evaluating indirect effects stems from NEPA and the Council on Environmental Quality (CEQ) regulations for implementing NEPA (40 CFR 1500-1508). It is important to note that evaluating indirect effects and cumulative effects are two distinct analyses. Although they have strong similarities and are consistent with one another, indirect and cumulative impacts are addressed separately in Iowa DOT NEPA documents. This section of the manual will focus on indirect effects. See Chapter 22 for information on cumulative effects. The CEQ provides the following definition for indirect effects:

> *Indirect effects are impacts caused by an action and are later in time or further removed in distance but are still reasonably foreseeable (40 CFR 1508.8[b]).*

The CEQ considers the terms "effect" and "impact" synonymous in its regulations. The analysis of indirect impacts should take into account the fact that effects may be detrimental or beneficial.

21.1 Legislation, Regulations, and Guidance

21.1.1 Federal Legislation and Regulations

ⓘ *40 CFR 1508, Terminology and Index.*

21.1.2 Guidance Documents

ⓘ *Federal Highway Administration (FHWA) Position Paper, Secondary [Indirect] and Cumulative Impact Assessment in the Highway Project Development Process, April 1992.*

ⓘ *CEQ Handbook, Considering Cumulative Effects under the National Environmental Policy Act, January 1997.*

ⓘ *Question 18 of Forty Most Asked Questions Concering CEQ's National Environmental Policy Act Regulations (46 CFR 18026), March 1981.*

NEPA also directs agencies to examine effects that are not easily recognized and may be generally categorized as indirect (or "secondary").

ⓘ ***U.S. Environmental Protection Agency (EPA), Consideration of Cumulative Impacts in EPA Review of NEPA Documents (EPA 315-R-99-002), May 1999.***

ⓘ ***National Cooperative Highway Research Program (NCHRP) Report 466, Desk Reference for Estimating the Indirect Effects of Proposed Transportation Projects. Louis Berger Group. 2002.***

ⓘ ***FHWA Memorandum: Interim Guidance: Questions and Answers Regarding Indirect and Cumulative Impact in the NEPA Process, January 31, 2003—***see Appendix 21a or the FHWA link in Section 21.3, *Additional References*.

Although some of these documents only reference cumulative effects in the title they provide some discussion of indirect effects as well. The last document listed above is particularly noteworthy because it is the most recent guidance available, issued specifically by FHWA, as of this writing. This 2003 guidance is also structured around a "Q&A" format, with twelve questions providing the basis for a detailed discussion of the NEPA context for considering indirect and cumulative impacts, key concepts and definitions, case law, and links to more information. This FHWA memorandum is reproduced in this manual as Appendix 21.

21.2 Conducting Indirect Impacts Analyses

NCHRP Report 466, *Desk Reference for Estimating the Indirect Effects of Proposed Transportation Projects,* provides guidance and a framework for practitioners in defining "indirect effects" of proposed transportation projects, identifying tools for estimating these effects, and analyzing these effects. Table 21-1 shows the process for assessing indirect effects, as outlined in this report. Iowa DOT follows these processes in conducting analyses of indirect impacts. These processes are intended to apply equally to Environmental Impact Statements (EISs) or Environmental Assessments (EAs).

During the early coordination steps, it is important to ask, "Which resource areas warrant a discussion of indirect and cumulative impacts?" and "Why do they warrant a discussion?"

21.2.1 Early Coordination of Indirect Impacts Analysis

During the early coordination or scoping phase of a project it is important to ask, "Which resource areas warrant a discussion of indirect impacts?" and "Why do they warrant a discussion?" Early and ongoing consultations among Iowa DOT, FHWA, other applicable agencies, and the public will help determine the resource areas appropriate for analysis. Considerations must include the importance of a given resource to the project area and the potential for the project to cause indirect impacts to that specific resource. In some cases, Geographic Information Systems (GIS) methods will prove useful. Determinations about which resources to study should ultimately be agreed to among members of the Iowa DOT Project Management Team. Resource areas that are analyzed for indirect impacts should then be described in the environmental document in terms of direct impacts, indirect impacts, and then mitigation measures, in that order. While there may be discussion of indirect impacts for many resources, others may focus only on direct impacts.

The process of working with agencies to identify resource areas to be analyzed should be documented and described in the Agency Coordination section of the study. In many cases, the determination of which resources warrant additional indirect impact analysis depends on the characteristics of the project and the project's location in relation to specific resources. For example, a new highway bypass that provides improved access may have an indirect effect of converting farmland to residential use, with the new residences producing a new labor force that attracts new businesses. As you can see, these indirect effects are often not as readily apparent because

Table 21-1

Eight Steps in Indirect Impacts Analysis		
Step	Analysis Steps (per NCHRP Report 466)	When Involved and Why
1	Scoping (or Early Coordination)	Determine the basic approach, effort required, and geographical boundaries.
2	Identify the Study Area's Direction and Goals	Compile information regarding the study area to help define the context for assessment.
3	Inventory the Study Area's Notable Features	Gather and synthesize additional data on environmental features. Identify specific environmental issues to be used to assess the project.
4	Identify Impact-Causing Activities of Proposed Action and Alternatives	Determine how the proposed alternatives may cause impacts to the resources identified in the prior steps.
5	Identify Potentially Significant Indirect Effects for Analysis	Catalog the indirect effects associated with project activities and alternatives; identify whether any have potentially significant effects meriting further analysis.
6	Analyze Indirect Effects	Estimate the magnitude of the potentially significant effects using qualitative and quantitative techniques. Describe future conditions with and without the proposed action.
7	Evaluate Analysis Results	Evaluate the uncertainty of the results of the indirect effects analysis for its ramification on the overall assessment.
8	Assess Consequences and Develop Mitigation	Evaluate the consequences of the indirect effects in the context of the full range of project impacts. Develop strategies to avoid or lessen any effects found to be unacceptable. Reevaluate the indirect effects in the context of the mitigation strategies.

Source: NCHRP Report 466, Introduction to Indirect Effects Analysis.

they are more removed from the transportation improvement in time or space.

Agencies and other interested parties should be consulted about indirect effects as early as feasible in the project development process—if there are resources of potential concern. Obtaining the agencies' agreement on the resources to be studied will help focus and provide additional insight into the development of project alternatives.

21.2.2 Describing the Affected Environment

Assuming that the resources to be studied for indirect impacts have been identified during the early coordination period, the remainder of the analysis can be conducted concurrently with the development of an EA or EIS. The CEQ notes that the descriptions of affected environments should contain four types of information so that indirect effects can be adequately addressed:

- Data on the status of important natural, cultural, social, or economic resources and systems
- Data that characterize the important environmental or social stress factors
- A description of pertinent regulations, administrative standards, and development plans
- Data on environmental and socioeconomic trends

Collecting these data may involve review of various data sources, often with emphasis on regional or state-, county- and citywide planning data (for example, agricultural land production or wetland impacts are often recorded over large geographic areas). In some cases, GIS tools and field reviews may help to clarify the relevant resource characteristics. Describing the affected environment on the basis of the four types of information listed above will then culminate in the determination of a baseline condition for comparing the proposed action and alternatives.

In determining a baseline condition, it is necessary to account for the indirect effects of past actions that have created the existing environmental condition. With that in mind, two possible methods for selecting a baseline condition are:

- *The No-Build Alternative*—This is a common baseline to use, and one often consistent with the analysis of direct impacts. The No-Build baseline

condition also provides an easily understood comparison of how the environment is likely to change in the future without the proposed action.

- *Environmental Reference Point*—Another approach would be to consider a reference point for the resource. The reference point, whether simply the natural condition of the ecosystem or some modified (but sustainable) condition, serves as a benchmark to assess each alternative's environmental impacts. The analysis would then evaluate the resource's degree of impact or improvement from its reference point.

In short, the description of the affected environment for indirect effects does not substantially differ from the description for direct effects. However, the additional geographic, temporal, and resource interactive considerations made during the early coordination period need to be reflected when selecting the analytical baseline.

21.2.3 Determining Indirect Impacts

Potential approaches for analyzing indirect impacts are very diverse, and this manual will not attempt to offer a single concise methodology. Other guidance and case studies should be consulted and will confirm a great variety of practices. On the basis of the "scoping" steps, it is known that some resources will warrant more discussion than others. Gaining a thorough understanding of project design features and the range of impacts they may cause is the first step toward the identification of indirect effects. The next step is to examine the list of project impact-causing actions to explore the potential cause-effect relationships and establish which effects are potentially significant and merit subsequent detailed analysis (or, conversely, which effects are not potentially significant and require no further assessment). Such findings can be tested—for example, by looking at "cause-and-effect pathways." Pathways between human activities and environmental resources (as discussed in the CEQ Handbook, *Considering Cumulative Effects under the National Environmental Policy Act* [January 1997]) will often prove useful in the determination of indirect effects and particularly the roles of specific actions. NEPA requires an EA or EIS to evaluate only those indirect impacts that are reasonably foreseeable. The terms "likely" and "reasonably foreseeable" are properly interpreted as meaning that the impact is sufficiently likely to occur that a person of ordinary prudence would take it into account in making a decision (Sierra Club v. Marsh, 976 F. 2d – 1st Cir. 1992). Related findings have also held that speculation is not acceptable as a foreseeable impact; so while some uncertainty is acceptable, objective standards (such as past trend analysis) should be used to determine if an impact is probable. For each resource category, therefore, it may be useful to ask the following questions:

- Is the resource impact truly relevant to the cause-and-effect relationship of the highway project? Or is the concern of a more general nature?
- For this resource, is there a potential difference in outcomes between the project's build and no build alternatives?
- If there is a project-related issue, what geographic area is appropriate to consider? What timeframe is reasonably foreseeable?

Therefore, the analysis of indirect impacts should often be considered an extension of the discussion of direct impacts for each resource in the Environmental Analysis section. For Iowa DOT projects, the preferred practice is to document any potential indirect impacts within each resource category. The discussion will follow the discussion of direct impacts and measures to minimize harm. That is, each resource category in the Environmental Analysis section may be organized to address the affected environment, environmental consequences (i.e., direct impacts), and indirect impacts, followed by a discussion of the mitigation measures, as appropriate.

21.2.4 Mitigation Considerations for Indirect Impacts

By including indirect impacts in the same discussion as direct impacts to a resource, it is easier to clearly identify opportunities to minimize or mitigate impacts. A proactive approach to mitigation can often be demonstrated through efforts to engage with various resource agencies, if appropriate, to discuss

indirect impacts. If, for example, a highway project involves wetland impacts in an area where other actions are also consuming wetlands, there may be opportunities to work cooperatively on mitigation.

The management risks of being proactive with other agencies must also be recognized. The most noteworthy risk is that while various agencies may express support for broad-based resource management and mitigation, they may not be able to invest the commensurate funds or staff time to study or address the concerns. Therefore, while stewardship of lands and resources is important to a sound highway project's mission, project sponsors (such as FHWA and Iowa DOT) do not need to accept responsibility for direct impacts that reach beyond the mitigation measures of the project.

21.3 Additional References

U.S. Department of Transportation, FHWA, Environmental Guidebook: http://environment.fhwa.dot.gov/.

FHWA Memorandum: Interim Guidance: Questions and Answers Regarding Indirect and Cumulative Impact in the NEPA Process, January 31, 2003—see Appendix 21 or: http://www.environment.fhwa.dot.gov/.

NOTES:

Cumulative Impacts

CHAPTER 22

A proposed action's potential direct and observable effects are part of the basis for environmental and project location decisions by FHWA and state highway agencies. However, NEPA also directs agencies to examine effects that are not easily recognized and may be generally categorized as indirect and cumulative effects.

The requirement for evaluating indirect and cumulative effects stems from NEPA and the Council on Environmental Quality (CEQ) regulations for implementing NEPA (40 CFR 1500-1508). It is important to note that evaluating indirect effects and cumulative effects are two distinct analyses. Although they have strong similarities and are consistent with one another, indirect and cumulative impacts are addressed separately in Iowa DOT NEPA documents. This chapter of the manual will focus on cumulative impacts. See Chapter 21 for a discussion of indirect impacts. The CEQ provides the following definition for cumulative impacts:

> *Cumulative impacts are the impacts on the environment that result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions (40 CFR 1508.7).*

The CEQ considers the terms "effect" and "impact" synonymous in its regulations. The analysis of cumulative impacts should take into account the fact that effects may be detrimental or beneficial.

22.1 Legislation, Regulations, and Guidance

22.1.1 Federal Legislation and Regulations

ⓘ ***23 CFR 771.117, Categorical Exclusions (CEs).*** FHWA regulations for implementing NEPA (23 CFR 771) only address the topic of indirect and cumulative effects relative to the description of a CE. The regulations state that CEs are actions that do not "individually or cumulatively have any significant environmental impacts" (23 CFR 771.117). By this definition of a CE, FHWA acknowledges the need to include indirect and cumulative impacts in project decisions.

ⓘ ***40 CFR 1508, Terminology and Index.***

22.1.2 Guidance Documents

ⓘ ***FHWA Position Paper, Secondary [Indirect] and Cumulative Impact Assessment in the Highway Project Development Process, April 1992.***

NEPA also directs agencies to examine effects that are not easily recognized and may be generally categorized as indirect (or "secondary") and cumulative effects.

- ***CEQ Handbook, Considering Cumulative Effects under the National Environmental Policy Act, January 1997.***
- ***EPA, Consideration of Cumulative Impacts in EPA Review of NEPA Documents (EPA 315-R-99-002), May 1999.***
- ***FHWA Memorandum: Interim Guidance: Questions and Answers Regarding Indirect and Cumulative Impact in the NEPA Process, January 31, 2003—***see Appendix 21a or the FHWA link in Section 22.3, *Additional References*.

The last document listed above is particularly noteworthy because it is the most recent guidance available, issued specifically by FHWA, as of this writing. This 2003 guidance is also structured around a "Q&A" format, with twelve questions providing the basis for a detailed discussion of the NEPA context for considering indirect and cumulative impacts, key concepts and definitions, case law, and links to more information. This FHWA memorandum is reproduced in this manual as Appendix 22a.

22.2 Conducting Cumulative Impacts Analysis

The CEQ guidance, *Considering Cumulative Effects under the National Environmental Policy Act,* breaks the analysis of cumulative effects into three main components (shown in Table 22-1): scoping, describing the affected environment, and determining the environmental consequences. As can be seen in Table 22-1, these three components form the basis for the CEQ's 11 analytical steps. Iowa DOT follows these processes in conducting analyses of cumulative impacts. These processes are intended to apply equally to Environmental Impact Statements (EISs) or Environmental Assessments (EAs).

22.2.1 Early Coordination of Cumulative Impacts Analysis

The first analytical component described by the CEQ in Table 22-1 is scoping, which is usually related to an EIS. However, the scoping component is typically applied to the early coordination phase of developing an EA, although at a reduced level.

Table 22-1

Eleven Steps in Cumulative Impacts Analysis	
Environmental Impact Assessment Component	Analysis Steps (per 1997 CEQ Guidance)
Scoping (or Early Coordination)	1. Identify the significant cumulative effects issues associated with the proposed action and define the assessment goals. 2. Establish the geographic scope for the analysis. 3. Establish the time period for the analysis. 4. Identify other actions affecting the resources, ecosystems, and human communities of concern.
Describing the affected environment	5. Characterize the resources, ecosystems, and human communities identified in scoping in terms of their response to change and capacity to withstand stresses. 6. Characterize the stresses affecting these resources, ecosystems, and human communities and their relation to regulatory thresholds. 7. Define a baseline condition for the resources, ecosystems, and human communities.
Determining the environmental consequences	8. Identify important cause-and-effect relationships between human activities and resources, ecosystems, and human communities. 9. Determine the magnitude and significance of cumulative effects. 10. Modify or add alternatives to avoid, minimize, or mitigate significant cumulative effects. 11. Monitor the cumulative effects of the selected alternative and adapt management.
Source: CEQ, Considering Cumulative Effects under the National Environmental Policy Act, January 1997.	

During this first analytical component, it is important to ask, "Which resource areas warrant a discussion of cumulative impacts?" and "Why do they warrant a discussion?" This idea is similar to early project coordination or scoping to identify issues to be analyzed in depth in the NEPA document. Early and ongoing consultations among Iowa DOT, FHWA, other applicable agencies, and the public will help determine the resource areas appropriate for analysis. Considerations must include the importance of a given resource to the project area and the potential for the project to cause cumulative impacts to that specific resource. In some cases, Geographic Information System (GIS) methods will prove useful. Determinations about which resources to study should ultimately be agreed to among members of the Iowa DOT Project Management Team. Resource areas that are analyzed for cumulative impacts should then be described under a separate subheading of the Environmental Analysis section, titled Cumulative Impacts.

The process of working with agencies to identify resource areas to be analyzed should be documented and described in the Agency Coordination section of the study. In many cases, the determination of which resources warrant cumulative impact analysis depends on the characteristics of the project and the project's location in relation to specific resources. For example, if a river is located in close proximity to a proposed project, water resources and fisheries would likely be important topics for cumulative impact analysis. Iowa DOT would consult with Iowa DNR and other relevant agencies, possibly the U.S. Fish and Wildlife Service, early on in the coordination process. Another good example is a highly urbanized area that contains historic resources and/or historic districts. Cumulative impact analysis may be necessary even if the proposed transportation project would have relatively minor direct impacts to the historic resources. This is because the cumulative effects of other projects going on in the urban area might be very different compared to the direct impacts of the proposed project. The cumulative impacts could even be positive, if there are major historic preservation projects underway. In this situation, Iowa DOT would likely consult very early in the project with the State Historic Preservation Office (SHPO).

Selection of the individual resource areas for consideration of cumulative impacts helps to facilitate progress through the 11 analytical steps shown in Table 22-1. For instance, land use and wildlife resource areas would likely have very different appropriate geographic areas and/or time periods over which project-specific impacts would occur (Steps 2 and 3, respectively, of the CEQ's analysis steps). Establishing different geographic and time parameters for each resource would also clarify what other past, present, and reasonably foreseeable actions or projects should be considered in the analysis (Step 4). For example, in an urban area, it may be appropriate to consider the changes to land use over the past 30 years, given the time in which development has occurred, while wetlands may be investigated over a period of 50 or even 100 years. Discussing the resources to be studied with agencies will also provide an opportunity to review which actions or projects should be included.

Agencies and other interested parties should be consulted about cumulative effects as early as feasible in the project development process—if there are resources of potential concern. Obtaining the agencies' agreement on the resources to be studied will help focus and provide additional insight into the development of project alternatives.

22.2.2 Describing the Affected Environment

Assuming that the resources to be studied for cumulative impacts have been identified during the early coordination period, the remainder of the analysis can be conducted concurrently with the development of an EA or EIS. The CEQ notes that the descriptions of affected environments should contain four types of information so that cumulative effects can be adequately addressed:

- Data on the status of important natural, cultural, social, or economic resources and systems
- Data that characterize the important environmental or social stress factors
- A description of pertinent regulations, administrative standards, and development plans
- Data on environmental and socioeconomic trends

Collecting these data may involve review of various data sources, often with emphasis on regional or state-, county- and citywide planning data (for example, agricultural land production or wetland impacts are often recorded over large geographic areas). In some cases, GIS tools and field reviews may help to clarify the relevant resource characteristics. Describing the affected environment on the basis of the four types of information listed above will then culminate in the determination of a baseline condition for comparing the proposed action and alternatives.

In determining a baseline condition, it is necessary to account for the cumulative effects of past actions that have created the existing environmental condition. With that in mind, two possible methods for selecting a baseline condition are:

- *The No-Build Alternative*—This is a common baseline to use, and one often consistent with the analysis of direct impacts. The No-Build baseline condition also provides an easily understood comparison of how the environment is likely to change in the future without the proposed action.
- *Environmental Reference Point*—Another approach would be to consider a reference point for the resource. The reference point, whether simply the natural condition of the ecosystem or some modified (but sustainable) condition, serves as a benchmark to assess each alternative's environmental impacts. The analysis would then evaluate the resource's degree of impact or improvement from its reference point.

In short, the description of cumulative effects for the affected environment does not substantially differ from the analysis of direct effects. However, the additional geographic, temporal, and resource interactive considerations made during the early coordination period need to be reflected when selecting the analytical baseline.

22.2.3 Determining the Cumulative Environmental Consequences

Potential approaches for analyzing cumulative impacts are very diverse, and this manual will not attempt to offer a single concise methodology. Other guidance and case studies should be consulted and will confirm a great variety of practices. The CEQ Handbook, *Considering Cumulative Effects under the National Environmental Policy Act* (January 1997), states at the beginning of Chapter 4:

> *The diversity of proposed federal actions and the environments in which they occur make it difficult to develop or recommend a single method or approach to cumulative effects analysis.*

Chapter 4 *Determining the Environmental Consequences of Cumulative Effects* emphasizes the identification and description of cause-and-effect relationships for resources, ecosystems, and human communities. On the basis of the "scoping" steps, it is known that some resources will warrant more discussion than others. Such findings can be tested again as part of determining cumulative effects—for example, by looking at "cause-and-effect pathways." Pathways between human activities and environmental resources (as discussed in the above referenced Handbook) will often prove useful in the determination of cumulative effects and particularly the roles of specific actions. For example, the farmland resource may be particularly important within a given geographical area and may be subject to considerable indirect and cumulative impacts resulting from general urban growth and development. At the same time, it may be that the direct farmland impacts of the proposed highway project are negligible, because there are no strong pathways between the foreseeable impacts of the highway project and the farmland resources of the area. In such a case, the overall trend may be noteworthy but not especially deserving of attention in the context of the highway project.

The above confirms that it is often appropriate to describe the separate direct impacts of the proposed roadway project plus the potential cumulative impacts based on other past, present, or foreseeable activities. Some controls are necessary, however, because case law has held that NEPA requires an EA or EIS to evaluate only those impacts that are reasonably foreseeable (Sierra Club v. Marsh, 976 F. 2d – 1st Cir. 1992). Related findings have also held that speculation is not acceptable as a foreseeable

impact; so while some uncertainty is acceptable, objective standards (such as past trend analysis) should be used to determine if an impact is probable. For each resource category, therefore, it may be useful to ask the following questions:

- Is the resource impact truly relevant to the cause and effect relationship of the highway project? Or is the concern of a more general nature?
- For this resource, is there a potential difference in outcomes between the project's Build and No-Build alternatives?

If there is a project-related issue, what geographic area is appropriate to consider? What timeframe is reasonably foreseeable?

Therefore, the analysis of cumulative impacts should often be considered an extension of the discussion of direct impacts for each resource. For Iowa DOT projects, the preferred practice is to document any potential cumulative impacts within a separate subheading of the Environmental Analysis section, titled Cumulative Impacts.

22.2.4 Mitigation Considerations for Cumulative Impacts

A proactive approach to mitigation can often be demonstrated through efforts to engage with various resource agencies, if appropriate, to discuss cumulative impacts. If, for example, a highway project involves wetland impacts in an area where other actions are also consuming wetlands, there may be opportunities to work cooperatively on mitigation.

The management risks of being proactive with other agencies must also be recognized. The most noteworthy risk is that while various agencies may express support for broad-based resource management and mitigation, they may not be able to invest the commensurate funds or staff time to study or address the concerns. Therefore, while stewardship of lands and resources is important to a sound highway project's mission, project sponsors (such as FHWA and Iowa DOT) do not need to accept responsibility for mitigation measures that reach beyond the direct impacts of the project.

22.3 Additional References

U.S. Department of Transportation, FHWA, Environmental Guidebook: http://environment.fhwa.dot.gov/.

FHWA Memorandum: Interim Guidance: Questions and Answers Regarding Indirect and Cumulative Impact in the NEPA Process, January 31, 2003—see Appendix 22a or: http://www.environment.fhwa.dot.gov/.

NOTES:

Mitigation, Commitments, and Green Sheets

CHAPTER 23

This chapter discusses the general, non-resource specific, process for addressing mitigation, and making and documenting commitments. When impacts occur, mitigation is needed. Mitigation leads to a commitment, which must be documented in the project's Green Sheets.

23.1 Mitigation

The environmental document, whether an Environmental Assessment (EA) or an Environmental Impact Statement (EIS), must identify mitigation measures for the range of impacts of the proposed actions, regardless of whether the resource impacts would individually be considered "significant." The measures to be discussed should include "design alternatives, relocation assistance, possible land-use controls that could be enacted, and other possible efforts." (CEQ's *40 Questions*) Mitigation measures that are outside the lead agency's jurisdiction to implement should also be discussed; however, this lack of jurisdiction should be noted in the discussion. The probability of implementation should be disclosed in the discussion, in particular where there is a history of failure to implement mitigation measures. Additionally, if the mitigation measures have long-term implementation requirements and will not be ready in a time frame commensurate with the occurrence of the impact, this should be noted.

The discussion of mitigation has an obvious relationship with sequencing (avoidance, minimization, mitigation - see Chapter 13). For resources where sequencing is required, particular attention should be given to the requirement to discuss design alternatives that would avoid or minimize the impact to the resource.

For Iowa DOT projects, discussion of mitigation measures should consider the following points. These issues should be developed in consultation with the Project Management Team (PMT), including the appropriate district office and the Office of Design.

- Alternatives that would avoid the impact.
- Alternatives that would minimize impact or design treatments of an alternative that would minimize impact.
- The type of mitigation being proposed at a conceptual level (e.g., replacement in-kind, relocation assistance, enhancement of another site, etc.).
- The location of proposed mitigation.
- The agency with jurisdiction to implement the mitigation, if other than Iowa DOT.

When impacts occur, mitigation is needed. Mitigation leads to a commitment, which must be documented in the project's Green Sheets.

- Performance measures that the mitigation must meet to be considered successful.
- The timing of the implementation of the mitigation.

Mitigation measures may be discussed in the Alternatives and the Environmental Analysis sections of an EIS or an EA. Although most of the discussion belongs in the Environmental Analysis section, it is appropriate to discuss modifications made to reasonable alternatives to avoid and minimize impacts. Redundancy shall be eliminated to the greatest extent possible, however. Data should be presented in Environmental Analysis and referenced in Alternatives to the extent possible. Such decisions made to reduce impacts should be an integral part of the alternatives development process and should be noted.

23.2 Commitments

23.2.1 What is a Commitment?

A project commitment may take many forms. Generally, though, a commitment represents work that is "out of the ordinary" to satisfy an agreement made with a resource or regulatory agency or a specific property owner (which may include local government bodies with jurisdiction over impacted property) to mitigate for a project impact. Compliance with Iowa DOT standard specifications would not constitute a commitment, unless the application of the standard specification itself carries special requirements (e.g., in a particular location within the project area where it would not normally be applied).

Commitments are typically framed through coordination with resource or regulatory agencies in response to impacts created by a proposed project. As the work contained in a commitment is often an element of the permitting process for a resource, execution of commitments should be considered a binding agreement upon which the construction of the project itself is contingent.

Examples of commitments may include:

- Wetland mitigation, including type, location, size, timing of plantings and hydrological testing, etc.
- Special fencing to prevent wildlife species from entering the highway right-of-way.
- Wildlife passages under roadway embankments.
- Provisions for bicycle or pedestrian facilities.
- Construction of noise barriers, including type, height, location, and any special design characteristics (e.g., surface treatment or color).

Commitments will be recorded both in the environmental document for the project, as well as on the project's Green Sheets. Section 23.3 of this chapter discusses Green Sheets in more detail.

Descriptions of commitments should include enough information for the reader to understand what is being mitigated, what the mitigation concept is, where and when the mitigation should occur, who is responsible for the mitigation (especially if other than Iowa DOT), and future maintenance requirements, if applicable.

23.2.2 Responsibilities

The authority to make a commitment on behalf of Iowa DOT rests with the Director of OLE or his/her designee. OLE staff may be empowered to negotiate commitments with agencies, however.

The Iowa DOT office that receives the Green Sheet is responsible for fulfilling project commitments.

23.3 Green Sheets

During a project, mitigation measures may be needed to lessen the effects of an impact. If mitigation is required, a project may commit to certain actions. When commitments have been made on a project, the commitment should be documented on a project Green Sheet. The Green Sheet not only documents the commitment, but also communicates the commitments to others within Iowa DOT. The commitments noted on a Green Sheet become part of the project's contract documents during the letting and bidding process.

The Green Sheet form is used by OLE to describe a commitment that is made during the NEPA process. The Green Sheet tracks the commitment and ensures that the commitment is discussed in the environmental document and implemented during the project. However, Green Sheets should only be used when the commitment is "beyond the ordinary," as discussed in Section 23.2.

A Green Sheet should be completed based on the outcome of the NEPA process for a project. The OLE Document Manager is responsible to complete the Green Sheet, if it is required.

23.3.1 Format of the Green Sheet

The Green Sheet form is available on OLE's website. The form is printed on green paper and is made up of several sections. These sections include project information, commitments, disposition, and an acknowledgement form. The project information, completed by the OLE Document Manager, should include the county, route, location, project number, and the Document Manager's name.

On the form, commitments are divided into separate headings in order to outline each commitment. These include Natural Sciences, Social Sciences, Engineering, Cultural Resources and Regulated Materials. For each commitment, the engineering or resource topic, the action being committed, and environmental contact should be described or named.

The disposition section follows the descriptions of the commitments. The disposition section is used to track notifications, and includes a list of the people who have compiled and reviewed the commitment(s). The people who sign and date this part of the form include the Cultural Resource Manager, the Location Engineer, the NEPA Document Manager, the OLE Director, Regulated Materials Manager, and the Wetland Resource Manager.

Once the Green Sheet is reviewed and signed by the appropriate people, it is transferred to the appropriate office for a signature and date. The appropriate person or office(s) will be responsible to make sure that the commitment is completed. The responsible people/office(s) may include the Road Design Engineer, District Engineer, District Construction Engineer, Resident Construction Engineer, Consultant Coordination Section, Bridges and Structures, Right-of-Way, Construction, Local Systems, FHWA, Contracts, and/or Specifications. In addition, a comment box is available for anyone who would like to include any additional comments on the form.

The Green Sheet is used to facilitate communication about commitments between OLE and the receiving offices. However, if issues arise, direct communication should occur between OLE and the receiving office(s) through face-to-face contact, phone calls, and/or e-mails.

NOTES:

CHAPTER 24

Reserved for Future Expansion

PART IV

Resource Studies

Introduction: Resource Studies

CHAPTER 25

The purpose of Part IV of the *OLE Manual*, *Resource Studies,* is to provide guidance for analyzing and recording impacts to resources that may potentially be encountered during development of transportation projects.

Part IV consists of the following chapters and resource topics:

26	Surface Water and Water Quality
27	Special River Designations
28	Waters of the United States, Including Wetlands
29	Floodplains and Hydraulics
30	Threatened and Endangered Species, Wildlife, and Upland Communities
31	Land-Use Impacts
32	Social/Community Impacts
33	Environmental Justice
34	Relocation Impacts
35	Economic Impacts
36	Energy
37	Visual Impacts
38	Air Quality
39	Noise
40	Agriculture
41	Regulated Materials
42	Cultural Resources: Archaeology, Historic/ Architectural Preservation, and Tribal Notification
43	(Reserved for future additions)

Each chapter in this part was designed to have a similar structure to ensure that the reader can easily find important information. The chapters contain the following sections:

- *Legislation, Regulations, and Guidance*—Includes a listing and brief description of all federal and state regulations and agency guidance for the resource.
- *Resource/Regulatory Agencies and Interested Groups*—Each resource category discussion references the key federal, state, and local agencies that typically have an interest in the resource. This includes information on agency jurisdictions and responsibilities.
- *Methodology for Conducting Planning-Level Studies*—Describes the effort necessary for the planning-level environmental documentation and related analyses to support NEPA documentation, including possible fieldwork, and agency correspondence.

The purpose of Part IV of *OLE Manual*, Resource Studies, is to provide guidance for analyzing and recording impacts to resources that may potentially be encountered during development of road projects.

- *Format and Content of Technical Reports or Memoranda*—Technical reports or memoranda may be necessary when project circumstances demand detailed analysis of the issues specific to a resource category in order to support the discussion presented in the NEPA document. For example, special studies and reports are often needed when project alternatives or study areas involve features such as wetlands, sensitive noise receptors, or potential environmental justice concerns. The level of professional specialization or expertise required to address a resource category is also often an indicator of the need for a technical report. Most of the resource sections provide discussion on the information that should be included in the resource technical report for that specific resource, but all technical reports should contain, at a minimum, the following information:
  - Location of project
  - Description of project
  - Methodology of analysis
  - Findings of analysis (including data collected and comparison of alternatives)
  - Recommendations
- *Format and Content of NEPA Documentation Discussion*—Provides information on content needed to complete NEPA documentation and suggested text for specific circumstances. The FHWA's Technical Advisory T6640.8A is integrated throughout the resource sections in this part of the manual. These sections contain guidance on the specific resource content for Environmental Assessments (EAs) and Environmental Impact Statements (EISs). The affected environment and environmental consequences discussions in a NEPA document will be combined in a section titled, Environmental Analysis. This chapter will include, for each resource, a discussion of the affected environment, environmental consequences, and measures to avoid or minimize harm, as appropriate.
- *Continued Work in Design and Construction*—This section includes information on permits that may need to be obtained and mitigation measures that should be tracked using Green Sheets. Green Sheets provide information about the environmental commitments that need to be fulfilled during project development and construction and assure that the project management team (PMT) is aware of the commitments. They provide continuity from the planning/NEPA process into the final permitting, design, and construction processes. Information in the sheets includes engineering, natural, social and cultural commitments, and contacts for each topic. It also includes information on the participants who compiled and reviewed the Green Sheets and where the information was transferred for further review. Development of Green Sheets is closely associated with the completion of the final EIS and record of decision (ROD) and also the permitting process. Green Sheets are discussed in Chapter 23, and an example of a Green Sheet is included in Appendix 25a.
- *Additional References*—Website addresses and attachments included in the appendix are listed in this section.

In addition to being similar in structure, the chapters were designed to be modular in nature. As each chapter in this part of the manual discusses a distinct resource topic, the chapters can be easily updated and replaced as legislation, regulations, or preferred methodology changes.

NOTES:

Surface Water and Water Quality

CHAPTER 26

Several federal and state regulations require that Iowa DOT work to ensure water quality throughout all phases of transportation projects. Iowa DOT accomplishes this by documenting transportation impacts on the quality of surface water resources, obtaining relevant permits, and following approved mitigation measures (if required) throughout the facility planning, design, construction work, and operation stages.

26.1 Legislation, Regulations, and Guidance

26.1.1 Federal Legislation and Regulations

ⓘ ***Federal Water Pollution Act of 1972 as amended by the Clean Water Act (1977 and 1987), Sections 303(d), 305(b), 401, 402, and 404.*** The purpose of the Clean Water Act is not only to protect the existing quality of water bodies but also to prevent their degradation. The following is a description of each of the applicable sections of the law:

- Section 303(d) provides for the establishment of water-quality standards and identification of waters that cannot meet these standards. States develop Total Maximum Daily Load (TMDL) standards to help such "impaired waters" attain water-quality standards.
- Section 305(b) delegates to the states the control over the determination of "designated uses" for water bodies within their boundaries.
- Section 401 addresses state water-quality certification and is an agreement that water-quality standards will be achieved by preventing, reducing, and eliminating pollution. The Water Resources Section applies for certification from the Iowa Department of Natural Resources (Iowa DNR) when impacts to waters of the U.S. cannot be avoided.
- Section 402, National Pollutant Discharge Elimination System (NPDES). This is a pollution-prevention program that requires development projects to have plans that limit the amount of pollution that enters the existing water resources. Both point source and non–point source pollution are regulated under this program according to the size of the construction area and population within it. On March 10, 2003, Phase II of the NPDES stormwater program was implemented in Iowa. Phase II stormwater discharge permits consist of three parts: public notice of stormwater discharge, notice of intent, and pollution prevention plan. The public notice of stormwater discharge is intended to inform the public that a stormwater discharge permit is being sought. The notice of intent

The purpose of the Clean Water Act is not only to protect the existing quality of water bodies but also to prevent their degradation.

is the application to the Iowa DNR so that the agency can monitor all projects in Iowa for which it has applications. The notice of intent and the public notice of stormwater discharge are managed by the Office of Construction. The pollution prevention plan is developed by the project designer and kept on the construction site at all times as part of the project plans. These components of stormwater discharge permits are described further in Chapter 26.

- Section 404 applies if a discharge of dredge and fill material into waters of the U.S. is anticipated. The Water Resources Section applies for a Section 404 permit if impacts to waters of the U.S. cannot be avoided and manages mitigation plans when mitigation is required. See Chapter 28 for more information about Section 404.

ⓘ ***Rivers and Harbors Act of 1899.***

- Section 10 prohibits work in navigable waters without prior approval from the U.S. Army Corps of Engineers.
- Section 9 specifically addresses the need for approval from the Coast Guard for construction of any bridge or causeway over navigable waters of the U.S.

ⓘ ***Safe Drinking Water Act of 1974, as ammended, Section 1424(e)***. Prohibits federally funded projects from adversely affecting principal or sole-source aquifers and provides authority to designate principal and sole-source aquifers; 1986 amendments introduced wellhead protection areas and delegated their designation to the states (Iowa DNR performs this function for Iowa).

ⓘ ***Fish and Wildlife Coordination Act of 1958.*** Ensures that agencies such as Iowa DOT evaluate the fish and wildlife impacts associated with a project that involves stream or water-body modification. These modifications can include channel relocation, excavation, culvert installation or extension, bridge pier work, or any other activity changing the course, current, or cross-section of a stream or water body and not including centerline or ditch culverts primarily conveying stormwater within highway right-of-way. Though it is not binding, the Secretary of the Interior created this act to ensure that fish and wildlife are given ample consideration in projects that affect water resources. Chapters 28 (*Waters of the United States, Including Wetlands*) and 30 (*Threatened and Endangered Species, Wildlife, and Upland Communities*) provide further discussion of impacts to these resources.

26.1.2 State Legislation and Regulations

ⓘ ***Iowa Administrative Code 567.61, Water-Quality Standards***. Iowa's water quality standards (WQS) are written into regulation at 567 Iowa Administrative Code, Chapter 61. Iowa DNR determines not only what the designated uses are for each water body but also what the WQS are for each constituent. In cooperation with the Iowa DNR, Iowa DOT seeks to ensure that these standards are not compromised by roadway projects. These standards are expected to be achieved through applicable sections of the Clean Water Act, discussed above.

ⓘ ***Iowa Code 314.23.*** Wetlands removed by a state transportation project shall be replaced by the acquisition of wetlands in the same general vicinity, if possible, for public ownership and preservation, or by other mitigation deemed to be comparable to the wetland removed, including, but not limited to, the improvement, development, or preservation of wetland under public ownership.

ⓘ ***Iowa Code 455B.171 - 455B.183***. Establishes requirements for the protection and management of surface water quality.

26.1.3 Interagency Memoranda of Understanding

None applicable.

26.1.4 Guidance Documents

ⓘ ***FHWA TA T6640.8A***. Provides guidance on issues specific to water quality and their treatment in NEPA documents.

ⓘ ***FHWA Federal-Aid Policy Guide Part 650, Subpart B.*** Reinforces the agency's intent to incorporate erosion and sediment control into highway construction projects under direct supervision of FHWA in an effort to minimize impact to water resources receiving roadway runoff.

ⓘ ***Iowa Department of Transportation Requirements for Section 404 Permits Procedure Guide, updated August 2007.*** Iowa DOT guidance that discusses when Section 404 permits are required and the process for handling requests. The guidance also explains the types of Section 404 permits that may apply to Iowa DOT projects. (See Appendix 26e.)

26.1.5 Resource/Regulatory Agencies and Interested Groups

For a description of the agencies and interested parties and their roles, see Table 26-1.

26.2 Methodology for Conducting Surface Water and Water Quality Studies

26.2.1 Introduction

Protection of the quality of surface waters in Iowa is provided by a network of agencies fulfilling the guidelines of several federal laws and associated state mandates. The *Rivers and Harbors Act of 1899* is relied upon to protect navigable waterways. The *Clean Water Act*, enacted in 1972, prohibits the discharge of pollutants, dredge and fill material, and stormwater into surface waters to protect the quality of water resources. The *Safe Drinking Water Act of 1974* not only ensures that tap water remains safe to drink but also has provisions that protect the sources of water.

Table 26-1

Resource/Regulatory Agencies and Interested Groups	
Agency	**When Involved and Why**
U.S. Environmental Protection Agency (EPA)	Reviews NEPA-related documents; has discretionary authority of Clean Water Act.
U.S. Army Corps of Engineers (Corps)	Coordinates with DOT regarding Clean Water Act Section 404 permitting and Rivers and Harbors Act Section 10 permitting.
Iowa Department of Natural Resources (DNR)	Develops Section 401 water quality standards and determines designated uses as delegated to it by EPA under Clean Water Act (these can be found in the Iowa Administrative Code); DNR oversees the Section 402 NPDES permitting program. Administers the Protected Water Areas (PWA) program.
U.S. Coast Guard	Coordinates with Iowa DOT regarding Rivers and Harbors Act Section 9 permitting.
Federal Highway Administration (FHWA)	Provides federal assistance to local DOTs to develop and improve roadways, bridges, and the National Highway System.
National Park Service	Protects wild and scenic rivers; The National Center for Recreation & Conservation, a National Park Service program, also works to protect river segments on the Nationwide Rivers Inventory (NRI)*.
U.S. Fish and Wildlife Service (USFWS)	Coordinates with Iowa DOT if a water body modification is expected to impact fish and wildlife, including formal consultation regarding assessing project involvement with threatened or endangered species.
** The Wild and Scenic Rivers Act is administered by an interagency council composed of representatives from the Bureau of Land Management, National Park Service, U.S. Fish and Wildlife Service, and U.S. Forest Service.*	

Two main federal agencies are responsible for these laws: the U.S. Environmental Protection Agency (EPA) and U.S. Army Corps of Engineers. To a lesser extent, the U.S. Coast Guard also has duties. In Iowa, the Iowa DNR determines state water-quality standards and manages water resources toward the prevention of water pollution.

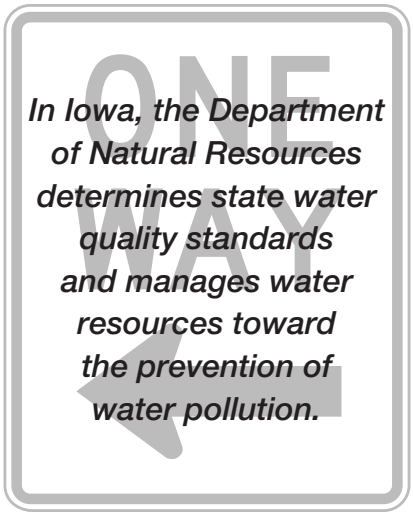
26.2.2 Applicability

Iowa DOT projects may affect water resources that certain laws aim to protect. To ensure that projects are in compliance with these laws, Iowa DOT (or the consultant) may refer to the applicable sections of the *Rivers and Harbors Act, the Clean Water Act, and the Safe Drinking Water Act*, and Iowa's state regulations, which are outlined in this chapter, during their analysis of impacts.

26.2.3 Surface Water Resources Analysis Process

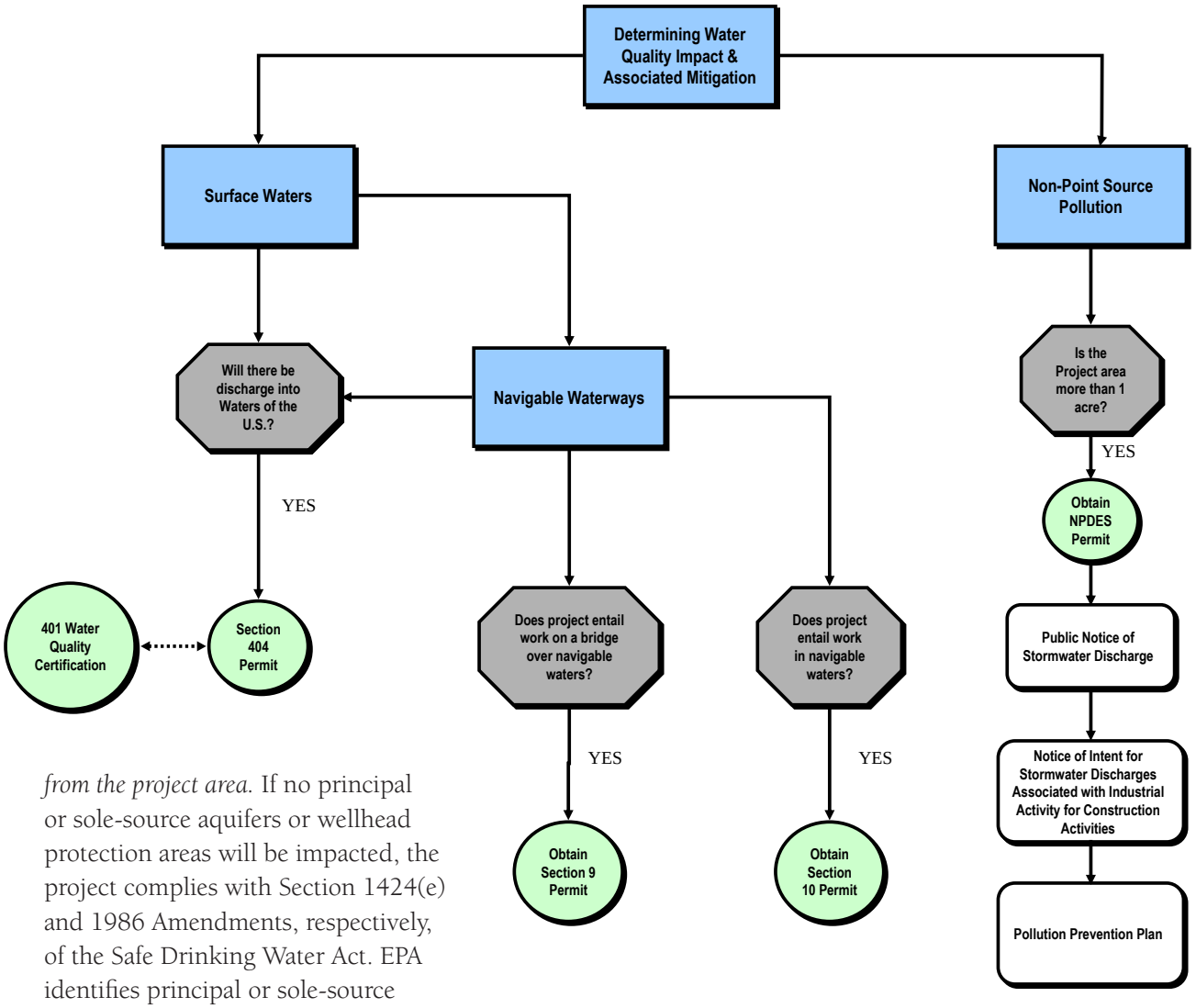
The Iowa DOT NEPA Compliance and Water Resource Sections (or Iowa DOT consultants) should identify and document the following items to determine the appropriate water-quality analysis methods and expected impacts to surface waters. Where possible, GIS should be used to capture and analyze data.

- *Surface water bodies by name within the project area.* Hard-copy maps, aerial photos, GIS coverages, and electronic databases can assist in the location and identification of surface water resources.



- *The surface water bodies' applicable designated uses and water-quality standards as described in Chapter 61 of the Iowa Administrative Code 567.* List the water quality of surface water bodies within the project location and if any are "impaired" and on the 303(d) list. This is generally brought to the attention of Iowa DOT staff during the early agency coordination phase. If a water body is impaired, Iowa DOT will be referred to its associated TMDL program for water-quality standards with which to comply. Additional References for determining "impaired" waters and their associated TMDL programs are located in Section 26.6.
- *The geographic extent of the project/facility.* On March 10, 2003, Phase II of the NPDES permit process went into effect. At this time, if the project/facility area disturbs 1 acre or more, Phase II of the NPDES permit process will apply. This ensures compliance with Section 402 of the Clean Water Act and is typically addressed by the Offices of Design and Construction (and Office of Location and Environment staff when mitigation is required). See Exhibit 26-1.
- *Surface waters (including wetlands) that will require dredging and/or filling.* If no surface waters require dredging and/or filling, the project is in compliance with Section 404 of the Clean Water Act. If dredging, filling or any work within a channel will be required, Iowa DOT's Water Resources Section will coordinate with the U.S. Army Corps of Engineers regarding further action. See Exhibit 26-1.
- *Sensitive water bodies (e.g., water supply reservoirs, ground water recharge areas, and high-quality streams) that may be within the project construction corridor and/or receive roadway runoff.* Iowa DNR and other concerned agencies will typically bring this to Iowa DOT's attention during the early agency coordination phase and work with Iowa DOT throughout project development to ensure that appropriate mitigation measures are put in place.
- *Drinking-water sources (e.g., principal or sole-source aquifer, wellhead protection areas, private wells) that may be within the project construction corridor and/or receive runoff or other non-point source pollution*

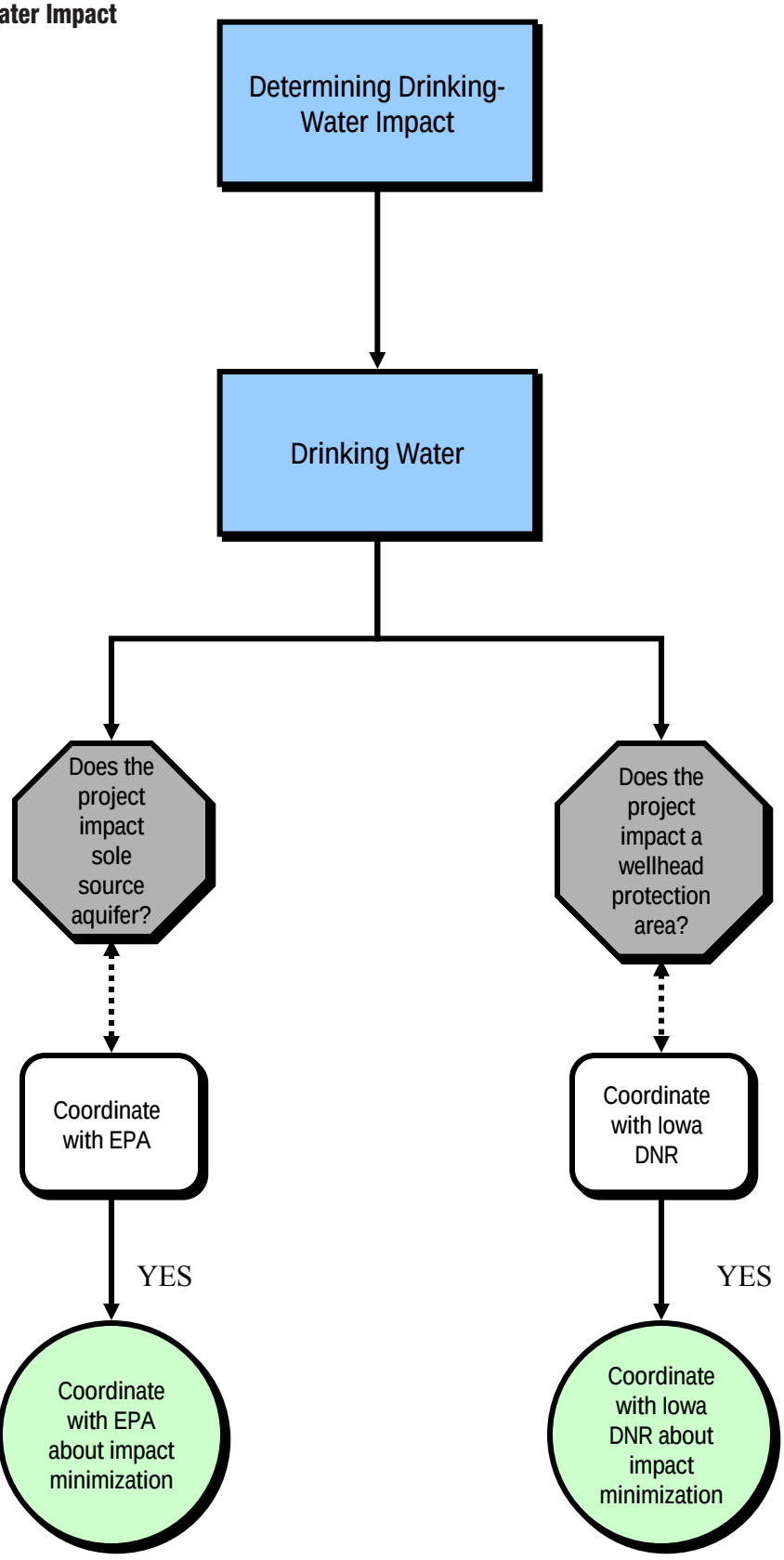
Exhibit 26-1
Determining Water Quality Impact and Associated Mitigation



from the project area. If no principal or sole-source aquifers or wellhead protection areas will be impacted, the project complies with Section 1424(e) and 1986 Amendments, respectively, of the Safe Drinking Water Act. EPA identifies principal or sole-source aquifers and would inform Iowa DOT if one may be impacted by a proposed project. In Iowa, Iowa DNR is the agency that designates wellhead protection areas and would notify Iowa DOT if a wellhead protection area is within the proposed project's limits and what the appropriate mitigation measures would be. See Exhibit 26-2. It is standard procedure to close and/or relocate private wells located on parcels to be acquired for transportation uses and discontinue the wells' water supply status. Iowa DOT's Office of Right-of-Way, Property Management Section coordinates with Iowa DNR regarding well closures.

- *Aquatic habitats that are expected to receive runoff into the system or require channel bed alterations.* The Iowa DNR, EPA, or U.S. Army Corps of Engineers will typically bring this to the attention of Iowa DOT during the early agency coordination stage and will work with Iowa DOT to determine appropriate mitigation. Mitigation efforts are documented as part of the Section 404 permit process to comply with Section 404(b)(1) of the Clean Water Act.
- *Navigable waterways in which work may occur or over which bridges may be constructed.* If no work is expected within navigable waterways, the project complies with Section 10 of the Rivers and

Exhibit 26-2
Determining Drinking Water Impact



Harbors Act. If work is expected within navigable waterways, Iowa DOT Office of Bridges and Structures coordinates with the U.S. Coast Guard regarding further action. Similarly, if no bridge work is necessary over navigable waterways, the project complies with Section 9 of the Rivers and Harbors Act. If bridge work is necessary, the Office of Bridges and Structures will obtain a permit from the U.S. Coast Guard. See Exhibit 26-1.

After any potential water resources have been identified within the project area, it should be determined if the project can avoid impacts to the identified resources. This can be accomplished through a design change, structural modification or even no action. If avoidance is not possible, the project should seek to minimize impacts. Methods for avoiding or minimizing impacts should be included in the NEPA document.

26.3 Format and Content of Technical Reports or Memoranda

None applicable, under most circumstances.

26.4 Format and Content of NEPA Documentation Discussion

FHWA TA T6640.8A addresses how each topic area should be discussed within the NEPA document. The following is a description of how FHWA recommends water quality be addressed in draft Environmental Impact Statements.

- Describe conditions of water bodies within the project area. Data about existing conditions may be available from local or state agencies (as applicable) with jurisdiction over the water body.
- Identify what water bodies might be impacted by roadway runoff as a source of non-point source pollution. Impacts from each alternative should be outlined, as well as proposed mitigation measures.
- Determine whether an area designated as a principal or sole-source aquifer may be impacted by the proposed project. If no alternatives impact an aquifer, the project complies with the Safe Drinking Water Act. If an alternative affects an aquifer, coordination with EPA must result in a plan to assure there will be no impact to the aquifer.
- Determine, in coordination with Iowa DNR, whether a wellhead protection area might be affected, and if so, discuss appropriate mitigation measures.

The Final EIS should also include discussions regarding detailed permitting issues such as approximate quantities of dredge or fill material, construction grades, and proposed mitigation measures.

Water quality discussions in EAs do not require the same level of detail as found in EISs. The FHWA recommends that water-quality impacts be briefly described in the EA along with all applicable mitigation measures. Public and agency concerns should be addressed in the discussion as well.

For Categorical Exclusions, a description of any potential water-quality impact, mitigation measures and public or agency concerns should be noted in the project report, if one is prepared, in addition to including appropriate documentation in the project file.

26.5 Continued Work in Design and Construction

Following is a list of required permits and mitigation measures for surface water should also be considered during continued work in final design and construction.

- *NPDES Permit,* from Section 402 of the Clean Water Act. Qualified projects must acquire a Stormwater Discharge permit, which is regulated by Iowa DNR, to comply with the NPDES program. The Office of Construction, in cooperation with the designer, will be responsible for obtaining the permit. The three associated documents are:
  1. Notice of Intent for Stormwater Discharges Associated with Industrial Activity for Construction Activities,

2. Public Notice of Stormwater Discharge to be published in two newspapers for one day before work is to begin on the project, and

3. Pollution Prevention Plan characterizes the nature of the disturbance and describes the pollution control and stormwater management measures to be implemented as part of the project design plans.

Samples of the above documents are available in Chapters 10D and 10E of the Iowa DOT *Design Manual* and in the Appendix of this manual, (Appendices 26a–26c); see also Section 26.6.

- *404 Permit,* from Section 404 of the Clean Water Act; obtained from the U.S. Army Corps of Engineers by the Water Resources Section if the project entails discharge of dredge and fill material into waters of the U.S.
- *Section 10 Permit,* from Section 10 of the Rivers and Harbors Act; obtained from the U.S. Army Corps of Engineers by the Office of Bridges and Structures if dredging or filling within navigable waterways is anticipated as part of the proposed project.
- *Section 9 Permit,* from Section 9 of the Rivers and Harbors Act; obtained by the Office of Bridges and Structures from the U.S. Coast Guard if there will be bridge work over navigable waters.

Additionally, the following publications can be used for guidance in addressing roadway runoff in road and preliminary bridge design, specifically estimating pollutant loading into receiving surface waters and wetlands, and for help in determining the level of impact and appropriate mitigation measures.

"Constituents of Highway Runoff" Federal Highway Administration (1981).

"Management Practices for Mitigation of Highway Stormwater Runoff Pollution" Federal Highway Administration (1985).

"Effects of Highway Runoff on Receiving Waters" Federal Highway Administration (1987).

"Assessing the Impacts of Bridge Deck Runoff Contaminants in Receiving Waters" Volumes 1 and 2. NCHRP Report 474 (2002).

26.6 Additional References

U.S. Coast Guard, Office of Bridge Administration, useful links to Rivers and Harbors Act and permitting requirements: http://www.uscg.mil/.

U.S. Coast Guard, Office of Bridge Administration, Section 9 permitting: http://www.uscg.mil/.

Iowa DNR, Energy & Geological Resources Division, Geological Survey Bureau, Water Monitoring Section, Iowa's STORET Database: http://wqm.igsb.uiowa.edu/.

Iowa DOT, Storm Water Discharge Permits, 10D-1, Design Manual, Chapter 10 Roadside Development and Erosion Control, September, 1997: http://www.dot.state.ia.us/.

EPA, 2002 Draft 303(d) List of Impaired Waters for Iowa: http://www.iowadnr.gov/.

EPA, Office of Water, STORET: http://www.epa.gov/.

EPA, Surf Your Watershed webpage: http://www.epa.gov/.

Water Quality Standards for Iowa, Title IV, Wastewater Treatment and Disposal, Environmental Protection {567}, Chapter 61, Water Quality Standards: http://www.epa.gov/.

The following are blank documents that are available to be filled out for submission when necessary:

- Sample Notice of Intent
- Public Notice of Stormwater Discharge Template (Appendix 26a, see also Iowa DOT *Design Manual*)
- Example Pollution Prevention Plan (Appendix 26b, see also Iowa DOT *Design Manual*)
- Stormwater Discharge Permit Flowchart (Appendix 26c, see also Iowa DOT *Design Manual*)

Special River Designations

CHAPTER 27

As of 2009, no river segments in Iowa have been designated as part of the National Wild and Scenic Rivers System. However, other special waterway designations, such as the National Rivers Inventory (NRI) and the Iowa Protected Water Area (PWA) program, may be relevant when evaluating the impacts of Iowa DOT highway projects.

27.1 Legislation, Regulations, and Guidance

27.1.1 Federal Legislation and Regulations

ⓘ *16 USC 1271–1287.5(d), Wild and Scenic Rivers Act, October 2, 1968.*

27.1.2 State Legislation and Regulations

ⓘ ***Iowa Administrative Code 567.75.*** Statewide listing by county of protected streams in Iowa.

ⓘ ***Protected Water Areas Program, 1987.*** Addresses the need for additional open space protection and protection of existing scenic areas.

27.1.3 Interagency Memoranda of Understanding

None applicable.

27.1.4 Guidance Documents

ⓘ ***FHWA Technical Advisory T6640.8A, Section V.*** Establishes how Wild and Scenic Rivers should be covered in NEPA documents.

27.2 Resource/Regulatory Agencies and Interested Groups

Table 26-1 in Chapter 26, *Surface Water and Water Quality,* lists resource/regulatory agencies and groups that have an interest in Iowa rivers.

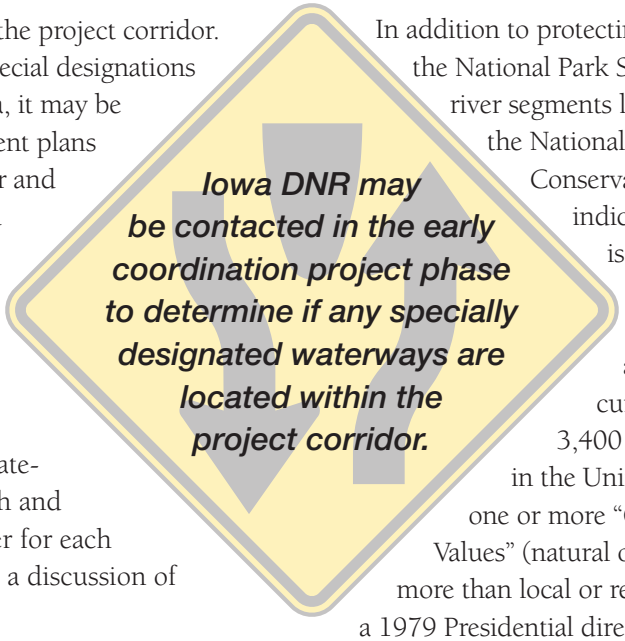
27.3 Methodology for Conducting Special River / Waterway Studies

During the initial phases of NEPA documentation, the project area should be reviewed to determine if a river in the study area is part of the NRI, the PWA, or any other special designation. Iowa DNR may be contacted in the early coordination project phase to determine if any specially designated

As of 2009, no river segments in Iowa have been designated as part of the National Wild and Scenic Rivers System.

waterways are located within the project corridor. If there are waterways with special designations located within the project area, it may be necessary to obtain management plans for the specific bodies of water and to discuss project impacts and alternatives with the agency that has jurisdiction of the designated waterway.

Rivers with special designations may fall into two categories: federal and state-protected. The exact approach and coordination efforts may differ for each category. See Section 27.6 for a discussion of permitting requirements.



27.3.1 Federal Waterways

Currently, there are no federally listed Wild and Scenic Rivers in Iowa. *The Wild and Scenic Rivers Act of 1968* (Public Law 90 542) designated 27 "Study Rivers" for possible inclusion in the Wild and Scenic River System. An 80-mile reach of the Upper Iowa River was designated as a "Study River." A report about the Upper Iowa River was transmitted to Congress on May 11, 1972; however, the river did not receive the Wild and Scenic designation.

In addition to protecting Wild and Scenic Rivers, the National Park Service (NPS) also protects river segments listed on the NRI through the National Center for Recreation and Conservation. Inclusion on the NRI indicates that a river segment is a potential "candidate" for Wild and Scenic designation and that a study is deemed appropriate. The NRI currently contains more than 3,400 free-flowing river segments in the United States believed to possess one or more "Outstandingly Remarkable Values" (natural or cultural) judged to be of more than local or regional significance. Under a 1979 Presidential directive and related Council on Environmental Quality procedures, all federal agencies must seek to avoid or mitigate actions that would adversely affect one or more NRI segments. Table 27-1 lists Iowa river segments included on the NRI.

Due to the potential for adverse effects on the values of a potential wild, scenic, or recreational river, consultation with the National Park Service would generally be required if any of the following actions are proposed along the river segments listed in Table 27-1. This list is not exhaustive.

Table 27-1

Nationwide Rivers Inventory (NRI) Segments in Iowa			
River	Length (Miles)	Counties	Reach
Boone	25	Hamilton, Webster	Webster City to Confluence with Des Moines River
Cedar	26	Louisa, Muscatine	Iowa River to Hwy 6
Maquoketa	68	Jackson, Jones	Mississippi River to US 151 Bridge (omit small reservoir NW of Maquoketa)
Middle Racoon	15	Guthrie, Dallas	City of Panora to City of Redfield dam
Turkey	110	Clayton, Fayette, Winnesheik, Howard	Mississippi River to Vernon Springs
Upper Iowa	64	Winnesheik, Allamakee	City of Kendallville to Hwy 76 crossing
Wapsipinicon	195	Clinton, Scott, Cedar, Jones, Linn, Buchanan, Black Hawk, Bremer	Mississippi River to Hwy 334 at Frederika (omit reservoir NW of Independence)
Yellow	1	Allamakee	Entire segment within Effigy Mounds National Monument
Yellow	34	Allamakee	Mississippi River to Hwy W60 (near Myron)

- Small dock
- Small bulkhead
- Clearing and snagging
- Drainage canal, culvert, or fall
- Irrigation canal
- Levee or dike
- Rip-rap, bank stabilization, or erosion control structure
- Small reservoir
- Increase in commercial Navigation
- Dredging or filling
- Run-of-the-river dam or diversion structure
- Radio tower, windmill
- Clear-cut timber harvest
- Road
- Railroad
- Building (any type)
- Pipeline, transmission line
- Bridge or ford
- Gas, oil, or water well
- Subsurface mine opening
- Quarry
- Power substation
- Recreation area
- Dump or junkyard
- Change in flow regime

The following are examples of types of development which appear most likely to cause serious adverse effects if they are constructed adjacent to or in close proximity to a NRI river. Proposal of these actions will almost always require consultation with NPS because their effects are likely to conflict with the values of a potential wild, scenic, or recreational river. These effects could be severe enough to foreclose designation of the affected river segment.

- Impoundment
- Channelization
- Instream or surface mining
- Lock and dam
- Airport
- Landfill
- Factory
- Gas or oil field
- Major highway
- Railroad yard
- Power plant
- Sewage treatment plant
- Housing development
- Shopping center
- Industrial park
- Marina
- Commercial dock

For projects potentially affecting the wild, scenic, or recreational rivers listed in Table 27-1, the NEPA Compliance Section will forward project scoping letters to the National Park Service during early scoping activities. Comments from the National Park Service will be addressed during the NEPA process. These activities will complete the consultation requirements of the National Wild and Scenic Rivers Act.

For small projects not subject to early scoping activities or for DOT-administered projects with no federal funding, the Water Resources Section will review for potential impacts to the NRI river segments listed in Table 27-1 as part of the wetlands review. If there are potential impacts to an NRI listed river segment, the Water Resources Section will consult with the National Park Service via letter.

27.3.2 State-Protected Waters

The Protected Water Areas program was established in 1987 by the Iowa Legislature to address the need for additional open space protection. The program's basic purpose is to maintain, preserve, and protect existing natural and scenic qualities of selected lakes, rivers, marshes, and adjacent areas. This purpose is being achieved through the designation of at least

one example of a natural water area in each of Iowa's seven landform regions. Areas designated as PWAs are cooperatively managed by persons and agencies that own land along the selected bodies of water. Iowa DNR provides leadership and coordination for property owners interested in protecting their land and the adjacent water resource. As of 2004, sections of five rivers have been designated as PWAs in Iowa and are listed in Table 27-2.

Master plans for PWA segments in Iowa have been written, and partially implemented. These plans are available through Iowa DNR, which also maintains a list of possible locations for future PWA designation. As of 2004, the list of possible PWAs includes sections of the Little Turkey, North and South Skunk, Iowa, and Cedar Rivers. See Section 27.7 for a link to the location of PWA segments in Iowa.

27.4 Format and Content of Technical Reports or Memoranda

None applicable.

27.5 Format and Content of NEPA Documentation Discussion

NEPA documentation concerning Wild and Scenic Rivers typically entails a brief narrative in the Environmental Analysis section that includes a statement to the effect that the project, "will not involve any segments of state or federal (potential) Wild and Scenic Rivers," typically is adequate.

Discussions concerning any other protected water designations may be included in the water quality section of the NEPA document. For EAs, these designations should only be discussed if they exist within the project area. Projects involving publicly owned protected water areas will also need to undergo a 4(f) evaluation. For further information concerning water quality discussions, see Chapter 26, *Surface Water and Water Quality.* Impacts to floodplains may also be discussed in the NEPA document. More information on floodplains is included in Chapter 29, *Floodplains and Hydraulics.*

Table 27-2

State Protected Water Areas Program Segments in Iowa

River	Length of PWA-Designated Segment (in River Miles)	Counties	Reach
Boone	25	Hamilton, Webster	Webster City in Hamilton County to the confluence with Des Moines Rivers
Little Sioux River	34.5		Spencer in Clay County to the Linn Grove dam in Buena Vista County
Middle Raccoon	14.6	Guthrie, Dallas	Panora in Guthrie County to the dam in Redfield in Dallas County
Upper Iowa	64.2	Winnesheik, Allamakee	Kendallville in Winneshiek County to Highway 76 north of Waukon in Allamakee County
Wapsipinicon	177	Clinton, Scott, Cedar, Jones, Linn, Buchanan, Black Hawk, Bremer	Highway 93 in Bremer County (in the Sweet Marsh Wildlife Management Area) to the confluence of the Mississippi and Wapsipinicon Rivers on the Clinton & Scott County line

27.6 Continued Work in Design and Construction

There are no separate permitting requirements for projects involving impacts to rivers or waterways with special designations in Iowa. Impacts to any of the above-mentioned waterways should adhere to the same permitting guidelines as those discussed in Chapter 26 for impacts to waterways in the state. Additionally, projects involving impacts to a publicly owned protected water body may be subject to a Section 4(f) evaluation. These projects should be coordinated with FHWA for a determination of the applicability of section 4(f). Projects that may potentially impact a river listed on the NRI inventory do not require a separate permit. However, it is probable that permitting agencies will examine proposed actions that affect rivers or waterways that have a special designation. As a result, coordination should begin with the appropriate regulatory agencies as soon as impacts are identified.

27.7 Additional References

Iowa DNR, Protected Water Areas (PWA): http://www.iowadnr.gov/.

Iowa General Assembly, The Iowa Administrative Code (Administrative Rules): http://www.legis.state.ia.us/.

National Park Service, National Wild and Scenic Rivers System, Congressionally Authorized Study Rivers, Wild and Scenic Rivers Study Status, December 1998: http://www.rivers.gov/.

Rivers, Trails, and Conservation Assistance Program, Nationwide Rivers Inventory: http://www.ncrc.nps.gov/.

Rivers, Trails, and Conservation Assistance Program, Nationwide Rivers Inventory, Outstandingly Remarkable Values (ORVs) section: http://www.ncrc.nps.gov/.

FHWA Environmental Guidebook (Wild and Scenic Rivers): http://environment.fhwa.dot.gov.

NOTES:

Waters of the United States, Including Wetlands

CHAPTER 28

Iowa DOT seeks to avoid and minimize effects to wetlands and other water resources and to also lessen unavoidable losses resulting from projects.

28.1 Legislation, Regulations, and Guidance

28.1.1 Federal Legislation and Regulations

ⓘ ***Clean Water Act, Section 404.*** Authorizes the U.S. Army Corps of Engineers to regulate the discharge of dredged or fill materials into waters of the United States, including wetlands. It also establishes the requirement to demonstrate and document that mitigation is considered in sequence (i.e., first avoiding the impact; if the impact is not avoidable/ then minimizing the impact; and finally mitigating the impact).

ⓘ ***Clean Water Act, Section 401.*** Establishes authority of the Iowa DNR to review all dredge and fill permits issued by the U.S. Army Corps of Engineers in Iowa to provide reasonable assurance that state water-quality standards are not being violated as a result of an action.

ⓘ ***Protection of Wetlands, Executive Order 11990.*** Establishes requirements that federal agencies must minimize detrimental actions affecting wetlands while preserving and enhancing the natural and beneficial values that wetlands provide.

ⓘ ***SWANCC Decision, 2001.*** Establishes that the U.S. Army Corps of Engineers does not have jurisdiction over isolated wetlands that have no surface water connections with other wetlands or waters of the United States. The Iowa DOT Procedures and Policies Manual, Section 500.03, establishes departmental protection for these waters that have fallen out of U.S. Army Corps of Engineers jurisdiction.

ⓘ ***33 CFR 328.3(b), 1986.*** Establishes the definition of wetlands to include presence of hydrophytic vegetation, hydric soils, and wetland hydrology.

ⓘ ***23 CFR 777.*** Provides policy and procedures for the evaluation and mitigation of adverse environmental effects to wetlands and natural habitat resulting from federal aid projects funded pursuant to provisions of Title 23 of the U.S. Code.

ⓘ ***33 CFR 325 and 332.*** Compensatory mitigation for losses of aquatic resources (2008). Establishes standards and criteria for all types of compensatory mitigation issued pursuant to Section 404 of the Clean Water Act and/or Sections 9 or 10 of the Rivers and Harbors Act of 1899.

The Iowa DOT seeks to avoid and minimize effects to wetlands and water resources and to also lessen unavoidable losses resulting from projects.

28.1.2 State Legislation and Regulations

ⓘ ***Iowa Administrative Code 61.3, 1997.*** Establishes that wetlands, in connection with designated beneficial-use stream segments, are given the same protection as the stream segment; declares that general use of waters must be free from substances in concentrations that are acutely toxic to human, animal, and plant life.

ⓘ ***Iowa Administrative Code 456B.*** Includes an inventory of protected wetlands Types 3, 4, and 5—per Circular 39 terminology—that are over 2 acres, excluding those agricultural areas that are wet because of ditch plugging.

ⓘ ***Iowa Administrative Code 314.23.*** Wetlands removed by a state transportation project shall be replaced by the acquisition of wetlands in the same general vicinity, if possible, for public ownership and preservation, or by other mitigation deemed to be comparable to the wetland removed, including, but not limited to, the improvement, development, or preservation of wetland under public ownership.

ⓘ ***Iowa Administrative Code 314.24.*** Destruction or damage to wetlands shall be avoided if reasonable alternatives are available for the location of roads, streets, or highways at no significant greater cost.

28.1.3 Interagency Memoranda of Understanding

ⓘ ***Statewide Implementation Agreement (NEPA/404 Merger).*** Establishes a streamlining process by which federal agencies such as FHWA, U.S. Army Corps of Engineers, and U.S Fish and Wildlife Service (USFWS) can more efficiently review and process fill permits (Section 404).

28.1.4 Guidance Documents

ⓘ ***Iowa DOT Policies and Procedures Manual, Policy No. 500.03.*** Establishes guidelines and responsibilities for the investigation, development, and management of wetlands.

ⓘ ***Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region, 2008.*** Seeks to address regional wetland issues and improve the accuracy and efficiency of wetland delineation procedures.

ⓘ ***U.S. Army Corps of Engineers Wetlands Delineation Manual, 1987.*** Provides guidelines and methods to determine whether an area meets established wetland criteria for purposes of Section 404 of the Clean Water Act.

ⓘ ***FHWA-IP-82-23 and IP-82-24.*** A Method for Wetland Functional Assessment, Volumes I and II. Provides information on methods used to complete a wetland functional assessment. See Section 28.7 for a Web address for these publications.

ⓘ ***FHWA Technical Advisory T6640.8A.*** Section V. Establishes standards for wetland field data collection and NEPA documentation for transportation projects receiving federal funding.

ⓘ ***U.S. Army Corps of Engineers Regulatory Guidance Letter 01-1.*** "Guidance for the Establishment and Maintenance of Compensatory Mitigation Projects". Superseded by RGL No. 02-2. 12/24/02.

ⓘ ***Protected Water Areas Program, Protected Water Areas Plan, 1981.*** Areas designated as Protected Water Areas (PWAs) are cooperatively managed by persons and agencies owning land along the selected lakes, rivers and/or marshes.

ⓘ ***State Comprehensive Outdoor Recreation Plan, 1988.*** Provides a synopsis of outdoor recreation supply, demand, and issues as they relate to Iowa; the Iowa Wetland Protection Plan was created to supplement this plan.

ⓘ ***Wetland Protection Plan, 1988.*** Establishes criteria by which wetlands can be prioritized for protection; priority classes include palustrine emergent marshes, restored wetlands, interior riverine wetlands, border river wetlands, and fens.

ⓘ ***Prairie Pothole Joint Venture Plan.*** Establishes a plan to increase waterfowl populations through habitat conservation projects that improve natural diversity across the U.S. Prairie Pothole landscape by protecting the wetlands.

ⓘ ***North American Waterfowl Management Plan.*** Establishes a plan for conservation projects not only to advance waterfowl conservation but also to make substantial contributions toward the conservation of all wetland-associated species; created the Upper Mississippi Great Lakes Joint Venture.

ⓘ ***Upper Mississippi Great Lakes Joint Venture.*** Joint venture between portions of Minnesota, Iowa, Kansas, Nebraska, Michigan, Missouri, Illinois, Indiana, Ohio, and Wisconsin to create management plans that conserve habitat for migratory birds and other wildlife.

ⓘ ***Iowa Department of Transportation Requirements for Section 404 Permits Procedure Guide, updated August 2007.*** Iowa DOT guidance that discusses when Section 404 permits are required and the process for handling requests. The guidance also explains the types of Section 404 permits that may apply to Iowa DOT projects. (See Appendix 28c.)

28.2 Resource/Regulatory Agencies and Interested Groups

See Table 28-1.

28.3 Methodology for Conducting Water Resources Studies

See Exhibit 28-1 for a water resources analysis flowchart.

28.3.1 Pre-Fieldwork Procedures and Resources

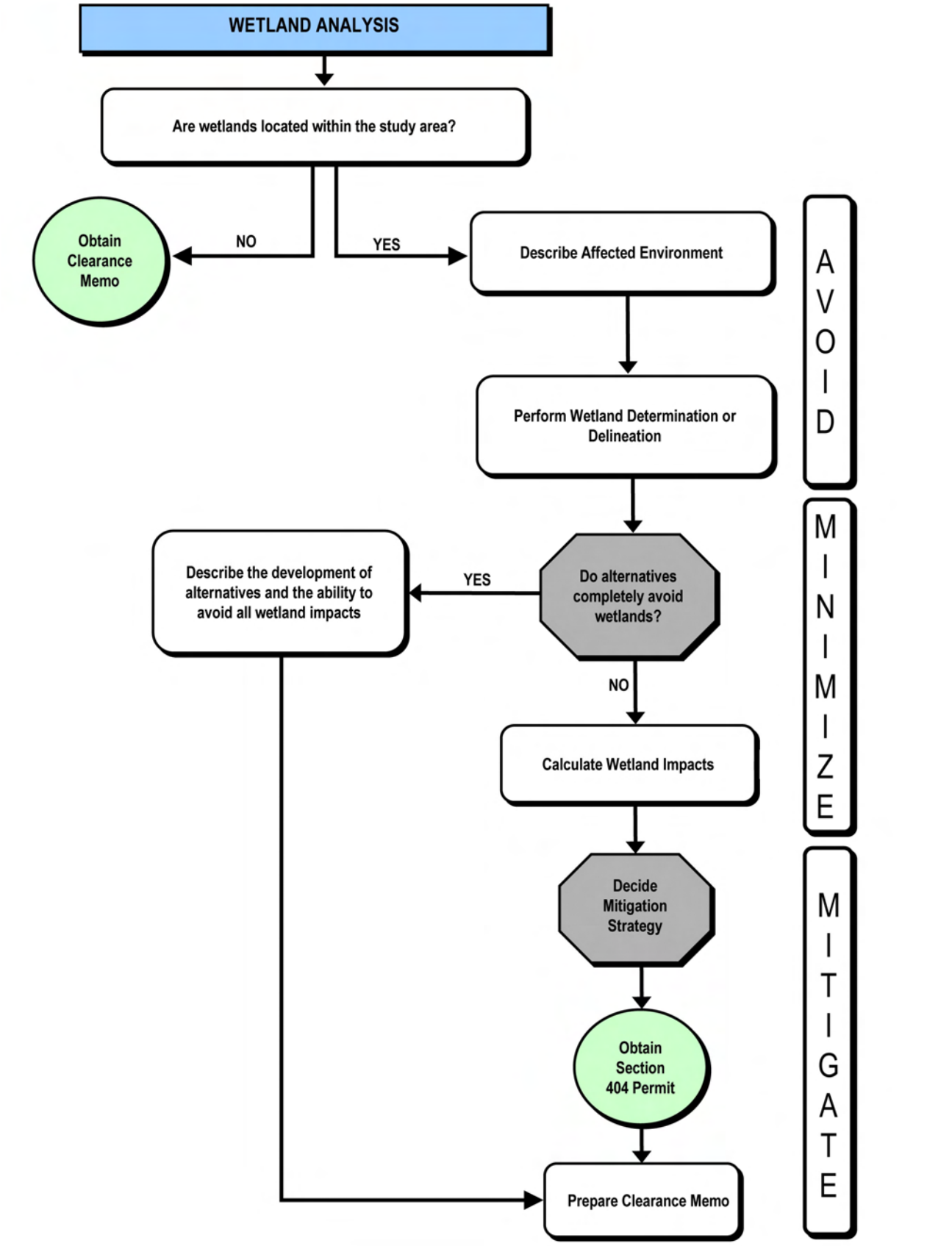
Pre-fieldwork procedures are defined as those preliminary steps that are necessary for all water resources-related reviews. These steps should be followed regardless of the size of the proposed road improvement project, from a resurfacing to a new proposed alignment.

For small road improvements, e.g., resurfacing, these preliminary steps may be sufficient, and no further fieldwork may be required. This determination should be made in coordination with the Water Resources Section. For larger projects where the potential exists for water resources impacts, the pre-fieldwork procedures will serve as information to help complete fieldwork.

Table 28-1

Resource/Regulatory Agencies and Interested Groups	
Agency	**Jurisdiction**
U.S. Army Corps of Engineers	Section 404 permit authority over the discharge of dredge or fill into all waters of the U.S., including wetlands.
Iowa Department of Natural Resources	Section 401 Water Quality Certification issuance authority. Projects requiring a Section 404 permit will also require a Section 401 Certification.
U.S. Environmental Protection Agency	Authority to veto Corps Section 404 permits. The EPA reviews documents for EIS and EA level projects and also reviews Corps Section 404 permit applications.
U.S. Fish and Wildlife Service	Has no permit authority, rather it reviews Corps Section 404 permit applications and provides comments to all federal agencies on threatened and endangered species issues.
Mitigation Banking Review Team	Includes representatives from the Corps, DNR, USFWS, EPA, and NRCS. The MBRT will provide comments as to the development of and need for mitigation banking projects.
Federal Highway Administration	Provides federal assistance to local DOT's to develop and improve roadways, bridges, and the National Highway System.
U.S. Coast Guard	Coordinates with the DOT regarding Rivers and Harbors Act Section 9 and 10 permitting.
Natural Resource Conservation Service	Authority to map and delineate wetlands in agricultural areas. All wetlands in non-agricultural areas are under Corps jurisdiction.

Exhibit 28-1
Wetland Analysis



If there are no National Wetland Inventory (NWI) wetlands listed in the project area, the *Soil Survey* maps show no hydric soils, USGS quadrangle maps show no streams or drainages in the project area, and no right-of-way would be required, then the determination is that the project will likely entail "no impacts". This is stated in a clearance memo and is sent by the Water Resources Section internally to the Offices of Contracts and Design, as well as the appropriate district office. The clearance memo is not sent to any state or federal agencies. The project is also cleared in the Iowa DOT Project Scheduling System. For larger projects involving the potential for significant impacts to water resources, the steps outlined in Exhibit 28-1 may be followed.

A GIS project file may also be started at this stage in project development and updated as information becomes available.

Resources

The following are resources for gathering pre-fieldwork information:

- *NWI.* USFWS Interactive NWI Wetlands Mapper provides basic GIS wetland information such as location and type. Information may also be obtained from the Natural Resources Geographic Information System (NRGIS).
- *National Resources Conservation Service (NRCS) County Soil Surveys.* Most of the information contained in the County Soil Surveys is available as GIS layers; hard copies are available for each Iowa County in the Water Resources Section.
- *County Hydric Soil Lists.* County lists are more accurate than published national hydric soils lists. County lists are available from the appropriate County NRCS Office as well as the Iowa DOT Water Resources Section.
- *USGS Quadrangle Maps.* Show basic topographical information as well as surface water features including streams, drainages, lakes, and some wetlands. May be obtained from the NRGIS.

28.3.2 Field Procedures for Wetland and Stream Studies

Wetland Determinations

Wetland determinations are different from wetland delineations in that they are typically not conducted with the same level of detail. Wetland determinations are based on a combination of published sources (e.g., NWI, hydric soil mapping, aerial photography, and field verification) and by conducting "windshield surveys." Wetland determinations are appropriate early in the project planning process.

Currently, Iowa DOT does not have a preferred data form to use while conducting wetland determinations or windshield surveys. However, the following should be considered when completing wetland determinations:

- Mapped (i.e., NWI mapping) wetland boundaries should be adjusted with characteristics observed during a field visit;
- A GIS map of NWI boundaries may be placed on a digital aerial photography layer, and adjustments to NWI boundaries could be estimated in the field on the basis of observed landscape position and dominant vegetation;
- The adjusted boundaries may then be digitized by the field researcher, whether it is the Water Resources Section Project Manager or the consultant;

Global positioning systems (GPS) may also be used to aid in conducting wetland determinations.

Stream Determinations

Stream determinations are used to identify water resources such as drainages, ditches, streams, or rivers within a project area, and to assist the regulatory agencies in determining if a feature is jurisdictional. Stream determinations are made based on the presence or absence of an ordinary high water mark using a list of physical characteristics determined by the U.S. Army Corps of Engineers.

Stream determinations use background resources such as aerial photography and USGS quadrangle

maps, but are based largely on onsite inspection of the project area. Iowa DOT has developed a Waters of the United States Determination Data Form to conduct stream determinations. This form is based on guidance from the Regulatory Branch of the U.S. Army Corps of Engineers, Rock Island District. The stream determination procedure only considers whether or not the feature displays the physical characteristics of a jurisdictional stream; it does not take the quality of the resource into consideration.

Wetland and Stream Identification

The definition of wetlands as used by the NWI is not the same as the definition provided in the 1987 U.S. Army Corps of Engineers *Wetland Delineation Manual*. Therefore, some discrepancies between NWI (a remote sensing effort) and field observations should be expected.

Each site reviewed during a wetland and/or stream determination should be assigned a unique identifier (number, letter, or combination). Unique identifiers should be assigned to those sites that are likely water resources (wetlands or streams) as well as those that were checked and found unlikely to be water resources. Often, background resources (NWI, aerial photography, hydric soil mapping, USGS quadrangle maps) may show characteristics of a water resource when in fact no water resource is present. It is important to document both the presence of water resources and the lack of water resources where background resources suggest a wetland or stream may be present.

It is important to document both the presence of water resources and the lack of water resources where background resources suggest a wetland or stream may be present.

Calculation of Estimated Wetlands and Streams

Estimated acreage of wetlands in the project area should be calculated to the nearest tenth of an acre.

Estimated length of stream in the project area should be calculated to the nearest foot.

Standards of Aerial Photography

High-level aerial photography is available for Iowa. More-detailed (low-level) aerial photography is generally available on a project-specific basis. Generally, scales up to and including 1:500 may be used.

28.3.3 Field Procedures for Permit Application Studies

Wetland Delineation

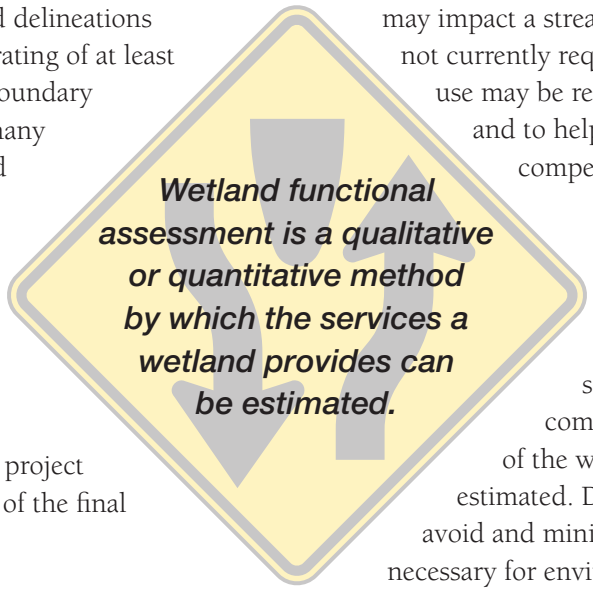
Wetland delineations are appropriate for advanced stages of the roadway development process, e.g., where the range of alternatives has been narrowed down. For projects in which the NEPA/404 merged process will be used, delineations should be performed before the NEPA document is complete. Wetland delineations must be conducted according to procedures as outlined in the *t*o the Corps of Engineers *Wetland Delineation Manual (1987)* and its *Midwest Regional Supplement(2008)*. Delineations are to be completed only by staff/consultants specifically trained in the use of the *Midwest Regional Supplement*.

The three-parameter wetland delineation must include an assessment of dominant vegetation, hydric soils characteristics, and indicators of wetland hydrology. Routine data forms as presented in the *2008 Regional Supplement* should be used to collect field data.

GPS Survey of Wetland Boundary

GPS may be appropriate for recording the wetland boundary during the course of a wetland delineation. The Iowa DOT Water Resources Section is implementing GPS in conducting in-house wetland delineations and has requested that consultants use GPS to locate wetland boundaries in the field.

GPS units used in wetland delineations should have an accuracy rating of at least one meter. The wetland boundary must be indicated by as many GPS points as are required to accurately depict it. Areas found to be non-wetlands in the course of a wetland delineation should be located by one GPS reference point. This information may be incorporated into the GIS project file and submitted as part of the final delineation report.



Wetland Functional Assessment

Wetland functional assessment is a qualitative or quantitative method by which the services a wetland provides can be estimated. While wetland functional assessment is not currently required for Iowa DOT projects, its use may be requested to distinguish between classes of wetlands of varying natural quality. If a project requires a wetland functional assessment refer to the following methods (see Section 28.7 for links to information on methods):

- FHWA IP-82-23 and IP-82-24, A Method for Wetland Functional Assessment, Volumes I and II
- The Hydrogeomorphic Method (HGM), Prairie Pothole Model

Stream Determinations

Stream determinations are appropriate for advanced stages of the roadway development process and must include an assessment of the physical characteristics of the resource. The Iowa DOT's Waters of the United States Determination Data Form should be used to collect field data.

Stream Assessment

A stream assessment is a quantitative method by which the functions a stream provides can be estimated to determine the extent a roadway project may impact a stream. While a stream assessment is not currently required for Iowa DOT projects, its use may be requested to assess stream impacts and to help in determining acceptable compensatory mitigation.

Wetland and Stream Impact Estimation

Once wetland delineations and stream determinations have been completed for the project area, impacts of the well-defined alternatives can be estimated. Documentation of steps taken to avoid and minimize impacts to water resources is necessary for environmental and permit documents. If it has been determined through the preliminary design process that impacts are unavoidable, a wetland and/or stream mitigation site study should be completed to determine possible mitigation locations. The estimated wetland acreage or stream length affected by the alternatives should be determined to establish mitigation needs. The impact estimate should be broken down by each of the Cowardin Classification types[1], and, when possible, include a discussion of the quality of wetlands or streams impacted.

Wetland and Stream Mitigation Site Studies

The Water Resources Section should be consulted prior to beginning any mitigation site study. Generally, areas suitable for wetland mitigation are sites that are not already jurisdictional wetlands, and areas suitable for stream mitigation are sites with a degraded or impaired stream. The following are resources useful for determining possible mitigation sites:

- Availability and/or service areas of approved wetland mitigation banks or in lieu fee programs.
- *NWI:* Locate the appropriate NWI maps for the area in which a wetland mitigation site is sought. NWI map names are the same as their corresponding USGS 7.5-minute topographic

[1] Cowardin, L. M., V. Carter, F. C. Golet and E. T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. FHS/OBS-79/31. U.S. Fish and Wildlife Service, Office of Biological Services. Washington, D.C.

maps. NWI coverage is readily available as a GIS layer or in hardcopy from the USFWS Interactive NWI Wetlands Mapper website (see Section 28.7 for website address).

- *Iowa DNR Section 303(d) Impaired Waters List:* Identify streams in the vicinity of the project area which the Iowa DNR has determined to be impaired and has targeted for improvement.
- *USGS Quadrangle Maps:* The USGS maps should be used for watershed assessments and preliminary site assessments prior to entering the field. NWI layers are overlaid on a USGS quadrangle map for proficient assessments.
- *Natural Resources Conservation Service (NRCS) County Soil Surveys:* Soil survey data can be readily obtained as GIS layers or as hard copy. The soil survey data will be valuable in locating areas of hydric soils. Corroboration with recent aerial photography will help to locate areas of drained hydric soils. Drained hydric soil areas are often cost-effective sites for wetland mitigation.
- *NRCS Wetland Mapping:* The NRCS maintains records in their field offices pertaining to wetlands primarily in agricultural land. NRCS wetland categories include Wetland (W), Farmed Wetland (FW), Artificial Wetland (AW), and Prior Converted (PC). Areas designated as PC are generally hydric soils drained prior to 1985 and are specifically exempt from jurisdiction as wetlands. PC lands are desirable as potential mitigation sites if wetland hydrology can be readily restored.
- *Other Resources:* The Iowa DOT Office of Right-of-Way maintains a listing of Excess Parcel Files that should be consulted to determine if an appropriate fit exists for a mitigation site for those areas listed in the files. In addition, contacts should also be made with Iowa DNR biologists, NRCS District Conservationists, as well as the appropriate County Conservation Board directors for information pertaining to potential mitigation sites.

28.4 Format and Content of Technical Reports or Memoranda

28.4.1 Water Resources Technical Report (Natural Resources Technical Report)

The Water Resources Technical Report is a detailed report which documents the findings of the wetland delineations and stream determinations. When delineations/determinations are performed prior to the preparation of a NEPA document (as in the case of projects processed under the NEPA/404 concurrent process), the Water Resources Technical Report should be used as a basis for water resources data used in the NEPA document.

A Water Resources Technical Report includes completed wetland delineation field forms, stream determination data forms, labeled ground photographs of each site, a map indicating the location of each site, and a photocopy of field notes. The Water Resources Technical Report should contain a high level of detail. If appropriate, the results of a wetland functional assessment or stream assessment may be incorporated into the Water Resources Technical Report. Detailed water resources information may also be a part of a Natural Resources Technical Report.

28.4.2 Proposed Mitigation, Mitigation Bank, or Approved In Lieu Fee Agreement

Mitigation becomes necessary when unavoidable water resource impacts have been identified as the result of a project. Proposed mitigation is typically at an approved wetland mitigation bank, onsite, or at an

offsite location within the same watershed as where the impacts occur. Replacement ratios will vary and are dependent upon the type of mitigation proposed and on the quality of water resources impacted.

28.4.3 Conceptual Mitigation Plan

A Conceptual Mitigation Plan should be developed when mitigation is necessary but credits from a mitigation bank or in lieu fee program are unavailable. The Conceptual Mitigation Plan should, at a minimum, include the following information:

- Identification of the proposed mitigation site(s) (determined by a mitigation site study), and what methods of mitigation will be used. Possible methods for wetlands include mitigation banking, an in lieu fee program, or permittee-responsible in-kind mitigation. Possible methods for streams include in-stream restoration/improvement and/or riparian improvement (see glossary).
- Mitigation ratios that will be used. Emergent wetlands will be mitigated at a minimum 1.5:1 ratio, whereas forested wetlands will be mitigated at a minimum 2:1 ratio. The amount of stream mitigation will be determined on a case-by-case basis.

This Conceptual Mitigation Plan will be used in permit applications (see Section 28.6).

28.5 Format and Content of NEPA Documentation Discussion

When preparing the water resources sections of a NEPA document, FHWA Technical Advisory T6640.8A should be consulted in addition to Executive Order 11990, Protection of Wetlands.

EAs and EISs are generally written in the same style but require varying levels of detail in describing a resource and potential associated impacts. The appropriate level of detail varies widely by project.

The Environmental Analysis discussion in a NEPA document as related to water resources may typically include an estimate of impacted wetland acreage by wetland type and impacted stream by length for each proposed alternative and a table with the following information describing project area water resources:

- Unique identifier for each water resource in the project area and in the immediate vicinity of the project area.
- Total approximate size of each wetland (acres) or stream (feet) in the project area or in the immediate vicinity of the project area.
- Brief description of the location of project area water resources and the date the fieldwork was completed.
- Brief description of characteristics and Cowardin Classification of each wetland in the project area or in the immediate vicinity of the project area.

The EA or EIS should also discuss the efforts undertaken to avoid, minimize and mitigate impacts to water resources. This may include other alternatives investigated which avoid impacts, as well as design variations considered to minimize water resource impacts.

An EA or EIS level project may have no wetland or stream impacts; however, NEPA documentation may be required because of effects not associated with water resources. In those cases, a statement in the NEPA document to the effect that no impacts to waters of the United States, including wetlands, will occur is sufficient.

28.6 Continued Work in Design and Construction

The following is a list of permits that may be necessary when wetlands and/or streams are affected by construction. More information about permitting and mitigation is also available in Section 10.4 of the Iowa DOT *Construction Manual*.

28.6.1 404 Permit

Section 404 of the *Clean Water Act* establishes a program to regulate the discharge of dredged and fill material into waters of the United States, including wetlands. A permit from the U.S. Army Corps of

Engineers is required for activities such as fills for development, water resource projects (such as dams and levees), infrastructure development (such as highways and airports), and conversion of wetlands to uplands for farming and forestry.

The *Clean Water Act* Section 404 Permit Application Checklist, written by Iowa DOT, is a guide for requesting Section 404 authorization for transportation projects in Iowa. The checklist can be found in Appendix 26a. The document is updated frequently to reflect current guidance. The current version should be obtained from the Water Resources Section prior to beginning every permit application. The Iowa DOT Water Resources Section obtains Section 404 permits for applicable projects.

28.6.2 Individual Permits

Individual permits apply to projects involving more than one-half (0.5) acre of wetland impacts and also for those projects impacting high-quality aquatic resources. The U.S. Army Corps of Engineers will require an individual permit for any project that it determines would have more than minimal environmental impact. Individual permits are effective for a period of five years.

28.6.3 Nationwide Permits

Nationwide permits apply to projects that entail minimal impacts to the aquatic environment. Projects must involve less than one-half (0.5) acre of cumulative wetland impacts to be eligible for a nationwide permit and must be completed within two years from the date of issuance. Nationwide permits allow the U.S. Army Corps of Engineers to authorize activities with minimal adverse environmental impacts in a timely manner and maintain protection of the aquatic environment.

28.6.4 Regional Permit

Currently, Iowa has only one applicable regional permitting requirement. Regional Permit 7 was reinstated in 2002 and applies to fill material placed in waters of the U.S. for road-crossing projects within Iowa. Projects covered under Regional Permit 7 must be completed within five years from date of issuance.

28.6.5 Section 401 Certification

Section 401 review evaluates both short- and long-term impacts to water quality within the state and ensures that a project is consistent with the state's water-quality standards. Individual State Section 401 water quality certification is required by the Iowa DNR for all projects requiring a federal Individual Section 404 permit.

Nationwide Permits and Regional 7 permits are certified programmatically.

28.6.6 Sovereign Lands Construction Permit

A Sovereign Lands Construction Permit may be required for projects that involve impacts to state park or preserve land that do not require a Section 404 permit. If a project impacts an area that lies below the ordinary high water mark but above the water's surface and is not classified as a wetland resource [and thereby not requiring a Section 404 permit] a Sovereign Lands Construction Permit would be required. The permit will be obtained by the OLE staff.

28.6.7 NPDES Permit

The National Pollutant Discharge Elimination System (NPDES) permit is triggered by any proposed mitigation site (banking or non-banking) larger than one acre. While the Iowa DOT Office of Construction typically manages NPDES permit submittals for transportation projects, the mitigation designer (consultant or Iowa DOT) is responsible for preparing NPDES permit applications for mitigation sites. Iowa DOT is responsible for submitting the actual NPDES permit application to the Iowa DNR. See Procedure Guide for NPDES Permit Application included in Appendix 28b. For further discussion of NPDES permitting requirements, see Chapter 26, *Surface Water and Water Quality.*

28.6.8 Floodplain Permit

A state floodplain permit issued through the Iowa DNR is also required for any wetland mitigation site proposed within a 100-year floodplain. Typically, the designer responsible for the mitigation design will also be responsible for preparing materials for a floodplain permit from the Iowa DNR for the proposed mitigation site. Iowa DOT is responsible for submitting the permit application. See Chapter 29, *Floodplains and Hydraulics* for more information on floodplain permits as they pertain to construction activities in general.

28.6.9 Wetland or Stream Mitigation Site Design

Because of the potential for a wide variety of site constraints that may be present for a project, there are no strict design criteria that must be followed throughout the wetland or stream mitigation design process. Flexibility through the design process should be exercised to ensure the success of the mitigation site. The mitigation site design should be left to the discretion of the designer in cooperation with the Water Resources Section Project Manager. The design team shall include the Iowa DOT Water Resources Section Project Manager, Team Leader, Environmental Engineer, Hydrogeologist, and consultant (if a contracted project). Mitigation projects are typically let as stand-alone contracts. All mitigation work, from planning through to construction, is kept separate from the roadway project. From the Water Resources Section, both the Project Manager and Environmental Engineer should work closely with construction staff and contractors during construction.

28.6.10 Mitigation Monitoring Plan

Mitigation sites typically require monitoring for 5 years to fulfill permitting obligations. The Iowa DOT Mitigation Monitoring Protocol, available in the Office of Location and Environment, establishes the procedures and guidance for conducting post construction monitoring of mitigation sites. The protocol was developed by Iowa DOT and should be consulted for information and guidance regarding the methodology and procedures for conducting mitigation monitoring. Monitoring is done by the Water Resources Section or by a consultant.

Mitigation monitoring includes qualitative and quantitative data collection for soils, hydrology, and vegetation. The level of monitoring may vary from site to site and should be negotiated and established at the permit stage and identified in the permit conditions.

28.7 Additional References

The 1987 Corps of Engineers Wetland Delineation Manual: http://www.wes.army.mil/.

FHWA IP-82-23 and IP-82-24, A Method for Wetland Functional Assessment, Volumes I and II: http://ma.water.usgs.gov/.

Field Indicators of Hydric Soils (NRCS citation): ftp://ftp-fc.sc.egov.usda.gov/.

The Hydrogeomorphic Method (HGM), Prairie Pothole Model: http://www.dot.state.ak.us/.

Iowa Wetlands and Riparian Areas Conservation Plan: http://www.ag.iastate.edu/.

U.S. Army Corps of Engineers Regulatory Guidance Letters: http://www.spk.usace.army.mil/.

USFWS Interactive NWI Wetlands Mapper: http://wetlands.fws.gov/.

Natural Resources Geographic Information System: http://www.nrri.umn.edu/.

NOTES:

Floodplains and Hydraulics

CHAPTER 29

Floodplains are regulated by both state and federal requirements. At the state level, floodplains are regulated by Iowa Department of Natural Resources (Iowa DNR). At the federal level, the regulatory body is Federal Emergency Management Agency (FEMA). As a part of the National Flood Insurance Program (NFIP), Iowa DNR is considered by FEMA as the responsible state agency to oversee this federal program.

Iowa DNR floodplain regulations affect only those highway projects in the floodplains of streams draining over 100 square miles in rural areas and two square miles in urban areas. Projects on streams with drainage areas below thresholds are covered by Policy No. 500.10 in the Iowa DOT *Policies and Procedures Manual* (PPM), which outlines the procedures for the hydraulic review of these projects and the coordination with the communities (cities and counties).

29.1 Legislation, Regulations, and Guidance

29.1.1 Federal Legislation and Regulations

- ***Executive Order 11988, Floodplain Management, 1977.*** Directs federal agencies to avoid conducting, allowing, or supporting actions in a floodplain.
- ***U.S. DOT Order 5650.2, Floodplain Management and Protection, 1979.*** Prescribes policies and procedures for ensuring that proper consideration is given to avoiding and mitigating adverse floodplain impacts in agency actions, planning programs, and budget requests.
- ***23 CFR 650(a), Location and Hydraulic Design and Encroachments on Floodplains.*** Provides guidance for documenting flooding risks, floodplain impacts, measures to minimize impacts, and measures to mitigate floodplain impacts.
- ***40 CFR 1508.7 – 1508.8, Cumulative Impacts.*** Defines the impacts and effects that must be addressed and considered by federal agencies in satisfying the requirements of the NEPA process, which includes direct, indirect, and cumulative impacts.
- ***Section 9 of the Rivers and Harbors Act of 1899, the Bridge Act of 1906, and the Truman-Hobbs Act of 1940.*** These acts regulate the construction of bridges over navigable waters of the United States. federal law prohibits the construction of any bridge across navigable waters of the United States unless first authorized by the U.S. Coast Guard (USCG). The USCG approves the location and clearances of bridges through the issuance of bridge permits or permit amendments,

Iowa DNR floodplain regulations affect only those highway projects in the floodplains of streams draining over 100 square miles in rural areas and two square miles in urban areas.

under the authority of Section 9 of the Rivers and Harbors Act of 1899 and other statutes. A Section 9 permit is required for new construction, reconstruction or modification of a bridge or causeway over waters of the U.S.

ⓘ ***Section 10 of the Rivers and Harbors Action of 1899.*** Regulates construction, dumping, and dredging in navigable waters of the United States. A Section 10 permit is obtained from the U.S. Army Corps of Engineers (USACE) for structures or work (other than bridges and causeways) affecting the navigable waters of the U.S.

29.1.2 State Legislation and Regulations

ⓘ ***Iowa Code 455.*** Provides Iowa DNR permit authority to regulate construction and alterations within floodplains.

ⓘ ***Iowa Code 567.70.*** Covers floodplain definitions, permit application forms, and rules of practice.

ⓘ ***Iowa Code 567.71.*** Covers when approval is required for floodplain or floodway development.

ⓘ ***Iowa Code 567.72.*** Covers minimum statewide criteria for approval for typical road-related floodplain development.

ⓘ ***Iowa Code 567.75.*** Covers methods by which Iowa DNR regulates floodplain development.

28.1.3 Interagency Memoranda of Understanding

ⓘ ***Memorandum of Agreement (MOA) between Iowa DOT and Iowa DNR. August 4, 1994.*** Establishes procedures for coordinating highway encroachments in floodplains of streams or rivers draining, at the project location, less than 260 square kilometers (100 square miles) in rural areas and 5.2 square kilometers (2 square miles) in urban areas with cities and counties participating in the NFIP. The Office of Bridges and Structures has the original copy of the agreement.

29.1.4 Guidance Documents

ⓘ ***FHWA TA T6640.8A, Section V.*** Establishes standards for NEPA documentation for transportation projects receiving federal funding.

ⓘ ***Iowa DOT PPM Policy No. 500.10 Floodplain Development.*** Background of MOA between Iowa DNR and Iowa DOT, provides detailed instructions about the MOA and for completing the required forms.

29.1.5 Other Regulations, Permits, and Letters

Several additional regulations, permits, or letters may affect compliance activities:

ⓘ ***Iowa DNR Floodplain Development Permit.*** An Iowa DNR permit is necessary for various types of floodway/floodplain-development. Examples are channel straightening, levee construction, excavation and stockpiling of overburden and rock materials, building construction, dams, stream crossing, and bank protection work. Any person who plans to perform or allow such floodplain construction has a duty to contact the Department to determine if a floodplain construction permit is needed. See Section 29.6.

ⓘ ***FEMA Letter of Map Amendment (LOMA).*** FEMA uses the most accurate flood hazard information available and applies rigorous standards in developing the Flood Insurance Rate Maps (FIRM). However, because of limitations of scale or topographic definition of the source maps used to prepare a FIRM, small areas may be inadvertently shown within a Special Flood Hazard Area (SFHA) on a FIRM even though the property is on natural ground and is at or above the Base Flood Elevation (BFE). Recognizing that these situations do occur, FEMA established administrative procedures to change the designation for these properties on the FIRM. These processes are referred to as the Letter of Map Amendment, or LOMA, process and the Letter of Map Revision Based on Fill, or LOMR-F, process.

ⓘ ***FEMA Letter of Map Change (LOMC).*** A LOMC is a letter which reflects an official revision to an effective NFIP map. LOMCs are issued in place of the physical revision and republication of the effective map.

ⓘ ***FEMA Conditional Letter of Map Revision (CLOMR).*** A CLOMR is FEMA's comment on a proposed project that would, upon construction, affect the hydrologic or hydraulic characteristics of a flooding source and thus result in the modification of the existing regulatory floodway, the effective BFE or the SFHA. The letter does not revise an effective NFIP map; it indicates whether the project, if built as proposed, would be recognized by FEMA. Once a project has been completed, the community must request a revision to the FIRM to reflect the project. "As-built" certification and other data must be submitted to support the revision request.

29.2 Resource / Regulatory Agencies and Interested Groups

There are two levels of floodplain regulations that apply to Iowa DOT projects: state regulations administered by Iowa DNR and federal requirements administered by FEMA. As a part of the NFIP, Iowa DNR is considered by FEMA as the state agency responsible for overseeing this federal program.

Iowa DNR reviews projects to ensure compliance with not only state regulations but also NFIP requirements. Projects on streams with drainage areas below thresholds are covered by PPM Policy No. 500.10, which outlines the procedures for the hydraulic review of these projects and the coordination with the communities (cities and counties).

During the planning stage of project development, OLE shall:

1. Determine whether the project will encroach upon a floodplain as described in Section 29.3.
2. Note such encroachments in the environmental document.

Also during the planning stage, the Office of Bridges and Structures shall prepare the information required by the agreement, complete a Record of Coordination of Floodplain Development, and send copies to Iowa DNR and to the appropriate District Engineer.

The District Engineer shall communicate the information to the affected city/county and act as liaison between the Office of Bridges and Structures and the local government. For further details see Background of Memorandum of Agreement between Iowa DNR and Iowa DOT. See Table 29-1.

Table 29-1

Resource/Regulatory Agencies and Interested Groups	
Agency	When Involved and Why
Iowa Department of Natural Resources	Environmental document review and permits.
U. S. Army Corps of Engineers	Environmental document review and permit.
Federal Emergency Management Agency	Environmental document review.
U.S. Coast Guard	When a project may potentially affect navigable waters of the United States

29.3 Methodology for Conducting Floodplain Studies

29.3.1 Review of Available Resources

Most basic floodplain impact assessments can be made from published floodplain maps. These maps, whether on geographic information systems (GIS) layers or hard copy, will show the 100-year and 500-year floodplain areas. Generally, the focus of the assessment should be on the 100-year floodplain. Typically, the basic floodplain assessment contains information gathered during the NEPA process, though more detailed floodplain studies may be completed after the NEPA process. For consultant projects, the floodplain assessment should be forwarded to the NEPA Document Manager.

Floodplain boundaries drawn by FEMA are created for the NFIP. Three types of maps are published: a Flood Hazard Boundary Map (FHBM), a Flood

Boundary and Floodway Map (FBFM), and a FIRM. The use of these maps is mandatory in determining whether a highway location alternative will encroach on the base floodplain.

These maps are available through the FEMA Flood Map Service Center (http://www.fema.gov). Searching the map service center by the catalog allows the user to select from the following products:

- *FHBMs or FIRMs for an area*—scanned (digital) versions of paper maps showing areas subject to flooding and actuarial insurance rate zones. The product is a digital, nongeoreferenced image. The use of such images is possible with a GIS but it would have to be aligned to its geographic location and scaled properly. Coverage for Iowa is quite extensive in areas prone or potentially affected by floods.
- *Q3 Digital Flood Data*—Digital representations of certain features from the FIRM. The digital product vs. vector data outlining the flood risks. GIS is required to use and view these data. Coverage for Iowa is limited to very few counties.

Iowa DOT currently stores paper copies of some of the FHBMs and FIRMs in the Office of Bridges and Structures. Contact the Office of Bridges and Structures for map availability.

The Iowa DNR should also be contacted during the early coordination process regarding potential impacts to floodplain areas.

Potential impacts to floodplains can be assessed when floodplain boundaries and preliminary road design (computer-aided designing and drafting [CADD] work) becomes available. At that time, it will be necessary to determine the square footage of potential impacts to the 100-year floodplain and whether potential road impacts are transverse or longitudinal with respect to a given 100-year floodplain. See Section 29.7 for additional sources of floodplain mapping.

29.3.2 Basic Floodplain Evaluation

NFIP maps, or other information developed by Iowa DOT if NFIP maps are not available, shall be used to determine whether a highway location alternative will include an encroachment. Location studies shall include evaluation and discussion of the practicability of alternatives to any longitudinal encroachments.

Location studies shall include discussion of the following items, commensurate with the significance of the risk or environmental impact, for all alternatives containing encroachments and for those actions that would support base-floodplain development:

- The risks associated with implementation of the action
- The impacts on natural and beneficial floodplain values
- The support of probable incompatible floodplain development
- The measures to minimize floodplain impacts associated with the action
- The measures to restore and preserve the natural and beneficial floodplain values impacted by the action

Location studies shall include evaluation and discussion of the practicability of alternatives to any significant encroachments or any support of incompatible floodplain development.

Local, state, and federal water resources and floodplain management agencies should be consulted to determine if the proposed highway action is consistent with existing watershed and floodplain management programs and to obtain current information on development and proposed actions in the affected watersheds.

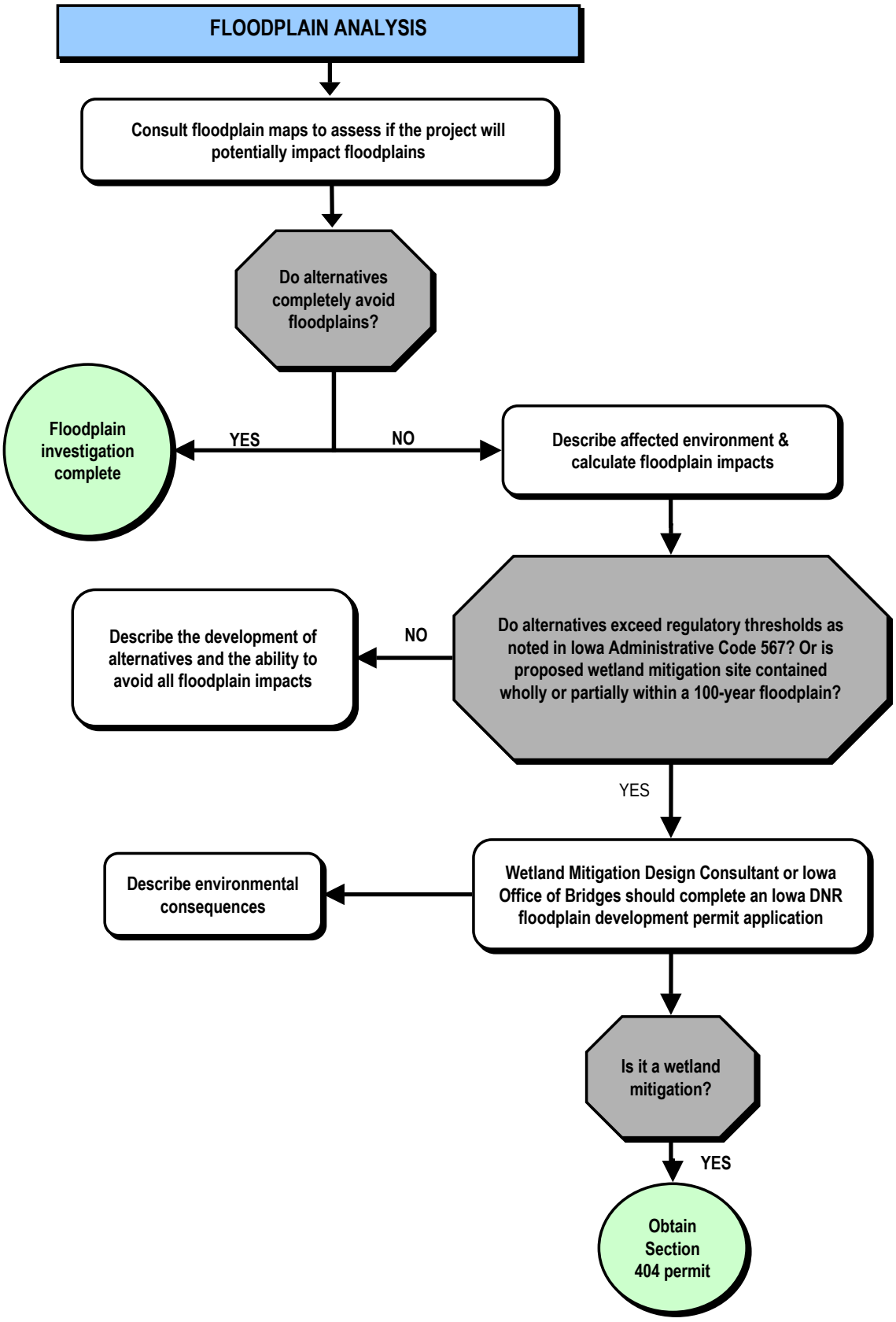
See Exhibit 29-1 for a floodplain analysis flowchart.

29.3.3 Hydraulic Impacts Assessment

Hydraulic technical studies such as Hydraulic Engineering Center (HEC)[1]-2 modeling and bridge scour analysis may be useful if more detailed floodplain studies are deemed warranted. These studies are typically accomplished by the design

[1] Hydrologic Engineering Center (HEC), an organization within the Institute for Water Resources, is the designated Center of Expertise for USACE.

Exhibit 29-1
Floodplain Analysis



consultant. Normally, hydraulic impact assessment requires a high level of engineering and it generally occurs after the NEPA process during final design. The studies are not covered in detail within this manual, but a brief description of both studies is given below.

HEC-2 Modeling

HEC-2 is a modeling program from USACE that was designed for their Water Surface Profiles Program. It is the standard for FEMA floodplain and river channel evaluations during the preliminary design stage of project development. It is capable of modeling sideflow weirs, drop structures, and floodplain encroachments and can be used to evaluate floodway encroachments, identify flood hazard zones, manage floodplains, and design and evaluate channel improvements. HEC-2 modeling can be used to calculate the effect an in-stream structure would have on upstream water levels.

Bridge Scour Analysis

See the *Guidelines for Preliminary Design of Bridges* and *Culverts Manual* from the Office of Bridges and Structures. Appendix C of that manual describes methods to estimate scour for existing and proposed structures. Also in Appendix C are recommendations for reducing and preventing scour effects on existing and proposed bridges and worksheets for documenting the analysis.

29.3.4 No-Rise and Zero-Rise Requirements

FEMA has additional regulations that prohibit encroachments in regulated floodways unless it is accompanied by a no-rise analysis that demonstrates the project will cause no increase in the 100-year flood level. It is necessary in these cases to get an engineering certification that the proposed project will not affect the pre-construction base flood elevations. The no-rise evaluation may also consider the pre-construction floodway elevations or floodway data widths.

In addition to the no-rise evaluation, a zero-rise standard has been adopted by a number of communities in the United States. This designation treats floodplains and a floodways equally, and is a more restrictive floodplain protection policy. While development can still occur within the floodplain or floodway, it often requires construction on existing fills, building in the shadow of existing development, or mitigating new development by increasing conveyance area (using setback of levees, providing compensatory storage elsewhere, etc.). The zero-rise name refers to the fact that the regulations preclude development and floodplain encroachments that would cause a measurable rise in base flood elevations, the definition of "measurable rise" can vary by community.

Early coordination with FEMA, USCG, Iowa DNR, and local jurisdictions should occur to identify the no-rise/zero-rise requirements of a given project.

In order to obtain a no-rise certification from FEMA, it is necessary to either conduct a hydraulic analysis or to provide technical data and an explanation of why such an analysis is not required. For hydraulic modeling, the step-backwater computer model should be obtained for the specified geography by contacting the FEMA Library. The model should be run for both existing and proposed conditions and the results of the analysis should be submitted with the sealed no-rise certification form.

29.3.5 Highway Embankments as Flood Control Structures

FHWA floodplain regulations acknowledge that there may be limited instances when highway embankments function as dams or flood control structures. FHWA does not have design standards to apply in these cases, but rather defers to the appropriate state and federal agencies responsible for dam safety (USACE and Iowa DNR). However, FHWA has determined that highway embankments may not be certified as levees due to the fact that they were not designed and constructed for purposes of flood control. As such, they pose safety risks and place DOTs and FHWA in dangerous positions in terms of liability. Flood control certification for a highway embankment would place the FHWA in a direct flood control role for which it does not have authority. For these reasons, FHWA discourages DOTs from certifying or allowing certification of highway embankments as levees. FHWA also discourages retrofit of existing embankments for flood control purposes.

29.4 Format and Content of Technical Reports and Memoranda

The format and content of technical reports and memoranda concerning floodplain assessment and hydraulic impact assessment should follow guidelines as prescribed in FHWA TA 6640.8A. Executive Order 11988, Floodplain Management, should also be consulted.

The format and content of a Bridge Scour Analysis is covered in the Guidelines for Preliminary Design of Bridges and Culverts Manual from the Office of Bridges and Structures.

29.5 Format and Content of NEPA Documentation Discussion

For work in floodplains that require permit approval, the environmental documentation must explain the impacts the project will have on these areas, and on the resources within those areas. It is important to note that most permitting functions are dependent on final design plans that are completed subsequent to completion of the NEPA process. Depending on the outcome of the final roadway or bridge design, it is possible that the issue of NEPA floodplain impacts may need to be revisited.

A CE project with proposed work in the 100-year floodplain or floodway would typically involve a brief description of the 100-year floodplain and regulatory floodway in the project area. For work within a 100-year flood plain, indicate the length of the encroachment and whether it is a transverse or longitudinal encroachment. Include with the CE, a copy of the floodplain reference used for the assessment (e.g. appropriate part of the FEMA map(s) that includes the project location). For each alternative encroaching on a designated or proposed regulatory floodway, provide a preliminary indication of whether the encroachment would be consistent with the regulatory floodway. If the preferred alternative encroaches on a regulatory floodway and mitigation is required, briefly describe the mitigation.

An Environmental Assessment (EA) will typically contain a brief description of the project, the floodplain reference used for assessment (Flood Insurance Program studies, Flood Insurance Rate Map, etc.), and a description of the nature of encroachment. Historical information, such as frequency of floodwaters "overtopping" project area roads, typically will also be included. A table is recommended to describe the encroachments including the floodplain where it occurs, along with type (transverse or longitudinal) and length of encroachment. If the project results in a longitudinal encroachment, additional discussion on whether the encroachment can be practicably avoided as well as a discussion covering the following topics is needed:

- Potential for interruption of a transportation facility that is needed for emergency vehicles or provides community's only evacuation route
- Impact on natural and beneficial floodplain values
- Increased risk of flooding
- Project supports and/or results in incompatible floodplain development
- Permit conditions (if any). See Section 29.6 for more details.

In the Environmental Analysis section of an Environmental Impact Statement (EIS), the affected environment discussion should describe the characteristics of the floodplain, including the size and location of floodplain within the project, the waterways with which it is associated, and whether any parcels in the floodplain were purchased with FEMA funds. A map of the floodplain should be included in the Environmental Analysis section or the floodplain should be included on an environmental resources inventory map in the appendix of the document.

The environmental consequences discussion in the Environmental Analysis section should briefly summarize the results of the floodplain assessment. This information may be derived from the technical memorandum or report, if one was prepared. The summary should identify the number of encroachments and any support of incompatible floodplain developments and their potential impacts.

Where an encroachment or support of incompatible floodplain development results in substantial impacts, the draft EIS should provide more detailed information on the location, impacts, and appropriate mitigation measures such as avoidance and minimization applications. In addition, if any alternative (1) results in a floodplain encroachment or supports incompatible floodplain development having significant impacts, or (2) requires a commitment to a particular structure size or type, the EIS needs to include an evaluation and discussion of practicable alternatives to the structure or to the significant encroachment. Efforts to meet no-rise, and as applicable, zero-rise, requirements should also be documented. The EIS should include exhibits which depict the alternatives, the base floodplains, and, where applicable, the regulatory floodways.

For each alternative encroaching on a designated or proposed regulatory floodway, engineering and environmental analyses should be undertaken commensurate with the level of encroachment, to permit consistent evaluation and identify impacts. Coordination with FEMA and appropriate state and local government agencies should be undertaken for each floodway encroachment.

If the preferred alternative encroaches on a regulatory floodway, the final EIS should discuss the consistency of the action with the regulatory floodway. If a floodway revision is necessary, the final EIS should include evidence from FEMA and local or state agencies indicating that such revision would be acceptable.

29.5.1 Only Practicable Alternative Finding

A proposed action that includes a significant encroachment shall not be approved unless FHWA finds that the proposed significant encroachment is the only practicable alternative. This finding shall be included in the final environmental document (final EIS or Finding of No Significant Impact [FONSI]) and shall be supported by the following information:

- The reasons why the proposed action must be located in the floodplain
- The alternatives considered and why they were not practicable
- A statement indicating whether the action conforms to applicable state or local floodplain protection standards

See 44 CFR 67580, Nov. 26, 1979, as amended at 48 CFR 29274, June 24, 1983, for more information. The FHWA TA T6640.8A and Executive Order 11988 should also be consulted.

29.6 Continued Work in Design and Construction

29.6.1 Iowa DNR Floodplain Development Permit

Iowa Code 567.71 describes when an Iowa DNR Floodplain Development Permit is required. The design consultant should complete floodplain permit applications if the permit is required for proposed wetland mitigation within the 100-year floodplain. The Iowa DOT Office of Bridges and Structures should complete floodplain permit applications if the permit would be required for potential road-related impacts to the 100-year floodplain.

29.6.2 Section 404 Permit

The Section 404 permit process may vary depending on the project's complexity, location, and environmental effect. The permit is needed if there is any discharge of dredge or fill material into waters of the United States. This includes mitigation of wetlands within a floodplain. See Chapter 28, *Waters of the United States, Including Wetlands*, for a more detailed discussion of Section 404 permits. Note that a joint application has been developed by the Department of the Army and State of Iowa for permits to construct, excavate or fill in streams, lakes, wetlands, or floodplains in waters and on state lands within Iowa.

29.7 Additional References

Iowa Code 567: http://www.legis.state.ia.us/.

Floodplain mapping can be obtained from the following sources:

- GIS layers: http://www.esri.com/.
- National Flood Insurance Program map—order hard copy maps through the FEMA Flood Map Store: http://www.fema.gov/.

NOTES:

Threatened and Endangered Species, Wildlife, and Upland Communities

CHAPTER 30

This chapter discusses the requirements for identifying and evaluating species that have been categorized as being either threatened or endangered at the state or federal level. These species have special protection under state or federal regulations and, in addition to being individually important, may also be indicators for sensitive habitats.

30.1 Legislation, Regulations, and Guidance

30.1.1 Federal Legislation and Regulations

ⓘ ***50 CFR 402.12(c), Endangered Species Act of 1973.*** The purpose of the Endangered Species Act (ESA) is to conserve "the ecosystems on which threatened and endangered species depend" and to also conserve and recover listed species. It requires concurrence with U.S. Fish and Wildlife Service (USFWS) on presence or absence of federal threatened and endangered species in the project area. Under the law, species listed as either threatened or endangered are provided protection and regulated by the USFWS.

ⓘ ***16 USC 661–666, Fish and Wildlife Coordination Act.*** The amendments enacted in 1946 require consultation with the USFWS and the fish and wildlife agencies of states where the "waters of any stream or other body of water are proposed or authorized, permitted or licensed to be impounded, diverted…or otherwise controlled or modified" by any agency under a federal permit or license. Consultation is to be undertaken for the purpose of "preventing loss of and damage to wildlife resources."

ⓘ ***The federal list of endangered and threatened wildlife and plants.*** Listing of plant and animal species that are protected under ESA. This list can be found on the USFWS website. A link is provided at the end of this chapter, see Section 30.10.

30.1.2 State Legislation and Regulations

ⓘ ***The state list of Iowa's endangered and threatened plants and animals.*** Since the original list was developed in 1977, the list has been revised numerous times, with the most recent revision effective in 2008 (Iowa Administrative Code Chapter 77). The state list includes all federally listed endangered and threatened species that occur in Iowa. A link is provided at the end of this chapter, see Section 30.10.

ⓘ ***Iowa Code 481B.*** Endangered plants and wildlife. Establishes the processes and procedures in dealing with Threatened and Endangered Species in the State of Iowa.

These species have special protection under state or federal regulations and, in addition to being individually important, may also be indicators for sensitive habitats.

30.1.3 Interagency Memoranda of Agreement

ⓘ ***Memorandum of Agreement Between Iowa Department of Natural Resources and Iowa Department of Transportation Regarding Transportation Land Use Within the Loess Hills*, dated November 12, 2008.** Coordination between the Iowa DOT and Iowa Department of Natural Resources (DNR) will be handled by a staff biologist within the OLE section. (See Appendix 30a)

30.1.4 Guidance Documents

ⓘ ***FHWA Technical Advisory T6640.8A, Section V.*** Requires the highway agency to obtain information from USFWS and/or the National Marine Fisheries Service (NMFS) to determine whether or not any listed or proposed threatened or endangered species and designated and proposed critical habitat are within a project area.

ⓘ ***FHWA memorandum dated February 20, 2002, "Concerning Interaction of NEPA and Endangered Species Act."***

ⓘ ***Revised Indiana Bat Guidelines.*** Iowa DOT departmental memo dated August 29, 2007.

ⓘ ***Bald Eagle habitat guidance from USFWS, dated March 22, 1993.***

ⓘ ***Endangered Species Act Coordination Procedures for the Iowa Department of Transportation.***

30.2 Resource / Regulatory Agencies and Interested Groups

See Table 30-1.

30.3 Section 7 Procedures

Iowa DOT's approach to consultation under Section 7 of the ESA is commensurate with the level of environmental review required by the federal action agency, FHWA. In the absence of state procedures for threatened and endangered species, consultations with Iowa DNR are carried out in the same manner as with USFWS and NMFS.

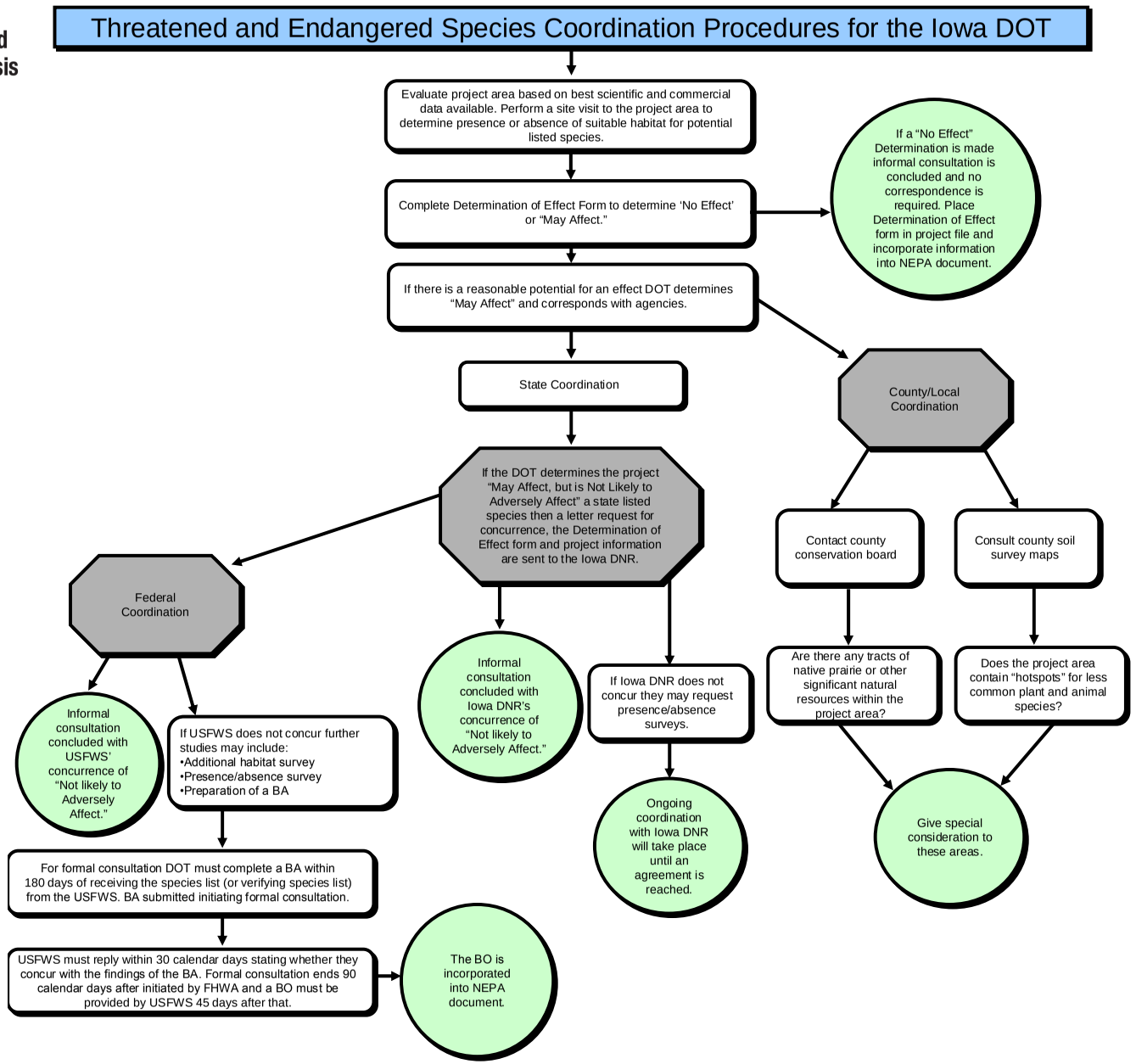
30.3.1 Project Evaluation

The Iowa DOT evaluates the project area based on the best scientific and commercial data available. Evaluation tools should include, at a minimum, the Iowa DNR Natural Heritage Database, Iowa DNR Soils of Special Concern, Iowa State University GAP data and aerial photography. For major projects, typically Environmental Impact Statement (EIS) or Environmental Assessment (EA) level NEPA documentation, a letter request is sent to USFWS and Iowa DNR to request information on listed or proposed species or critical habitat in the project area (see Exhibit 30-1). A site visit of the project area is also appropriate to gather information about the project. Fieldwork during the site visit should generally focus on the presence or absence of suitable habitat for potential listed species rather than a search for the listed species themselves.

Table 30-1

Resource/Regulatory Agencies and Interested Groups	
Agency	**When Involved and Why**
U.S. Fish and Wildlife Service (USFWS)	Involve in early coordination activities and throughout the project, as appropriate, for Section 7 consultation of the Endangered Species Act of 1973 and also the Fish and Wildlife Coordination Act. The USFWS provides a list of threatened and endangered species for the project area through early coordination efforts.
Iowa Department of Natural Resources (DNR)	Involve in early coordination and throughout the project, as appropriate. Joint authority over Fish and Wildlife Coordination Act in cooperation with USFWS. Provides list of threatened and endangered species for the project area through early coordination efforts.
County Conservation Boards	Involve in early coordination and throughout the project, as appropriate. Provides information on a local level of any known tracts of native prairie or other significant natural areas.

Exhibit 30-1
Threatened & Endangered Species, Wildlife, & Upland Plant Communities Analysis

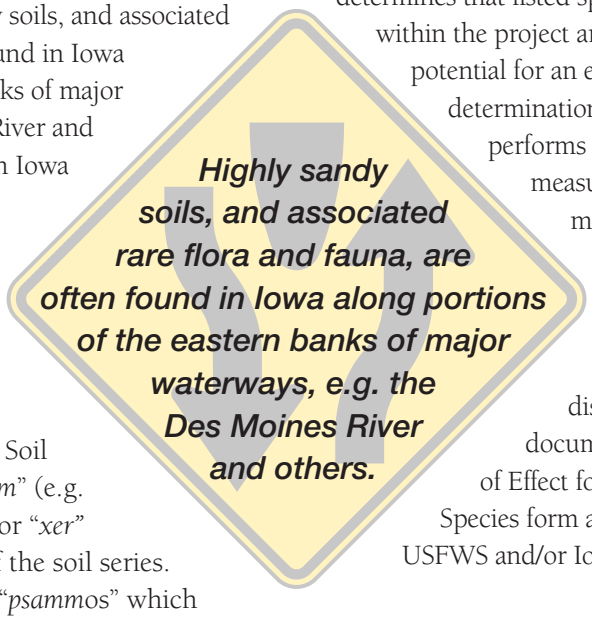


Other Wildlife and Upland Plant Communities

Appropriate county conservation boards should be contacted to determine if any known tracts of native prairie or other significant natural resource areas may be present within the project area. The Iowa DNR list of species of special concern should also be consulted to determine the likely presence of these species within the project area. Although species listed as special concern by the Iowa DNR are not officially regulated, the presence of these species within a project area may provide an indicator as to the level of habitat quality present. Areas determined to potentially contain native prairie tracts or other significant natural areas should be given additional consideration during site investigations.

County Soil Surveys

County soil survey mapping should be consulted to determine the predominant soil types located within a given project area. Sandy soils are often "hotspots" for less common plant and animal species. These dry sandy soils often provide refuge for several uncommon species in Iowa and should be given additional consideration when encountered. Highly sandy soils, and associated rare flora and fauna, are often found in Iowa along portions of the eastern banks of major waterways, e.g. the Des Moines River and others. The Loess Hills of western Iowa are also associated with rare flora and fauna.



The presence of highly sandy soils within the project area can be determined by a brief review of the soil taxonomy page of the appropriate County Soil Survey. Look for the root "*psamm*" (e.g. "*psamm*ent" or "udi*psamm*ent") or "*xer*" (e.g. "*xeric*") in the taxonomy of the soil series. The root "*psamm*" derives from "*psamm*os" which means highly sandy. The root "*xer*", which derives from "*xeric*", means very dry—the presence of this root in the taxonomy of a given soil series may suggest that the area should be field checked. It is not uncommon for very dry soils to support unusual plant communities.

Geographic Information Systems (GIS)-ready digital coverage of soils is available for almost all of Iowa. These coverages should be obtained and added to the project file. Soil polygons that contain particularly sandy soils (consult GIS metadata or the Natural Resources Conservation Service [NRCS]) can be graphically highlighted on GIS maps and used as an aid during fieldwork.

30.3.2 Determination of Effect and Need for Consultation

Small Projects—Typically CE-Level NEPA Documentation

Upon evaluation of the project if the Iowa DOT determines that no listed species or habitat are present within the project area a 'No Effect' determination is made on the Determination of Effect for Threatened and Endangered Species form. Informal consultation is concluded and no correspondence with USFWS or Iowa DNR is required. The Determination of Effect form is maintained in the project file.

Upon evaluation of the project if the Iowa DOT determines that listed species or habitat are present within the project area and there is a reasonable potential for an effect a "May Affect" determination is made. The Iowa DOT performs avoidance and minimization measures. If avoidance/minimization measures, in conjunction with other information, support a "Not Likely to Adversely Affect" determination (beneficial, insignificant or discountable) then the Iowa DOT documents this on the Determination of Effect for Threatened and Endangered Species form and correspondence with USFWS and/or Iowa DNR is required.

Major Projects—Typically EIS- or EA-Level NEPA Documentation

Upon evaluation of the project and receiving a response from USFWS and/or Iowa DNR if the Iowa DOT determines that no listed species or habitat

are present within the project area a "No Effect" determination is made on the Determination of Effect for Threatened and Endangered Species form. Section 7 consultation is concluded. Correspondence with USFWS and Iowa DNR is recommended but not required. The Determination of Effect form is included in the NEPA document.

Upon evaluation of the project if Iowa DOT determines that there is a reasonable potential for an effect a "May Affect" determination is made. The Iowa DOT performs avoidance and minimization measures. If avoidance/minimization measures, in conjunction with other information, support a "Not Likely to Adversely Affect" determination (beneficial, insignificant, or discountable) then Iowa DOT documents this on the Determination of Effect for Threatened and Endangered Species form and correspondence with USFWS and/or Iowa DNR is required.

30.3.3 Informal Section 7 Consultation and Concurrence

Iowa DOT informally consults with USFWS for most projects to satisfy Section 7 requirements. The FHWA delegated the authority for informal consultation to state DOTs on August 7, 1986. If FHWA requests formal consultation or if Iowa DOT's determination of effect concludes that a project is likely to adversely affect a threatened or endangered species, then formal consultation is required.

A letter request, along with the Determination of Effect Form and other project information, is sent to USFWS and/or Iowa DNR to request concurrence with Iowa DOT's determination. Concurrence by USFWS and/or DNR concludes informal consultation. A copy of USFWS's and/or Iowa DNR's concurrence letter is included in the NEPA document.

If USFWS and/or Iowa DNR do not concur, the Iowa DOT/FHWA evaluates whether the non-concurrence supports further studies which may include additional habitat surveys, presence/absence surveys, collection of other additional data and whether a Biological Assessment (BA) shall be prepared and formal consultation requested through FHWA.

30.3.4 Formal Consultation

For formal consultation the Iowa DOT must complete a BA within 180 days of receiving the species list from USFWS (or verifying list with USFWS). Formal consultation is initiated when FHWA submits the BA and information required in 50 CFR 402.14(c) to USFWS. FHWA's submittal should recommend a review of the draft Biological Opinion (BO) by FHWA, even if this extends the time to completion.

USFWS must reply within 30 calendar days, stating whether they concur with the findings of the BA. Clarification and dispute resolution at the lowest level shall also occur at this time, which could lead to informal consultation. Formal consultation ends 90 calendar days after initiated by FHWA and a BO must be provided by USFWS 45 days after that. The conclusion of the BA, the BO, and Incidental Take Statement are included in the NEPA document. FHWA memo dated February 20, 2002, contains additional information. (See Appendix 30b.)

The purpose of the BO is to answer questions of jeopardy/no jeopardy and adverse modification/no adverse modification of habitat. An incidental take statement is an attachment to the BO and is non-discretionary. Iowa DOT and FHWA should ensure that USFWS provides a measurable parameter in the incidental take statement, such as the number of individuals to be taken.

30.4 Field Procedures

All information gathered during the pre-fieldwork phase will be helpful during fieldwork. Field studies for threatened and endangered species would normally entail a site visit to the project area. Prior approval from the appropriate landowners is required before beginning the site visit.

Fieldwork during the initial site visit should generally focus on the presence or absence of suitable habitat for potential listed species rather than a search for the listed species themselves. General assessments as to the overall quality of habitat based on degree of naturalness present within the project corridor

should be noted and recorded at this time. Important features observed should be added to the GIS database. Fieldwork may focus on the individual listed species in instances where large nests, e.g., those of Bald Eagles, or other easily identifiable attributes are generally evident from considerable distances. A general species list should also be prepared for other nonagricultural areas encountered such as woodland tracts and riparian areas.

Relevant threatened and endangered species information typically will be incorporated into a Technical Memorandum or Technical Report as appropriate. This Technical Memo or Report is typically also forwarded to the NEPA document manager and staff biologist.

In instances where native prairie tracts or undisturbed woodland areas are encountered within a project area, a plant species list should be compiled listing both native as well as non-native species. The description concerning the quality of area being surveyed can be qualitative and should include a brief discussion of dominant species, indicator species, and invasive species. Observations as to the degree of site disturbance should be documented as well as locations of native prairie remnants or woodland tracts. It is not necessary to compile a list of wildlife encountered during a site visit.

Additional surveys, varying in complexity, may be warranted after the project is evaluated and coordination with USFWS and/or Iowa DNR has occurred. The additional surveys may be performed by Iowa DOT staff biologists or qualified consultants.

30.5 Defining and Determining Woodland within Study Areas

Per Iowa Code 314.23 Environmental Protection—Woodlands: "Woodland removed shall be replaced by plantings as close as possible to the initial site, or by acquisition of an equal amount of woodland in the general vicinity for public ownership and preservation, or by other mitigation deemed to be comparable to the woodland removed, including, but not limited to, the improvement, development, or preservation of woodland under public ownership."

For the purposes of Iowa DOT Office of Location and Environment, an area is considered woodland if:

1. The area consists of three acres or greater of forested land having at least 200 trees (3" diameter at breast height [dbh] or greater) per acre; or

2. The area consists of 0.5 acre or greater but less than three acres of forested land having at least 200 trees (3" dbh or greater) per acre and is connected to a larger tract of forested land with the entire area being greater than three acres (not including treed fencerows, property lines, etc.)

30.6 Transportation Land Use within the Loess Hills

The Water Resources Section of OLE will review projects to determine whether Iowa DOT projects fall within the Loess Hills as part of the W0 review. If needed, coordination between the Iowa DOT and Iowa Department of Natural Resources (DNR) will be handled by a staff biologist within OLE. The Iowa DOT will complete a Data Form developed for this coordination process and submit it to the Iowa DNR for their review (see Appendix 30c). Coordination would become part of OLE's administrative record and incorporated into NEPA documents if applicable.

For projects in the Loess Hills requiring early coordination during the NEPA process, the DOT will consult with the DNR about impacts to the Loess Hills. In accordance with the MOA, impacts to the Loess Hills will be avoided where feasible and practicable.

30.7 Format and Content of Technical Reports or Memoranda

Results of the site visit should be summarized in a Technical Memorandum that typically should contain information about the type of plant communities encountered, habitat characteristics, levels of diversity, as well as information regarding the degree and types of disturbance present. The technical memorandum should also document the fieldwork dates, describe the level of field effort and methods, the locations of special status species and noteworthy plant communities, and who performed the work.

The technical memorandum should be submitted to NEPA document manager or staff biologist. If appropriate, Iowa DOT will submit the document to USFWS and/or Iowa DNR for their review as well. The report needs to be sent as hardcopy and electronic copy and should contain a GIS database of relevant layers. (See Chapter 1 and Chapter 46 for additional information on the submission of electronic documents and GIS database layers.)

30.8 Format and Content of NEPA Documentation Discussion

The threatened and endangered species, wildlife, and upland plant communities discussions in the Environmental Analysis section is the same for a project processed as either an EA or an EIS.

The biological technical memorandum or report should be used as a source for information concerning threatened and endangered species in a NEPA document. In the event that federally listed protected species will likely be impacted by a proposed project the draft NEPA document should make reference to the Section 7 consultation. It is preferable that the BO be obtained before the NEPA document is signed.

The affected environment discussion in the Environmental Analysis section should contain a discussion of coordination efforts with state and federal agencies concerning potential presence of listed species within a given project area. It should also discuss habitat requirements of listed species and the presence, or absence, of such habitat within the project area. Much of these data can be summarized in tabular form.

The environmental consequences discussion in the Environmental Analysis section should contain a discussion of potential impacts to each listed species per proposed alternative as well as a brief discussion of avoidance or minimization techniques. Much of these data can also be summarized in tabular form and/or depicted on GIS-generated graphics.

30.9 Continued Work in Design and Construction

In the event that a need for a permit or further consultation has been identified, the consultant shall coordinate all permitting efforts through OLE.

- *Takings permit (state).* If it is determined that a proposed project will have an unavoidable impact to any state listed Protected Species, the Iowa DNR may require that a Takings Permit be issued to document the "good cause" justification.
- *Per Iowa Code 481B, Endangered Plants and Wildlife,* the definition of take is as follows:

  "Take" in reference to fish and wildlife, means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect and it includes an attempt to engage in any such conduct.

  "Take" in reference to plants, means to collect, pick, cut, dig up or destroy in any manner.

- *Per Iowa Code 481B.8,* "Damage to property or human life, upon good cause shown and where necessary to reduce damage to property or to protect human health, endangered or threatened species found on the state list may be removed, captured, or destroyed, but only pursuant to a permit issued by the director."

30.10 Additional References

16 USC 661–666, Fish and Wildlife Coordination Act: http://uscode.house.gov/.

Iowa General Assembly, The Iowa Administrative Code (Administrative Rules): http://www.legis.state.ia.us/.

The Federal Endangered Species Act: http://www.fws.gov/.

The federal list of endangered and threatened wildlife and plants in Iowa: http://ecos.fws.gov/.

The state list of endangered and threatened wildlife and plants: http://www.iowadnr.gov/.

Land-Use Impacts

CHAPTER 31

Land-use decisions and transportation investments are closely interrelated. Land use often determines the demand for transportation facilities and transportation projects augment land-use possibilities. Thus, land-use decisions and transportation investments affect the level of mobility in the region, the viability of each transportation mode in the region, and the overall efficiency of the region's transportation facilities and services. In addition, transportation investments can have impacts on land uses at the regional, community, and site-specific levels.

NEPA, 42 USC 4231, requires that all actions sponsored, funded, permitted, or approved by federal agencies undergo evaluation to ensure that environmental considerations, such as impacts related to land use, are given due weight in project decision-making. Early coordination with local jurisdictions concerning land-use issues is important for several reasons: to identify local conditions that could affect design, to obtain early support for the project, and to ensure sufficient time for extensive local review.

31.1 Legislation, Regulations, and Guidance

31.1.1 Federal Legislation and Regulations

ⓘ *42 USC 4231, NEPA*

ⓘ *40 CFR 1502.16(c) (environmental consequences)*

ⓘ *40 CFR 1508.8(b) (indirect effects)*

30.1.2 State Legislation and Regulations

None applicable.

30.1.3 Interagency Memoranda of Understanding

None applicable.

31.1.4 Guidance Documents

ⓘ *FHWA Technical Advisory T6640.8A, Section V.* Provides guidance for uniformity and consistency in format, content, and processing of environmental studies and documents pursuant to NEPA.

ⓘ *Question 23 of Council on Environmental Quality (CEQ) Q&A, Conflicts between Proposed Action and Land-Use Plan.* Deals with conflicts between a proposal and the objectives of federal, state, or local land-use plans.

NEPA, 42 USC 4231, requires that all actions sponsored, funded, permitted, or approved by federal agencies undergo evaluation to ensure that environmental considerations such as impacts related to land use are given due weight in project decision-making.

ⓘ ***FHWA Community Impact Assessment—A Quick Reference for Transportation.*** Explains the process to evaluate the effects of a transportation project on a community and its quality of life.

31.2 Resource / Regulatory Agencies and Interested Groups

See Table 31-1.

31.3 Methodology for Conducting Land-Use Studies

31.3.1 Determine Land-Use Types

Determine the acreage of land-use types (see Sample Tables 31-2 and 31-3) that are within the project corridor and what acreage of each type would be converted to roadway use by the project. If available for the project, Geographic Information System (GIS) sources should be incorporated and used for data analysis (see Chapter 46, *Geographic Information Systems*). The breakdown of land-use categories would depend on the length and type of corridor and on the scope of the improvement. Categories to be noted on Iowa DOT projects are listed as follows:

Agricultural

- Cropland
- Pasture
- Harvestable timber
- Nursery stock
- Farm ponds and creeks with associated vegetation
- Farm buildings and farmsteads

Developed

- Residential (single and multi-family uses [does not include farmsteads])
- Commercial (business facilities, such as retail, wholesale, financial, real estate, restaurants, and other services)
- Industrial (manufacturing activities, light industrial uses, etc.)

Vegetated Open Land (non-recreational)

- Woodlands (mesic forest, floodplain forest, etc.)
- Grasslands

Water Bodies/Features

- Wetlands
- Reservoirs and detention areas
- Lakes and streams

Recreation

- Private recreation areas
- Public recreation areas

Other / Miscellaneous

- Utilities
- Landfills

Table 31-1

Resource/Regulatory Agencies and Interested Groups	
Agency	**When Involved and Why**
Local municipalities/county agencies	Coordinate at beginning of project to collect planning documents and discuss policies, development plans, and goals. Both municipalities and counties can have authority on zoning and land-use issues, depending on the location of the project (within or outside incorporated area).
Regional planning affiliations (RPA)/metropolitan planning organization (MPO)	Coordinate at beginning of project to collect planning documents (including land-use plan, transportation plan, etc.). The regional planning agency or MPO is often involved in long-range planning and forecasting.
State transportation agency	The Department of Transportation is responsible for developing the State Transportation Improvement Plan. Coordinate at beginning of project to collect such plans as well as policy guidance.

- Mining areas
- Other uses that may be present along a particular corridor

This list should be adapted for rural versus more urban projects. For a longer project corridor that traverses a predominantly rural area, the appropriate land-use category breakdown may need to place more emphasis on the types of agricultural and vegetated open land present in the project area. For a corridor that has significant development along the roadway, such as typically found along more urban projects, the emphasis may be on the breakdown of the developed lands category.

A map of the land-use categories listed above should be developed for the project area. The use of GIS for this effort is strongly encouraged. As Iowa Code allows cities to extend their planning area by up to 2 miles beyond their incorporated limits, any mapping produced depicting land-use categories should also note the 2-mile planning boundary.

31.3.2 Data Collection

- Collect published documents, including comprehensive land-use plans or development plans as well as zoning map information prepared by each community, county, or economic development agency, as available.
- Collect transportation plan documents prepared by the Metropolitan Planning Organization (MPO), Regional Planning Affiliations (RPA), Iowa DOT, and other local agencies (if available).
- Review documents to determine whether and how the proposed roadway project is consistent (or inconsistent) with (MPO, RPA, DOT, and/or local land-use) plans.
- Collect information from primary data sources, including field reviews and interviews with local government officials and relevant organizations (chambers of commerce, etc.).
- Communicate government officials regarding development policies and plans and determine whether the proposed roadway project is consistent with local land-use plans.

31.3.3 Determine Project's Area of Influence

After all available data have been collected and reviewed, determine the project's area of influence. This effort includes assessing the following:

- Whether the improvements would cause significant and/or far-reaching changes in existing land use,
- Whether the project would facilitate or impede potential growth throughout the travelshed, and
- Whether land-use impacts would be limited to the land converted from its existing use to the transportation facility.

31.4 Format and Content of Technical Reports or Memoranda

Documentation detailing methodology and findings is required. Whether this is in the form of a technical report or a detailed memorandum would vary, depending on the complexity of land-use issues, the significance of impacts to the community, the type of project, and the level of controversy. This determination should be made with Iowa DOT staff for consultant projects. Greater levels of impact or controversy are likely to lead to the determination that a report is appropriate. If utilized as part of the analysis, GIS materials and data should be included in the documentation and provided to Iowa DOT in a GIS format, as defined in Chapter 46, *Geographic Information Systems*.

31.5 Format and Content of NEPA Documentation Discussion

The affected environment discussion in the Environmental Analysis section presents a snapshot of land use in the area, as follows:

- Provide an overall description of land use in the project area. This should include a general explanation of the area. (Does the project traverse a predominantly rural or suburban area? What communities does the improvement travel through? What is the general land use of the area?)

- Provide historic context, as appropriate, if it helps the reader to understand trends.
- Provide an existing land-use map and a proposed future land-use map, if it would aid the reader in understanding land use. Show the corridor(s) on the maps for easy reference and comparison.
- Describe the status of planning for the area and the relationship between the proposed improvement and land-use plans, policies, and controls.
- Describe existing and planned land use adjacent to the proposed improvement. Indicate whether the proposed project is consistent with local/regional land-use plans.

The environmental consequences discussion in the Environmental Analysis section describes land-use consequences of the proposed improvements, as follows:

- Describe the amount of right-of-way required by the proposed project, and summarize information in a table. Describe/quantify the amount of right-of-way being taken from each land-use category (see Tables 31-2 through 31-4).
- Describe how land uses/resources may be disrupted directly by the project's right-of-way, borrow areas, etc., and how the proposed facility may affect adjacent land uses/properties. This discussion should deal with the land directly affected by the project (land converted from its existing use to transportation use), as well as land outside the immediate right-of-way that may be ultimately affected by the proposed improvements (by changing access, etc.).
- Indirect and cumulative impacts on land use should also be discussed in the NEPA document (Environmental Assessment [EA], Environmental Impact Statement [EIS], etc.). See Chapters 21 and 22 for guidance.

31.6 Continued Work in Design and Construction

None applicable.

31.7 Additional References

None applicable.

Table 31-2

Sample Table - Right-of-Way Requirements		
Land-use Type	Alternative A (acres)	Alternative B (acres)
Total right-of-way required	790	988
Amount of existing right-of-way used	12	311
Amount of new right-of-way required	778	677

Table 31-3

Sample Table - Amount of Land Converted to Roadway Use		
Land-use Type	Alternative A (acres)	Alternative B (acres)
Amount of new right-of-way required	10	8.5
Agricultural	3.5	3.1
Residential	2.1	2.5
Commercial	0.5	0
Industrial	1.0	0.9
Recreation	0	0
Other/miscellaneous	1.5	2.0

Table 31-4

Sample Table - Amount of Land Converted to Roadway Use		
	Alternative A (acres)	Alternative B (acres)
Amount of new right-of-way required	810	778
Agriculture/pasture	730	706
Woodlands (mesic forest, floodplain forest, and pine plantation)	23	34
Grasslands	11	16
Water bodies	6	10
Developed lands	38	11
Other/miscellaneous	2	1

Social / Community Impacts

CHAPTER 32

Transportation projects impact the communities that surround them. A social or community impact assessment considers the positive and negative effects of a project, policy, or plan on the community. Social/community impacts are influenced by a project's effect on historic or cultural resources; the availability of open spaces, parks, and recreational facilities; the quality of environmental design; and the availability of affordable housing.

A social/community impact analysis should compare changes in the level of community well-being before and after the new development. Social/community impacts may be described quantitatively, but it is difficult to assign a dollar value to them, and they are therefore most often described qualitatively.

32.1 Legislation, Regulations, and Guidance

32.1.1 Federal Legislation and Regulations

ⓘ *40 CFR 1502.16 (environmental consequences)*

ⓘ *40 CFR 1508.8 (effects)*

ⓘ *40 CFR 1508.14 (human environment)*

32.1.2 State Legislation and Regulations

None applicable.

32.1.3 Interagency Memoranda of Understanding

None applicable.

32.1.4 Guidance Documents

ⓘ ***FHWA Technical Advisory T6640.8A, Section V.*** Provides guidance for uniformity and consistency in format, content, and processing of environmental studies and documents pursuant to NEPA.

ⓘ ***FHWA, Community Impact Assessment: A Quick Reference for Transportation.*** Publication No. FHWA-PD-96-036. This guide outlines the community impact assessment process, highlights critical areas that must be examined, and identifies the basic tools and information sources in parallel with the FHWA NEPA project development process.

A social or community impact assessment considers the positive and negative effects of a project, policy, or plan on the community.

32.2 Resource / Regulatory Agencies and Interested Groups

See Table 32-1.

32.3 Methodology for Conducting Social / Community Impact Studies

32.3.1 Determine Level of Information Needed

The first step in assessing the social/community impacts is determining the scale or emphasis of the data to be collected. For a lengthy corridor, for example, information may need to be collected at the county level and then at the community/city level. For a shorter, urban corridor, information may need to be collected at the community/city level and then at census-block level.

If available for the project, data should be collected in a digital format and incorporated into GIS for analysis. For detail on structure and setup of GIS see Chapter 46, *Geographic Information Systems*.

32.3.2 Identify and Document Neighborhoods

Identify and delineate neighborhoods and communities within the project area by using available information from the community (such as comprehensive plans or maps), by conducting a windshield survey, or by interviewing key community leaders for information. This includes identifying the community's socioeconomic characteristics and physical features (housing types, boundaries of a neighborhood, public and private facilities and services available, etc.) for use in assessing community cohesion and access to services.

32.3.3 Collect and Document Demographic Information

Collect from the U.S. Census Bureau and Iowa Profiles the following demographics, as appropriate, depending upon the scope of the project:

- Population and household characteristics,
- Median age,
- Median housing value,
- Ethnic and racial distribution,
- Median years of school completed, and
- Median household income.

Present trends and, if possible, compare areas (e.g., city vs. county) in a table and in the text of the report.

Collect demographic forecasts, if available. These may be prepared by regional agencies, counties, or even by communities (data are often detailed in comprehensive plans).

Table 32-1

Resource/Regulatory Agencies and Interested Groups	
Agency	When Involved and Why
Local municipalities/county agencies	Coordinate early in the process with local municipalities and county agencies to identify community cohesion characteristics, neighborhood boundaries, etc. Local communities or counties may define and maintain information on neighborhood boundaries and both may also be good sources for information on general community characteristics.
Public safety providers (i.e., police and fire districts)	Coordinate early in the process with public safety providers. Public safety providers maintain records of their service districts; provide district information as well as their perception of potential impacts.
Regional planning agency/ metropolitan planning organization (MPO)	Coordinate early in the process with regional planning agency/metropolitan planning organization. Similar to local cities and counties, regional agencies may be able to provide data on services, community or neighborhood character, etc.
Community facility providers (i.e., school districts, hospitals, nursing homes, etc.)	Coordinate early in the process with community facility providers. Community facility providers maintain records of their service area and user characteristics; facility providers should be contacted to determine the services they provide, to whom, and potential impacts.
Formal or organized community or neighborhood groups	Coordinate early in the process with formal or organized community or neighborhood groups. These groups should be able to provide input regarding community or neighborhood issues, potential impacts, as well as possible avoidance or mitigation measures.

Information regarding the elderly, minority groups, low income populations, disabled persons, and transit-dependent populations may be collected from community leaders, church officials, transit providers, and local social support organizations.

32.3.4 Identify and Document Potentially Affected Facilities

Identify community facilities within the project's area of influence. This list may include schools, libraries, religious facilities, health care facilities (hospitals, nursing homes, etc.), police and fire facilities and service areas, and recreation areas. This information may be obtained through mapping, windshield surveys, and coordination with community leaders. Impacts to these facilities can be direct or indirect. Direct impacts to community facilities include displacement or relocation, temporary or permanent access changes, or creation of a barrier due to the transportation facility. Indirect impacts include altered travel times, bisection of service areas, etc.

32.3.5 Collect and Document Information from Residents

Discuss the project with residents in the project area and collect their opinions regarding the proposed project and perceived impacts, as well as potential avoidance, minimization, or mitigation measures. This may be accomplished in various ways—by meeting with neighborhood or community groups or gathering input at public meetings for the project, for example.

32.3.6 Analyze Potential Effects

After all available data have been collected and reviewed, determine the project's area of influence. Identifying the area of influence includes assessing whether the improvements would cause substantial and/or far-reaching changes in existing community and social resources.

Analyze how the proposed project may impact communities and/or specific neighborhoods. Changes caused by the proposed project may be either beneficial or adverse. The analysis should include impacts on cohesion due directly to the proposed improvements (e.g., a new facility bisecting a neighborhood). There should also be consideration of potential cohesion impacts as a result of changes in travel patterns and accessibility (e.g., is additional traffic now directed through an area where there had previously been a low traffic volume?), as well as traffic safety and overall public safety related to the project. In analyzing the potential effects, one should consider such questions as the following:

- Would the project alternatives split existing neighborhoods?
- Is there a potential to isolate a portion of a neighborhood or ethnic group?
- Could the project generate new development? What are the potential effects of this (positive and negative)?
- Is there a potential to cause a change in property values (increase or decrease)?
- Would any of the alternatives separate residents from community facilities?
- Does the project change access or travel patterns (positive or negative)? If so, does it move traffic into or away from the community/neighborhood?
- Is new access provided where it did not previously exist?

Analyze the impact to groups that are especially benefited or harmed by the proposed project (e.g., effects to the elderly, disabled persons, pedestrians, public transit–dependent individuals, ethnic groups). Impacts to ethnic groups and low-income persons will be further analyzed in the context of environmental justice, in Chapter 33, *Environmental Justice*.

Finally, consider potential enhancements if adverse project impacts are expected to occur.

32.4 Format and Content of Technical Reports or Memoranda

Documentation detailing methodology and findings is required. This may be in the form of a technical report or detailed memorandum. The report or memorandum should document the sources of data;

the types of populations and groups present in the project area; and identify neighborhoods and public services and facilities. Finally, the results of the analysis should be documented and the basis for the findings explained.

Additionally, if utilized as part of the analysis, GIS materials and data should be included in the documentation and provided to Iowa DOT in a GIS format, as defined in Chapter 46, *Geographic Information Systems*.

32.5 Format and Content of NEPA Documentation Discussion

The affected environment discussion in the Environmental Analysis section of the document should:

- *Summarize regional and community demographic characteristics as well as historical and forecasted growth in the project area.* The information collected should be presented in a table, as shown in Table 32-2. It may also be beneficial to present the information in a map format.
- *Provide a general description of surrounding neighborhoods and communities.* This should include an overview of how the area looks and how it functions, including community cohesion and access to services. Provide historical context, as appropriate, if it would help the reader to understand trends. Provide a map if it would aid the reader in understanding locations of neighborhoods or communities. If a map is provided show the corridor(s) on the map for easy reference and comparison.
- *Identify affected public facilities and services within the project area.* Provide a map, if it would aid the reader in understanding locations of facilities. If a map is provided, show the corridor(s) on the map for easy reference and comparison.

The environmental consequences discussion in the Environmental Analysis section of the document should:

- *Discuss changes in neighborhoods or community cohesion as a result of the proposed action.* Discuss direct impacts to a community, which include severance, access disruption, bisection, bypass, and relocation. In addition to direct effects, consider the effects on residents who will not be displaced but who will be left in proximity to the project facility. This discussion should include changes in travel patterns and accessibility (automobile, bicycle, or pedestrian, as applicable).
- *Discuss impacts to public facilities and services (listed above) and how the proposed transportation improvements may impact* those facilities' ability to meet community needs.

Table 32-2

Sample Table - Regional and Community Demographic Characteristics in the Project Area

	County	Community
Population		
1980	77,956	9,252
1990	76,836	10,643
2010 projection	90,685	13,051
Households		
1980	37,121	4,406
1990	37,481	5,192
2010 projection	45,342	6,525
1990 Racial Distribution		
White	53,308	8,284
Black	16,544	1,979
Other	6,984	380
Spanish Origin*	9,483	635
1990 Median Household Income	$30,967	$30,794

**Persons included in this category may also be represented in other categories.*

- Discuss the overall impacts to a community. Include change in value or marketability of properties adjacent to the planned improvement, reduced or increased neighborhood attractiveness, etc., as applicable.
- Discuss ways to avoid, minimize, or mitigate adverse impacts that occur as a result of the proposed project.
- Discuss enhancements that would be implemented, if any are proposed as part of the project.

32.6 Continued Work in Design and Construction

None applicable.

32.7 Additional References

FHWA Environmental Guidebook: http://www.fhwa.dot.gov/.

FHWA-PD-96-036, "Community Impact Assessment": http://www.fhwa.dot.gov/.

Iowa Profiles (with the Iowa Social and Economic Data Atlas): http://www.iastate.edu/.

U.S. Census Bureau: http://www.census.gov/.

NOTES:

Environmental Justice

CHAPTER 33

Transportation projects that increase safety or improve capacity require considerable investments of capital. However, not everyone may benefit equally from transportation projects. Environmental justice (EJ) is concerned with a variety of public policy efforts to ensure that adverse human health or environmental effects of governmental activities such as transportation projects do not fall disproportionately upon minority and/or low-income populations. EJ ensures that transportation system changes such as road improvements are carefully studied to determine the nature, extent, and incidence of probable impacts, both favorable and adverse. Iowa DOT develops its transportation projects with the intent of assuring that all Iowa citizens benefit equally from transportation investments.

33.1 Legislation, Regulations, and Guidance

33.1.1 Federal Legislation and Regulations

- ***Executive Order (EO) 12898 "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," February 11, 1994.*** Seeks to promote the fair treatment of people of all races, income, and culture with respect to the development, implementation, and enforcement of environmental laws, regulations and policies, and strives to ensure greater public participation among the targeted groups.
- ***Executive Order 12948, "Amendment to Executive Order No. 12898," January 30, 1995.*** Provides modifications and clarifications.
- ***Executive Order 13166, "Improving Access to Services for Persons with Limited English Proficiency, August 11, 2000.*** The Executive Order requires federal agencies to examine the services they provide, identify any need for services to those with limited English proficiency (LEP), and develop and implement a system to provide those services so LEP persons can have meaningful access to them.
- ***FHWA Memorandum from Associate Administrator for Program Development, "Nondiscrimination, Environmental Justice, and Community Impact Assessment in Planning and Project Development," July 27, 1995.***
- ***U.S. Department of Transportation (U.S. DOT) Order 5610.2, "Order to Address Environmental Justice in Minority Populations and Low-Income Populations." April 15, 1997.*** Provides that the Office of the Secretary and each Operating Administration within the DOT will develop specific procedures to incorporate the goals of the DOT Order and EO 12898 with the programs, policies, and activities which they administer or implement.

EJ ensures that adverse human health or environmental effects of governmental activities do not fall disproportionately upon minority and/or low-income populations.

ⓘ *FHWA Order on Environmental Justice, "FHWA Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," December 2, 1998.*

33.1.2 State Legislation and Regulations

None applicable.

33.1.3 Interagency Memoranda of Understanding

None applicable.

33.1.4 Guidance Documents

ⓘ *Council on Environmental Quality, "Environmental Justice: Guidance under the National Environmental Policy Act," December 10, 1997.*

ⓘ *Iowa Department of Transportation, Policies and Procedures Manual, Policy No. 300.05, "Title VI Program."*

ⓘ *Iowa Department of Transportation, Office of Location and Environment, "Limited English Proficiency Plan," May 2008.*

ⓘ *U.S. Environmental Protection Agency (EPA), "Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analyses," April 1998.*

33.2 Resource/Regulatory Agencies and Interested Groups

See Table 33-1.

33.3 Methodology for Conducting EJ Analysis

33.3.1 Determine Characteristics of the General Population

Using the most recent U.S. Census data, determine the demographic and income characteristics of the general population. For projects without a major impact on regional transportation (e.g. bridge reconstruction), an acceptable "general population" could be defined by geopolitical boundaries such as a city or county. However, for major projects—those with a sizable influence on regional transportation (e.g. new corridor), it is best to define a project-specific general population, that is, the total population that will be affected—positively or negatively—by the project. An example of this would be to use the project's "travelshed" or the total area that would regularly utilize the facility as your general population. Key data for this analysis include racial characteristics and median household income. This data are best presented in a table or other delineated format, or illustrated by a geographic information systems (GIS) graphic.

33.3.2 Determine the Project's Area of Influence

Impacts within the project's area of influence can include human health impacts such as noise and air quality, environmental degradation, impacts on community cohesion, or displacement and relocation impacts. The impact area can be determined using the project area or "footprint" of the project (this will determine the displacements and right-of-way acquisition associated with the project). Other relevant areas of influence include the 67-decibel (dB) noise contour (noise

Table 33-1

Resource/Regulatory Agencies and Interested Groups	
Agency	**When Involved and Why**
Local municipalities (i.e., planners and elected officials)	Should be consulted early in process to aid in the identification of EJ populations and in developing potential strategies for engaging such groups
Community facility providers (see Chapter 32)	Should be consulted early in the process to determine potential adverse or beneficial impacts on provision of services to EJ populations
Council on Environmental Quality	Provides guidance on and potential review of EJ analysis

impacts), or the project "viewshed" (the area visually impacted by the project). The area of influence is project-specific and based on that project's associated impacts. For example, in the case of major roadway construction through a residential area, one of the major impacts of concern would likely be noise; thus, using defined noise contours to determine the population that would be subjected to noise levels above the 67-dB contour would be a reasonable "area of influence."

In limited instances, particularly on large or urban projects, EJ impacts could affect an entire community rather than just the immediate project area. This would occur when the impacts to a low-income community or minority group adjacent to a project damage the area as a whole (e.g., removal of a large number of affordable housing units so that there is no longer a sufficient amount of affordable, community-wide housing).

33.3.3 Determine the Impacted Population's Characteristics

In order to determine the presence of an EJ population, first determine the characteristics of the impacted population (i.e., population within the area of influence). Using U.S. Census data available for block groups or other small geographic areas such as quarter-sections, determine the impacted population's racial/ethnic and income characteristics. Other social program participation, such as school lunch programs, can be helpful in determining income characteristics of a defined population. Determine if the incomes in the area fall below the poverty levels established by the U.S. Department of Health and Human Services (HHS).

33.3.4 Compare Impacted Population to General Population

Compare the characteristics of the general population to those of the impacted population to determine whether there is a disproportionate impact (see the glossary for the definition of "disproportionately high and adverse impact"). A table listing the two populations' demographic characteristics is the clearest way to compare the populations. A GIS graphic could also be used to represent the comparison.

33.3.5 Determine Whether There Is An EJ Impact

An impact can be defined as an EJ-related one if the affected population bears a disproportionate share of a project's negative environmental effects, as compared to the general population. Any disproportionate impact will be discussed as part of the environmental consequences of the proposed action. The project team shall investigate and document whether it is reasonable to avoid or minimize the impacts to this population. Design modifications or selection of other reasonable alternatives can sometimes minimize or eliminate impact to an EJ group. A project alternative with an EJ impact would be carried forward only if the social, economic, or environmental effects of the impact-avoiding alternatives render them impractical.

33.3.6 Mitigate EJ Impacts

Where impact-avoiding measures are not reasonable, consider mitigation measures. Working with community agencies and relevant not-for-profit groups can help determine appropriate mitigation strategies. Mitigation measures include enhancements or offsetting benefits and opportunities that are reasonable in cost and scope and help the project fit more harmoniously into the community. (Examples may include landscaping/green space, sidewalks or other pedestrian accommodations, lighting features, and the creation of community programs or advisory groups.)

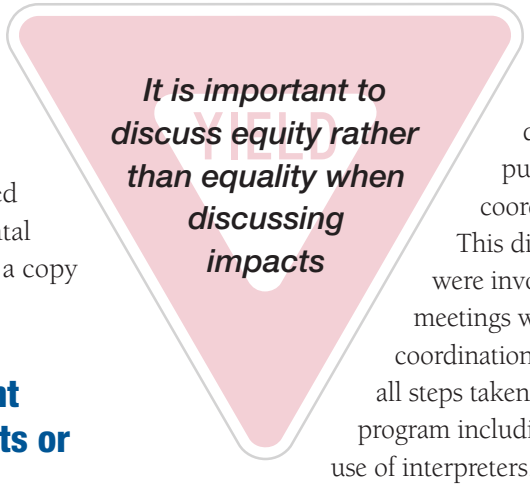
33.3.7 Ensure Public Participation

Where EJ impacts occur, a proactive and ongoing public involvement program should be implemented to engage the affected public, seek input on potential impact issues, and provide information on project development issues. See Chapter 44, *Public Involvement*, for discussion of appropriate public involvement strategies, including a discussion of specific strategies for assuring meaningful access for Limited English Proficiency (LEP) persons if applicable. (Also, see the following subsection for an overview of OLE's LEP Plan.) Special efforts may need to be made to ensure that minority or low income

populations, or LEP persons, are aware of the public involvement process and are able to participate. The use of interpreters, bilingual meeting materials, and careful selection of meeting locations may be appropriate, depending on the project conditions.

33.3.8 Limited English Proficiency

The intent of the OLE LEP Plan is to identify and engage persons of limited English proficiency so that they can have meaningful access to information and services provided by Iowa DOT. Using the environmental justice methodology described above and the analysis methodologies detailed in the OLE LEP Plan, OLE staff will expand the project's EJ evaluation to identify and engage, as may be appropriate, persons of limited English proficiency. When it is determined that language assistance services are necessary to assure meaningful access for LEP persons, OLE staff will assess and implement activities, as may be deemed reasonable by Iowa DOT. The technical memorandum carried out in accordance with the OLE's LEP Plan will be the basis for the conclusions presented in the project's NEPA environmental document. See Appendix 33a for a copy of OLE's LEP Plan.



33.4 Format and Content of Technical Reports or Memoranda

In cases where an EJ impact occurs, a formal technical report or memorandum should be prepared. The memorandum should include the aforementioned analysis, as well as a detailed record of public outreach and coordination, especially those efforts made with regard to the populations impacted.

33.5 Format and Content of NEPA Documentation Discussion

The affected environment discussion of EJ in the Environmental Analysis section should begin with the income and racial characteristics of the general population and include those characteristics of the population within a project's "area of influence." This information should be based on published data, such as those already discussed. The documentation should also compare the impacted and general populations to determine whether there is a disproportionate impact on either low-income or minority populations.

Even if no EJ-impacted population is identified, a brief discussion of EJ should be included in the environmental document. The presence of any minority or low-income persons triggers the investigation, and then the impacts and their magnitude must be assessed.

If an EJ impact is identified, the environmental consequences discussion should include the public involvement process used to coordinate with the affected persons. This discussion should note what groups were involved, where and how frequently meetings were held, and the results of that coordination. The discussion should include all steps taken to facilitate participation in the program including: transportation provisions, use of interpreters, advertising in alternative papers/other languages, posters in neighborhoods, neighborhood committee input, etc. If applicable, the text should include an acknowledgment of EJ impacts and an analysis of why avoidance and minimization alternatives are unreasonable on the basis of social, economic (including cost), and environmental effects. Where impacts occur, and avoidance is not reasonable, the NEPA document should provide an examination of reasonable mitigation measures. Mitigation measures should include enhancements or offsetting benefits and opportunities that are reasonable in cost and scope and help the project fit more harmoniously into the community.

It is Iowa DOT's intent that public involvement be conducted in such a manner that the following statement may be included in the discussion of the EJ public involvement activities (See Chapter 44, *Public Involvement*):

> *Throughout the project, the public involvement process has been inclusive of all residents and population groups in the study area and did not exclude any individuals on the basis of age, color, creed, disability, gender identity, national origin, pregnancy, race, religion, sex, sexual orientation, or veteran's status.*

33.6 Continued Work in Design and Construction

Where mitigation measures are proposed, they should be included in construction plans as appropriate. These measures should be specifically identified and listed on the project Green Sheets.

33.7 Additional References

23 CFR 200, Title VI Program and Related Statutes—Implementation and Review Procedures: http://www.fhwa.dot.gov/.

23 CFR 200.7, FHWA Policy on Title VI: http://www.fhwa.dot.gov/.

23 CFR 771.105, Policy: http://www.access.gpo.gov/.

42 USC 2000(d)-2000(d)(4), Civil Rights Act of 1964, Nondiscrimination in Federally Assisted Programs, Title VI: http://www.access.gpo.gov/.

42 USC 3601-3619, Civil Rights Act of 1968, Title VIII: http://www.access.gpo.gov/.

FHWA Course, Environmental Justice, Midwest Resource Center, June 2001: See Appendix 33b.

FHWA, Title VI & Environmental Justice, Impacts of the Civil Rights Restoration Act of 1987 on FHWA Programs: http://www.fhwa.dot.gov/.

Pub. L 100-259, Civil Rights Restoration Act of 1987: http://www.fhwa.dot.gov/.

NOTES:

Relocation Impacts

CHAPTER 34

A project can be said to have relocation impacts when residents or businesses must be relocated to accommodate it. When a proposed project involves the displacement of people or businesses, Iowa DOT must evaluate the direct and indirect relocation impacts and determine how these impacts can be best mitigated. Relocation assistance in the form of advisory services and monetary benefits for persons displaced by programs and projects is a necessary and essential part of transportation programs and projects. Such assistance ensures that those displaced as a result of federally assisted programs or projects designed for the benefit of the public as a whole will not suffer disproportionate injuries. Iowa Code 316, the "Relocation Assistance Law," establishes a uniform policy for the fair and equitable treatment of displaced persons that serves to minimize the hardships of relocation.

34.1 Legislation, Regulations, and Guidance

34.1.1 Federal Legislation and Regulations

- *42 USC 4601, Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Uniform Act), as amended.*
- *42 USC 3601–3619, Title VIII of Civil Rights Act of 1968, Fair Housing Act.*
- *42 USC 3601–3631, Fair Housing Act Amendments of 1988.*
- *23 CFR 710, 750 and 49 CFR 24, Uniform Relocation Assistance and Real Property Acquisition Act of 1970 (amended in 1987).* Re-establishes a uniform policy for fair and equitable treatment of individuals and businesses displaced as a direct result of programs or projects undertaken by a federal agency or with federal financial assistance; primary purpose of this act is to ensure that such persons do not suffer disproportionate injuries as a result of programs and projects that are designed for the benefit of the public as a whole, and to minimize the hardship of displacement.

34.1.2 State Legislation and Regulations

- *Iowa Code 316 (relocation of persons displaced by highways).*
- *Iowa Code 6B (procedure under eminent domain).*

34.1.3 Interagency Memoranda of Understanding

None applicable.

When a proposed project involves the displacement of people or businesses, Iowa DOT must take steps to assess direct and indirect relocation impacts and determine how these impacts can be best mitigated.

34.1.4 Guidance Documents

ⓘ ***FHWA, "Your Rights and Benefits as a Displaced Person under the Federal Relocation Assistance Program."***

ⓘ ***Iowa DOT, Office of Right-of-Way Design Manual (2008).*** Provides information on the Iowa DOT right-of-way process.

34.2 Resource/Regulatory Agencies and Interested Groups

See Table 34-1.

34.3 Methodology for Conducting Relocation Impact Studies

While the methodology discussed in this chapter applies to work to be done by OLE or consultant staff in the preparation of environmental documentation for a project, it is also important to coordinate with the Office of Right-of-Way, as necessary.

To assess relocation impacts, follow these steps:

1. *Collect housing data from primary sources. Interview local officials and/or housing organizations.* Conduct windshield surveys to identify local housing stock, unique neighborhood characteristics, and housing availability within the project area.
2. *Determine the number of households displaced for each alternative under consideration.* Do so by overlaying the project's design files on county assessor's property-line files or aerial photography.
3. *Determine characteristics of the households displaced.* The assessment of households should include the inhabitants' characteristics. Include race, age, household/family size, income levels, house size (number of bedrooms), and owner-tenant status. These data are available from the U.S. Census Bureau, local economic reports, community resources, visual inspections, and county assessors' records. (Note: In rural locations this information may be more difficult to obtain or may be incomplete.)
4. *Determine availability of comparable replacement housing.* Using real estate listings and/or interviews with housing/real estate organizations, assess the amount and type of available replacement housing. Analysis should include price range, size (number of bedrooms), occupancy status (owner/tenant), and location of the replacement housing. This assessment must also consider any special relocation requirements/considerations (e.g., language barriers or handicap-accessible replacement housing) on the basis of visual assessment of neighborhood and interviews with local representatives and housing officials.

Table 34-1

Resource/Regulatory Agencies and Interested Groups	
Agency	**When Involved and Why**
Local municipalities (i.e., planners and elected officials)	These entities should be consulted early in the study process to assist in characterizing and locating available housing stock, and ability of the community to absorb displacements. Municipalities have housing agencies or other departments that maintain housing records (particularly on affordable housing) and community characteristics; if the location of the project is within an incorporated area.
County agencies	County agencies often maintain information similar to that of the local municipalities for unincorporated areas; in addition, the county assessor's office maintains information on housing values. These entities should be consulted early in process to assist in characterizing and locating available housing stock, and ability of the community to absorb displacements.
Housing organizations, real estate groups	Groups such as these can assist in understanding of unique neighborhood characteristics, and comparable locations. These entities can also be sources for information on available housing and overall housing stock and should be consulted early in the study process.

5. *Estimate the number and characteristics of businesses and farms to be displaced.* The assessment should identify available sites for relocations, the likelihood of such a relocation, and the potential impacts to the business or farm.

6. *Determine availability of comparable replacement housing for businesses and farms.* Conduct the same assessment for businesses and farms when a proposed project will displace either.

7. *Consider indirect impacts.* For major projects, this discussion should include, in addition to the direct effects of relocation, any related indirect impacts to schools, taxing districts, etc., due to the elimination of households or businesses in one area and their subsequent move to another area. This can be done by calculating actual losses from the tax base (in terms of sales or property taxes) or by estimating the impacts on the local school district due to the change in enrollment. Further discussion of the economic impacts associated with project relocations is included in Chapter 35, *Economic Impacts.*

8. *Address relocation issues and requirements.* Coordinating with local officials, housing organizations, business groups, or other individuals may be helpful to determine the best measures for handling relocation impacts. Such coordination is strongly encouraged for projects with substantial relocations. Interviews and coordination with the aforementioned groups and individuals should address measures, beyond these provided by the Uniform Act, to reduce impacts or to determine the availability of financial incentive programs or other opportunities for those who are to be relocated. The project public hearing is also a source of such information, and should include representatives from the Office of Right-of-Way, given their responsibilities in the property acquisition process.

9. *The potential acquisition of agricultural land triggers the requirements of Iowa Code 6B.* The requirements of Iowa Code 6B include special efforts to identify and notify potentially affected property owners of the project and public involvement activities. These requirements are discussed in greater detail in Chapter 44, *Public Involvement.*

   The County Auditor is the source for property owner information.

10. *The potential acquisition of a historic property requires consultation with Iowa DOT's Cultural Resources staff.* Further discussion of potentially impacted historic properties is included in Chapter 42, *Cultural Resources.*

34.4 Format and Content of Technical Reports or Memoranda

Where relocation impacts occur, a memorandum detailing interviews with local representatives and housing officials should be maintained as part of the project file. Additionally, where available, parcel impact data should be provided to Iowa DOT in a Geographic Information Systems (GIS) format, as defined in Chapter 46, *Geographic Information Systems.*

The Office of Right-of-Way will also prepare documentation resulting from title searches, property valuations, and meetings with property owners. OLE should request any documentation prepared by the Office of Right-of-Way, if available in a time frame to assist in the preparation of the environmental document.

34.5 Format and Content of NEPA Documentation Discussion

34.5.1 Relocation Impacts

The Environmental Analysis section will include for each resource a discussion of the affected environment, environmental consequences, and measures to minimize harm, as appropriate. Generally, an affected environment discussion will not be included for relocations; however, there should be a discussion of the environmental consequences of the proposed action. Relocation impacts should be discussed in the environmental consequences discussion in a NEPA document;

however, they need only be included in Environmental Impact Statements (EISs) and Environmental Assessments (EAs) for projects that result in displacements.

- *Describe the residential relocation situation.* The assessment of relocation impacts must be conducted in sufficient detail to explain the relocation situation, including anticipated problems and proposed solutions. Where a proposed project will result in relocations, the document should provide an estimate of the number and characteristics of households, businesses, and farms to be displaced. If there are limited displacements, do not include characteristics such as race and income level for privacy reasons. In cases of substantial relocation impacts, race and income should still be discussed only in general terms. Relocations are best summarized in a table.
- *Address special relocation considerations.* Include special concerns and community/neighborhood impacts that require special considerations. Examples of this would include racial, cultural, special needs (handicap-accessible), or religious communities.
- *Discuss comparable replacement housing.* The discussion of replacement housing should focus on price ranges, sizes of units (number of bedrooms), and occupancy statuses (owner/tenant). If the available replacement housing stock is insufficient, not financially feasible, or substandard, include the commitment to last-resort housing.
- *Describe commercial and farming relocations.* If a proposed project will displace businesses or farms, discuss their number and characteristics. Include potential relocation sites, the likelihood of such relocation, and any potential impacts related to the displacement. This discussion should include standard direct relocation impacts, but should also include any related indirect impacts to schools, taxing districts, etc., due to the elimination of households or businesses in one area, and the subsequent move to another area. Relocations are best summarized in table format.
- *Document coordination with local officials.* Document, and make a record of all coordination with local officials, housing organizations, business groups, or individuals. This coordination should address measures to reduce impacts, and determine the financial and incentive programs or opportunities available to relocatees beyond the Uniform Act. Such coordination is particularly encouraged for projects with substantial impacts.

34.5.2 Prepared Statements

In the discussion of environmental consequences, the relocation section for any project resulting in residential or business displacements should include the following statement:

> *The acquisition and relocation program will be conducted in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. Relocation resources are available to all residential and business relocatees without discrimination.*

A standard statement also applies when the project *does not* require any new right-of-way; include language similar to the following:

> *The proposed improvements require no additional right-of-way; therefore, no relocation impacts occur as a result of this project.*

34.6 Continued Work in Design and Construction

The following activities will be handled by the Office of Right-of-Way or by the city/county for local systems improvements:

- Right-of-way appraisals
- Right-of-way negotiations
- Right-of-way acquisitions
- Right-of-way condemnation

34.7 Additional References

1999 Iowa Acts, House File 476.3: Statement of Property Owner's Rights. http://www.iowadot.gov/.

FHWA, Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970. http://www.fhwa.dot.gov/.

Iowa DOT Guidance, Highways and Your Land. http://www.iowadot.gov/.

Iowa DOT, Office of Right-of-Way Design Manual (2008). http://www.iowadot.gov/.

NOTES:

Economic Impacts

CHAPTER 35

Transportation projects can affect the economic conditions of a community by impacting the community's development, tax revenues, public expenditures, employment, and retail sales. They can also displace and change accessibility to businesses. Businesses may be adversely or positively impacted depending on the project. Recognizing this link between transportation and economic conditions is an important consideration in environmental studies.

35.1 Legislation, Regulations, and Guidance

35.1.1 Federal Legislation and Regulations

ⓘ ***23 CFR 710, 750 and 49 CFR 24, Uniform Relocation Assistance and Real Property Acquisition Act of 1970 (amended in 1987).*** Re-establishes a uniform policy for fair and equitable treatment of individuals and businesses displaced as a direct result of programs or projects undertaken by a federal agency or with federal financial assistance; primary purpose of this act is to ensure that such persons do not suffer disproportionate injuries as a result of programs and projects that are designed for the benefit of the public as a whole, and to minimize the hardship of displacement.

35.1.2 State Legislation and Regulations

None applicable.

35.1.3 Interagency Memoranda of Understanding

None applicable.

35.1.4 Guidance Documents

ⓘ ***FHWA Technical Advisory T6640.8A, Section V.*** Addresses social, economic, relocation, and joint development impacts.

35.2 Resource/Regulatory Agencies and Interested Groups

See Table 35-1.

The purpose of Part IV of the *OLE Manual*, Resource Studies, is to provide guidance for analyzing and recording impacts to resources that may potentially be encountered during development of road projects.

Table 35-1

Resource/Regulatory Agencies and Interested Groups	
Agency	**When Involved and Why**
Local municipalities (i.e., planners)	Coordinate with them early in the process regarding economic and business effects
Local chambers of commerce, or other similar groups	Coordinate with them early in the process to gather business information as well as to discuss potential impacts of a project
Taxing bodies	Coordinate with them early in the process to gather information and data for tax impact analysis

35.3 Methodology for Conducting Economic Impact Studies

Assessing the economic impact of proposed projects involves assessing both the physical impacts of the project on businesses, such as a displacement or parking impacts, as well as how the project may affect a business even when it isn't physically impacted, such as through changes to access or the removal of drive-by business. In assessing these impacts, the following seven tasks should be completed:

- Characterize labor force variables, employment trends, and economic trends. Collect data on businesses, including the number of employees, type of business, size of business, clientele demographics, and employee demographics. In addition, economic trends should be collected from Midwest PROfiles (see Section 35.7) since existing and historic conditions help establish the history of the community. However, the level of detail will vary depending on the magnitude and location of the project. Determine the number of major employers within the project area for larger projects that may have regional economic implications.
- If businesses are displaced, estimate the number of people employed at each establishment. In addition, while not required, the use of modeling may be appropriate in some complex projects. (Modeling, when used, would generally only apply to Environmental Impact Study [EIS] projects.) The necessity for conducting any of these assessments should be determined by the nature of the project impact in the proposed areas. Information about labor force and employment can be obtained through census data or by interviewing state, county, and city officials, and the local community.
- Calculate tax losses/gains to each taxing authority as a result of the project. Determine the amount of land to be removed from the tax rolls for each taxing body and apply their tax rate to an estimated land value to determine an estimated annual loss.
- Determine business impacts due to the proposed improvement. A business may be considered impacted if it is displaced. It also may be impacted if it loses enough land to render its operation too small to stay in business based on the generated revenue loss (e.g., resulting farm parcel would be too small to cultivate, loss of parking area would disrupt operations). Businesses, such as gas stations or convenience stores, which are dependent on drive-by traffic, may also be impacted by the relocation of a roadway away from its location. When evaluating business impacts, consider the number of business displacements, decline in patronage, and lost jobs.
- Establish any indirect impacts to businesses. Indirect impacts include residual effects on businesses that remain after other businesses have been displaced. Possible effects may include temporary or permanent changes in business access, changes in traffic patterns, changes in property value, and impacts on highway and user safety.
- Consider indirect business impacts if the proposed improvement is a bypass. If the proposed improvement is a bypass, highway-related businesses located within the project area may be adversely affected, particularly those along the old alignment. Highway-related businesses may include gas stations, motels, or restaurants. The impact may result in decreased revenue or tax base, or loss of jobs.

- Develop ways to minimize or reduce economic impacts. Mitigation measures should be developed by Iowa DOT (or consultant) in an attempt to reduce economic impacts and should address known and foreseeable public and agency concerns. These mitigation measures may be developed in conjunction with local government agencies, if appropriate. Possible mitigation measures may include proposing appropriate access control, developing a public information program, implementing design changes, providing new signage, or suggesting that local zoning be updated.

35.4 Format and Content of Technical Reports or Memoranda

In most cases, a technical report or memo will not be required; however, this should be determined by NEPA compliance staff on an individual project basis. For all projects, raw data sources collected should be included in the project files. Geographic Information Systems (GIS) data should be provided to Iowa DOT, consistent with Chapter 46, *Geographic Information Systems*.

35.5 Format and Content of NEPA Documentation Discussion

The affected environment discussion in the Environmental Analysis section of an EIS should discuss the types of businesses and employment within the project area. In addition, this discussion should include the income and tax base. A table should be developed to list this information.

The environmental consequences discussion in the Environmental Analysis of an EIS should discuss the following:

1. Impacts on the regional and/or local economy such as development, tax revenues, employment opportunities, etc.
2. Impacts on the vitality of existing highway-related businesses (e.g., gas stations, motels).
3. Impacts on established business districts and any opportunities to minimize or reduce such impacts (e.g., impact to a downtown resulting from building a bypass).
4. Tax consequences of proposed project, which include both removal of lands from the tax rolls (and what that financial loss to specific taxing bodies would be), as well as discussion of impacts resulting from induced growth.
5. The number of displaced businesses.
6. An estimated number of jobs lost and the effects on any existing businesses along a project corridor, or within close proximity, which are not relocated.

35.6 Continued Work in Design and Construction

None applicable.

35.7 Additional References

FHWA Technical Advisory T6640.8A (see "Economic Impacts" section): http://www.fhwa.dot.gov.

FHWA, Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970: http://www.fhwa.dot.gov.

Iowa State University, Midwest PROfiles: http://www.seta.iastate.edu.

NOTES:

Energy

CHAPTER 36

Energy includes fossil fuels, labor, and highway construction materials. As an environmental resource, energy consumption (both in project construction and as a result of the project) should be addressed in NEPA documents. However, unless reducing or minimizing energy consumption is a project goal, such as in mass transit or commuter travel enhancement projects, energy consumption is typically not a key decision-making criterion. Reducing energy consumption is generally a byproduct of other transportation improvement goals, such as reducing congestion and improving travel times and level of service.

36.1 Legislation, Regulations, and Guidance

36.1.1 Federal Legislation and Regulations

None applicable.

36.1.2 State Legislation and Regulations

None applicable.

36.1.3 Interagency Memoranda of Understanding

None applicable.

36.1.4 Guidance Documents

ⓘ ***FHWA Technical Advisory T6640.8A, Section V.*** Provides guidance for uniformity and consistency in format, content, and processing of environmental studies and documents pursuant to NEPA.

36.2 Resource/Regulatory Agencies and Interested Groups

No special resource or regulatory agencies must be consulted as part of the energy analysis.

36.3 Methodology for Conducting Energy Studies

- *Define the during-construction increase in energy requirements.* Determine in general terms (e.g., increases or decreases in energy use versus actual British thermal unit [BTU] use) the increase in consumption associated with the general types of equipment to be used and the length of the construction period. Energy

Energy includes fossil fuels, labor, and highway construction materials. As an environmental resource, energy consumption (both in project construction and as a result of the project) should be addressed in NEPA documents.

requirements should also consider any increase or decrease in energy consumption associated with maintenance of the roadway following construction, and determine the potential for decreased energy consumption after construction due to improved efficiency.

- *Identify any long-term changes in energy requirements.* Estimate any increase or decrease in energy consumption associated with post-construction roadway maintenance. Also consider any decrease in energy requirements in terms of decreased travel times and more efficient overall travel operations.
- *Conclude whether there is a net change in energy requirements.* Compare the short-term increases in energy consumption to the long-term changes in energy requirements, and determine if the project ultimately results in a change in energy usage.
- *Identify conservation potential.* Indicate whether any conservation measures will be implemented as part of the preferred alternative.

Note: A detailed energy analysis, computations of BTU requirements, etc., are not required except for large projects (none in Iowa to date).

36.4 Format and Content of Technical Reports or Memoranda

Due to the typically short length of this section, a technical report is not applicable. If, in a rare case, energy impacts were substantial, Iowa DOT could request the preparation of a memorandum, and would at that time indicate the format and content.

36.5 Format and Content of NEPA Documentation Discussion

Generally in the Environmental Analysis section, an affected environment discussion will not be included for energy; however, there should be a discussion of the environmental consequences the proposed action will have on energy usage. The discussion of energy impacts for most small- to moderate-sized projects should be brief.

Discuss the general energy requirements associated with construction of the project. Address any increases or decreases in energy associated with post-construction maintenance and operations. In the environmental consequences discussion, determine the net change in energy requirements. Finally, consider the conservation potential of the alternatives associated with decreased travel times and more efficient operations. If any specific energy conservation measures are to be implemented as part of the preferred alternative, include a description at the end of the environmental consequences discussion. Do not include any standard statements in the discussion of energy impacts.

36.6 Continued Work in Design and Construction

If any energy mitigation or conservation measures are prescribed in the discussion of impacts, these should be coordinated with the contracting representatives to ensure that they are included in the construction specifications on the project Green Sheets. Such measures could include prohibitions on detours during peak travel hours (to reduce fuel consumed by out-of-direction travel), requirements for energy-efficient construction methods, or altered work periods to reduce congestion and therefore the number of idling vehicles.

36.7 Additional References

None applicable.

NOTES:

Visual Impacts

CHAPTER 37

Transportation projects can have visual impacts on the people who live near a facility or drive through it daily. For communities, the visual features of a roadway can establish a tone, creating a first—and lasting—impression for visitors.

37.1 Legislation, Regulations, and Guidance

37.1.1 Federal Legislation and Regulations

ⓘ ***23 USC 128, 23 USC 138, 49 USC 303 (Public Laws 100-17, 07-449, and 86870), 23 USC 109(h).*** FHWA requires the identification of the project's impacts on visual resources; this document provides guidance for completing a visual impact analysis and explains what it should include.

ⓘ ***23 USC 101(g), 133(b), and 133(g), Intermodal Surface Transportation Efficiency Act (ISTEA), 1991.*** Established a Transportation Enhancement Program.

- Established a program that offers broad opportunities and federal dollars for unique and creative actions to integrate transportation into our communities and the natural environment.
- ISTEA mandated the creation of a Scenic Byways Program. FHWA has set criteria for designing scenic byways, based upon their scenic, historic, recreational, cultural, archaeological, or natural intrinsic qualities.

ⓘ ***23 USC 101, (Public Laws 109–59109–59, § 1(a), Aug. 10, 2005, 119 Stat. 1144) Safe Accountable, Flexible, Efficient Transportation Equity Act, A Legacy for Users (SAFETEA-LU).*** SAFETEA-LU builds on the foundation of ISTEA, supplying the funds and refining the programmatic framework for investments needed to maintain and grow the nation's vital transportation infrastructure.

ⓘ ***23 CFR-750, The Highway Beautification Act, 1965.*** The Highway Beautification Act of 1965 was enacted to provide effective control of outdoor advertising and junkyards, protect public investment, promote the safety and recreational value of public travel and preserve natural beauty, and provide landscapes and roadside development reasonably necessary to accommodate the traveling public.

The visual impacts of transportation projects can be a critical feature to the people who live near a facility or drive through it daily.

37.1.2 State Legislation and Regulations

Section 313.67, Code of Iowa. Gives Iowa DOT authority to acquire land, rights, or interest in land to preserve scenic areas along primary highways.

37.1.3 Interagency Memoranda of Understanding

None applicable.

37.1.4 Guidance Documents

ⓘ ***FHWA TA T6640.8A,*** Section V. Provides guidance for uniformity and consistency in format, content, and processing of environmental studies and documents pursuant to NEPA.

ⓘ ***AASHTO Highway Subcommittee on Design Task Force for Environmental Design, "A Guide for Transportation Landscape and Environmental Design," June 1991.*** Basic reference used to improve landscape and environmental design with specific guidance for the accommodation of transportation features that require aesthetic consideration.

ⓘ ***FHWA, "Flexibility in Highway Design," Publication No. FHWA-PD-97-062; HEO 30/7 97(10M)E, June 1997.*** Illustrates the flexibility already available to designers within adopted state standards.

ⓘ ***FHWA, The Environmental Guidebook, Aesthetics (including "Esthetics and Visual Quality Guidance Information Memorandum" [August 18, 1986], and "Environmental Impact Statement [EIS], Visual Impact Discussion" [undated]).*** The "Esthetics and Visual Quality Guidance Information Memorandum" is a guide in the development and discussion of visual quality information in the project-development process. FHWA's "Visual Impact Discussion" serves as a guide for the preparation of a visual impact discussion for an EIS.

ⓘ ***FHWA, "Visual Impact Assessment for Highway Projects" Publication DOT FH-11-9694.*** This document provides detailed guidance on scoping, performing, and documenting the visual impact assessment.

37.2 Resource/Regulatory Agencies and Interested Groups

See Table 37-1.

37.3 Methodology for Conducting Visual Impacts Studies

The methodology for conducting planning level studies will vary depending on the project. Not all projects will have a visual resources impact sufficient to require extensive review and commentary. Typically a CE will not require visual impact review. Visual resources are usually addressed in an EA or EIS only in special circumstances when the potential for visual resource impact exists, such as when a cultural or Section 4(f) resource is involved. The determination to

Table 37-1

Resource/Regulatory Agencies and Interested Groups	
Agency	**When Involved and Why**
Neighborhood groups, public and private institutions, businesses along the corridor.	Groups should be consulted early in process to provide input on visual resources. The specific groups involved will vary by project depending on the nature of the visual impact.
State and local arts councils, and other organizations with an interest in design, art, and architecture.	Groups should be consulted early in process to provide input and to help determine ways to protect, restore, and enhance the project's visual quality.
Other resource agencies and government units.	Agencies should be consulted early in process to provide input. Other agencies may become Involved when a particular visual impact affects an agency's particular area of concern.

complete an assessment will be made based on several factors, including: numbers of viewer groups affected; existence of scenic resources; degree and totality of the proposed changes in the visual environment; and local concerns or project controversy. For example, a project that replaces or rehabilitates an existing facility generally does not require a formal analysis.

The FHWA publication entitled "Visual Impact Assessment for Highway Projects" provides a framework for conducting visual impact studies. The FHWA methodology should be used as a guide, which may be modified to fit a particular project. The assessment methodology essentially involves the following:

- Define the project setting and viewshed.
- Analyze existing visual resources and viewer response.
- Assess the visual impacts of project alternatives.
- Propose methods to mitigate adverse visual impacts.

The project setting and viewshed are established by identifying the project's immediate visual environment as it relates to the visual environment of the geographic region. Defining the project setting and viewshed will help establish the frame of reference for comparing the project alternatives. The project setting is described in terms of landscape units and the viewshed is a subset of the landscape unit. A landscape unit can be thought of as an "outdoor room" that has distinct characteristics in the regional setting. The viewshed can be thought of as the surface area that is visible from an observer's viewpoint. It includes the views from the proposed project and the location of viewers likely to be affected by the visual changes. Said another way, the assessment considers two views, the view from the proposed road and the view of the proposed road. See Table 37-2. The viewshed describes the views that the project could potentially affect.

Table 37-2

Typical Viewer Groups	
Groups with a View From the Road	Groups with a View Of the Road
Driver	Residents
Passengers	Commercial/Industrial Interests
	Recreational Groups
	Other Special Interest Groups
	Way side and Rest Area Users
	Cyclists and Others in the traffic right-of-way

Source: FHWA, "Visual Impact Assessment for Highway Projects" Publication DOT FH-11-9694

Inventory the existing resources of the project's visual environment and analyze their attributes. This establishes the baseline conditions for a project by identifying a viewer's response to the existing visual resources in the project area. This is important because the project could alter the visual experience by changing the visual resource base.

The impact is assessed by examining the change that would be introduced by the project and the associated viewer response. Examine the roadway variables that have a visible affect on the environment such as the number of travel lanes, their width, and the pavement material and color. Design speeds and gradient standards also determine the roadway's effect on the visual environment. Examine structures and appurtenances. Examine all the work to be done within the right-of-way including activities like earthwork, drainage, and roadside plantings. Identify the viewer response to changes in the visual environment. The visual impact is the sum of the degree of changes in visual resources caused by the project and the viewer response to the change. The viewer response considers the viewer exposure, sensitivity to change, the cultural significance of the visual resource, and local values.

Identify measures to enhance the positive effect and minimize or eliminate the negative effects. The mitigation measures should address the specific visual impact or problem caused by the project. Mitigation measures could include activities such as corridor selection, horizontal alignment, vertical alignment, landscaping, selective clearing, lighting, and mowing patterns.

37.4 Format and Content of Technical Reports or Memoranda

Documentation detailing methodology and findings is required. Whether this is in the form of a technical report or detailed memorandum could vary, depending on the project. All raw-data sources collected, such as photos or visual simulations, should be included in the project files, as well as collected in electronic format (where possible) and included in the project's GIS database.

37.5 Format and Content of NEPA Documentation Discussion

The affected environment section within the Environmental Analysis section should discuss the significant visual resources and features of the existing environment, such as the existing visual characteristics, quality, and sensitive resources. This section should also identify the groups with a view from or a view of the road. A table may be used to illustrate this information (see Table 37-2).

The environmental consequences section should discuss the impacts to the existing visual resource, the relationship of the impacts to potential viewers from (and of) the project, as well as measures to avoid or reduce the adverse impacts. The NEPA document should explain the consideration given to features associated with design quality, art, and architecture in the project planning stage. In addition, when a proposed project will include features associated with design quality, art, or architecture, the NEPA document may be circulated to officially designated state and local arts councils and other appropriate organizations interested in design, art, and architecture. The final NEPA document should identify any proposed mitigation for the preferred alternative if it is feasibly practicable.

37.6 Continued Work in Design and Construction

Commitments to include visual improvements may be made and may be represented in engineering plans. However, the form and format of the representation will depend upon the proposed mitigation. Any commitments should be specifically identified and listed on the project's Green Sheets.

37.7 Additional References

FHWA, The Environmental Guidebook; see "Aesthetics" and "Scenic Byways" sections: http://environment.fhwa.dot.gov/.

FHWA, Flexibility in Highway Design: http://www.fhwa.dot.gov/.

FHWA TA T6640.8A; see "Visual Impacts" section: http://www.fhwa.dot.gov/.

FHWA, Transportation Enhancements Overview: http://www.fhwa.dot.gov/.

NOTES:

Air Quality

CHAPTER 38

Air quality impacts can result from various Iowa DOT activities and projects including transportation related projects (vehicle emissions) and maintenance, construction, or demolition of facilities (particulates and other emissions). The transportation conformity provisions of Clean Air Act Amendments of 1990 (CAAA) and planning provisions of the Transportation Equity Act for the 21st Century (TEA-21) and the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) require areas that violate the National Ambient Air Quality Standards (NAAQS) to demonstrate that through the transportation conformity process, that transportation investments have air quality impacts consistent with the clean air goal of the State Implementation Plan (SIP). Federal clean air rules identify special requirements, conformity rules, in "nonattainment" and "maintenance" areas to ensure that proposed transportation projects do not cause or contribute to existing air quality problems.

A mobile source air toxic (MSAT) emissions analysis is also required for some projects depending on the size and type of the proposed roadway improvement. This chapter will assist practitioners in conducting MSAT emissions analysis as well as conformity and hot spot analysis to demonstrate compliance with existing air quality control plans and programs.

Air quality impacts can result from various Iowa DOT activities and projects including transportation related projects (vehicle emissions) and maintenance, construction, or demolition of facilities (particulates and other emissions).

38.1 Legislation, Regulations, and Guidance

38.1.1 Federal Legislation and Regulations

- *23 CFR 450 (metropolitan planning).*
- *40 CFR 93.116(a) (criteria and procedures: localized CO, $PM_{2.5}$, and PM_{10} violations [hot spots]).*
- *40 CFR 93.123 (procedures for determining localized CO, $PM_{2.5}$, and PM_{10} concentrations [hot-spot analysis]).*
- *40 CFR 51, Appendix W (guidelines on air-quality models).*
- *Clean Air Act Amendments of 1990 (CAAA).*

38.1.2 State Legislation and Regulations

None applicable.

38.1.3 Interagency Memoranda of Understanding

None applicable.

38.1.4 Guidance Documents

ⓘ *Federal Highway Administration (FHWA) TA T6640.8A, Section V.*

ⓘ *Iowa DOT Updated Streamlined Environmental Assessment (EA) Template, Section 5.4.3*

ⓘ *U.S. Environmental Protection Agency (EPA) Transportation Conformity Guidance for Qualitative Hot-spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas (EPA420-B-06-902), March 2006.*

38.2 Resource / Regulatory Agencies and Interested Groups

See Table 38-1.

Table 38-1

Resource/Regulatory Agencies and Interested Groups	
Agency	When Involved and Why
U.S. Environmental Protection Agency Region VII	Provides concurrence of project-level hot-spot air quality conformity during the review on an EIS.
Iowa DNR Air Quality Bureau	Regulates fugitive emissions during construction activities.

38.3 Mobile Source Air Toxics

In addition to the criteria air pollutants for which there are NAAQS, EPA regulates air toxics. Most air toxics originate from human sources, including on-road mobile sources, non-road mobile sources (such as airplanes), area sources (such as dry cleaners), and stationary sources (such as factories or refineries).

MSATs are a subset of the 188 hazardous air pollutants defined by the Clean Air Act. The 21 MSATs are compounds emitted from highway vehicles and non-road equipment. Some toxic compounds are present in fuel and are emitted to the air when fuel evaporates or passes uncombusted though the engine. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal air toxics also result from engine wear or from impurities in oil or gasoline. In response to the need for federal guidance in documenting MSAT impacts by state DOTs, FHWA issued interim guidance on February 3, 2006, to advise state DOT's on when and how to analyze MSATs in the National Environmental Policy Act (NEPA) process for highway projects.

38.4 Conformity and Hot Spot Analyses

One of the key issues in understanding air quality as related to transportation projects is the concept of *attainment*. Attainment, as discussed in this chapter, refers to whether the study area has been designated by EPA as being *in attainment* of the NAAQS. Attainment status is therefore a measure of whether or not air quality in an area complies with the NAAQS for six criteria air pollutants: carbon monoxide, sulfur dioxide, particulate matter, ground-level ozone, lead, and nitrogen dioxide.

Discussion of air-quality considerations in NEPA documents should consider two perspectives. The first is the applicability of *transportation conformity,* which is based on whether the proposed project is located in an area designated as either nonattainment of, or maintenance of, any NAAQS. Four transportation-related criteria pollutants are considered for transportation conformity: carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2), and particulate matter ($PM_{2.5}$ and PM_{10}). Precursors of these pollutants also are considered in regional air quality analyses for nonattainment areas. These precursors include volatile organic compounds (VOCs) and oxides of nitrogen (NO_x) in ozone areas; NO_x in NO_2 areas; VOC and NO_x in PM_{10} areas[1]; NO_x in $PM_{2.5}$ areas[2]; and VOC, sulfur oxides (SO_x) and/or ammonia (NH_3) in $PM_{2.5}$ areas[3]. The second perspective is the project-level

[1] If EPA or Iowa DNR Air Quality Bureau finds that they are a significant contributor to the PM_{10} problem

[2] NO_x must be considered unless EPA and Iowa DNR Air Quality Bureau find that it is not a significant contributor to the $PM_{2.5}$ problem

[3] Only if EPA or Iowa DNR Air Quality Bureau finds that they are significant contributors to the $PM_{2.5}$ problem

CO hot-spot analysis, if applicable. Project level hot spot analysis applies only to CO and PM_{10} nonattainment and maintenance areas and is based on quantitative analysis using applicable EPA-approved air quality models or qualitative analysis.

40 CFR 450 requires that a metropolitan planning organization (MPO) be designated for each urban area of more than 50,000 people by agreement between the governor and units of general-purpose local governments. The MPO will prepare and periodically update a long-range transportation plan (LRTP) and develop a transportation improvement program (TIP) for its area. This work is done in cooperation with Iowa DOT. The MPO LRTP covers a minimum 20-year planning horizon. Federal law requires a minimum 3-year TIP.

Pursuant to the CAAA, MPOs in air sheds designated by EPA as nonattainment or maintenance of the NAAQS for one of the transportation-related criteria pollutants are required to demonstrate that LRTPs and TIPs conform to the SIP. The MPO, FHWA, and Federal Transit Administration (FTA) must make a finding of conformity for MPO LRTPs and TIPs in coordination with EPA.

For example, the State of Iowa is designated as an attainment area for all NAAQS except possibly $PM_{2.5}$.[4] The LRTP, TIP, project-level corridor conformity, project-level CO hot-spot analysis, and PM_{10} qualitative and quantitative analyses are not required. Under FHWA's Guidelines for an Environmental Impact Statement (EIS), a comparison of corridor emissions from the No-Build and Build Alternatives may be required. The requirement would be determined during the agency scoping and early coordination process.

In December 2006, EPA lowered its 24-hour ambient air quality health standard for $PM_{2.5}$ from 65 to 35 micrometers per cubic meter of air. Possible contributors of $PM_{2.5}$ include industrial combustion as well as vehicle exhaust. After EPA's review of nonattainment area boundaries for $PM_{2.5}$, anticipated to be complete in late summer or fall 2009, EPA may direct Iowa DNR to develop a SIP. The SIP is a plan for reestablishing air quality attainment within the area currently in nonattainment. Generally, an air quality model is developed and used to evaluate the potential impact of major infrastructure improvements, such as projects that add capacity to the existing highway system. Iowa DOT is obligated to work with Iowa DNR and EPA to ensure that proposed projects meet the requirements of any SIPs once they are adopted.

Accordingly, a conformity determination under 40 CFR Part 93 (*Criteria and Procedures for Determining Conformity to State or Federal Implementation Plans of Transportation Plans, Programs, and Projects Funded or Approved under Title 23 USC or the Federal Transit Act)* would be required for projects in the areas of nonattainment for $PM_{2.5}$.

In April 2007, EPA issued a guidance memorandum clarifying how transportation conformity will be implemented under the revised $PM_{2.5}$ standard. Per the memo, transportation conformity for the new 24-hour $PM_{2.5}$ standard does not apply until one year after the effective date of the nonattainment designations that consider that standard.

All transportation projects requesting federal funding and all regionally significant projects within carbon monoxide, ozone, NO_2 or PM_{10} nonattainment or maintenance areas must be analyzed for regional air emissions of the applicable pollutant for which the area is designated nonattainment or maintenance. Should any part of the State of Iowa be designated as nonattainment for the transportation-related criteria pollutants of CO, ozone, NO_2, and PM_{10} subsequent to printing of this manual and for parts of the state potentially in nonattainment for $PM_{2.5,}$ the following sections describe the procedures to be used to meet air quality conformity and NEPA air quality analysis requirements. For an update on the attainment/nonattainment status of $PM_{2.5}$ in Iowa refer to the Iowa DNR website at http://www.iowadnr.gov. A SIP would be prepared if EPA and Iowa DNR Air Quality Bureau identified emitted PM from motor vehicle tailpipes, as well as from normal brake and tire wear to be a significant contributor to

[4] Portions of two counties were designated by EPA as nonattainment for $PM_{2.5}$ on December 22, 2008, however this designation is currently under review by EPA. The most recent monitoring data (3 years of monitoring data: 2006, 2007, 2008) indicate these areas to be in attainment for $PM_{2.5}$. It is anticipated that EPA will issue clarification in summer or late 2009.

the PM_{10} or $PM_{2.5}$ problem in the nonattainment area. The EPA rules do not currently require conformity determinations for projects outside of nonattainment areas (i.e., within attainment areas).

38.4.1 Exempt Projects

Projects that are exempt from the requirements to determine conformity are listed in 40 CFR 93.126. These projects are mostly ones that maintain existing transportation facilities, and are typically processed as Categorical Exclusions (CEs). EPA and the U.S. DOT have agreed that project-level analysis of local CO and particulate matter impacts may not be necessary for these projects, which are exempt from the requirement to determine air-quality conformity. These exempt projects may proceed toward implementation even in the absence of a conforming LRTP and TIP.

In the event that a MPO (in consultation with EPA, FHWA, FTA, or other agencies) determines that a project is nonexempt because it may have potentially adverse emission impacts for any reason, then an air-quality analysis should be performed as described in Section 38.4.3. See also Exhibit 38-1.

38.4.2 Non-exempt Projects

Regional Conformity Analysis

To determine conformity of non-exempted projects within designated nonattainment areas, OLE must ascertain whether the project is from a conforming LRTP and a conforming TIP and satisfies other applicable conditions. Note that regional planning agencies (i.e., MPOs) are usually the entities that develop these plans. The environmental document would report the consistency of the project with those regional plans. To determine conformity for projects in nonattainment areas or maintenance areas outside of locations served by MPOs, OLE would initiate a regional emissions analysis for the area.

If only some of the project's stages are included in the conforming TIP, the project may still be found to conform (after a hot-spot analysis) provided the total project is included in the regional emissions analysis done for the program. If the total project is not included in the regional analysis, the project cannot be found to conform and a final environmental document cannot be approved.

Air Quality Analysis-Project Level Analysis

The methodology for determining the CO, ozone, NO_2, $PM_{2.5}$, and PM_{10} air-quality analysis for EAs and EISs should be determined in consultation with FHWA, MPO, and EPA during the agency scoping and early coordination process. For areas in nonattainment for ozone and/or NO_2 no project level evaluation is required. A qualitative discussion of the regional conformity determination previously conducted by MPO for the regional TIP would be included in the environmental document.

The project level analysis for projects in nonattainment or maintenance areas for CO and PM_{10} begins with a screening analysis of project-level local CO impacts. If the project fails the screening analysis, then a full air-quality modeling analysis is required. The procedures for the CO screening analysis and quantitative analysis are described in the following section.

38.4.3 Procedures for Air-Quality Analysis

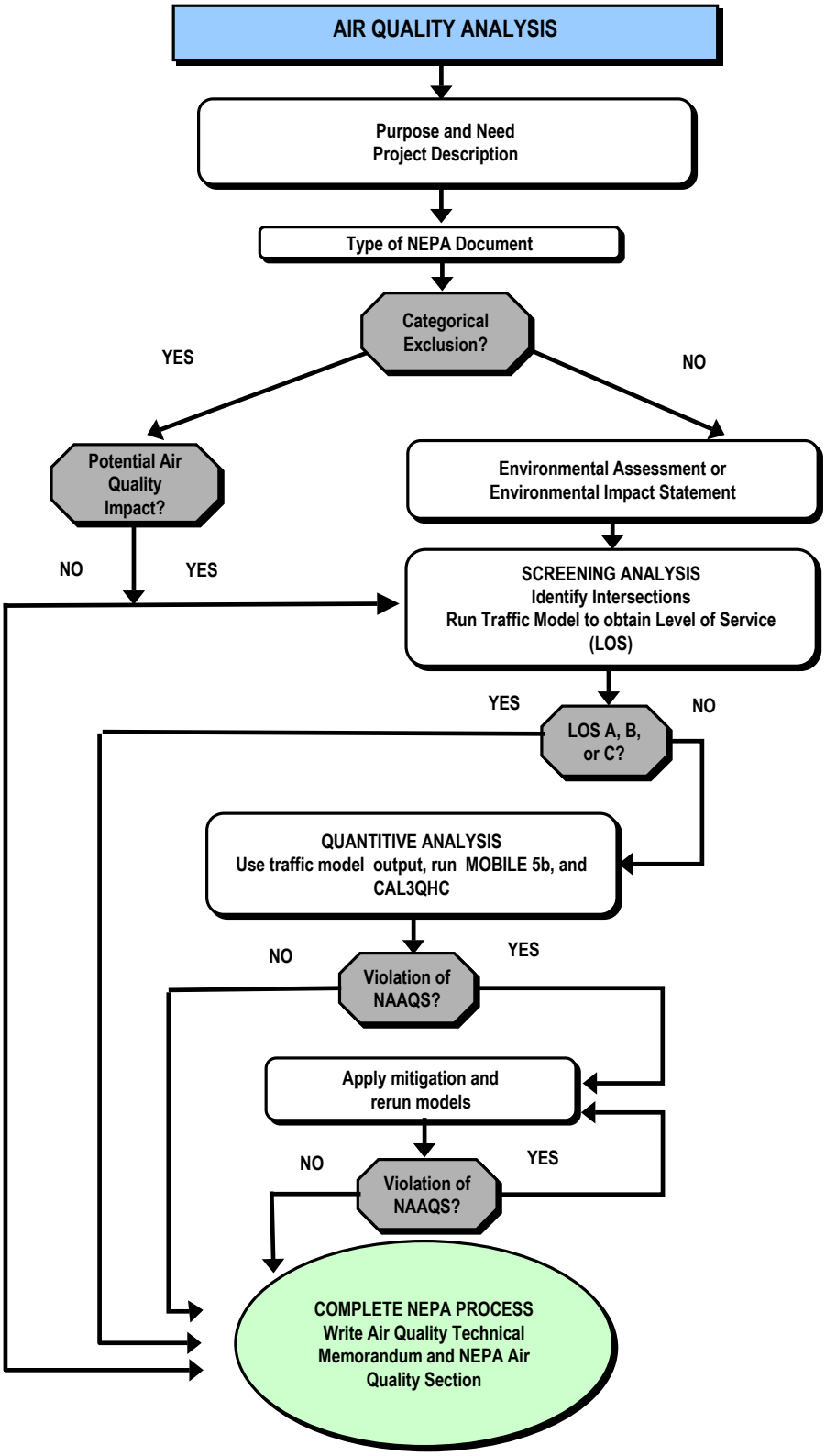
40 CFR 93.116(a), Criteria and Procedures: Localized CO, $PM_{2.5}$ and PM_{10} Violations (Hot Spots), states that the conformity criteria are satisfied if it is demonstrated that no new local violations will be created and the severity or number of existing violations will not be increased as a result of the project. This is determined by comparing the Build and No-Build Alternatives.

For these procedures, a hot spot is defined as a signalized intersection affected by the project. For freeway projects with grade-separated interchanges, this would be the first signalized intersection on either side of the interchange.

$PM_{2.5}$ and PM_{10} Hot-Spot Analysis

The criteria and procedures for hot-spot analyses will be generally the same for both $PM_{2.5}$ and PM_{10} areas,

Exhibit 38-1
Air Quality Analysis



except for PM_{10} areas with approved conformity SIPs (Iowa does not currently have any such areas). Quantitative $PM_{2.5}$ or PM_{10} hot-spot analyses will be required when appropriate methods and modeling guidance are available. Qualitative hot-spot analyses involve more streamlined reviews of local factors, such as local monitoring data near a proposed project location.

For all $PM_{2.5}$ and PM_{10} areas, guidance contained in the U.S. EPA document *Transportation Conformity Guidance for Qualitative Hot-Spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas* would be used to complete qualitative $PM_{2.5}$ and PM_{10} hot-spot analyses only for "projects of air-quality concern" as defined in the final rule by 40 CFR 93.123(b)(1). The final rule specifies that projects of air quality concern are certain highway and transit projects that involve significant levels of diesel traffic, or any other project that is identified by the $PM_{2.5}$ or PM_{10} SIP as a localized air quality concern.

A qualitative $PM_{2.5}$ or PM_{10} hot-spot analysis is not required for projects that are not an air quality concern. For these types of projects, state and local project sponsors should briefly document in their project-level conformity determinations that Clean Air Act and 40 CFR 93.116 requirements were met without a hot-spot analysis, since such projects have been found to not be of air quality concern under 40 CFR 3.123(b)(1).

CO Hot-Spot Analysis

Screening Analysis

40 CFR 90.123 states that for projects that are at level-of-service (LOS) D, E, or F, or those that will change to those categories due to project-related increased traffic, the air-quality screening analysis must be based on a quantitative approach and data. This is accomplished by using applicable air-quality models, databases, and other requirements specified in 40 CFR 51 Appendix W (Guidelines on Air-Quality Models).

To perform the screening analysis, the LOS using the appropriate traffic model (e.g., CORSIM) of all signalized intersections affected by the project will be determined. All intersections that are found to be LOS A, B, or C for the No-Build and Build Alternatives are considered in conformity, and no further analysis is required. For those intersections found to be LOS D, E, or F, further quantitative analysis is required.

Quantitative Analysis

The quantitative analysis requires the use of applicable air-quality models. A model is required to determine vehicle emission factors. A model is required to determine localized impacts. If the project fails the screening analysis, a full air-quality modeling analysis is required to determine the LOS of the signalized intersection (e.g., CORSIM, SYNCHRO, etc.).

The steps to conduct the quantitative analysis are as follows:

1. Model the vehicle emission factors using the appropriate model.
2. Prepare the output of the appropriate traffic model (e.g., CORSIM, etc.) to be used as input to the appropriate model.
3. Model the CO 1-hour concentrations at the affected signalized intersections.
4. Add the projected background CO concentrations to the modeled results in Step 3.
5. Compare the resultant 1-hour concentration with the NAAQS 1-hour standard of 35 parts per million (ppm).
6. Convert the resultant 1-hour concentration to an 8-hour concentration. The standard conversion factor is 0.7.
7. Compare the resultant 8-hour concentration with the NAAQS 8-hour standard of 9 ppm.
8. Compare the No-Build Alternative concentrations with the Build Alternative concentrations.

The intersections that do not exceed the NAAQS in the future year have demonstrated conformity, and no further analysis is needed. Compare any intersection in the Build Alternative that exceeds the NAAQS for the future year with the No-Build

Alternative. If the Build Alternative does not create a new violation or increase the severity or number of violations predicted by the No-Build Alternative, then hot-spot conformity has been demonstrated and no further analysis is required.

Mitigating measures must be applied to those intersections that create a new violation or increase the severity or number of existing ones. These measures may include reconfiguring the intersection, optimizing traffic signalization, or performing other engineering and operational measures.

With the mitigating measures in place, rerun the quantitative analysis to determine if hot-spot conformity has been met. Repeat this process until there are no new violations or increases in the severity or number of existing violations.

38.5 Format and Content of Technical Reports or Memoranda

The Air-Quality Technical Memorandum is a complete document of the air-quality analysis. A typical table of contents for this document is as follows:

- *Project description*—A general description of the project should be provided to address the type of project, its location, and project limits.
- *Current air-quality conditions*— Describe the climate and meteorological conditions of the project area. Also quantify the current air-quality levels and attainment designation.
- *Air-quality analysis methodology*— Summarize the air-quality methodology developed during the agency consultation, scoping and early coordination meetings and used to determine air-quality impacts and hot-spot conformity.
- *$PM_{2.5}$ or PM_{10} hot-spot analysis*— For those projects that are an air quality concern for $PM_{2.5}$ or PM_{10} (as discussed in Section 38.4.3) and therefore require a hot-spot analysis, the interagency consultation process would be used to determine what is required for documentation for a specific project.

  The hot-spot analysis documentation should include sufficient information to justify the conclusion that a proposed project meets conformity hot-spot analysis requirements in 40 CFR 93.116 and 93.123. The amount of documentation needed and method of analysis chosen will vary depending on individual circumstances (e.g., local background $PM_{2.5}$ or PM_{10} concentrations, the size and nature of the project, etc.).

  The hot-spot analysis documentation should include:

  – A description of the proposed project (the appropriate section of the NEPA document can also be referenced when relevant), including where the project is located, the project's scope (adding an interchange, widening a highway, expanding a major bus terminal, etc.), when the project is expected to be open to traffic, and what part of 40 CFR 93.123(b)(1) is applicable.
  – A description of the method chosen to conduct the hot-spot analysis (see Question 4.1)
  – A description of the type of $PM_{2.5}$ or PM_{10} emissions from the proposed project that are considered in the qualitative hot-spot analysis (see Questions 3.2, 3.3, and 3.4)
  – A description of existing conditions pertaining to the project and project location (see list of factors that may be considered in Question 4.3)
  – A description of the changes in these factors that will result from the project for future scenarios, including changes in the surrounding environment that will affect $PM_{2.5}$ or PM_{10} air quality, changes in traffic and emissions trends (see Question 4.4)
  – A description of the analysis year(s) that is examined (see Question 3.5)
  – A discussion of any mitigation measures that will be implemented and their expected effects

  - A conclusion for how the proposed project meets 40 CFR 93.116 and 93.123 conformity requirements for the $PM_{2.5}$ and/or PM_{10} air quality standards

- *CO hot-spot screening analysis*—Identify the traffic model that was used to determine the LOS calculations for each identified intersection. Provide a matrix of each intersection with its LOS designation. Identify each intersection that is LOS A, B, or C and indicate that these intersections are considered to meet air-quality conformity and no further analysis is required. Identify those intersections that are LOS D, E, or F as those requiring hot-spot-modeling analysis.
- *CO hot-spot modeling analysis*—Provide a matrix of each intersection of LOS D, E, and F with the modeled 1-hour and 8-hour CO concentrations, comparing the No-Build with the Build Alternatives. Identify those intersections that are predicted to be within the 1-hour CO standard (35 ppm) and the 8-hour CO standard (9 ppm) and indicate that these intersections are considered to meet air-quality conformity and no further analysis is required.
- *Initial air-quality impact determination*— If there are no violations of the CO standards, then the project is considered to meet air-quality conformity and have no significant impacts on air quality. If there are CO violations predicted in the Build Alternative, then compare the CO concentration of the build scenario with the no-build scenario. If the Build Alternative concentration is lower than or equal to the no-build scenario, then the intersection is considered to be in air-quality conformity with the CO standard. If the Build Alternative CO concentration exceeds the No-Build Alternative CO concentration, then mitigation measures must be applied to the violating intersection.
- *Mitigation measures*—Develop and describe mitigation measures for those intersections that violate the CO standards where the build scenario exceeds the no-build scenario. Such measures may include the reconfiguration of the intersection, elimination of the intersection with a grade-separated interchange, optimize traffic signalization, or any other engineering or operational change. Rerun the traffic and air-quality models to determine and report the new intersection concentrations. Repeat this process until there are no new violations or increases in the severity of violations of the CO standards.
- *Final air-quality impact determination*—Summarize the results of the CO screening and modeling efforts. Document the projects air-quality conformity based on the screening and modeling results. Describe significance (or non-significance) of the air-quality impacts of the project with respect to regional air-quality levels.
- *Appendixes*—Provide any correspondence with regulatory agencies including the results of consultation process on the air-quality analysis methodology, the assessment of current conditions, projected CO background concentrations, etc. Provide the MOBILE 6 modeling input and output data, summary of the LOS calculations, summary of the traffic modeling output data, and the CAL3QHC modeling input and output data.

38.6 Format and Content of NEPA Documentation Discussion

The affected environment discussion in the Environmental Analysis section of the environmental document should summarize the current air-quality conditions. The Air-Quality Technical Memorandum, if one is prepared, should be used as a source of information. In particular, the attainment or nonattainment status of the area should be noted. The level of documentation to be included in the EA or EIS should be discussed with the OLE Document Manager.

For a project that is located in a nonattainment or maintenance area, the document should indicate which pollutants caused the area to be classified as such. Then it should address regional transportation conformity, making a statement to the effect that the project is in the SIP and TIP found in accordance with EPA's final conformity regulations revised January 9, 2008, due to incorporation of SAFETEA-LU provisions passed by Congress in 2005. It would

also list specific dates of the pertinent conformity determinations by the MPO and FHWA/FTA.

The document should point out that the design concept and scope have not changed since the SIP and TIP were found to conform. If the design concept and scope have changed to the extent that it will affect the regional transportation model, then the air analyst needs to work with the OLE and the MPO to update the regional conformity determination prior to completing the air quality analysis.

In general, the environmental consequences discussion should summarize the project level air-quality impacts as determined by the CO screening Analysis, CO Modeling Analysis, and Mitigation Measures sections of the *Air-quality Technical Memorandum,* if one was prepared and if screening or modeling was required for the project. CO, $PM_{2.5}$, and PM_{10} hot-spot analyses are not required to consider construction-related activities, which cause only temporary increases in emissions.

38.6.1 MSAT Discussion

For most projects, environmental documentation for a transportation project should include basic analysis of the likely MSAT emission impacts of the preferred alternatives for a project. However, the technical tools that are available do not enable prediction of the project-specific health impacts of emission changes associated with the alternatives carried forward in the final environmental documentation. Thus, a discussion in accordance with CEQ regulations (40 CFR 1502.22[b]) regarding incomplete or unavailable information should be included. For EAs, language tailored to various project type scenarios, including Minor Widening Projects, New Interchange with New Connector Roadway, New Interchange/ No New Connector Roadway, and Expanded Intermodal Centers or other projects which impact truck traffic, but that do not reach the category three criteria of "major new intermodal center" can be found in Section 5.4.3 of the Iowa DOT Updated Streamlined EA Template (available on the OLE page of Iowa DOT's website). For projects processed as an EIS, the appropriate level of discussion to be included in the EIS should be discussed with the OLE Document Manager.

38.7 Continued Work in Design and Construction

Each site that is affected by construction-related activities is considered separately, using the established procedures specified in the Iowa DOT *Construction Manual.*

38.8 Additional Resources

23 CFR 450, Planning Assistance and Standards: http://www.fhwa.dot.gov/.

23 CFR 771, Environmental Impact and Related Procedures: http://www.fhwa.dot.gov/.

40 CFR 93, Subpart A, Conformity to State or Federal Implementation Plans of Transportation Plans, Programs, and Projects Developed, Funded or Approved Under Title 23 USC or the Federal Transit Laws: http://www.gpo.gov/.

Clean Air Act Amendments of 1990: http://www.epa.gov/.

FHWA, *The Environmental Guidebook,* see "Air Quality": http://environment.fhwa.dot.gov/.

FHWA TA T6640.8A, see "Air Quality Impacts" section: http://www.fhwa.dot.gov/.

FHWA, Transportation Efficiency Act of the Twenty-first Century: http://www.fhwa.dot.gov/.

NOTES:

Noise

CHAPTER 39

The purpose of this section is to provide guidance in the analysis of highway traffic noise and the design of noise abatement measures. This manual is not meant to supersede the laws and regulations governing highway construction practices and procedures.

39.1 Legislation, Regulations, and Guidance

39.1.1 Federal Legislation and Regulations

ⓘ ***23 CFR Part 772, "Procedures for Abatement of Highway Traffic Noise and Construction Noise," July 8, 1982; August 5, 1982; and August 26, 1996.***

ⓘ ***23 USC 109 (i), Standards.*** Requires the U.S. DOT to develop standards for highway noise levels that are compatible with different land uses. Projects may not be approved unless the project is determined to include adequate measures to implement the appropriate noise level standards. Also authorizes the U.S. DOT to approve projects to which noise level standards are applicable for the purpose of carrying out the noise standards (e.g., acquisition of right of way, construction of noise walls, and landscaping.

Contains the FHWA noise procedures. State-funded Iowa DOT projects are also generally developed in conformance with this directive. It should be noted that FHWA has procedures for addressing highway-related noise, while states are granted the ability to set standards in conformance with the FHWA procedures.

The FHWA noise procedures list the steps that must be taken in the preparation of traffic noise studies for highway construction projects. The guide defines when noise impacts occur and when noise abatement must be considered. The guide also requires that information be given to local officials for use in land-use planning. Noise studies are required for projects that are designated as either Type I or Type II as defined below. This designation should not be confused with the different categories of NEPA document types.

- A Type I project is a federal or federal-aid highway project for constructing a new highway or reconstructing an existing one by significantly changing either the horizontal or vertical alignment or increasing the number of through traffic lanes. A "significant change" in the horizontal or vertical alignment occurs when a change is likely to result in increased noise levels to a development.
- Noise studies are also required for the addition of passing lanes, truck climbing lanes, interchanges, ramps, and auxiliary lanes on existing highways.

Part 772 of Title 23 of the Code of Federal Regulations (23 CFR 772) contains the FHWA noise procedures. As mandated by 23 USC 109(i), all federal-aid highway projects are to be developed in conformance with this directive.

- A Type II project is a federal or federal-aid highway project for noise abatement along an existing highway. This type of project is often referred to as a retrofit project, because the noise mitigation is not performed in conjunction with a highway construction or reconstruction project.

39.1.2 State Legislation and Regulations

ⓘ ***Iowa Department of Transportation, Policy 500.07, "Highway Traffic Noise Analysis and Abatement," revised 2007.*** Policy 500.07, "Highway Traffic Noise Analysis and Abatement," establishes Iowa DOT's policies and interoffice responsibilities and procedures for highway traffic noise analysis and abatement.

Iowa DOT recognizes both Type I and II traffic noise abatement projects. In general, Policy 500.07 commits the state to applying the necessary measures to reduce excessive noise from highway traffic and highway construction where such measures are feasible and economically reasonable.

Noise abatement measures are considered for existing noise-sensitive land uses and noise-sensitive developments that are planned, designed, and programmed at the time of "public knowledge" of the location of a proposed highway project. The date the public is officially notified of the adoption of the location of a proposed highway project is the date of FHWA approval of the final environmental document.

39.1.3 Interagency Memoranda of Understanding

None applicable.

39.1.4 Guidance Documents

ⓘ ***FHWA TA T6160, "Analysis of Highway Construction Noise," March 13, 1984.***

ⓘ ***FHWA, "Highway Traffic Noise Analysis and Abatement, Policy and Guidance," June 1995.*** In June of 1995, FHWA issued "Highway Traffic Noise Analysis and Abatement, Policy and Guidance." This document provides current policies and guidance for noise studies.

The FHWA Policy Paper states that state highway agencies were required to develop written policy guidelines by June 11, 1996. FHWA reviewed and approved the state highway agency guidelines.

ⓘ ***American Association of State Highway and Transportation Officials (AASHTO), "Guide on Evaluation and Abatement of Traffic Noise," 1993.*** The guide on evaluation and attenuation of traffic noise from AASHTO, "Guide on Evaluation and Abatement of Traffic Noise," provides the general procedures and techniques used in the evaluation of traffic noise and in the mitigation of traffic noise impacts. In addition, AASHTO has produced the "Guide Specifications for Structural Design of Noise Barriers," which serves to assist in barrier design.

ⓘ ***Federal Highway Administration Report Number FHWA-PD-96-046, "Measurement of Highway-Related Noise," May 1996.***

39.2 Resource/Regulatory Agencies and Interested Groups

See Table 39-1.

39.3 Methodology for Conducting Studies

Noise studies prepared for environmental documents are subject to FHWA and Iowa DOT requirements for the preparation of such studies. Typically, the level of detail of noise studies does not change with the type of environmental document being prepared (i.e., a noise study prepared for an Environmental Assessment [EA] would be the same as that prepared for an Environmental Impact Statement [EIS]). However, at the alternatives analysis level, when preliminary design data are not yet available, it may be appropriate

Table 39-1

Resource/Regulatory Agencies and Interested Groups	
Agency	When Involved and Why
FHWA	The methodology, findings, and recommendations of the noise study report for a federal- and state-funded project must conform to the FHWA requirements and be approved by Iowa DOT. The noise study report is subject to reviews of both agencies before its recommendations for noise abatement are accepted.
Local government	To assist local government with land-use controls, noise studies should identify zones of potential noise impact. Copies of noise study reports should be given to city and/or county planning departments. If environmental documents are prepared, the noise study reports should be distributed with the EIS or EA.

to conduct a program level study by developing simplified noise contours and identifying potential areas where noise abatement could be required.

Typical traffic noise studies require a prescribed methodology that evaluates the potential noise impacts on existing and planned land uses within the project corridor and offers feasible and reasonable noise abatement measures for impacted areas, where possible. The noise analysis is accomplished through the identification of noise sensitive areas and evaluation of existing and projected design year traffic noise conditions at those areas. Design-year noise predictions are typically based on traffic volumes and conditions 20 years in the future. Noise levels under both future Build and No-Build scenarios are predicted.

39.3.1 Land Use

Land use must be determined adjacent to and in the immediate area of the project. The zoning and comprehensive land-use plan designations for the project area also need to be obtained from the local land-use jurisdiction. Land use covered by the noise study must include existing activities, developed lands, and undeveloped lands for which development is planned, designed and programmed. The date a development is *planned, designed, and programmed* is also determined through coordination with the local land-use planning jurisdiction. Strong evidence of probable development, such as a building permit, may be required in some cases to firmly establish such a date.

The date the public is officially notified of the adoption of the location of a proposed highway project is the date of FHWA approval of the final environmental document. Special traffic noise abatement will generally not be considered if a sensitive development is planned, designed, and programmed *after* this "date of public knowledge" of the location of a proposed highway project.

Land use should be identified on a map with a minimum 1:2400 (1":200') scale. Displacements due to project construction should also be identified.

39.3.2 Existing Noise Levels: Traffic Noise Measurement Procedure

Field measurements need to be conducted along all existing or proposed roadway segments or links that may be affected by a proposed project. For example, one or more representative sites within each segment are to be sampled if traffic volumes, mix, or horizontal/vertical geometry change enough to impact traffic noise levels. Field monitoring will generally be conducted in accordance with FHWA's guidance document, *"Measurement of Highway-Related Noise"* (Appendix 39a).

Noise measurement sites should be representative of land-use activity areas around them. An adequate number of photos of the site should be taken to document the conditions at the measurement site and to aid in relocating the microphone should follow-up measurements be needed. Noise measurements may be taken to:

- Determine existing noise levels
- Verify the accuracy of the traffic noise prediction model
- Determine unusual shielding conditions
- Establish non-traffic related noise levels

- Provide the public with actual measured noise levels rather than estimated noise levels
- Provide litigation support
- Determine effectiveness of noise abatement measures

Document the location where each of the measurements was taken; the characteristics of the measurement sites; the time of the measurements; traffic counts and speeds; equipment calibration; and weather data (including wind speed, temperature, and relative humidity) during the measurements. Noise measurement sites should be shown on a figure.

39.3.3 Traffic Noise Predictions

Traffic noise predictions should be made using the FHWA Traffic Noise Model (TNM) or other methodologies approved by FHWA.

Noise prediction sites should be located at all measurement sites. For projects with a small number of residences, predictions should be made at every residence. For a project with a large number of residences, it is not necessary to have traffic noise predictions at every residence. However, sufficient noise prediction locations must be selected based on their being representative of the entire residential area to be studied.

Prediction sites as well as measurement sites are typically located 5 meters (16 feet) from the face of the residence. This is subject to change if that location is not feasible or if the outside activity area is better represented by another location. Most outdoor activity areas are near the residence. A location near the residence can give some indication of the interior noise levels if 10 decibels (dBAs) is subtracted for open window conditions as appropriate. Noise measurements should not be closer to the building than 3 meters (10 feet) owing to possible noise reflections from the building.

For projects with a low probability of mitigation, predictions at the estimated right-of-way line and predicted noise contours can be utilized to assess impact levels (L_{eq} 66 dBA for residences, where L_{eq} indicates equivalent continuous noise levels).

The predictions at the estimated right-of-way line quantify the noise level changes, unless alignment changes are proposed. The noise contours identify probable noise impacts.

In determining noise impacts, traffic noise predictions are to be made for the worst-case noise hour. This is typically the peak truck hour, but may be the peak vehicular volume hour. A comparison should be made between these two conditions in order to determine which of the two results in worst-case noise levels.

The build future noise predictions are typically based on traffic volumes and conditions 20 years in the future. The future year of study must be decided upon prior to beginning the study.

39.3.4 Traffic Noise Impacts

As defined in the FHWA noise procedures, traffic noise impacts occur when the predicted traffic noise levels approach or exceed the noise abatement criteria (NAC) or when the predicted traffic noise levels substantially exceed the existing noise levels. Table 39-2 shows the FHWA NAC as presented by 23 CFR 772.

A measured or predicted traffic noise level of 1 dBA less than the NAC in the FHWA procedures constitutes *approaching* the NAC. Also, a predicted traffic noise level of 10 dBA or more above the existing noise level *substantially exceeds* the existing noise level.

In determining and abating traffic noise impacts, primary consideration is to be given to outdoor activity areas. Noise mitigation/abatement will usually be considered only where frequent human use occurs and a lowered noise level would be of benefit.

The impact criteria of 1 dBA less than the noise abatement absolute levels of Table 39-2 will apply to all activity categories including interior and exterior noise levels. The exterior noise impact criteria for residences, schools, parks, and churches is L_{eq} 66 dBA. If no activity areas are present, the interior noise impact criterion of L_{eq} 51 dBA is used. The exterior noise abatement criterion for commercial activities is L_{eq} 71 dBA.

Table 39-2

FHWA Noise Abatement Criteria		
Activity Category	Design Noise Levels Hourly Leq (dBA)	Description of Land-Use Activity Category
A*	57 (exterior)	Tracts of land for which serenity and quiet are of extraordinary significance, and which serve an important public need. The preservation of serenity and quiet is essential if this land is to continue to serve its intended purpose. Such areas could include amphitheaters, particular parks or portions of parks, open spaces, or historic districts which are dedicated or recognized by appropriate local officials for activities requiring special qualities of serenity and quiet.
B*	67 (exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, and parks which are not included in Category A, and residences, motels, hotels, public meeting rooms, schools, churches, libraries, and hospitals.
C	72 (exterior)	Developed lands, properties, or activities not included in Categories A and B, above.
D	—	Undeveloped lands.
E	52 (interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, ospitals, and auditoriums.

Source: 23 CFR 772, Procedures for Abatement of Highway Traffic Noise and Construction Noise, FHWA, April 1992.
**Parks of these categories include all such lands (public or private) that are used as parks as well as those public lands officially set aside or designated by a governmental agency as parks on the date of public knowledge of the proposed highway project.*

The use of the property should be a consideration when determining traffic noise impacts. For example, churches may be in use on days of the week or hours when traffic volumes may be low. Noise impacts may not exist when the period of high noise levels does not coincide with the time of use. Parks are another example. Noise impacts may not exist when the portions of the park exposed to high noise levels do not have frequent use.

During the traffic noise analysis, attention should be given to the acoustic barriers, such as buildings, fences or vegetation, which will be removed during project construction. Such physical barriers may reduce traffic noise. Their removal could increase noise levels.

The presence of narrow vegetative screens should also be considered as their removal may generate complaints from the public.

Noise impacts should be discussed in the report and identified on a figure. All noise level changes created by the project, either by alignment shifts, speed changes, or traffic volume changes, should be discussed in the report.

39.3.5 Evaluation of Traffic Noise Abatement Measures

Abatement Selection Process

Iowa DOT considers implementation of noise abatement measures for all areas identified as being impacted by traffic noise. In order for noise abatement measures to be implemented, they must prove to be both feasible and reasonable. The feasibility of a noise abatement measure has to do with the extent to which it can provide noise reduction. The reasonableness of a measure is related to its cost effectiveness in the context of the number of homes or other noise-sensitive areas it benefits.

In order for a noise abatement option to be selected, it must be both feasible and reasonable. Noise abatement is generally only applied to exterior noise sensitive spaces at ground level. Noise abatement is typically not applied to upper-story noise sensitive areas.

Feasibility of Noise Abatement

Noise abatement measures should obtain substantial noise reductions. Iowa DOT views an 8- to 10-dBA reduction as a substantial noise reduction. For solid

wall noise barriers, an expected 5-dBA reduction is required, but every reasonable effort should be made to achieve a substantial (8- to 10-dBA) noise reduction. If a 5-dBA reduction cannot be achieved, then the noise abatement under consideration is not feasible.

Reasonableness of Noise Abatement

Reasonableness is determined on the basis of the cost of abatement per benefited residence. The Document Manager should be consulted to determine the current cost criteria per residence, based on 2007 costs. A benefited residence is one where the noise level at its commonly used outdoor space is expected to be reduced by 5 dBA or more.

Available Noise Abatement Measures

- *Noise barriers*—Construction of noise barriers between the roadway and noise receiver areas is typically the most practical and effective method of abating traffic noise. Noise barriers can be constructed in the form of earthen berms or walls or a combination of berm and wall.
- *Traffic management measures*—For some locations where traffic management measures can be implemented, they could be an effective method to mitigate traffic noise. Such measures include the restriction of truck traffic and imposition of low speed limits. Truck or speed restrictions are not recommended where they conflict with the designated use of the roadway or create unreasonable delay or hardship on the motoring public.
- *Highway design*—Noise abatement/mitigation may also be achieved through the design of a highway. Design measures that could be utilized to control or reduce traffic noise include alignment changes and depressing the roadway below existing grade. The selection of pavement texture has also been found to have limited, short-term effects on overall traffic noise levels. Changes in roadway grade and alignment can be an effective method of avoiding or reducing a noise impact for new alignments. Typically, alignment and grade changes are not an effective method to mitigate noise along an existing alignment due to the cost involved in acquiring additional right-of-way and the inconvenience to the public. A depressed roadway cut section can effectively reduce traffic noise. If a project has a need for additional fill material, a lower roadway grade may be a cost-effective method to provide the fill material and also reduce traffic noise. The texture of the pavement has been found to have little effect on the overall traffic noise levels. The pavement texture is subject to change over time through normal wear of the pavement surface and/or the filling of surface voids with sand or other material. Any benefit that might be derived from a smooth or coarse texture is soon lost under such conditions. In addition, the noise originating from the interaction of the tires and pavement is only one of several sources of traffic noise. Other noise sources include exhaust, vehicle vibrations, engine noise, etc.
- *Land-use controls*—Appropriate zoning or development restrictions can eliminate or reduce noise impacts on future development. Ideally, local government agencies should adopt land-use plans that place commercial and industrial land uses adjacent to the highway right-of-way. Such plans would effectively create buffer zones for other noise-sensitive lands beyond the immediate vicinity to the highway.
- *Noise buffer zones*—Buffer zones can preempt development that would be adversely impacted by traffic noise.
- *Abatement measures for severe impacts*—Where severe traffic noise impacts exist or are expected, and normal mitigation measures are not physically feasible or are economically unreasonable, other extraordinary noise abatement measures, such as the purchase of private dwellings from willing sellers, may be considered. Severe noise impacts exist when noise levels exceed Leq 75 dBA. These situations will be considered on a case-by-case basis in accordance with FHWA guidelines. The FHWA Division Administrator must approve these special abatement measures.

Opinions of Impacted Residents and/or Property Owners

- *Community support and concerns*—Strong community support for or concerns with noise mitigation should be noted during the public involvement process. Support or concerns should be addressed during the evaluation of noise mitigation.
- *Mitigation approval*— A majority of the impacted residents must be in favor of the construction of the noise mitigation. When apartments or mobile home courts are analyzed, the opinion of the owners and where warranted the renters will be sought. Contact with the residents should be made during the preparation of the NEPA document or just prior to final design.

39.3.6 Construction Noise

Construction noise is addressed generically and in a somewhat qualitative fashion in the noise study report. When a special plan for controlling construction noise in a sensitive location is needed, the OLE shall, in consultation with the Office of Construction, the Office of Design and the District Office, develop the plan for inclusion in the contract documents and project Green Sheets. Typically, local noise ordinances impose time restrictions on construction activities and standard specifications require that construction machinery be equipped with mufflers and be well maintained. In certain circumstances, even in the absence of local ordinances, Iowa DOT may elect to place restrictions on working hours to reduce construction noise. This will be determined on an individual project basis.

39.4 Format and Content of Technical Reports or Memoranda

39.4.1 Long-Form Report

The long-form noise study report will typically be used to document lengthy or complex noise studies. A typical outline for report forms is provided in Appendix 39b. The format should be appropriate to the specific project and should be clear, concise, and easy to read. A hard copy of the report as well as an electronic version should be submitted to OLE.

39.4.2 Short-Form Report

The short-form noise study report documents the same type of information as the long-form noise study report but uses a form format. The purpose behind this report is to document the result of a noise study on a simple project of small scope. A copy of the short-form format is provided in Appendix 39c. A hard copy and electronic version of this report should also be submitted to OLE.

Geographic information system (GIS) data created for the noise studies should also be submitted to the Iowa DOT along with the technical report or memorandum.

39.5 Format and Content of NEPA Document Discussion

39.5.1 Information Required for Noise Section of NEPA Document

Categorical Exclusions

For projects being processed as categorical exclusions, a brief summary of the noise study report should be included with noise values presented in written form, including any noise abatement commitments.

Environmental Assessments

The Environmental Analysis section of the EA should reference and summarize the noise study report. The summary should include a description of the noise sensitive areas, existing noise levels, and information about any measurements taken during the study, including the dates and times the measurements were taken. Specific references may be made to the noise study report, as appropriate. The availability of the noise study report at Iowa DOT offices should also be noted.

Coordination that occurred during the noise study process should be documented. The Comments and Coordination section shall discuss the history of the noise process and include letters from agencies expressing comments on the noise study report. Resolution of comments shall also be documented in this section.

In Findings of No Significant Impact (FONSIs), the summary section includes a brief statement indicating the effect of the project as related to the FHWA noise abatement criteria.

Environmental Impact Statements

The affected environment discussion in the Environmental Analysis section of the EIS should provide a brief description of noise sensitive areas, including information on the numbers and types of activities that may be affected. Any measurements taken during the course of the project should be discussed, including the times and dates of the measurements.

The environmental consequences discussion in the Environmental Analysis section should summarize the noise study report and include the following information:

1. The extent of the impact (in decibels). This will include a comparison of the future predicted noise levels with both the FHWA noise abatement criteria and the existing predicted noise levels.
2. Noise abatement measures which have been considered and those measures that would likely be incorporated into the proposed project.
3. Noise problems for which no prudent solution is reasonably available and the reasons why.
4. Reference the noise study report. It should also be noted that the noise study report is available for review at Iowa DOT offices.

Noise in the Reevaluation Process

The reevaluation of a project conducted for phase approval or because of a major change should include a review of the noise study report to determine whether changing land use, roadway design, or previously modeled results might need to be reassessed. The reevaluation may result in no change to the noise study report or in a completely new noise study report being required. It is recommended that any computer modeling efforts be conducted using the same noise model used in the original evaluation unless directed otherwise by OLE's Noise Specialist and, if federally funded, the FHWA Division Office. Coordination between the FHWA Division Office and OLE staff during the reevaluation process on federally funded projects is recommended.

39.5.2 Relationship of Noise to Other Resource Topics

The findings of the noise study may have implications on other environmental resource topics. Land use and noise are obviously closely linked. In areas where parks or other Section 4(f) lands are affected by adverse noise levels, the issue needs to be addressed in the Section 4(f) discussion. When high traffic-noise levels affect low-income and minority neighborhoods, the Environmental Justice section should closely examine the issue.

39.6 Continued Work in Design and Construction

39.6.1 Commitment to Mitigation

23 CFR Part 772.11 requires that "before adoption of a final environmental impact statement or finding of no significant impact, the highway agency shall identify:

1. Noise abatement measures which are reasonable and feasible and which are likely to be incorporated in the project, and
2. Noise impacts for which no apparent solution is available."

Noise abatement commitments can be made at two times during a project's development. The first time will be during the period at which the Categorical Exclusion (CE), EA, or EIS is being finalized. By then, the noise studies will have progressed to the stage at which noise-impacted areas have been identified.

At this stage, it is unlikely that exact locations, abatement types, right-of-way requirements, etc., can be determined, although approximate barrier location and height information should be available. Abatement commitments should also be included in the project Green Sheets. The second time will be prior to Plans, Specifications, and Estimates (PS & E) approval.

The normal noise abatement design goal will be a reduction of 8 to 10 dBA. However, the minimum reduction should be 5 dBA or more. During the final design phase, exact barrier locations, heights, and types will be determined. Abatement commitments must be documented in the reevaluation prior to construction advertisement, regardless of project funding sources. It is the responsibility of OLE to insure that all noise abatement commitments that are made are provided to the project's design staff (in-house or consultant). This will include copies of the noise study report, any pertinent design-related information gained from the public involvement process, and basic design information such as wall height, location, and aesthetic treatment. These commitments are also noted on the Green Sheets to help ensure that the commitments are shared with design staff.

If at any point during the final design phase it is determined that project conditions have changed such that any committed element of the noise abatement is no longer warranted, any proposed changes to the project commitments should be coordinated with OLE staff and the FHWA, as appropriate. This coordination should occur prior to requesting approval for construction and advertisement.

39.6.2 Noise Barrier Design Considerations

- *Noise reduction goals*—The goal of abatement is to provide the optimum amount of noise reduction for the funds expended. The minimum acceptable amount of noise reduction is defined as 5 dBA. Typically, however, the noise reduction goal should be 8 to 10 dBA if such reduction can be obtained for a reasonable cost.
- *Designing for ground-floor and second-floor receivers*—Primary consideration is to be given to ground-floor outdoor activity areas. Design of noise mitigation measures for other than ground-floor receivers often results in designing a wall that must be very high, and would be unlikely to meet the criteria for reasonableness and feasibility. In addition, a noise barrier high enough to break the line-of-sight and provide mitigation for second-floor receivers can appear imposing and overwhelming to first-floor residents. Such a barrier is therefore seldom acceptable to first-floor residents. On occasion, a building with more than one floor may be so located, and the topography be such, that it is possible to mitigate traffic noise levels to an upper floor by constructing a noise barrier of reasonable height. Mitigation should not be excluded for ground-floor impacts merely on the basis that mitigation cannot be provided for upper-floor impacts.
- *Barrier height limitations*—To minimize the aesthetic impact both to driver and to residents, noise walls should have a maximum height of 16' above grade when installed over extended distances.
- *Level of design detail*—The analysis for noise mitigation measures is generally made during the location phase before detailed topography or design information is available. Project designs at this stage are often preliminary and subject to change. For this reason, it may not always be possible to determine the final elevation and location of the noise barrier. The final noise barrier design may have to be done during the final design phase of the project. At that time, finished elevations for the top of wall will be provided based on accurate survey and design information.
- *Drainage control*—The placement of the barrier must take into account existing ditches and water runoff. Noise barriers can act as dams or barricades to normal runoff.
- *Aesthetic considerations*—The visual impact of noise barriers should be part of the design process. Consideration should be given to height, end transitions, and surface texture. The construction material affects the appearance and compatibility with the surroundings. Horizontal and vertical elements also need to be detailed.

- *Truck exhaust height considerations*—As a general design consideration, noise walls should have sufficient height to block the view of the truck exhaust stacks. For design purposes, a truck stack height of 13.1 feet should be used. This is not meant to be a minimum height requirement.
- *Scenic view from residences*—Residents living adjacent to a highway may have scenic vistas, which they wish to maintain. Noise mitigation measures may be designed that effectively mitigate traffic noise while maintaining the scenic vista. Sensitivity should be used when designing noise barriers to determine if it is possible to offer a design compromise that takes into account both noise mitigation and the resident's scenic vista.
- *Side slopes of earth berms*—When designing earth berms, care should be taken to provide side slopes that can be safely negotiated by a vehicle that may accidentally leave the roadway. Normally 3:1 side slopes within the clear zone can be safely negotiated without the danger of flipping the vehicle. In addition, where possible, 3:1 side slopes are preferred to facilitate maintenance such as mowing. If side slopes steeper than 3:1 are necessary, landscaping may be needed.
- *Location of noise barriers*—Where possible, noise barriers should be located as close to the highway right-of-way line as practical. Construction of noise mitigation on private land may be advantageous to increase effectiveness or reduce cost. Construction off the highway right-of-way may also be preferred when a railroad or utility lines are adjacent to the road. In such cases the opinions of the noise impacted residents as to the desirability of the mitigation measures and the use of their property for barrier construction must be carefully weighed.
- *Expected life and maintenance of barriers*—The anticipated life span of a concrete wall is 30–50 years or greater. Timber walls have an estimated life of 20–30 years or less. The requirements for maintenance on concrete walls are low. Maintenance of wood walls can be expected to be somewhat higher. Maintenance of earth berms can be low or high depending on the covering and the slope: mowable grass, non-mowable grass, irrigated landscaping, non-irrigated landscaping, or bark.
- *Noise walls and existing fences*—An isolated pocket of land between noise barriers and access control fences, property lines, or private fencing should be avoided. Such areas act as collection points for litter, provide a location to foster the growth of weeds, and can attract urban campers. Fences between property lots should be connected to the noise walls to protect privacy and increase security.
- *Wetlands and archeological sites*—Noise barriers should not fill in wetlands or disturb archeological sites.
- *Roadside safety design*—Safety factors to consider when designing a barrier are (1) safe sight distances and (2) roadway clear zones.
- *Noise barrier end treatments*—To minimize the effect of flanking noise around the end of a wall, wing walls may be added to the ends. Wing walls should not be allowed to affect safe sight distance. Wing walls are usually only installed at cross streets where public right-of-way is present. Installation at private driveways may be done on a case-by-case basis. Where sufficient material and right-of-way is available, the end of the wall can be buried in earth berms. The ends of walls should not be lower than 6 feet if there is the potential for children to play or climb on the wall.
- *Reflected noise from a single noise barrier*—Highway-traffic noise levels are not typically increased by the construction of a noise barrier on the opposite side of a highway from a receiver. Studies with measured reflective noise have never shown increases greater than 1-2 dBA. For a person with average hearing noise increases of 1-2 dBA are typically not perceptible.

39.7 Additional References

Federal Highway Administration Report Number FHWA-PD-96-046, "Measurement of Highway-Related Noise," May 1996.

Federal Highway Administration TA T6160, "Analysis of Highway Construction Noise," March 13, 1984.

Agriculture

CHAPTER 40

Agricultural land, defined as land suitable for cultivation and other uses, has historically been an important resource in Iowa. Recognizing this, both state and federal legislation have been enacted to preserve and protect agricultural land. The most important legislation regarding the preservation of agricultural land is the Farmland Protection Policy Act (FPPA). The purpose of this act is to ensure that federal programs do not lead "to the unnecessary and irreversible conversion of farmland to nonagricultural uses."

When a proposed project involves the acquisition of land outside of an urban area, Iowa DOT must take steps to assess and determine potential agricultural land impacts. The assessment is done through coordination with the Natural Resources Conservation Service (NRCS). Through this coordination, the amount and type of agricultural land being impacted is determined, as are potential mitigation measures.

40.1 Legislation, Regulations, and Guidance

40.1.1 Federal Legislation and Regulations

ⓘ *7 USC 4201 et seq., The Farmland Protection Policy Act of 1980 and 1995.*

ⓘ *7 CFR 658, The Farmland Protection Policy Act.*

40.1.2 State Legislation and Regulations

ⓘ ***Iowa Code 6B.*** Discusses the process required to be followed when the condemnation of private property occurs.

ⓘ ***Iowa Code 306.9.*** States that relocation of primary highways through cultivated land shall be avoided to the maximum extent possible. Diagonal routes should also be avoided if feasible and prudent alternatives exist. Existing right-of-way of roadways should be utilized to their full extent. If additional right-of-way is needed then the additional right-of-way should preferably be contiguous to the existing right-of-way.

ⓘ ***Iowa Code 314.12.*** Contains the restoration processes that should be followed when fill dirt, soil, or other materials are to be removed from borrow pits.

ⓘ ***Iowa Code 314.12A.*** Describes the same restoration processes as described in Iowa Code 314.12 but refers to areas not considered borrow pits.

Agricultural land has historically been an important resource in Iowa. Recognizing this, both state and federal legislation have been enacted to preserve and protect agricultural land.

ⓘ ***Iowa Code 314.24.*** States that cities, counties, and the department shall to the extent practicable preserve and protect the natural and historic heritage of the state in the design, construction, reconstruction, relocation, repair, or maintenance of roads, streets, or highways.

40.1.3 Interagency Memoranda of Understanding

None applicable.

40.1.4 Guidance Documents

ⓘ ***FHWA Technical Advisory T6640.8A, Section V.***

40.2 Resource/Regulatory Agencies and Interested Groups

See Table 40-1.

40.3 Methodology for Conducting Agricultural Land Studies

40.3.1 Farmland Protection Policy Act (FPPA) Guidelines

This section discusses the FPPA guidelines. These guidelines were developed for federal-aid projects.

Federal-aid projects that require acquisition of right-of-way must comply with FPPA provisions. The FPPA's purpose is to "minimize the extent to which federal programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses, and to assure that federal programs are administered in a manner that, to the extent practicable, will be compatible with State, unit of local government, and private programs and policies to protect farmland" (7 USC 4201[b]).

NRCS is the agency primarily responsible for implementation of the FPPA. Under FPPA, NRCS provides technical assistance to federal agencies, state and local governments, tribes, and nonprofit organizations to develop farmland protection programs and policies.

40.3.2 Applicability

The FPPA applies to Iowa DOT projects that require farmland acquisition. If a project has potential for farmland acquisition, this process should be followed. Farmland, according to the FPPA, is defined as either prime, unique, or that which is of state or local importance. These terms are further defined in the glossary and in 7 USC 4201(c)(1) and 7 CFR 658.2(a). Land that is already in or committed to urban development or water storage, as defined in the glossary and in 7 CFR 658.2(a), or that is within the Urban Area Limit does not qualify as farmland and is therefore not subject to the FPPA.

Table 40-1

Resource/Regulatory Agencies and Interested Groups	
Group	**When Involved and Why**
U.S. Department of Agriculture—NRCS	Coordination should take place early in the process if assistance is needed to determine the presence of farmland; further coordination would be needed to determine whether or not to proceed with farmland conversion. Form AD-1006 must be forwarded to the NRCS office as part of the coordination process as soon as sufficient information is available. Staff contact information for each county can be found at http://offices.sc.egov.usda.gov/locator/app.
Iowa Department of Agriculture and Land Stewardship—Iowa Soil and Water Conservation Districts	Early coordination with this agency is suggested to address any issues that may arise. Staff contact information for each county can be found at http://www.agriculture.state.ia.us/default.asp.
Local agricultural agencies (e.g., Iowa State Extension to Agriculture and Natural Resources)	Early coordination with these agencies is suggested to address any issues that may arise. Staff contact information for each county can be found at http://www.extension.iastate.edu/ag/.

40.3.3 Farmland Protection Policy Act Process

The FPPA process is a way to determine and assess the impacts to farmland subject to FPPA and should be completed early in the project. The following is the process to be completed by Iowa DOT, usually the OLE NEPA Compliance Section or (if applicable) the consultant. For local systems projects, this process is completed by the or the applicant with assistance from the NEPA Compliance Section. This process is also detailed in Exhibit 40-1.

- Determine whether the project will require the acquisition of right-of-way by looking at the project design maps. If right-of-way is not needed, the FPPA is not applicable.
- If right-of-way is needed, determine if the project is specifically for the purposes of national defense (its the project being a segment of the National System of Interstate and Defense Highways does not meet this criterion). If it is for defense purposes, the project is exempt and the FPPA is not applicable.
- If the project is not specifically for the purposes of national defense, determine whether farmland that may be subject to FPPA will be converted for the project. If no potential FPPA-eligible farmland is involved, document this in both the project file and the environmental document.
- If farmland potentially subject to FPPA will be converted to transportation uses, or if conversion is uncertain, then Parts I, III, and VI of Form AD-1006 may need to be completed. As determined jointly by Iowa DOT, NRCS, and the FHWA, projects requiring aquisition of 5 acres or less of new right-of-way per mile or per site do not require a Form AD-1006. This determination was made in the interest of reducing unnecessary paperwork, and was based on a determination that the project does not present a significant impact to farmland. Otherwise, Form AD-1006 should be completed. A copy of Form AD-1006 can be found in Appendix 40a.
  (Note: at the discretion of the Document Manager, and in coordination with the NRCS, the Farmland Conversion Impact Rating for Corridor Type Projects form [NRCS-CPA-106] may be completed instead.)
- If Form AD-1006 is required, determine whether the total of Site Assessment Points in Part VI of the form is 60 or more; if not, Form AD-1006 does not need to be submitted to NRCS. See Section 40.3.4 for further guidance. Place the completed Form AD-1006 in the project files and summarize in the environmental document. The Farmland Protection Policy process is completed.
- If Form AD-1006 Part VI scores 60 or more, submit it and a project location map to the NRCS field office in the county where the project is located.
- NRCS field office will send notification within 30 calendar days of receipt of Form AD-1006 if any land impacted by the project is subject to FPPA.
- If farmland subject to FPPA is not impacted, NRCS field office will complete Part II of Form AD-1006 and return it. The Farmland Protection Policy process is completed.
- If farmland subject to FPPA is impacted, the NRCS field office will complete Parts II, IV, and V of Form AD-1006 and return it. Part VII of Form AD-1006 will then need to be completed by either the Iowa DOT consultant or NEPA Compliance staff.
- Determine whether any of the project alternatives scores a total of 160 points or more on Form AD-1006. If the project alternatives score 160 points or more, give impacted farmlands a higher level of consideration for protection, which could include mitigation. In the NEPA document for the project, the purpose and process for completing the form should be explained briefly. The environmental document should also discuss the number of points assigned to the project and the conclusion reached by calculating the points.
- Document the level of consideration or protection given to farmland in the environmental document.
- Following selection of an alternative, submit one copy of Form AD-1006 indicating the selected alternative to the NRCS field office in the county where the project is located. The Farmland Protection Policy process is completed. The OLE NEPA Compliance Section will keep one copy of Form AD-1006 for inclusion in the project files.

40.3.4 Guidance for Completing Part VI of Form AD-1006

Although instructions for completing Form AD-1006 are included with the form, the following guidance has been provided below to help with scoring the site assessment criteria (Part VI of the form). These instructions summarize those listed in 7 CFR 658.5(b), and in addition, give interpolated point values for the ranges of percentages listed. Use the point values shown in the tables below (or a linear interpolation between these values) when determining the Part VI score for each of the site assessment criteria. Instructions for each of the 12 site criteria are listed below.

1. Area in nonurban use: Using the Table 40-2, assign a point value for the percentage of land in nonurban use within a 1-mile radius of the project.

Table 40-2

Percentage	>90	90	80	70	60	50	40	30	20	<20
Point Value	15	14	12	11	9	7	5	2	1	0

2. Perimeter in nonurban use: Using Table 40-3, assign a point value for the percentage of the project site perimeter that borders land in nonurban use.

Table 40-3

Percentage	>90	90	80	70	60	50	40	30	20	<20
Point Value	10	9	8	7	6	5	4	3	1	0

3. Percent of site being farmed: Using Table 40-4, assign a point value for the percentage of the project site that has been farmed (managed for a scheduled harvest or timber activity) for more than 5 of the last 10 years.

Table 40-4

Percentage	>90	90	80	70	60	50	40	30	20	<20
Point Value	20	19	16	14	11	9	6	4	1	0

4. Protection provided by state and local government: If the site is subject to state, local government, or private programs or policies to protect farmland, assign 20 points. If not, assign 0 points.

5. Distance from urban built-up area: This criterion does not apply to street and highway projects. Assign 0 points.

6. Distance to urban support services: This criterion does not apply to street and highway projects. Assign 0 points.

7. Size of present farm unit compared to average: Using Table 40-5, assign a point value for the average size of the farm unit(s) containing the site (before the project) as compared with the average size farm unit in that county.

Table 40-5

Percentage	>=100	95	90	85	80	75	70	65	60	55	50
Point Value	10	9	8	7	6	5	4	3	2	1	0

Note: The percentage above is calculated by dividing the average site farm unit(s) size by the average farm unit size in that county. Average farm sizes in each county are available from the NRCS field office.

8. Creation of nonfarmable farmland: Using Table 40-6, assign a point value for the percentage of remaining farmland that will be nonfarmable if the project site is chosen.

Table 40-6

Percentage	>25	25	20	15	10	5	<5
Point Value	25	24	18.25	12.5	6.75	1	0

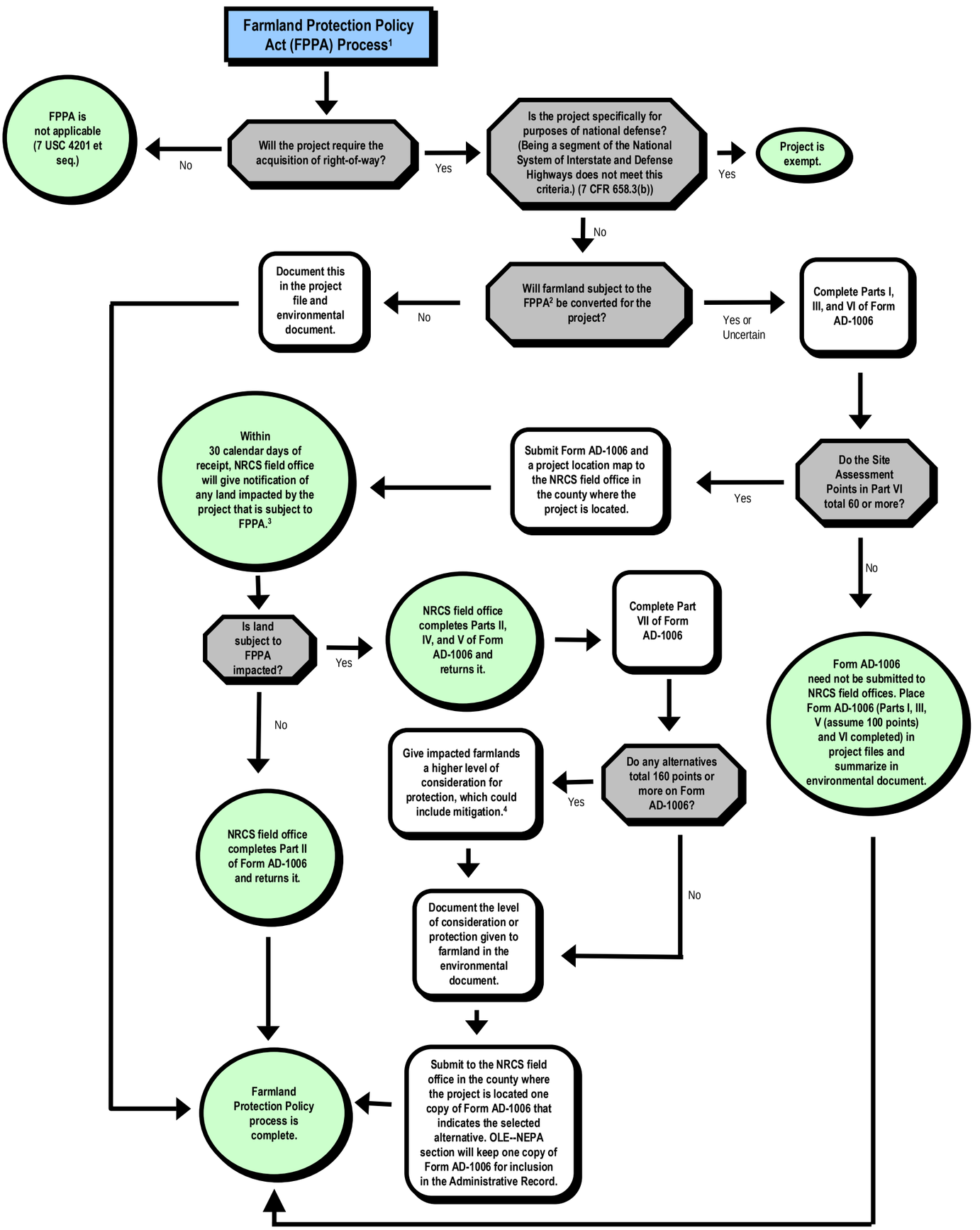
Note: The percentage above is calculated by dividing the amount of remaining farmland that is nonfarmable by amount of farmland that is converted by the project. For example: If, as a result of the project, 1 acre of farmland is left nonfarmable and 5 acres are converted, the percentage is 20 and 18.25 points are assigned.

9. Availability of farm support services: Assign a point value for the availability and adequate supply of farm support services, such as farm suppliers, equipment dealers, processing and storage facilities, and farmer's markets. Use the following scale:

   - All required services are available = 5 points
   - Some required services are available = 4 to 1 points
   - No required services are available = 0 points

10. On-farm investments: Assign a point value according to the amount of substantial and well-maintained on-farm investments on the project site such as barns and other storage buildings, fruit trees and vines, field terraces, drainage, irrigation, waterways, or other soil and water conservation measures. Count only the on-farm investments that are actually on the project site.

Exhibit 40-1
FPPA Process



Adopted from FHWA "NEPA and the Transportation Decision-Making Process" workbook and Iowa DOT "Federal-Aid Project Development Guide for Local Public Agencies."

[1]The following is the process to be completed by Iowa DOT, usually the Office of Location and Environment (OLE) NEPA section, or (if applicable) the consultant. For local systems projects, this process may be completed by the district office or the applicant with assistance from the NEPA section. This process is also detailed in Section 4.5.

[2]See the glossary for guidance on what constitutes farmland, or see Section 1540(c) of the FPPA and 7 CFR 658.2(a) Not all farmland is subject to the FPPA. Some prime farmland is excluded (see 7 CFR 658.2(a)).

[3]If the NRCS does not respond within 30 days and further delay would interfere with construction activities, you may proceed without any additional consideration for farmland impacts.

[4]Mitigation could include (a) using land that is not farmland, (b) identifying alternative locations that would convert fewer acres of farmland or use other farmland of lower relative value, and (c) re-examining any special siting requirements for the project, as noted in 7 CFR 658.4(c)(4).

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Use the following scale:

- High amount of on-farm investments = 20 points
- Moderate amount of on-farm investments = 19 to 1 points
- No on-farm investments = 0 points

11. Effects of conversion on farm support services: Assign a point value according to the reduction in demand for farm support services that the project would create by converting farmland to nonagricultural use. Use the following scale:
    - Substantial reduction = 25 points
    - Some reduction = 24 to 1 points
    - No significant reduction = 0 points
12. Compatibility with existing agricultural use: Assign a point value according to the degree to which the proposed use of the project site is sufficiently incompatible with agriculture that it will likely contribute to the eventual conversion of surrounding farmland to nonagricultural use. Use the following scale:
    - Incompatible with existing agricultural use of surrounding farmland = 10 points
    - Tolerable to existing agricultural use of surrounding farmland = 9 to 1 points
    - Fully compatible with existing agricultural use of surrounding farmland = 0 points

40.3.5 Iowa Code 306.9—Diagonal Severance

According to Iowa Code 306.9, the relocation of primary highways through cultivated land shall be avoided to the maximum extent possible. Diagonal routes should also be avoided if feasible and prudent alternatives exist. Existing right-of-way should be utilized to its full extent. If additional right-of-way is needed, then the additional right-of-way should be contiguous to the existing right-of-way.

Diagonal severances of cropped parcels have the potential to create unfarmable parcels. This may occur either because the separate pieces of the remaining parcels are too small to be efficient for farming or because the shape of the remaining parcel contains angles that are too sharp to allow farm machinery to make turns.

Specific criteria do not exist to measure the impact of a diagonal severance. However, a reasonable judgment may be made by superimposing the proposed alternative on aerial photography of the project area. Any judgments about potential creation of unfarmable parcels should be discussed in the environmental document for the project.

40.3.6 Iowa Code 6B—Authority to Condemn Agricultural Land

Iowa Code 6A.21 1a defines agricultural land as follows:

> *Agricultural land means real property owned by a person in tracts of ten acres or more and not laid off into lots of less than ten acres or divided by streets and alleys into parcels of less than ten acres, and that has been used for the production of agricultural commodities during three out of the past five years. Such use of property includes, but is not limited to, the raising, harvesting, handling, drying, or storage of crops used for feed, food, seed, or fiber; the care or feeding of livestock; the handling or transportation of crops or livestock; the storage, treatment, or disposal of livestock manure; and the application of fertilizers, soil conditioners, pesticides, and herbicides on crops. Agricultural land includes land on which is located farm residences or outbuildings used for agricultural purposes and land on which is located facilities, structures, or equipment for agricultural purposes. Agricultural land includes land taken out of agricultural production for purposes of environmental protection or preservation.*

When agricultural land that meets this definition may be impacted by a project, Iowa Code 6B requires a public hearing before condemnation authority can be given. Chapter 44, *Public Involvement*, of this manual discusses the process for complying with the property owner notification requirements of Iowa Code 6B in greater detail.

40.4 Format and Content of Technical Reports or Memoranda

Technical reports or memoranda are not typically required beyond Form AD-1006, which must be maintained in the project files.

If it is determined that a technical report or memorandum is appropriate for a project, it will be developed in hard copy and electronic formats, and the impact maps will be available in the project's geographic information system (GIS) database. It should discuss the resources consulted to identify agricultural resources, consultation with agencies and the public on agricultural issues, and the methodology used to assess potential agricultural impacts. It should also include as exhibits a copy of Form AD-1006 (if appropriate), aerial photography of any diagonal severances.

40.5 Format and Content of NEPA Documentation Discussion

The NEPA documentation process is normally the manner in which FPPA compliance is reached. In order for a NEPA document to be approved by FHWA, the NEPA document must show that the Act was followed.

FHWA TA T6640.8A discusses factors that should be discussed for each reasonable alternative where an impact to farmland may occur. Following is a summary of the agricultural guidance in the TA.

The affected environment discussion in the Environmental Analysis section of the environmental document should cover the types of agriculture and farming practiced in the project area. Areas meeting the definition of "farmland" should be discussed. Farmland includes land that is (1) prime, (2) unique, (3) other than prime or unique but of statewide importance, or (4) other than prime or unique but of local importance.

The environmental consequences discussion in the Environmental Analysis section should summarize the results of early agency coordination when farmland, as defined above, may be potentially impacted by a project alternative under consideration. See Table 40-1 for a list of agencies for coordination. The environmental document should also include a map of all farmlands in the project impact area and a discussion of the alternative's potential impact on farmlands and the measures to avoid or reduce the impacts. This section should also discuss what efforts have been made to avoid or minimize diagonal severances, if applicable.

Reference should be made in the text to Form AD-1006, which should be completed and included in the environmental document as an exhibit. When a score of 160 points or more on Form AD-1006 is obtained, the environmental document should discuss alternatives to avoid farmland impacts. If avoidance is not possible, measures to minimize the impacts should be evaluated.

40.6 Continued Work in Design and Construction

No additional work is generally needed in these phases, but exceptions can occur. These exceptions may include reexamining access to fields, maintaining access during construction, restriction of certain construction activities during planting or harvesting seasons, etc.

40.7 Additional References

Farmland Protection Policy Act as amended at 59 Federal Register 31117, June 17, 1994: http://www.fhwa.dot.gov.

FHWA Guidelines for Implementing the Final Rule of the Farmland Protection Policy Act for Highway Projects, 1989: http://www.fhwa.dot.gov.

FHWA Supplemental Guidance for Implementation of Farmland Protection Policy Act, 1985: http://www.fhwa.dot.gov.

FHWA Technical Advisory T6640.8A; see "Farmland Impacts" section: http://www.fhwa.dot.gov.

Instructions for Form AD-1006:
http://www.nrcs.usda.gov.

Iowa Code 306.9 and 314.12:
http://www.legis.state.ia.us.

Iowa Code 314.12A (Senate File 144):
http://www.legis.state.ia.us.

NOTES:

Regulated Materials

CHAPTER 41

This chapter discusses the methodology and documentation requirements for conducting studies of regulated materials on a project. The timely identification of involvement with regulated materials has benefits that include cost savings through the avoidance of contaminated sites and a reduction in legal liability.

41.1 Legislation, Regulations, and Guidance

This section provides the legislation, regulations, and guidance most likely to be applicable to and associated with typical transportation projects with regulated materials impacts. It is not all-inclusive; site-specific conditions may be encountered where additional, unique regulations may apply. In these instances, Iowa DOT and its contractors must coordinate with the appropriate regulatory agencies to ensure compliance with the applicable regulations. Key regulations or guidance and their likely applicability are provided in the following sections.

41.1.1 Federal Legislation and Regulations

- *42 USC 103, CERCLA and Superfund Amendments and Reauthorization Act of 1986 (SARA; also known as the federal Superfund program) (Superfund sites).*
- *40 CFR 61, Clean Air Act, National Emissions Standard for Hazardous Air Pollutants (asbestos abatement and demolition sites).*
- *33 USC 1251 et seq., Clean Water Act (sites potentially affecting surface water bodies).*
- *40 CFR I, Resource Conservation and Recovery Act of 1976 (RCRA); and Office of Solid Waste and Emergency Response Directive 9902.3-2A (May 31, 1994) (RCRA sites).*
- *40 CFR 761, Toxic Substances Control Act (TSCA) (PCB sites).*

41.1.2 State Legislation and Regulations

- *Iowa Administrative Code 567–135 (underground storage tank [UST] sites).*
- *Iowa Administrative Code 567–100, 567–131, 567–133, 567–137, 567–140, 567–141, and 567–148 (other properties with releases of regulated materials).*

Regulated Materials Reviews are performed to identify contaminated properties so that they can be factored in to alternative selection & design considerations.

41.1.3 Interagency Memoranda of Understanding

None applicable.

41.1.4 Guidance Documents

ⓘ *American Society of Testing and Materials (ASTM) E 1527. Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process.*

ⓘ *ASTM E 1903. Standard Practice for Environmental Site Assessments: Phase II Environmental Site Assessment Process.*

ⓘ *Can-Do Reference Manual: Guidelines for Implementing Iowa Department of Transportation's Can-Do Project Development Process, Iowa Department of Transportation, October 2001.*

ⓘ *FHWA TA T6640.8A, Section V.*

41.2 Resource/Regulatory Agencies and Interested Groups

This subsection summarizes the primary regulatory agencies that may be involved in transportation-related hazardous waste projects. As with the regulatory summary, this listing is not comprehensive, and in certain instances other agencies may be involved. Iowa DOT and its contractors must work together to ensure that the appropriate regulatory agencies are involved as required. See Table 41-1.

41.3 Methodology for Conducting Regulated Materials Studies

The overall process for regulated materials reviews, investigations, and remedial actions follows the steps, processes, and general schedule outlined in Iowa DOT's *Can-Do Manual*. Specific steps are described in the following subsections.

The work discussed within this chapter may be completed by NEPA Compliance Section staff or its consultant, unless otherwise specified in the text.

41.3.1 Initial Regulated Materials Review

Scheduling/Coordination of Initial Regulated Materials Review with Other Environmental Activities

An Initial Regulated Materials Review should be performed concurrently with the Environmental Assessment (EA) or Environmental Impact Study (EIS) preparation, and in conjunction with other environmental investigations (e.g., threatened and endangered species investigations, Phase I/II cultural investigations, and wetlands surveys), as outlined in the *Can-Do Manual* (see Appendix A of the *Can-Do Manual* for the schedule relationships).

Table 41-1

Resource/Regulatory Agencies and Interested Groups	
Agency	**When Involved and Why**
U.S. Environmental Protection Agency (EPA) Region VII	RCRA sites, CERCLA sites, PCB (TSCA) sites. EPA has approval authority for site investigation and corrective action work plans and final corrective action and closure of these sites. EPA regulates operation of RCRA sites and approves permits required for activities at these sites.
Iowa Department of Natural Resources (DNR)	UST/LUST sites, state hazardous waste sites (non-RCRA or CERCLA), asbestos abatement, solid waste sites, and other release sites (such as manufactured gas plant sites) regulated under Iowa Administrative Code. DNR regulates operation of active sites and has approval authority for work plans, site closures, and applicable permits required for activities at these sites.
Local/municipal agencies (various)	Depending on the project and the location, various local or municipal agencies, such as the County Sanitarian, the County Health Department, and the Municipal Water Department, may have authority to require notifications regarding issues such as septic tanks and private well records and groundwater issues potentially affecting municipal water supplies. Local agency coordination should occur as needed on a project-specific basis.

Purpose of Initial Regulated Materials Review

The purpose of the Initial Regulated Materials Review is to identify properties that are, or may be, contaminated with regulated materials along the alternatives within the corridor study area so that the presence of these properties may be factored into subsequent alternative selection and design considerations. It is preferable to avoid highly contaminated sites in order to minimize potential additional costs, liability, or schedule delays due to site remediation.

Procedures/Methodology for Conducting Initial Regulated Materials Review

This Initial Regulated Materials Review might also be called a Phase I Environmental Site Assessment and generally follows the most current version of ASTM E 1527. Sites with potential contamination issues may be identified through private database-search companies; various state and federal databases; review of historic aerial photographs, Sanborn maps, or city directories; title searches, windshield surveys, or other sources or combinations of sources. Databases searched are to include sources identified in the ASTM standard and sites listed in the Registry of Hazardous Waste or Hazardous Substance Disposal Sites (as defined in Iowa Administrative Code 567-148; also referred to as State Hazardous Waste Sites in Chapter 39), which is maintained by and available from the Iowa Department of Natural Resources (DNR). At a minimum, sites to be identified by this review include those on the National Prioritier List (NPL); Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) list; Iowa Registry of Hazardous Waste or Hazardous Substance Disposal Sites, known leaking underground storage tank (LUST) sites, and any sites currently or formerly operating as gas stations, bulk petroleum plants, rail yards, electrical substations, dry cleaners, landfills, junkyards, vehicle repair and auto body/paint shops, fleet maintenance facilities, and agricultural chemical and fertilizer dealerships. The ASTM standard should be applied broadly to these corridor studies to identify sites within the corridor study area that may contain recognized environmental conditions (RECs) (as defined in ASTM E 1527) and to prioritize sites relative to the potential for environmental releases and the potential impact of these releases on areas that may be acquired by Iowa DOT. The level of review and inspection at each site during a corridor study may be slightly less than the level of review performed at an individually-targeted site, although the primary elements of the ASTM standard are to be followed.

The Initial Regulated Materials Review may be done in steps, following the process outlined in Exhibit 41-1.

The Initial Regulated Materials Review typically starts with a database review and site identification, followed by a preliminary ranking, a review of aerial photography and other historic information, a field corridor review, agency interviews, and selected property-owner interviews.

The field corridor review(s) is performed as a windshield survey to verify occupants, locations, addresses, and uses of properties identified in database searches and to look for visible evidence of regulated materials releases at listed sites or other sites along the corridor. A checklist to be used for standard field corridor reviews is provided in Exhibit 41-2. Observations made during the field corridor review are to be documented with photographs in addition to the checklist. It is expected that each property identified during the database review will be viewed during the field corridor review. However, detailed property inspections of the interior and exterior property areas are not expected beyond those areas that can be viewed from public roadways. To the extent possible, recognized environmental conditions associated with each site are to be identified.

Agency interviews and property owner (or operator/occupant) interviews may be limited to those sites deemed to have a significant potential for contamination or environmental releases, and which could affect the alignment or alternative. Site rankings should be revisited and refined as additional data are collected from the field corridor review(s), agency interviews, and owner/operator interviews.

As part of the Phase I Environmental Site Assessment, sites are to be ranked as follows. Iowa DOT may use site specific information to move individual sites to a higher or lower ranking.

- *High Risk:* CERCLA sites, RCRA Corrective Action sites, RCRA Transportation, Storage or Disposal sites, State Hazardous Waste Sites classified as "a" or "b" (as defined in Iowa Code 567.148), CERCLIS sites, RCRA sites under Administrative Orders, LUST sites with a High Risk designation by Iowa DNR, rail yards, former manufactured gas plant sites, or any property where evidence of a notable release of regulated materials was observed during the field corridor review or site visit.
- *Moderate Risk:* LUST sites with a Low Risk designation by Iowa DNR, State Hazardous Waste Sites classified as "c" or "d" (as defined in Iowa Code 567.148), RCRA Large-Quantity Generators, former gas stations pre-dating Iowa DNR's RBCA rules (1996), commercial and industrial UST sites, vehicle junkyards and salvage yards, dry cleaners, electrical substations, landfills, petroleum pipeline terminals and bulk plants, vehicle repair and auto body/paint shops, fleet maintenance facilities, and commercial and industrial facilities where the potential for regulated materials was observed during the field corridor review or site visit and sloppy housekeeping practices were observed to an extent that the potential for environmental contamination is higher than if normal waste management practices had been followed.
- *Low Risk:* LUST sites with a No-Further-Action designation by Iowa DNR, State Hazardous Waste Sites classified as "e" (as defined in Iowa Code 567.148), RCRA Small-Quantity Generators, CERCLIS sites with a No-Further-Remedial-Action-Planned determination, farm and residential UST sites, above-ground storage tank sites, farm dumps, sites crossed by petroleum pipelines, RCRA Conditionally-Exempt-Small-Quantity Generators and other permitted users or generators of regulated materials that do not have releases listed in environmental databases or other documentation, sites regulated under air emissions permits, animal confinement operations, and commercial/industrial facilities where the potential for regulated materials to be present was observed during the site visits but no evidence of releases was observed or reported.
- *Minimal Risk:* Houses, farms, agricultural land, timbered land, recreational facilities, vacant land with no historical use listed in any of the other ranking categories, and commercial properties where a low potential or no potential for regulated materials to be present was observed during the site visits.

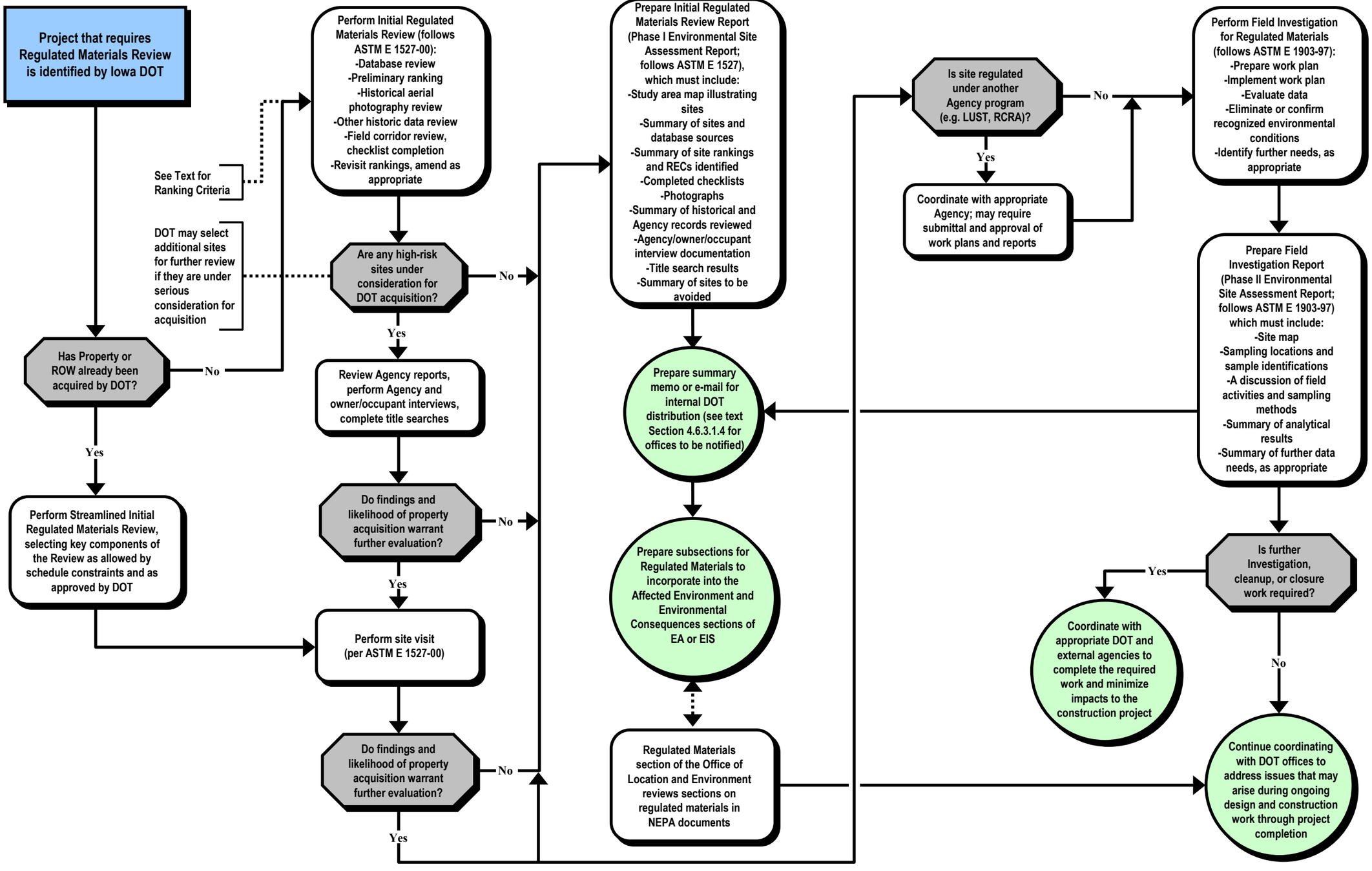
In some cases, it may be beneficial to request additional information, such as site investigation reports or release reports, for high-priority sites from various state and federal agencies, to further understand the potential site contamination issues. Title searches to identify previous owners and the presence of liens or easements on a property may be performed as directed by OLE for parcels that are likely to be acquired by Iowa DOT.

At this point, Iowa DOT may choose to perform individual site visits to properties that had obvious signs of environmental contamination during the field corridor review or that are under consideration for acquisition by Iowa DOT. Property owners and tenants are to be contacted to obtain permission and schedule the site visit prior to conducting the site visit. Written approval from the owners and tenants is to be provided to OLE prior to the site visit. Owner/operator interviews may be done in conjunction with these individual site visits. In the event Iowa DOT has already acquired a property, a site visit must be performed as soon as possible. A checklist to be used for standard site visits is provided in Exhibit 41-3. When specific individual sites are identified for such an assessment, it is expected that the full level of detail required to inspect each site and identify recognized environmental conditions (as described in the most current version of ASTM E 1527) will be followed.

Communication of Findings

Activities and findings are to be documented in a report (summarized in Section 41.4) and communicated to other Iowa DOT offices, including the NEPA Compliance and Location Studies Sections of OLE, Office of Design, Office of Right-of-Way, and the appropriate District Office.

Exhibit 41-1
Regulated Materials Review Process



CHAPTER 41

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Exhibit 41-2
Field Coordinator Review Checklist

Iowa DOT—Hazardous Waste and Regulated Substances—Field Corridor Review Checklist

Directions: This form is intended to supplement field notes associated with GIS mapping, aerial photography, and/or corridor maps showing listed sites provided by database search services. Corrections and other notes may be kept in field notebooks, on corridor maps, or on other tabular site summaries, (in addition to information on this form), for compilation into a summary report. The items listed on the form are key issues that should be noted during windshield surveys of a corridor. *This form should be completed for all sites initially identified as high risk* and for all other sites where potential environmental concerns are noted during the Field Corridor Review. At certain sites and for more detailed observations, the Site Visit Checklist should be used. Make additional copies of this form as needed.

Reviewer/Date:_____

Site Name (Occupant) and Address	Name, Address, Mapped Location Verified?	Notable Poor Housekeeping at the Site?	Notable Observations or Evidence of Past or Present Activities that have Potential for Releases (Please Describe. Attach Additional Pages if Necessary).	List Photographs and Description of Each

Exhibit 41-3
Site Visit Checklist

Iowa DOT—Regulated Materials—Site Visit Checklist

Site Address: _____
Name/Current Owner: _____
Current Tennant (if applicable): _____
Current Use: _____
Past Use(s): _____

Name of Individual Conducting Site Visit/Date of Site Visit: _____
Owner's Representative or other individual met: _____
Describe part(s) of site that were viewed/not viewed: _____
_____

Were any of the following (or evidence of any of the following) observed at the site? (Check all that apply).

	Product Drums		Waste Drums		Vent or Fill Pipes
	Ponds, Lagoons or Impoundments		Stressed or Dead Vegetation		Soil Discoloration or Staining
	Underground Storage Tanks		Above ground Storage Tanks		Pump Islands or Remnants
	Landfills or Dumps		Sumps or Pits		Standing Liquids
	Air emissions or Odors		Septic Tanks		Pipes or Pipe Lines
	Pesticides		Paints		Chemical Solvents
	Auto or Industrial Batteries		Seeps or discolored springs		Spills, leaks, leachate, or discolored water
	Oil sheens on water		Fill Dirt		Wastewater discharges
	Construction Debris		Evidence of fires		Monitoring wells
	Evidence of dumped, buried or burned Solid Waste		Transformers, electrical, or hydraulic equipment (possibly PCB-containing)		Water Supply Wells
	Other unusual features (describe):				

For each item checked above, please provide a description of the features observed and their condition (attach additional pages if necessary):

Iowa DOT internal communications may be summarized in a memorandum or e-mail in a format compatible with that required for NEPA documentation (see Section 41.5). Note that contamination originating from sites that are near a proposed corridor and that may not be directly acquired by Iowa DOT could still affect a corridor through soil or groundwater migration. Such sites should be indicated in the summary report and in subsequent internal Iowa DOT communications to the extent they can be identified.

Avoidance of Identified Sites

Every effort should be made to avoid properties contaminated with regulated materials, with particular emphasis placed on High and Moderate Risk properties. Thus, it is important to provide early findings to the Project Management Team (PMT). If full avoidance is not possible, Iowa DOT will evaluate the possibility of acquiring only a portion of a potentially contaminated property or negotiating a permanent easement over a portion of the property.

In the event that a simple avoidance alternative is not available, Iowa DOT will be responsible for weighing the potential environmental liabilities against other environmental constraints and overall project needs to select the best overall solution and manage the environmental issues appropriately.

41.3.2 Field Investigation for Regulated Materials

Scheduling/Coordinating Field Investigation for Regulated Materials with Other Environmental Activities

When potentially contaminated properties identified during the Initial Regulated Materials Review are under serious consideration for acquisition by Iowa DOT, Iowa DOT may elect to perform a Field Investigation for Regulated Materials. In accordance with Iowa DOT's Can-Do process, this investigation is typically performed within a few months of completion of the Initial Regulated Materials Review and should be performed concurrently with the land survey work for property acquisition, the development of alternatives, Section 41.4 reporting, and Phase II archeological investigations (if necessary; see Appendix A of the *Can-Do Manual* for the schedule relationships).

Purpose of Field Investigation for Regulated Materials

The purpose of a field investigation is to verify the presence of regulated materials in soil, groundwater, and other media (as appropriate) at targeted sites and to characterize the nature and extent of regulated materials at the site or within the area targeted for Iowa DOT acquisition.

Procedures/Methodology for Conducting Field Investigations for Regulated Materials

The investigation may be performed in phases. The first phase of field investigation is typically limited in extent, with the primary purpose of identifying specific constituents of concern and verifying their presence in soil, groundwater, or other media (as appropriate).

Because each site is unique, the specific approach for each site will be unique and will be developed on the basis of information obtained during the Initial Regulated Materials Review and any other available information (such as regional or site-specific geologic and hydrogeologic information).

This first phase of a Field Investigation for Regulated Materials might also be called a Phase II Environmental Site Assessment and generally follows the most current version of ASTM E 1903. The NEPA Compliance Section of OLE (or its selected environmental consultant) must develop a proposed scope of work or Phase II Investigation Work Plan that identifies proposed sample locations, depths, media to be sampled, analytical parameters, and the basis for the proposed samples. The scope and magnitude of the work plan and Phase II investigation effort is to be tailored to match the potential size and complexity of the site to be investigated. Samples of soil and groundwater are to be collected at appropriate locations and analyzed for appropriate parameters on the basis of available information, as described above. In some cases,

samples of additional media—such as surface water, sediment, or sludge—may be collected. Laboratory analytical results are to be summarized in figures and tables and compared to relevant regulatory standards.

Communication of Findings

Activities and findings are to be documented in a report (summarized in Section 41.4) and communicated by the NEPA Compliance Section of OLE to other Iowa DOT offices, including the Location Section of OLE, the Office of Design, the Office of Right-of-Way, and the appropriate District Office.

Iowa DOT internal communications may be summarized in a memorandum or e-mail. The summary should include the same information as required for discussion in a NEPA document (see Section 41.5).

Avoidance of Sites

Typically, a Field Investigation for Regulated Materials will be done only on a property that cannot be avoided or that has already been acquired. If the field investigation findings are significant enough for Iowa DOT to reconsider the property acquisition and assess other alignment alternatives, to investigate further the possibility of a partial property acquisition, or to consider other options, then these recommendations will be communicated internally as described above.

On the basis of the field investigation information, Iowa DOT will be responsible for weighing potential environmental liabilities against other environmental constraints and overall project needs to select the best overall solution and manage the liabilities appropriately.

Additional Field Investigation Phases and Remedial Activities (if Necessary)

Depending on the type of site (UST, RCRA, spill site, etc.), EPA or Iowa DNR may require notifications and copies of the Phase II report, and the site may be entered into a program regulated by another agency for further work planning, investigation, cleanup, and closure work, as applicable.

Once the presence of regulated materials has been verified at a site, additional investigation phases may be performed as necessary to further characterize the nature and extent of constituents identified at the site and within the area planned for acquisition by Iowa DOT. These investigations also are to consider the potential for offsite migration of regulated materials for assessing the potential for third-party liability. As mentioned above, these subsequent phases of investigation may be performed under the regulatory authority of EPA or Iowa DNR, depending on the type of site. Work planning, investigation, reporting, and remedial activities must be performed in coordination with the other agencies and in accordance with all applicable regulations.

41.4 Format and Content of Technical Reports or Memoranda

41.4.1 Initial Regulated Materials Review

Results of the Initial Regulated Materials Review (Phase I Environmental Site Assessment) are to be incorporated into the project GIS database (see Chapter 46, *Geographic Information Systems*) and summarized in a report. The report is to be delivered to Iowa DOT both electronically and in hard copy. The report format and content must follow the outline presented in the most current version of ASTM E 1527, or as directed by OLE, and include the following:

- Map of the study area with identified sites illustrated
- Summary of all identified sites and database sources
- Descriptions of the REC identified for each site
- Summary of site rankings and the basis for the ranking (may be a table or text, depending on the number of sites)
- Title search results, if performed
- Completed checklists from the Field Corridor Review and site visits performed
- Photographs from the Field Corridor Review and/or site visit
- Historical and agency records reviewed

- Results and documentation of property owner/occupant interviews
- Summary of sites identified as high priority for avoidance

A summary of this information will be communicated by OLE to other Iowa DOT offices and incorporated into the NEPA documentation as described in Section 41.5.

41.4.2 Field Investigation for Regulated Materials

Results of the Field Investigation for Regulated Materials (Phase II Environmental Site Assessment) are to be incorporated into the project GIS database (see Chapter 46, *Geographic Information Systems*) and summarized in a report. The report is to be delivered to Iowa DOT both electronically and in hard copy. The report format and content must follow the outline presented in the most current version of ASTM E 1903, or as directed by OLE, and include the following:

- Site map showing relevant features
- Sampling locations and sample identifications
- Discussion of field activities and sampling methods
- Table summarizing analytical results
- Comparison of analytical results to applicable regulatory standards
- Discussion of the results describing whether the presence of regulated materials was verified and, if so:
  - what the primary constituents identified are,
  - in what media the constituents were identified,
  - what the potential for offsite migration of the constituents identified is, and
  - what the needs for further site characterization, remediation, or regulatory reporting are (if applicable)

A summary of this information will be communicated by OLE to other Iowa DOT offices and incorporated into the NEPA documentation as described below.

41.5 Format and Content of NEPA Documentation Discussion

Regulated materials sites are not typically a key driver affecting the selection of an alternative under the NEPA regulatory framework (although some exceptions do exist, e.g., coal tar sites). However, their early identification and documentation within the NEPA process can help Iowa DOT and other agencies more fully understand the potential environmental liabilities and constraints associated with contaminated sites and make more informed decisions regarding alignment alternatives. When these sites can be identified and considered early in the process, alternatives that reduce the need for hazardous waste site remediation can be incorporated into the planning and design phases, thus avoiding unnecessary costs.

Within environmental documents, locations of regulated materials sites are to be identified on drawings illustrating other environmental constraints. Within a subsection for "Regulated Materials," key sites are to be briefly described under the *Affected Environment* discussion of the environmental document. Sites should be summarized by type (e.g., RCRA/CERCLA hazardous waste site, aboveground storage tank [AST]/UST site, LUST site) on the basis of rankings and the likelihood of their impact on the alternative(s). Reference can be made to the Phase I or Phase II technical reports.

Additional information, particularly regarding high-risk sites that will be affected by an alternative, is to be described under a specific subsection for Regulated Materials in the text under the *Environmental Consequences* discussion of the environmental document. Brief summaries of site information, the potential impact on the alternative to the site (relative to public health and other environmental concerns), and proposed mitigation measures to eliminate or minimize impacts or public health concerns are to be discussed. A summary of findings from field investigation(s) or reference to the Phase II technical report may be included if relevant.

In the event that the project qualifies for a categorical exclusion (CE), there are no further NEPA documentation needs other than those required for the technical report and internal communications discussed previously. If an engineering report is prepared to support the CE determination, a map illustrating regulated materials site locations and summary of hazardous waste sites consistent with the format required for an EA or EIS is to be included.

The NEPA Compliance Section of OLE will review the sections on regulated materials that are generated for each NEPA document prior to the document's production for public and agency review.

41.6 Continued Work in Design and Construction

Although it is strongly preferable to identify and avoid regulated materials sites early in the alternatives development process, instances will occur in which such a site will be identified after an alternative has been selected, right-of-way has been purchased, or construction has begun.

Additionally, continued work may occur on sites that were previously identified but have ongoing needs for site characterization and/or remediation prior to construction.

Other environmental issues may need to be addressed once Iowa DOT has acquired the property. These issues, such as the presence of asbestos-containing materials, PCB-containing transformers, or household hazardous waste, are not considered significant environmental constraints warranting an avoidance alternative, but they do require proper management and mitigation once it has been determined that a property with these issues will be affected by the selected alternative and will be acquired by Iowa DOT.

There may be occasions when potential regulated materials are encountered during construction. In these instances, time-critical actions must be performed to minimize delays and cost impacts affecting the road construction.

The following subsections further describe processes to be followed for each of the instances described in the preceding paragraphs.

41.6.1 Procedures to Address Sites Identified after Alternative Selection or after Iowa DOT Right-of-Way Purchase

When OLE is notified of an alternative selection or a right-of-way purchase that has not had a prior Initial Regulated Materials Review (Phase I Environmental Site Assessment), the general process will follow that outlined previously for the Initial Regulated Materials Review and Field Investigation for Regulated Materials (if warranted), although modifications to the approach may be made at Iowa DOT's discretion. Typically, the schedule for the Initial Regulated Materials Review will be accelerated compared to the schedule that would otherwise be performed in the initial planning phases of the project. Additionally, the scope of the Review may be more limited, to the extent that the Review focuses solely on a single property of potential concern and data collection is limited to those documents that are immediately available. Reporting requirements generally would be the same as those outlined previously, although Iowa DOT also may streamline the reporting process, limiting the report documentation to a compilation of raw data, field notes, and internal memoranda communicating key findings. If the EA or EIS has already been completed, typically no further NEPA documentation would be required.

41.6.2 Process for Addressing Ongoing Issues Previously Identified

In some cases, regulated materials or other site contamination issues may not be fully resolved to the appropriate regulatory agency's satisfaction before the project goes into design and construction phases. In these cases, Iowa DOT will need to continue coordinating with the regulatory agency and Iowa DOT's design and construction offices. Iowa DOT will make every effort to negotiate with the regulatory agency a satisfactory closure agreement for regulated materials sites that will not delay or otherwise impact the proposed construction because

of subsequent remediation. In some cases, the actual construction project itself may be used as a component of the site remediation (a new roadway may be used as a maintained engineered barrier to eliminate the pathway to human exposure, for example). If longer-term groundwater monitoring is required, the monitoring network should be established in such a way that it does not impact the proposed construction and operation of the planned facility.

Procedures for implementing ongoing investigation plans, negotiating closure agreements with regulatory agencies, implementing site remediation and groundwater monitoring (when necessary), and reporting will be site-specific and follow the appropriate regulatory requirements and guidance. Results and planned actions of ongoing activities will be communicated by OLE with the other Iowa DOT offices throughout the process.

41.6.3 Process for Addressing Other Environmental Management Issues

Asbestos

Industrial sites, commercial sites, residential structures, and any other sites with structures that will be demolished must be inspected by certified asbestos inspectors after Iowa DOT has acquired the property. Iowa DOT typically uses in-house certified inspectors to perform the initial surveys. If asbestos-containing material is identified, Iowa DOT will send a removal request letter to one of several approved asbestos abatement contractors with a current service agreement, and the materials will be removed and properly disposed of prior to demolition of the structure.

PCBs

If PCB-containing transformers or other equipment (such as hydraulic fluid lines) are identified at a property acquired by Iowa DOT, they will be managed and disposed according to TSCA regulations in coordination with EPA. Releases of PCBs to the environment at levels requiring action under TSCA are to be addressed through the Field Investigation of Regulated Materials process and managed or remediated according to TSCA regulations and in coordination with EPA.

Household Hazardous Waste

Farms and other properties with buildings acquired by Iowa DOT must be inspected by Iowa DOT (or an approved contractor) prior to their being demolished. If household hazardous waste is identified, OLE will notify the Office of Right-of-Way, Office of Contracts, and Office of Construction and arrange for the materials to be removed and properly disposed of prior to building demolition. In some cases, particularly if household hazardous wastes are discovered during the building demolition, the removal and disposal of these materials may be added to the demolition contract.

Junkyards, Demolition Debris, Municipal Waste

Impacts to junkyards, closed dumps, or disposed demolition debris may require special waste handling and management if the presence of regulated materials is verified. When junkyards, demolition debris, closed dumps, or sanitary landfills are identified during the Initial Regulated Materials Review or the Field Investigation for Regulated Materials at sites or along areas of potential right-of-way, OLE will notify the Office of Right-of-Way, Office of Design, and Office of Construction of their locations. The NEPA Compliance Section of OLE will recommend avoidance of these areas if at all possible. OLE also will review all available information about the sites and the materials disposed there. If information indicates the possible presence of regulated materials, OLE may proceed with a Phase II Environmental Site Assessment, depending on the anticipated needs of the construction project.

When it is determined that regulated materials and asbestos containing materials are not present, then the junk and demolition debris can be removed under a demolition or construction contract. If asbestos containing materials are present and must be removed, they are to be managed as described earlier in this chapter. If regulated materials are present, special waste handling and disposal may be necessary. This will be managed by OLE.

In cases when disruption and excavation of sanitary landfills or closed dumps is necessary, Iowa DNR rules, as found in Iowa Administrative Code 567-100.5, will be followed. The rules require written notification, an operational plan, and specific disposal procedures.

41.6.4 Procedures to Address Regulated Materials Encountered During Construction

In some instances, even when the full process is followed and Initial Regulated Materials Reviews and Field Investigations for Regulated Materials have been performed, regulated materials may be encountered during a project's construction. In these cases (even if the material encountered is unknown and may not be a regulated material), the construction contractor must stop work immediately and notify Iowa DOT. OLE must be notified, and will arrange for investigation of the suspect materials, and, if necessary, management and removal of the materials.

The NEPA Compliance Section of OLE will assess whether the materials must be removed immediately, managed, or disposed of, or to what degree characterizing the nature and extent of the waste materials is necessary prior to performing remedial activities. In most cases, waste characterization profiling (for disposal purposes) may be performed in conjunction with a removal action.

If the contamination encountered is extensive or complex in nature, the NEPA Compliance Section of OLE will determine the scope and magnitude of a Field Investigation for Regulated Materials at the site and arrange to implement the appropriate level of characterization. Iowa DOT also will notify EPA or Iowa DNR, as appropriate, and begin negotiations for site assessment, remediation, and closure so that the construction project is minimally affected.

The level and type of documentation for such activities will be site-specific and are to be done in accordance with the appropriate regulations and guidance and in coordination with the appropriate regulatory agency.

41.7 Additional References

National Priorities List Sites in Iowa:
http://www.epa.gov.

CERCLIS hazardous waste sites, Iowa:
http://www.epa.gov.

Iowa Registry of Hazardous Waste Disposal Sites:
http://www.iowa.gov/.

Iowa Administrative Code:
http://www2.legis.state.ia.us.

Iowa Code:
http://www2.legis.state.ia.us.

UST/LUST Site Listings:
http://www.iowa.gov/.

NOTES:

Cultural Resources: Archaeology, Historic/ Architectural Preservation, and Tribal Notification

CHAPTER 42

Cultural resources are indicators of human activity that are valued by or representative of a given culture, or that contain information about a culture. These resources include but are not limited to sites, structures, landscapes, districts, and objects that are at least 50 years old, and are associated with a culture or community for scientific, traditional, religious, or other reasons. These resources vary, and can include an old bridge, ancient tribal burial grounds, a turn-of-the-century barn, a Quonset hut, a trailer park, a landscape, or a district that includes multiple resources. Federal laws have been enacted requiring federal agencies to identify and protect cultural resources, and to determine whether the proposed federal action, if it is defined as an "undertaking," has the potential to affect historic properties.

Within Iowa DOT's OLE, the Cultural Resources Section identifies and evaluates cultural resources within a proposed transportation project area (or Area of Potential Effect, as defined later in this chapter) for eligibility to be listed on the National Register of Historic Places. The Cultural Resources Section examines the potential project effects on cultural resources, and works with DOT planners and design engineers to evaluate possible alternatives to avoid or minimize any such effects. The Cultural Resources Section also consults with the State Historic Preservation Officer (SHPO), the Federal Highway Administration (FHWA), Native American Indian tribes (tribes), consultants, interested parties, the general public, and the Advisory Council on Historic Preservation (ACHP). Such agency and public involvement will occur, as warranted, during the identification of the resources, the evaluation of their significance, the assessment of a proposed project's effects on the resources, and during planning for the minimization and mitigation of adverse effects. The Cultural Resources Section prepares and distributes reports as prescribed by law and subsequent regulations at each step.

42.1 Legislation, Regulations, and Guidance

Cultural resources, which include, for example, archaeological sites, historic buildings, and other structures, can be affected by transportation projects. State and federal legislation, regulations, and guidelines exist to help evaluate the impacts of transportation projects on cultural resources. The following sections describe federal legislation, regulations, and supporting guidance, as well as Iowa's state legislation and guidance for cultural resources.

The most common review is often referred to as the "Section 106 process," as it is derived from that Section of the National Historic Preservation Act of 1966 (NHPA). However, there are many other federal laws and regulations that describe measures to ensure the protection of cultural

Cultural resources are indicators of human activity that are at least 50 years old. More specifically, cultural resources are sites, structures, landscapes, and objects of some importance to a culture or community for scientific, traditional, religious, or other reasons. These resources vary, and can include an old bridge, ancient tribal burial grounds, a turn-of-the-century barn, a Quonset hut, or even a trailer park.

resources. The most relevant federal legislation and regulations for cultural resources, as applied to transportation projects, are described below and listed in Table 42-1. To review the complete text for any of these laws or regulations, please go to the applicable Internet link listed in Section 42.6.

Table 42-1

Federal Legislation and Regulations
National Historic Preservation Act of 1966, (NHPA), as amended (16 USC 470 et seq.)
Protection of Historic Properties (36 CFR 800) "Section 106"
Section 110 of the NHPA (36 CFR 60)
National Register of Historic Places (36 CFR 60)
Determinations of Eligibility for Inclusion in the National Register of Historic Places (36 CFR 63)
Archaeological Resources Protection Act of 1979, (ARPA) as amended (16 USC 470aa-mm)
Protection of Archeological Properties (43 CFR 7)
American Indian Religious Freedom Act of 1978, (AIRPA), (42 USC 1996 and 1996a)
Native American Graves Protection and Repatriation Act of 1990, (NAGPRA), (25 USC 3001-3013)
Department of Transportation Act of 1966, Section 4(f)

42.1.1 Federal Legislation and Regulations

ⓘ ***16 USC 470 et seq., as amended, National Historic Preservation Act of 1966.*** Establishes a program for the preservation of historic properties throughout the nation. This important legislation is based on earlier legislation (Historic Sites Act of 1935) established to protect cultural resources. The NHPA is the basic federal law governing the preservation of historic and archaeological resources of national, state, and local significance. It is the structural basis for a national program that coordinates and supports public and private efforts to identify, evaluate, and protect the nation's cultural resources. It has been amended many times, adding provisions for the principal preservation activities of the federal government and the states, including the National Register, the Advisory Council, technical preservation assistance, and the Historic Preservation Fund.

ⓘ ***36 CFR 800, "Section 106, Protection of Historic Properties," as revised and reissued with an effective date of January 11, 2001, and amended August 5, 2004.*** Section 106 of the NHPA requires federal agencies to take into consideration the effects of their undertakings (any project, activity or program involving federal funds, permits, or approvals) on historic properties (a resource listed on or eligible for listing in the National Register of Historic Places), and affords the Advisory Council a reasonable opportunity to comment on such undertakings. The process defined in 36 CFR 800 describes how federal agencies are to meet these statutory responsibilities.

The Section 106 process was designed to consider historic preservation concerns, while at the same time considering the needs of federal undertakings. Through the consultation process among agency officials and other parties, the effects of the undertaking on historic properties are considered, beginning during the earliest stages of project planning. The goal is to identify historic properties within the APE as early as possible in project development, evaluate the historic significance of the properties, assess the expected project impacts, and seek ways to avoid, minimize, or mitigate any adverse effects.

Section 106 requirements include properly scheduling and sequencing the technical and consultation work—timing is important. In this regard, working with Section 106 is similar to working with NEPA and Section 4(f) reviews. All require that reasonable, early efforts be made to look at alternatives, and to disclose and consult with interested agencies and other parties, tribes, and the public on impacts and possible measures to minimize or avoid them.

Section 106 also requires the federal agency official to complete the review process "…prior to the approval of the expenditure of any federal funds on the undertaking, or prior to the issuance of any license." The regulations also require that "…the agency official shall ensure that the Section 106 process is initiated early in the planning process so that a broad range of alternatives may be considered."

If an agency fails to complete the Section 106 process prior to the approval of an undertaking, the Advisory Council may review the situation to determine whether "foreclosure" has occurred. On the basis of its findings, the Advisory Council shall notify the agency official, and the agency's federal preservation officer, and allow the agency to respond. The Advisory Council can also make its determination of foreclosure available to the public and other parties that may have an interest in the undertaking, and any effects of the undertaking on historic properties.

ⓘ ***Section 110 of the NHPA.*** Outlines the broad historic preservation responsibilities of federal agencies. Each federal agency is to establish a preservation program, in consultation with others, to protect and preserve historic properties under their jurisdiction or affected by their action. The federal agency must follow additional guidelines when affecting a National Historic Landmark. In addition, the federal agency should coordinate their efforts to comply with the requirements of relevant and related federal laws such as NAGPRA and ARPA.

If a historic property is to be demolished, the federal agency is to provide recordation of the property prior to demolition. The federal agency may not grant a license, permit, or assistance to an applicant who damages or destroys a historic property with the intent of avoiding the requirements of Section 106, "unless the agency, after consultation with the Advisory Council, determines that circumstances justify granting such assistance despite the adverse effect..."

ⓘ ***36 CFR 60, National Register of Historic Places.*** The NHPA, as amended, authorizes the Secretary of the Interior to expand and maintain a National Register of Historic Places that includes districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, engineering, and culture.

ⓘ ***36 CFR 63, Determinations of Eligibility for Inclusion in the National Register of Historic Places.*** Describes the procedures for listing properties in the National Register.

ⓘ ***16 USC 470(aa)–(mm), Archaeological Resources Protection Act of 1979 (ARPA), as amended.*** Preserves and protects paleontological resources, historic monuments, memorials, and antiquities from loss or destruction.

ⓘ ***43 CFR 7, Protection of Archeological Properties.*** This regulation implements provisions of the Archaeological Resources Protection Act of 1979, as amended (16 USC 470(aa)–(mm)), by establishing uniform definitions, standards, and procedures to be followed by all federal land managers to protect archaeological resources on public and Indian lands of the United States.

ⓘ ***42 USC 1996 and 1996a, American Indian Religious Freedom Act of 1978 (AIRPA).*** Protects places, sacred objects, and rituals of religious importance to Native Americans, Eskimos, and Native Hawaiians.

ⓘ ***25 USC 3001-3013, Native American Graves Protection and Repatriation Act of 1990 (NAGPRA).*** Protects human remains and cultural material of Native Americans and Native Hawaiian groups. This legislation defines who may claim ownership of human remains; defines the intentional removal of Native American human remains and cultural objects; defines the process for their inadvertent discovery; and defines the illegal trafficking in such items. The law also provides for the repatriation of Native American human remains and cultural objects in the possession of, or controlled by, federal agencies and museums.

ⓘ ***49 USC 303, Department of Transportation Act of 1966, Section 4(f).*** This legislation states that "special effort [is] to be made to preserve the natural beauty of the countryside, and public park and recreation lands, wildlife and waterfowl refuges, and historic sites." Historic sites include historic or archaeological sites in, or eligible for inclusion in, the National Register of Historic Places. Proposed use of Section 4(f) property requires evaluation early in project development when alternatives to the proposed action are under study. The Section 106 process must be substantially completed prior to

processing a Section 4(f) document pertaining to adverse effects to a historic property. See OLE Manual, Part III, Chapter 19, *Section 4(f)*, for a full discussion of Section 4(f). Also see FHWA Technical Advisory T6640.8A, Section V.

42.1.2 State Legislation and Regulations

Iowa has specific legislation and guidelines pertaining to cultural resources that must be considered when evaluating the potential impacts of transportation projects on those resources. A listing of these is found in Table 42-2, and they are briefly described below. The complete text of the state statutes can be found in publications of the Iowa Code or on the Iowa Legislature website; the address can be found in Section 42.6.

Table 42-2

State Legislation and Regulations
State Department of Transportation Contracts (Iowa Code 263.B.5)
Protecting Ancient Remains (Iowa Code 263B.7-9)
Ancient Human Skeletal Remains (Iowa Code 685-11.1)
Natural and Historic Preservation (Iowa Code 314.24)

ⓘ ***Iowa Code 263B.5, State Department of Transportation Contracts.*** This code describes how, in the process of letting contracts for road construction, historic properties must not be "needlessly destroyed," but if the avoidance is not possible, Iowa DOT must obtain all information possible before the eligible cultural resources are destroyed. It also details procedures if historic properties or objects are found during construction.

ⓘ ***Iowa Code 263B.7-9, Protecting Ancient Remains.*** This code provides that the state archaeologist has the primary responsibility for investigating, preserving, and re-interring discoveries of ancient human remains. For purposes of this manual, "ancient human remains" can be defined as those remains found within the state which are more than 150 years old. This code also provides that the state archaeologist may, with the approval of the executive council, open a cemetery on existing state lands, for the reburial of ancient remains inadvertently unearthed in other areas of the state. The Iowa State Archaeologist has the authority to deny its permission to any party seeking to disinter ancient human remains, which the state archaeologist determines have state or national significance (following *National Register* standards) for the inspiration and benefit of the people of the United States.

ⓘ ***Iowa Administrative Code 685-11.1, Ancient Human Skeletal Remains.*** This code describes the procedures and authorities for ancient human remains, naming OSA as the agency to contact in the event of the discovery of human remains, or suspected human remains, believed to be over 150 years old. OSA has the authority to deny permission to disinter human physical remains from aboriginal ossuaries, gravesites, cemeteries, or any other archaeological deposit determined to have state or national historic or scientific significance. OSA is responsible for maintaining the records of all known or suspected ancient burial sites in Iowa. It may also coordinate activities that would lead to the protection and preservation of ancient burials. A permit is required for the disinterment of human remains less than 150 years old.

ⓘ ***Iowa Code 314.24, Natural and Historic Preservation.*** This code declares that transportation projects "shall to the extent practicable preserve and protect the natural and historic heritage of the state in the design, construction, reconstruction, relocation, and repair, or maintenance" of transportation facilities. And that the "destruction or damage to natural areas, . . . including historical sites or archeological sites shall be avoided, if reasonable alternatives are available . . . at no significantly greater cost." In addition, "a diligent effort to identify and examine the comparative cost of utilizing alternatives," must be done.

42.1.3 Interagency Programmatic Agreements

Currently there are six Programmatic Agreements (PAs) already in effect that pertain to Iowa's cultural resources. These PAs were established to provide

greater guidance for the Section 106 process with each of the specified subjects or projects, be it historic bowstring arch bridges or Transportation Enhancement projects. The five active PAs are as follows:

- ***"Programmatic Agreement (with Procedures) Among the Iowa Department of Transportation, the Iowa Division of the Federal Highway Administration and the Iowa State Historic Preservation Officer," July 2002 (under review for updates in 2009).*** The full text of this PA, as finalized, is located on the Iowa DOT website (link is listed in Section 42.6). See Appendix 42b also.
- ***Categorical "No Historic Properties Affected" Programmatic Memorandum of Understanding (PMOU) of August 1998.*** See Appendix 42a.
- ***Marsh Arch Historic Bridges Programmatic Agreement, 1996.***
- ***Nationwide Enhancement Projects Programmatic Agreement (with Iowa Addendum), 1997.*** The text of the Nationwide Enhancements Projects PA may be found on the FHWA website and also on the Advisory Council website (see Section 42.6).
- ***Programmatic Agreement Regarding Transportation Improvements That May Affect Bowstring Arch Bridges in the State of Iowa, 2002.***
- ***Programmatic Agreement for the Lincoln Highway Corridor in Iowa, 2006.***
- ***Memorandum of Understanding with Four Tribes, 2003.***

For Iowa DOT, the most significant of these PAs is the July 2002 agreement developed with the Iowa FHWA and the Iowa SHPO. In concert with this OLE Manual, this PA is a major guide for those working with Section 106. Copies of the other PAs can be obtained from Iowa DOT's Cultural Resources Section.

For Iowa DOT project development purposes, the Section 106 review process and the National Environmental Policy Act (NEPA) review process frequently run concurrently. These two processes can also integrate information for public hearings. The extent to which these two requirements may be combined is discussed in the Iowa Section 106 Programmatic Agreement described above. Section 42.3 also outlines procedures for conducting cultural resources.

The primary federal agency for Iowa DOT projects is FHWA. Iowa DOT has been delegated authority by FHWA to initiate consultation with the Iowa SHPO and the tribes regarding the effects of its undertakings (transportation improvement projects, or "projects") upon significant cultural resources.

42.1.4 Guidance Documents

The National Park Service (NPS), part of the U.S. Department of the Interior, is the federal agency primarily responsible for the conservation and protection of natural and cultural resources. NPS has issued numerous bulletins that provide standards and guidance for the identification, evaluation, documentation, rehabilitation, preservation, and restoration of historic buildings, sites and structures, and archaeological resources. Standards for professionals who would assist in the Section 106 process also have been promulgated by the Secretary of the Interior. The most relevant NPS bulletins are listed in Table 42-3; however, many others are available. There are also over 40 Preservation Briefs that provide technical information on "bricks and mortar" topics. These briefs were developed to assist owners and developers of historic buildings on how to recognize and resolve common preservation and repair problems. For a more complete listing, or to search for specific bulletins, contact NPS directly or via the Internet. The website for the NPS bulletins is included in Section 42.6.

NPS also provides technical assistance to state, local, and tribal governments as well as federal agencies, private organizations, and universities. Assistance is available through advisory consultation, planning services, site visits, and co-sponsored conferences and workshops.

Table 42-3

U.S. Department of the Interior, National Park Service Bulletins, and other Guidance Documents
National Register Bulletin 13: How to Apply the National Register Criteria for Evaluation
National Register Bulletin 38: Guidelines for Evaluating and Documenting Traditional Cultural Properties
National Register Bulletin 30: Guidelines for Evaluating and Documenting Rural Historic Landscapes
36 CFR 63, Keeper of the National Register
The Secretary of the Interior's Standards for Architectural and Engineering Documentation
The Secretary of the Interior's Standards for Rehabilitation (36 CFR 67)
The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring and Reconstructing Historic Buildings
The Secretary of the Interior's Standards and Guidance for Archaeology and Historic Preservation
The Secretary of the Interior's Proposed Historic Preservation Professional Qualification Standards (62 FR 33708, June 20, 1997)
Guidelines for Archaeological Investigations in Iowa (IA SHPO)
Guidelines for Iowa SHPO and OSA forms (SHPO and OSA)

ⓘ ***National Register Bulletin 13: How to Apply the National Register Criteria for Evaluation.*** The National Register of Historic Places documents the appearance and importance of districts, sites, buildings, structure, and objects significant in our prehistory or history. These properties represent the major patterns of our shared local, state, and national experience. To guide the selection of properties included in the National Register, the National Park Service has developed the National Register Criteria for Evaluation. These criteria are standards by which every property that is nominated to the National Register is judged. National Register Bulletin 13 explains how the National Park Service applies these criteria in evaluating the wide range of properties that may be significance in local, state, and national history. It should be used by anyone who must decide if a particular property qualifies for the National Register of Historic Places.

ⓘ ***National Register Bulletin 38: Guidelines for Evaluating and Documenting Traditional Cultural Properties.*** This bulletin is designed to assist federal agencies, SHPOs, certified local governments, Native American tribes, and other historic preservation practitioners who need to evaluate these types of properties when nominating them for inclusion in the National Register, or when considering their eligibility for the National Register as part of the Section 106 review process. It is designed to supplement other National Register guidance.

ⓘ ***National Register Bulletin 30: Guidelines for Evaluating and Documenting Rural Historic Landscapes.*** This bulletin defines a rural historic landscape, describes its characteristics, and suggests practical methods for survey and research. It also closely examines how the National Register criteria can be applied, significance and integrity evaluated, and boundaries drawn for rural properties having significant acreage. This bulletin also discusses the information needed to register these properties in the National Register.

ⓘ ***36 CFR 63, Keeper of the National Register.*** The office of Keeper of the National Register resides within the National Park Service. The Keeper makes the final determination in any dispute regarding the eligibility of a property for listing on the National Register of Historic Places.

ⓘ ***The Secretary of the Interior's Standards for Architectural and Engineering Documentation.*** This report describes the standards and guidelines for the development of acceptable documentation on historic buildings, sites, structures, and objects, for inclusion in the Historic American Building Survey (HABS) and the Historic American Engineering Record (HAER) collections.

ⓘ ***36 CFR 67, The Secretary of the Interior's Standards for Rehabilitation.*** These rehabilitation standards apply to historic buildings of all periods, styles, types, materials, and sizes. They apply to both the exterior and the interior of historic buildings. The standards also encompass related landscape features, and the building's site and environment as well as attached, adjacent, or related new construction. In order to be eligible for the 20-percent rehabilitation tax credit, rehabilitation projects must meet these standards, as interpreted by NPS, to qualify as "a certified rehabilitation."

ⓘ ***The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings.*** These standards are neither technical nor prescriptive, but are intended to promote responsible preservation practices to help protect irreplaceable cultural resources. For example, they cannot, in and of themselves, be used to make essential decisions about which features of the historic building should be saved and which can be changed. The Standards provide philosophical consistency to the work once a treatment approach has been selected. The four treatment approaches, in order of priority are Preservation, Rehabilitation, Restoration, and Reconstruction.

ⓘ ***The Secretary of the Interior's Standards and Guidance for Archaeology and Historic Preservation.*** These standards have three purposes: to organize the information gathered about preservation activities; to describe results to be achieved by federal agencies, states, and others when planning for the identification, evaluation, registration, and treatment of historic properties; and to integrate the diverse efforts of many entities performing historic preservation into a systematic effort to preserve the nation's cultural heritage.

ⓘ ***62 FR 33708, The Secretary of the Interior's Proposed Historic Preservation Professional Qualification Standards, June 20, 1997.*** These standards are designed to be a tool to help recognize the minimum expertise generally necessary for performing professionally credible historic preservation work. The standards are not designed to identify the best or ideal person for any position or the preeminent practitioners in any discipline, nor are they developed to qualify apprentice or entry level workers. The standards are designed to describe the typical expertise held by credible midlevel journeymen working in historic preservation.

ⓘ ***Guidelines for Archaeological Investigations in Iowa, December 1999 (Iowa SHPO).*** Although many useful publications on cultural resources have been written that can assist those planning transportation projects, this is the most commonly used publication for Iowa DOT projects. This manual describes reporting requirements by SHPO for archaeological research and surveys that may be completed by consultants, agencies, interest groups, or private landowners. In this comprehensive manual are examples of scopes of work, sample forms and reporting documents, and laws and regulations for archaeological research and survey work.

ⓘ ***Guidelines for Iowa SHPO and OSA Forms.*** The forms and instructions for completing the Archaeological Survey Short Report (ASSR) Form in Iowa, the Iowa Archaeological Site Form, and the Iowa SHPO Review and Compliance form are included in the guidelines and in Appendix 42c. To receive a copy of a publication, or for more information, contact the Cultural Resources Section, SHPO, or OSA.

42.2 Resource/Regulatory Agencies and Interested Groups

Table 42-4 describes Iowa DOT's interaction with local, state, and federal agencies and interested parties, such as Native American Indian tribes, when working on a proposed transportation project.

Table 42-4

Resource Agencies and Interested Groups	
Agency	**When Involved and Why**
County/City Engineers	Coordination during planning, design, and construction of county/city project. Authority for Section 106 consultation remains with OLE as delegated by FHWA.
SHPO	Involved from the beginning of a project. Provides comments on all aspects of Section 106 consultation.
FHWA	Coordination during planning, design and construction project. Retains final responsibility and authority for all Section 106 consultation. FHWA retains responsibility for communication with the ACHP and with Indian Tribes when there are adverse effects to properties of significance to the tribes.
U.S. Army Corps of Engineers	Citation of Statewide Section 106 Programmatic Agreement for recognition of FHWA (delegating OLE) with lead federal agency responsibility for Section 106 responsibilities on FHWA funded projects.
American Indian Tribes	Tribes who no longer reside in Iowa but may still have religious or cultural interests in the state. If tribes have an interest, involve them from the beginning of the project.
OSA	Consulted when burials (historic and prehistoric over 150 years old) are discovered or potentially impacted. Consulted for background research prior to archaeological field investigations.
Advisory Council on Historic Preservation (ACHP)	Generally oversees the operation of the Section 106 process including issuing regulations and guidance. Becomes involved in consultation with adverse effects upon specific request.

42.3 Methodology for Conducting Cultural Resource Studies

There are two procedural documents that must be referenced when managing and/or conducting cultural resources studies within, or for, Iowa DOT. These are:

- "Procedures for Implementation of Section 106 Requirements," exhibit "A" attachment to the Statewide PA, and
- "Can-Do Project Development Process."

Iowa DOT's Cultural Resources Section developed the document "*Procedures for Implementation of Section 106 Requirements*" (Procedures Document) in consultation with FHWA and SHPO. This comprehensive document, included as Appendix 42d, establishes the steps Iowa DOT will follow as it plans and develops state transportation projects to ensure that the requirements of Section 106 are met. The procedures established in this document are based on the requirements of revised 36 CFR Part 800 issued January 11, 2001, but with specific reference to the Iowa Section 106 process agencies involved, and the steps they will follow. Not every section of the federal regulation is addressed in the Procedures Document; attention is focused primarily upon those that normally will require specific interpretation or actions by Iowa DOT, FHWA, or SHPO. Although these procedures are based on the 36 CFR Part 800 regulations, there are sequencing deviations present which are due to the influence of Iowa DOT's "Can-Do Project Development Process."

The Can-Do process requires that many of the events in the timeline of project development, from the planning phase through the design phase, overlap or take place concurrently. The goal of Can-Do is to reduce, or streamline, the time required to complete the overall project development process, while ensuring a complete consideration of environmental impacts.

The Procedures Document is divided into three parts: Subpart A, "Purposes and Participants;" Subpart B, "The Section 106 Process;" and Subpart C, "Program Alternatives." Subpart B, the core section of the document, describes the Cultural Resources Section's methodology for the identification, evaluation, and treatment of historic properties in greater detail.

For OLE Manual purposes, the following discussion presents just an overview of the process a particular project may encounter as it is applied to each of the several possible Section 106 involvement scenarios. How a project is to be processed through

its Section 106 review depends upon 1) the type and scope of the project; 2) the type and location of cultural resource(s) affected; and 3) the extent of the anticipated impacts. To more effectively trace the route of a project through the process, the reader should refer to Exhibit 42-1, "The Section 106 Process Flowchart."

Regardless of scope and potential for impact, all projects begin their trip through the Section 106 process in the DOT's Cultural Resources Section. Referring to the flowchart (Exhibit 42-1), to initiate the Section 106 process, the Cultural Resources Section will:

- Establish that the project is an "undertaking" as defined for Section 106 purposes;
- Determine the project's "Area of Potential Effect" (APE) and the scope of resource identification efforts required;
- Determine the project's potential to cause an effect to cultural resources;
- Identify consulting parties and contact them, as appropriate to the scale of the project; and
- Arrange cultural resource surveys from qualified consultants, if required.

NOTE:

To ensure workflow efficiency and consistency of reporting and coordination styles, all communications with the Iowa SHPO regarding federal aid highway project in Iowa must, by agreement, be channeled through Iowa DOT, OLE's Cultural Resources Section. In addition to the SHPO coordination, this section also has the primary responsibility to initiate project reviews, determine the level of Section 106 processing appropriate to a project, order surveys and receive reports from qualified consultants, handle tribal and other public participation in the review process, and inform and advise DOT staff in matters regarding cultural resource management. Although the majority of Section 106 activities do occur during project planning and design stages, there are situations where the Cultural Resources Section will still, or again, be involved even after construction is underway. (See the lavender box at the bottom left on Exhibit 42-1.)

The path through the Section 106 process chosen for a particular project is broadly indicated on the flowchart by the use of underlying background colors. There are four distinct possible routes; the goal for the agencies is to complete the process as expeditiously as possible, while also ensuring adequate consideration and protection is given to cultural resources that may be affected by the project.

A key distinction to proper use of the chart is to realize that the path is somewhat different for archaeological sites than it is for historic/architectural properties. The primary reason for this is Section 4(f). The 4(f) regulation exempts archaeological sites from 4(f) review if their eligibility for the National Register is based on Criterion D, the ability to yield information, and that information can be recovered through mitigation. This applies to most archaeological sites in Iowa.

Any National Register properties eligible under Criterion A, B, or C, however, have value for preservation-in–place. Project alternatives which use those eligible properties must be reviewed for a determination under Section 4(f) that there is "No Prudent and Feasible" alternative.

The individual paths are reviewed briefly in the following sections; refer to the Section 106 Procedures Document for details, as needed.

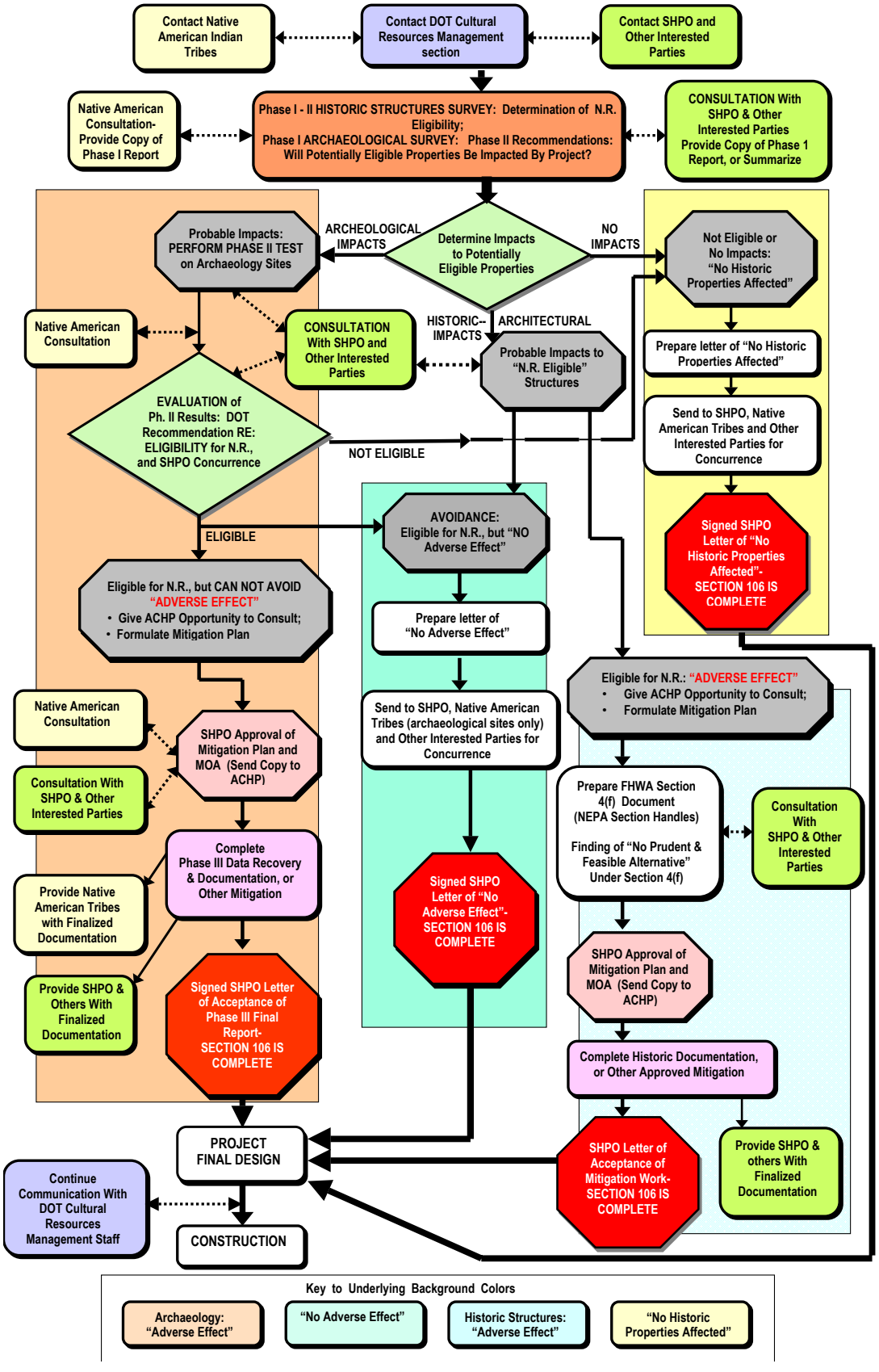
No Potential to Cause Effect (NPCE)

[not noted on Exhibit 42-1]

Frequently, the Cultural Resources Section reviews and determines a project is either not an undertaking, as defined; or is an undertaking, but the activity does not have the potential to cause effects on historic properties.

These project types are included in the "Categorical No Historic Properties Affected" PMOU and, as such, can be categorically excluded from further Section 106 consideration; no further DOT action is required. Also, SHPO does not review or concur with these projects.

Exhibit 42-1
The Section 106 Process Flowchart



No Historic Properties Affected (NHPA)

[pale yellow underlay, (upper right) on Exhibit 42-1]

SHPO concurrence in a DOT finding of NHPA is the quickest route through Section 106. It is achieved by any one or combination of the following:

- No potentially significant sites were identified during the Phase I surveys;
- Sites were found, but determined to be "Not eligible" for any of several reasons; or
- National Register eligible sites/properties were found, but the project will not affect them.

Except for the excluded projects referenced as NPCE in the first paragraph above, the Cultural Resources Section will generate a letter to SHPO concluding: "No Historic Properties Affected." A copy will be sent to interested tribes and other interested parties. SHPO is required to review the information within 30 days of receipt or relinquish their right to comment. Signed SHPO concurrence within 30 days, and no disagreement from other consulting parties, completes the Section 106 process for these projects. DOT and SHPO normally complete this level of the Section 106 processing; FHWA is notified of the project determination, and Advisory Council involvement is not needed.

No Adverse Effect

[gray/green underlay, (center) on Exhibit 42-1]

A determination by DOT and concurrence by SHPO of "No Adverse Effect" to historic properties elevates the Section 106 process to the next level of activity. The following are the key steps in this situation:

- Phase I cultural resource surveys (and Phase II if needed) have been performed; it has been determined that one or more potentially-significant historic properties (archaeological sites and/or historic architectural properties) are present in the project corridor's APE.
- Those sites and/or structures can be avoided through project relocation, redesign, or other avoidance techniques; in short, National Register sites and properties are present, they may be affected in some small way, but the parties have agreed that the effect will not be "adverse."
- The Cultural Resources Section will generate a letter to SHPO concluding there is "No Adverse Effect" to historic properties. A copy will also be sent to interested tribes and other interested parties. A signed SHPO concurrence and no "non-concurrence" responses from other consulting parties completes the Section 106 process. DOT and SHPO can normally complete this level of the Section 106 process; FHWA is notified of the project determination, and Advisory Council involvement is not needed.

Adverse Effect to National Register Eligible Historic Structures

[pale blue underlay, (lower right) on Exhibit 42-1]

An "Adverse Effect" determination by DOT and concurrence by SHPO for any type of cultural property elevates the Section 106 process to the next level, which requires more steps to complete the process. The procedures for handling adverse effects to historic structures differ somewhat from those followed for archaeological sites. For that reason, Exhibit 42-1 — and this summary — address the two processes separately.

- The National Register eligible historic structure cannot be avoided; therefore, the determination is an "Adverse Effect."
- Per Section 106 regulations, FHWA must contact the Advisory Council to advise it of the situation, and offer an opportunity for participation in the consultation with SHPO and others to plan measures to minimize harm and, ultimately, to mitigate the adverse effects. DOT provides documentation specified in Section 106 regulations to FHWA for submittal to the Council.
- DOT will consult with SHPO and other interested parties to formulate a mitigation plan which will become the basis for a Memorandum of Agreement (MOA) drawn up and executed between FHWA, SHPO, and the DOT (tribes are not normally involved in consultation concerning structures). Execution of the MOA completes consultation under Section 106 unless there are changes or additions to the project.

- Adverse Effects to historic structures brings into play Section 4(f) of the U.S.DOT Act. A Draft and Final Section 4(f) Statement will most often be needed. (These are normally prepared by OLE's NEPA Compliance Section; refer to Part III, Chapter 18.) A draft MOA is included in the draft 4(f), and the signed MOA must be included in the Final 4(f).
- An undertaking with 4(f) issues cannot proceed unless FHWA has approved the Final Section 4(f) Statement. To be eligible for approval, the document must demonstrate that there is "…no feasible and prudent alternative to the use of the Section 4(f) property." The review and discussion of possible alternatives must involve the SHPO and other interested parties, as appropriate to the scope and location of the project.
- The Iowa DOT (with FHWA oversight) must complete the stipulations of the MOA, and provide SHPO and other interested parties copies of the final report and any other mitigation materials.
- The commitments in the MOA are considered complete with receipt of a SHPO letter indicating acceptance of the mitigation work products.

Adverse Effect to National Register Eligible Archaeological Site

[tan underlay, (left side) on Exhibit 42-1]

Most non-mortuary and non-ceremonial archaeological sites are considered to be of historic (or cultural) significance primarily for the scientific/cultural data they contain. Their physical location and structure, per se, are not normally an element of their significance. (i.e., they satisfy Criterion D of National Register Eligibility Criteria.) Therefore, if data can be "substantially recovered" from a non-mortuary/non-ceremonial National Register eligible archaeological site through execution of a Data Recovery Plan (DRP) approved by SHPO. In this situation, Section 4(f) does not apply (see 23 CFR Part 771, "Environmental Impact and Related Procedures," Section 771.135(g)(2) for discussion).

- Per Section 106 regulations, FHWA must contact the Advisory Council to advise it of the situation, and offer an opportunity for participation in the consultation with SHPO and others to plan measures to minimize harm and, ultimately, to mitigate the adverse effects. DOT provides documentation specified in Section 106 regulations to FHWA for submittal to the Council.
- DOT will consult with SHPO and other interested parties (including tribes) to formulate a mitigation plan which will become the basis for a MOA executed between FHWA, SHPO, and the DOT. Execution of the MOA completes consultation under Section 106 unless there are changes or additions to the project.
- DOT (with FHWA oversight) will complete the Phase III Data Recovery and/or any other mitigation agreed to in the MOA, and provide SHPO and other interested parties copies of the final report.

The commitments within the MOA are considered complete with receipt of a SHPO letter indicating acceptance of the data recovery/mitigation work products.

It should be noted that an archaeological site can be considered National Register eligible, but the agencies involved in the coordination may agree that the site does not merit the expenditure of public funds for data recovery. This should be noted in the MOA.

42.3.1 Summary of Considerations Essential to Successful Application of Section 106

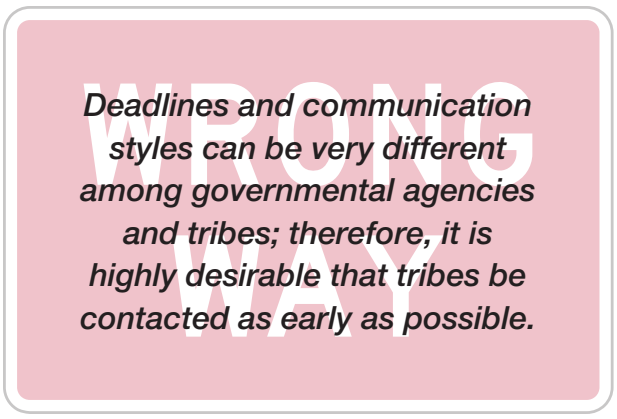
When evaluating a project's relationship to significant cultural resources, the first question that must be asked is, "Can adverse effects to the resource be avoided?" The Cultural Resources Section will coordinate with DOT staff project planners and designers to identify and evaluate ways to avoid adversely impacting the resource(s). If a resource cannot be avoided, the Cultural Resources Section must work with the DOT project development staff in an effort to identify measures which would minimize project impacts. The Cultural Resources Section will communicate with designers, engineers, and SHPO, to develop a plan to avoid or minimize impacts to the cultural resources. Consultant services may be used to perform these steps, as needed, to maintain project schedules.

If adverse effects to a historic property cannot be avoided, then the Section 106 process will require that an MOA be drafted and approved in consultation with SHPO (and any applicable Native American tribes and other interested parties). The MOA will stipulate how the effects to cultural resources will be mitigated.

42.3.2 Native American Consultation

FHWA is required to contact Native American Indian tribes if a project has the potential to affect cultural resources located within an area in which the tribe has indicated an interest. FHWA has delegated responsibility for initial contact with the tribes to Iowa DOT, specifically to the Cultural Resources Section. The Cultural Resources Section will contact the tribes who have expressed an interest in cultural resources within a particular proposed project area. The Cultural Resources Section will contact the tribes (and Office of the State Archaeologist) when Native American cultural issues, including burials, are potentially impacted. The tribes and OSA must be contacted when known or suspected burials are inadvertently impacted during construction.

Section 106 emphasizes that tribes which may have an interest in a project's potential for impacting Native American sites should be contacted early and often. The Cultural Resources Section staff and consultants strive to be sensitive to Native American Indian tribes' cultural traditions. Deadlines and communication styles can be very different among the various governmental agencies and tribes. Although FHWA has delegated responsibility for initial contact to OLE, the tribe always has the option of working directly with the federal agency because of their status as a sovereign nation and their right to government-to-government communication.



The Cultural Resources Section has developed a Tribal Notification Form to be used with all tribal contacts. The form is a self-mailer, designed to make the notification and information gathering process as simple as possible, and to encourage tribal response. This form and a sample letter to Native American tribe are included as Appendix 42e.

This process completed by OLE provides for three usual points of contact, but depending on a tribe's indication of interest, consultation may occur more or less often. The initial contact with the tribe(s) is made by DOT during the scoping, public meeting, and NEPA document notification phases for major projects. This contact is usually part of the standard public notification, and is completed through the NEPA and Public Involvement sections of OLE. The tribes receive materials sent to all other interested parties, plus the Tribal Notification Form.

The second DOT contact with the tribe(s) (often the *first* contact for minor projects) will take place after the archaeological survey work is complete, usually when the findings include prehistoric archaeology sites. The information provided to the tribe(s) includes an abstract of the survey that summarizes what was found, along with a map identifying potentially significant sites. Comments from the tribe(s) are solicited at this time. The tribe(s) can choose its level of consultation for this project: further consultation, copy of the full report, or no immediate comment, but wishes future contact with the Cultural Resources Section concerning the project.

The third DOT contact with the tribe(s) occurs when one or more tribes has indicated an interest in being involved with the project, or when the DOT anticipates that there will be adverse effects to a site known to be of interest to the tribe(s). The interested tribes are provided with copies of the site evaluation results and the site's Determination of Eligibility for the National Register. A map of the site is included, as is a discussion of proposed avoidance, minimization, or mitigation measures. The tribes are

again asked for their comment, and are requested to give an indication as to whether they would like to participate in a MOA. A project does not require tribal MOA participation for approval. The tribe(s) will be provided a final copy of the Data Recovery Report, if they have requested one.

42.4 Format and Content of Technical Reports or Memoranda

With SHPO participation and concurrence, Iowa DOT's Cultural Resources Section has developed a checklist of information to be included in reports submitted to them by cultural resource consultants. Adherence to the checklist will assist the Cultural Resources Section, and SHPO, in their timely review. The checklist is discussed below and included as Appendix 42f.

42.4.1 Technical Report Checklist

- All reports should include a project description.
- All reports should include the project corridor survey width and length (in feet or miles) as well as the survey area in acres, and project location by section, township, and range. Survey boundaries should be recorded with interval GPS coordinates and a GIS shape file for the I-Sites database (records Iowa's known cultural resources).
- GPS coordinates need to be in "State Plane" for DOT use and UTMs for I-Sites use.
- All reports should include the property owner's name, address, and telephone number, including any tenant names in the case of non-owner occupancy.
- All reports should include an abstract at the beginning of the report that provides a project summary.
- All larger reports should summarize the survey findings in a tabular format.
- If the report covers a survey for a bridge replacement project, the FHWA Structure Number (available from DOT or County Engineer) must be included, as well as basic structural information such as bridge type, size, and date of construction.
- All archaeological sites must be located using GPS coordinates and a polygon in a GIS shape file provided for inclusion in the I-sites database.
- All sites located during archaeological surveys must be identified with official site numbers issued by the OSA and include a completed archaeological site form. For large archaeological surveys, a block of numbers can be obtained from the OSA.
- Original archaeological site forms will be filed with the OSA. Narrative information about the site will be complete, but concise.
- For historical sites, the address and a set of GPS coordinates to verify address should be included.
- An Iowa Site Inventory Form (similar to NRHP nomination form) should be completed for each structure and district over 50 years old. A State Inventory Number for the form should be obtained from the Iowa SHPO.
- Historical property surveys must have a Determination of Eligibility for National Register listing, unless it is a reconnaissance or Phase IA level survey.
- The consultant is responsible for providing documentation materials and information to OLE for submittals of determination and tribal contacts.

Note 1:
To complete some of the above steps, it may be necessary to conduct additional consultation with a tribe in order to reach full agreement before the next step can be initiated.

Note 2:
All archaeologists working for Iowa DOT are required to be familiar with the policies and procedures established by the OSA under the Iowa Code for the respectful treatment of sensitive Native American sites. As stated in the Iowa DOT Construction Manual, contractors must cease work and notify the appropriate staff if previously unidentified archaeological materials are inadvertently uncovered.

Note 3:
There are various resources available regarding the Tribal Consultation process. Links to tribal contacts and other information are included in Section 42.6.

- Original historic site forms, with original photos and negatives, will be submitted to the Cultural Resources Section to be forwarded to SHPO.
- All technical reports must be submitted to the Cultural Resources Section. The Cultural Resources Section will forward the reports to the SHPO along with a letter of determination. All report submittals should include two hard copies of the report, an electronic copy, and the applicable GIS information.
- For large reports, two copies of the report should be provided on CD also.

Consultants may contact SHPO to consult with them, and the SHPO may advise the consultant on a project, but all formal communication with the SHPO must originate with the Cultural Resources Section. Consultants should keep the Cultural Resources Section informed about all correspondence, copying it on all letters and e-mails to the SHPO.

42.4.2 Additional Notes on Reporting and Coordination With SHPO

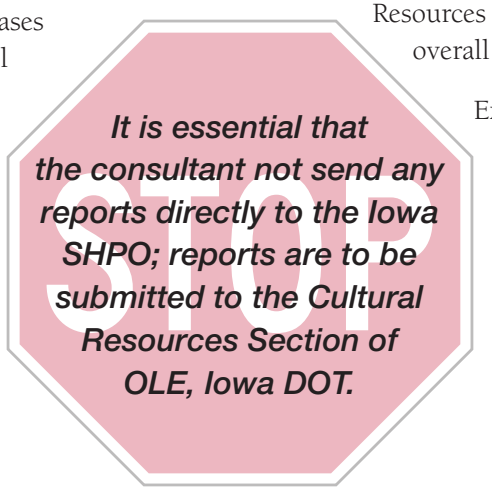
All consultants must be pre-qualified in DOT Category 352, "Cultural, Historic, and Native American Services," before contracting for archaeological or historical surveys with the DOT.

For large surveys, if a consultant has not previously worked in Iowa, it is mandatory that he or she meet with the Cultural Resources Section, and with SHPO, to review the survey plan for all phases of work. For Phase II archaeological site testing, the consultant should develop a scope of work which the Cultural Resources Section will submit for review by SHPO. This is to help prevent problems and misunderstandings that might occur later in the process.

For Phase III Data Recovery, the consultant will prepare a Research Design based on the results of the Phase II work. This Research Design will be submitted to the Cultural Resources Section and must be approved by SHPO before any Phase III site work begins.

Consultants may contact SHPO to consult with them, and SHPO may advise the consultant on a project, but all formal communication with SHPO for Section 106 *must* originate with the Cultural Resources Section. Consultants should keep the Cultural Resources Section informed about all correspondence, copying it on all letters and e-mails to SHPO. The consultant must send the project survey completion reports to the Cultural Resources Section. The consultant will provide recommendations within the report, but the Cultural Resources Section will determine the project's effect(s) on cultural resources, and provide the determination to SHPO.

It is essential that the consultant not send any reports directly to the Iowa SHPO; reports are to be submitted to the Cultural Resources Section of the OLE, Iowa DOT. If the consultant does submit information directly to SHPO, by agreement, that information will be forwarded to the Cultural Resources Section, which will only delay the overall progress of the review process.



Examples of survey sheets required by the Cultural Resources Section, OSA, and SHPO are included as Appendix 42g of this manual. Survey sheets can be copied from this manual or obtained from the SHPO website; the link is provided in Section 42.6.

42.4.3 Format and Content of Section 106 and Cultural Resources with NEPA Documentation

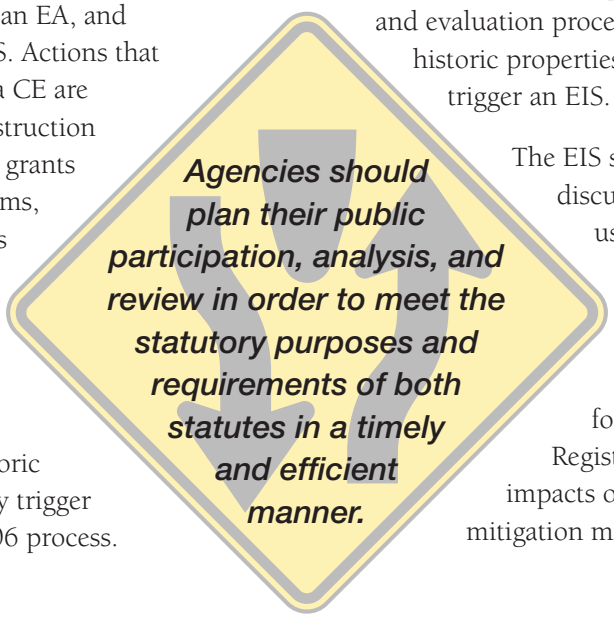
Section 106 and NEPA

According to Title 36 CFR, Part 800.8, federal agencies are encouraged to coordinate compliance of Section 106 and any steps taken to meet the requirements of NEPA. Coordination of both reviews should occur early in the process to fulfill the respective requirements.

36 CFR 800.8 also details the general principles of coordinating NEPA and Section 106, relevant NEPA actions, and the use of the NEPA process for satisfying portions of the Section 106 requirements, including standards for developing NEPA environmental documents for Section 106 purposes. Agencies should plan their public participation, analysis, and review in order to meet the statutory purposes and requirements of both statutes in a timely and efficient manner. NEPA documents will include discussion of Section 106 issues, and be processed accordingly, as described in the following subsections. The affected environment and environmental consequences discussions in a NEPA document will be combined in a section titled, Environmental Analysis.

Categorical Exclusions

Section 106 will be considered when screening projects for CEs, when drafting an EA, and during the preparation of an EIS. Actions that typically would be included in a CE are non-construction or minor-construction actions. For example, planning, grants for training and research programs, or limited construction activities such as pedestrian facilities, landscaping, and fencing would not usually impact cultural resources, but the installation of street lights or traffic signals may impact a historic district. This type of project may trigger further action for the Section 106 process.



The level of information to be provided in a CE regarding project impacts to Section 106 resources should be commensurate with the severity of the project's effects to those resources. With greater potential for damaging effects, the level of analysis should be increased. The discussion should be sufficient to define the extent of impacts, identify any appropriate mitigation measures, and address known and foreseeable public and agency concerns.

Environmental Assessments

An EA is completed to determine whether an action is a "major federal action significantly affecting the quality of the human environment." An EA examines the significance of an action and its potential to cause adverse effects on the environment, including potential effects to cultural resources. By the time an EA is being prepared, the Section 106 review for the project should already be in progress. The effects of an action on cultural resources cannot be adequately determined without having the results of the Section 106 review process completed through a draft MOA (if needed), or equivalent. The EA must include a discussion of all findings reached, and all mitigation agreements made, in relation to Section 106.

Environmental Impact Statements

An EIS is required for any major federal action that is expected to "significantly affect the quality of the human environment." It must consider the impacts to cultural resources as part of the data-gathering and evaluation process. An Adverse Effect on historic properties does not necessarily trigger an EIS.

The EIS should include a brief discussion of the methodologies used in identifying historic and archaeological resources; a description of the historic resources listed in, or eligible for listing in the National Register; a summary of the impacts of each alternative; and the mitigation measures proposed for each

affected cultural resource. The Draft EIS should also fully document evidence of coordination with SHPO, tribes, and other consulting parties on issues of "eligibility" and "effect" for both archeological and historic resources.

The Record of Decision (ROD), which concludes the EIS process, should include information on mitigation. Conclusions or findings related to the Section 106 process must be referenced as part of the ROD, to the extent appropriate.

> ***Note:*** *With an "Adverse Effect to Cultural Resources" Finding, it is more likely that a CE may be determined not to be the appropriate NEPA document, and an EA may be indicated (See next section). Exceptions would be those situations where, for example, a Programmatic Section 4(f) is applicable for a historic bridge or Transportation Enhancement project effects, or data recovery is the applicable mitigation for archeological site effects. Note also that, like EAs and EISs, the CE is a NEPA decision-making document. Although, its approval by FHWA does not automatically signify that all Section 106 requirements have also been met, Iowa FHWA operating policy is that the Section 106 process must be completed through the MOA stage, or equivalent, before the corresponding NEPA document can receive FHWA approval.*

OLE's NEPA Section, with input from the Cultural Resources Section, will ensure that, in the preparation of a CE, an EA, a FONSI, an EIS and/or a ROD, they include complete and adequate information concerning scoping, identification of historic properties, assessment of effects upon them, and consultation leading to resolution of any adverse effects. None of these NEPA environmental documents can be considered complete and adequate under FHWA regulations if they do not adequately document successful completion of the Section 106 process. Consequently, delays to completion of the Section 106 process through the MOA stage, or equivalent, will likely lead to delays in completion of the corresponding NEPA document for the project in question.

Consulting Party Comments

The Cultural Resources Section summarizes survey results, proposes Determinations of Eligibility, and proposes findings of effect (when impacts to cultural resources by the proposed transportation project are known), and compiles that information into a letter to send to SHPO with the report. Such a letter includes the name of the project, its location, and a brief description of the project. It also describes the area of potential effect, the extent of the project area that was surveyed, the level of cultural resource investigative work that was completed, and the results (e.g., no cultural resources were identified; cultural resources were identified, but the project will cause no adverse effect; or cultural resources were identified, and the project will have an adverse effect on one or more of the resources). An example of this type of letter is included in Appendix 41h. SHPO may sign the concurrence line provided at the end of the letter, or issue a separate letter of comment. SHPO must review the information within 30 days of receipt, or relinquish their right to comment, barring any requests for additional information.

42.5 Continuing Section 106 Coordination During Project Design and Construction

The commitments made for the mitigation of impacts to cultural resources will be communicated from the Cultural Resources Section to other DOT staff involved in road design, bridge design, right-of-way, and those involved in other activities associated with the further development and eventual construction of a project. Many times, changes occur as a project progresses through later stages of project development, and the possible impacts to cultural resources *must continue to be considered.* There must be continuous monitoring of the impacts to cultural resources, as design changes and/or on-site construction considerations may force modification of previous mitigation commitments.

There must be ongoing communication among the designers and engineers, and the Cultural Resources Section. If a project changes, other interested parties, such as SHPO and Native American tribes, may need to be consulted again. A design change could possibly benefit a cultural resource, or a change could negatively impact a historic property and invalidate the mitigation plan. To avoid any problems or delays, *communication must continue throughout project design and construction*. Again, the lavender box at the extreme lower left of Exhibit 42-1, the Section 106 Flowchart, is intended to graphically portray and emphasize the importance of keeping the Cultural Resources Section staff informed of project activities all the way through construction.

There must be ongoing communication among the designers and engineers, and the Cultural Resources Section to ensure full understanding and approval of any project modifications.

To ensure adherence to the cultural resource plan, project managers at each development step will attach a "green sheet" to the project files that stays with the project through the entire development and construction process. The green sheet indicates the mitigation agreements established for environmental commitments including cultural resources; such agreements should be included in engineering plans and specifications to ensure cultural resources are protected throughout design and construction.

Unanticipated Discoveries of Archaeological Sites during Construction

The Iowa DOT *Construction Manual* contains instructions for unanticipated discoveries of archaeological sites during construction. It states that construction contractors, working for Iowa DOT, must temporarily cease work and notify the project engineer, who will contact the Cultural Resources Section staff, if a previously unidentified cultural resource site is uncovered during construction. The link for the Construction Manual can be found in Section 42.6.

42.6 Additional References

Many useful links exist that can assist the Cultural Resources Section and their consultants who work with, and manage, cultural resources. The following Internet links provide further information, such as specific legislative language, the SHPO requirements, and the text for technical bulletins, etc. This list includes the most significant links for cultural resources related to Iowa DOT.

Advisory Council on Historic Preservation website has links for legislation, regulations, and standards, as well as links to SHPOs, PAs, and other pertinent information. The Nationwide PA on Transportation Enhancements is linked to this site: http://www.achp.gov.

Federal Highway Administration website has information on cultural resources, significant guidelines and standards, and a FHWA environmental handbook that includes a section on cultural resources. The PA on Transportation Enhancement is linked to this site: http://environment.fhwa.dot.gov.

Iowa Codes that discuss cultural resources can be found on this website in full text: http://www.legis.state.ia.us.

The Iowa DOT PA for Procedures for Implementation of Section 106 is found on this website: http://www.ole.dot.state.ia.us.

National Park Service has numerous sites that provide a wealth of information on cultural resources:

- Laws, Regulations, and Standards: http://www.cr.nps.gov
- National Register information: http://www.cr.nps.gov
- NPS Technical Assistance: http://www.cr.nps.gov
- NPS Publications: http://www.cr.nps.gov
- Native American Tribal Information: http://www.cr.nps.gov

- National NAGPRA Native American Consultation Database: http://www.cr.nps.gov

National Preservation Institute offers training courses on Section 106, drafting PAs and MOAs, and other cultural resource management topics: http://www.npi.org.

The Iowa Office of the State Archaeologist has information on standards for surveys, survey forms, regulations, and other information: http://www.uiowa.edu.

State Historic Preservation Office, with the Historical Society of Iowa, has an important website for information on state regulations and standards. Survey forms and other publications also can be found here: http://www.iowahistory.org.

The Iowa DOT Construction Manual can be found at: http://www.erl.dot.state.ia.us.

Center for Environmental Excellence by the American Association of State Highway and Transportation Officials (AASHTO). Historic Preservation/Cultural section provides brief summaries of historic preservation issues and programs applicable to the transportation community. http://www.environment.transportation.org.

FHWA's NEPA "Guidance for Preparing Documents" can be found at: http://nepa.fhwa.dot.gov.

NOTES:

CHAPTER 43

Reserved for Future Expansion

PART V

Public Involvement and the Administrative Record

Public Involvement

CHAPTER 44

This section summarizes the principal regulations and Iowa DOT guidance that direct public involvement in the project development process. It identifies the specific activities required for federal-aid, state, and local projects (e.g., public hearings).

44.1 Legislation, Regulations, and Guidance

44.1.1 Federal Legislation and Regulations

Legislation

ⓘ *23 USC 109(h) (Economic, Social, and Environmental Effects of Highways)*—Requires that final decisions on projects be made "in the best overall public interest." This legislation links public involvement activities to the decision-making process.

ⓘ *23 USC 128 (Public Hearing Requirements)*—Requires that state highway departments submitting plans for a federal-aid project that involves the bypassing of or passing through a community, or for an interstate system project, to certify to the Secretary of Transportation that they have held a public hearing or have afforded the opportunity to hear any objections from the public. In addition to the certification, a transcript of the public hearing and notice of publication must also be submitted.

ⓘ *National Environmental Policy Act (NEPA) of 1969*—Concerns the effect of man-induced changes on the environment. It calls for public participation in the scoping process, provides general public involvement requirements, and outlines the review process for draft environmental documents.

ⓘ *42 USC 2000, Title VI of the Civil Rights Act of 1964*—Emphasizes the need to ensure that minority groups (e.g., the elderly, handicapped, racial) are not discriminated against in federal-aid projects and do not bear a disproportionate share of the effects.

ⓘ *Americans with Disabilities Act (ADA) of 1990*—Requires state and local governments to hold any type of public service, program or activity in a location readily accessible to and usable by individuals with disabilities.

Regulations

ⓘ *23 CFR 771 (Environmental Impact and Related Procedures)*—Describes the public involvement and public hearing procedures, which must include coordination of public involvement activities with

This chapter summarizes the principal regulations and Iowa DOT guidance that direct public involvement in the project development process.

the NEPA process, and early and continued opportunities for public involvement. If a public hearing is required, reasonable notice should be given to the public indicating the availability of information, an explanation of the purpose and need, alternatives, social, economic and environmental impacts, and the right of way process. In addition, a hearing transcript and certification must be submitted to FHWA.

ⓘ ***40 CFR 1500-1508 (Regulations for Implementing NEPA)***—Requires agencies to make a conscientious effort to involve the public when implementing NEPA. Activities include public hearings and meetings, availability of documents, and opportunities for public input.

Executive Orders

ⓘ ***Executive Order 12898 of 1994 Concerning Environmental Justice for Minority and Low-Income Populations—***Reaffirms the principles of Title VI of the Civil Rights Act of 1964. It requires the identification of, and addressing of, disproportionately high and adverse effects on minority and low-income populations. The order requires meaningful public involvement outreach to and input from affected minority and low-income populations. In addition, projects should be analyzed to determine the need for Limited English Proficiency (LEP) activities. See Chapter 33 for more information.

ⓘ ***Executive Order 13166 dated August 11, 2000, improving access to services for persons with LEP—***See Iowa DOT Policies and Procedures Manual 300.05 and Chapter 33 of this manual for more information.

44.1.2 Other Federal Agency Regulatory Requirements

This section lists the other federal agency regulatory requirements that can affect public hearings, either through potential joint agency participation in a public meeting/hearing or through the need to present information about specific resource issues at those meetings/hearings. These regulations may have requirements for coordinating with the agencies with jurisdiction over specific resource issues. The requirements are discussed in more detail in Chapter 17 and in Part IV of this manual.

ⓘ ***The Advisory Council on Historic Preservation (ACHP) (36 CFR 800)—***See Chapter 42 for more information.

ⓘ ***The National Historic Preservation Action of 1966, as amended (Section 106) (16 USC 470 et seq.)***—See Chapter 42 for more information.

ⓘ ***The U.S. Army Corp of Engineers (COE) (33 CFR 325 and 327)***—See Chapter 26 for more information.

ⓘ ***The U.S. Coast Guard (USCG) (33 CFR 115.60)***

ⓘ ***The U.S. Fish and Wildlife Service (16 USC 661-666)***—See Chapter 30 for more information.

ⓘ ***Executive Order 11988 (projects with significant floodplain encroachments)—***See Chapter 29 for more information.

ⓘ ***Executive Order 11990 (projects affecting wetlands)—***See Chapter 28 for more information.

ⓘ ***Federal Water Pollution Act of 1972, as amended by the Clean Water Act (1977 & 1987) Section 402—***See Chapter 26 for more information.

44.1.3 State Legislation and Regulations

ⓘ ***Iowa Code, Chapter 6B (Procedure under Eminent Domain)***

ⓘ ***Iowa Code 306.19 (Corridor Preservation)***

ⓘ ***Iowa Administrative Code, Section 761 (Transportation Department)***

44.1.4 Interagency Memoranda of Understanding

None applicable.

44.1.5 Guidance Documents

ⓘ *Iowa DOT Policies and Procedures Manual 300.05 Title VI Program*

ⓘ *Iowa DOT Policies and Procedures Manual 510.02 Project Development Public Involvement Plan (PI Plan)*

ⓘ *Can-Do Reference Manual, Chapter 5 – Guide to Public Involvement*

ⓘ *Iowa DOT, Office of Location and Environment, Public Involvement Procedures Manual*

44.2 Introduction

Public involvement procedures do not vary by the source of funding. This section highlights the required public involvement activities for projects involving federal, state or local funding sources. Section 44.3 will describe how these activities are applied and coordinated into an overall public involvement program.

44.2.1 Federal-Aid Projects

Federal-aid-funded projects on the primary highway system may involve the following actions/activities:

- Coordination of public involvement activities with the NEPA process.
- Public involvement, which should begin early in the project development process (23 CFR 777.111[h]) and continue throughout the project. Public involvement is a major aspect in ensuring that decisions are "in the best overall public interest".
- Soliciting input from the public and notifying and involving the public in public meetings and hearings.
- Giving reasonable notice to the public of public hearings, including the availability of explanatory information and information required to comply with public involvement requirements of other laws, Executive Orders, and regulations. For most projects involving an Environmental Impact Statement (EIS) or Environmental Assessment (EA), Iowa DOT holds a public hearing. Typically a notice of availability of the environmental document is published along with the public hearing notice.
- Submitting the hearing's transcript and certification to FHWA (23 CFR 771) following the public hearing. This includes copies of written and oral comments.
- Describing where the public can access NEPA documents and related information. (40 CFR 1500-1508) through publication of the Notice of Availability (NOA).

Public involvement activities are identified and implemented as appropriate by OLE's Public Involvement Section (PI Section), in conjunction with other DOT and consultant staff involved in the proposed project. Refer to OLE's *Public Involvement Procedures Manual* for details of the PI process.

44.2.2 Projects Not Involving Federal-Aid Funds

State-Only Projects

Projects on the primary highway system that do not involve federal funds receive the same public involvement efforts as those that do (see Section 44.2 above).

Local Projects

Locally administered projects on the primary highway system will comply with Iowa DOT Project Development PI Plan (PPM 510.02).

Local government agencies may determine public involvement and agency coordination activities for projects that do not involve federal funds.

44.3 Public Involvement Considerations

The following sections detail public involvement activities that take place during the planning, design, and construction phases of project development.

44.3.1 Public Involvement Strategy

Introduction

The mission of Iowa DOT's public involvement process is an early and continuous public interaction throughout the project development process. Iowa DOT has developed a PI Plan, which describes how Iowa DOT will conduct its public involvement process in compliance with federal and state regulations and provides a framework for how it will fulfill its mission. The PI Plan was implemented by Iowa DOT Policy 510.02.

Consideration of Public Involvement Activities

The public involvement process is tailored to each project to address project-specific issues. Table 44-1 Consideration of Public Involvement Activities, identifies public involvement techniques alongside their effectiveness for typical project types: rarely used (RU), moderately successful (MS), successful (S). The table was developed based on past project experience, illustrating how public involvement techniques have been applied to other projects. Table 44-1 is included only as a reference when considering public involvement activity options. Further details of public involvement techniques can be found in Chapter 5 of the *Can-Do Manual*.

There is a correlation between the type of environmental document being completed for a proposed project, and the extent of public involvement. Although there is no prescribed formula for public involvement based on the type of environmental document (public involvement activities are tailored to the characteristics of a project), as a general rule, as the level of documentation increases, so does the scope of public involvement. Typically, a proposed improvement being processed as a Categorical Exclusion (CE) would have fewer overall environmental and social impacts than a proposed improvement being processed as an EA. An EA is used to determine if a higher level of documentation is warranted (i.e., completion of an EIS) when it is clear that a CE is not appropriate. Thus, as the documentation level increases so do the potential impacts and the need to expand the opportunities for public input.

Discussion of "Controversy"

Projects with significant controversy, organized opposition, or the possibility of legal action may require extra public involvement efforts to understand and address public concerns. The amount of additional public involvement efforts depends on the project and its issues. Early in the project development process, before developing the PI Plan, the PMT and PI Section will take steps to understand the concerns of the interested groups/parties to identify the most effective techniques for soliciting input and responding to concerns. See Chapter 5–*Identifying Public Involvement Techniques,* of the *Can-Do Manual* for information.

Public Involvement Plan

A project specific PI Plan may be developed for a proposed improvement. The District Engineer and the PMT, working with the PI Section, will determine the need for a PI Plan. This plan will identify the activities and techniques that will be used to solicit public and resource agency input throughout the project. The District Engineer, the Project Manager, and the PMT, working with the PI Section, will develop the PI Plan for a proposed project. Chapter 5 of the *Can-Do Manual* provides guidance on creating and implementing successful public involvement programs. It identifies responsibilities and commonly used techniques, as well as providing a framework for developing a PI Plan.

Environmental Justice and LEP concerns, including possible impacts to minority and low-income populations, will be identified during development of the PI Plan. Appropriate measures will be taken

to include these populations in the PI process. In addition, Iowa DOT will take reasonable steps to ensure meaningful access to programs and activities by LEP persons. Refer to Iowa DOT, OLE's *Public Involvement Procedures Manual* for details of the LEP evaluation process and examples of transcribed PI materials.

44.3.2 Public Hearings / Public Information Meetings

Public hearings generally are held for federal-aid projects if the project involves any the following:

- Completion of an EA, a draft EIS, or a supplemental EIS

Table 44-1

Consideration of Public Involvement Activities					
	Project Category				
Public Involvement Tools/Techniques	Resurface, widen and resurface or small projects without right-of-way	Road closure or projects with minor right-of-way	Improvement has Project Impacts or Requires Significant right-of-way		Major Improvement in Rural or Urban Areas
			In a Rural Area	In an Urban Area	
Open forum public hearing or meeting	RU	S	S	S	S
Focus groups (neighborhood groups)	RU	MS	MS	S	S
Drop-in centers (or onsite information centers)	RU	RU	MS	S	MS
Media strategies	MS	MS	S	S	S
Transportation fair	RU	RU	RU	MS	MS
Citizen surveys	RU	RU	MS	MS	MS
Brainstorming	RU	RU	RU	MS	MS
Citizen advisory committees	RU	RU	RU	MS	MS
Video techniques	MS	RU	MS	MS	MS
Community interviews	RU	MS	RU	MS	MS
Door-to-door canvassing	RU	RU	RU	MS	MS
Surveys and telephone polls	RU	RU	MS	MS	MS
Question and answer sessions	RU	RU	MS	MS	MS
Informal meetings with stakeholders	MS	S	S	S	S
Workshops	RU	RU	MS	S	S
Project websites	RU	S	S	S	S

RU Rarely Used
MS Moderately Successful
S Successful

- Acquisition of significant amounts of right-of-way
- Substantial changes to the layout or functions of connecting roadways or of the facility being improved
- A substantial adverse effect on abutting property
- Significant social, economic, environmental or other effect
- FHWA determination that a public hearing is in the public interest

Public Information Meetings

In accord with the Can-Do process, one or more public information meetings may be held at important project milestones to gather public input and disseminate information (for example, during development of the concept, following development of the range of alternatives, or when narrowing the field of feasible alternatives). The timing of public information meetings should be coordinated with other activities, such as the 404/NEPA concurrence points, steering committee meetings or completion of the project right-of-way plans.

There is no regulatory requirement to hold public information meetings. However, a public information meeting can satisfy Iowa DOT's requirement for a public involvement activity for certain projects, and it also meets the intent of the Can-Do process and the Iowa DOT's Project Development Public Involvement Plan. For example, whenever a primary highway is closed to traffic or right-of-way is acquired that does not require a public hearing, Iowa DOT may conduct a public information meeting to satisfy the requirement for a public involvement activity. Public information meetings occasionally are held during the Corridor Preservation implementation process. Typically, the PI Section will identify the need for a public information meeting. Refer to Iowa DOT OLE's *Public Involvement Procedures Manual* for details of the PI process.

Public Hearings

Iowa DOT holds a public hearing for projects requiring an environmental document. The public hearing is conducted during the document review period. Public hearings also are held when condemnation of agricultural land is anticipated, per Code of Iowa chapter 6B requirements. See *Notification of a Public Hearing Meeting and Right-of-Way Acquisition Involving Agricultural Lands* later in this chapter. Chapter 5 of the *Can-Do Manual* discusses public hearing and meeting responsibilities. For further details on the requirements for a pubic hearing, refer to 23 CFR 771, 23 USC 128 and Iowa DOT's Project Development PI Plan (project PI Plan).

Joint Public Hearing

Joint public hearings are held to satisfy the hearing requirements of other resource agencies involved in the project, or permits and approvals required for a project. For example, the U.S. Coast Guard (USCG) or the U.S. Army Corps of Engineers (USACE) may request public hearings as part of their reviews of bridge permit applications (USCG) or Section 404 permit applications (USACE). The PMT, working with FHWA and affected resource agencies, will identify opportunities to hold a joint public hearing, when appropriate.

Notification of a Public Hearing

The PI Section produces the notice of a public hearing in cooperation with the PMT, District Engineer, and the NEPA Compliance Section. The notice must be published as a legal notice in the official county newspaper or newspaper of general circulation in the county or city where the project is located. The first notice should be placed 30 to 40 calendar days prior to the meeting. The second notice should be published 4 to 20 calendar days prior to the meeting. The public hearing notice should include, at a minimum, a discussion of the information to be available at the hearing, an explanation of the proposed project, and the intent of the public hearing. Iowa DOT's Project Development PI Plan includes additional information about public hearings and meetings and an example of a public notice.

Notification of a Public Meeting

The PI Section produces the notice of a public meeting in cooperation with the District Engineer. The PI Section oversees the distribution of invitation letters to individuals/groups/entities on the project mailing list for both public information meetings and hearings. The Section also considers the appropriateness of press releases, display ads, posters, and project websites for notifying the public of upcoming public hearings or meetings.

Arranging a Public Hearing or Meeting

The PI Section, in coordination with the District Office, sets the hearing or meeting date. The District Office will oversee securing an appropriate facility for holding a public hearing or meeting. Public hearings and meetings should be held at a convenient time and place and located in a facility easily accessible to public transportation. The facility's size should comfortably accommodate the anticipated number of people attending. Public hearings and meetings typically are held in publicly owned facilities to help keep facility costs low. The facility should be able to accommodate all attendees in accordance with the 1990 Americans with Disabilities Act.

Preparation of Hearing and Meeting Exhibits

Exhibits should be prepared to explain the proposed project to the public. The following are examples of information to be considered on the exhibits to assist the public in interpreting project information:

- An aerial display with plan view of the proposed improvement
- A legend for social and environmental features, such as creeks, rivers, lakes, buildings, cemeteries, historical features, landmarks, etc., for hearings involving an environmental document
- Label streets, route numbers, railroads, rivers, creeks and jurisdictional boundaries, such as state lines, county, and city limits
- A north arrow, scale of the exhibit and photo year
- Typical main line sections when appropriate

The PI Section reviews all exhibits, newsletters, and other brochures developed for presentation at a public hearing or meeting prior to the event. See project PI Plan for identification of the information to be presented at a public hearing.

Meeting Format

The format for public hearings and meetings is an informal open forum meeting format, which allows the public to come anytime during the scheduled meeting hours and talk to the project team. The District Office or PMT will identify appropriate staff, including engineering and environmental consultants, to attend the public involvement event.

Soliciting Public Comments

Various methods are used to provide the public the opportunity to enter statements into the project record/transcript. They include a statement made individually and privately on a tape recorder, a comment form left at the public hearing/meeting, a comment form sent to the DOT after a public hearing/meeting, or e-mail correspondence sent to the DOT. It is recommended that the project team also write comments when speaking to the public one-on-one during the meeting to ensure that all comments are noted.

Comments received at public hearings and meetings, or during the public comment period, are incorporated into the development process and environmental document, as appropriate.

Public Hearing Transcript and Certification

Following a public hearing, the PI Section, in coordination with the District Office, will prepare a transcript of the hearing. The public hearing transcript and certification, documenting that a public hearing was held, are submitted to the FHWA Iowa Division Office. Oral statements and copies of all written statements from the public are included. This includes comments received during the public hearing, as well as those received during the public comment period. See Iowa DOT's Project Development PI Plan for more information on processing public hearing transcripts and an example of a public hearing certification.

44.3.3 Right-of-Way Acquisition Involving Agricultural Lands

When an acquisition of agricultural land from a parcel of 10 acres or more is required, and the exercise of eminent domain is anticipated, the PI Section, working with the District Engineer, must complete certain activities pursuant to Chapter 6B of the Iowa Code. See OLE's Public Involvement Procedures Manual and Chapter 6B of the Iowa Code for more information on eminent domain requirements. See also Chapter 40 for a discussion of the process for assessing agricultural impacts.

44.3.4 Notification of Availability of Environmental Documents

Environmental documents (EAs and EISs) are made available to the public and resource agencies for review and comment through a public comment period. A public hearing is generally held during this review period. The NOA of the document, and sites where it can be reviewed, is included in the hearing notice.

44.3.5 Construction

Just prior to beginning and during the construction phase, the public must be kept informed of construction-related activities. This includes the use of alternative routes during construction, contacts for additional information, and so on. If a significant amount of time has elapsed (because of funding or other issues) between the end of the project design (and its associated coordination activities) and the start of construction, extra effort may be necessary to remind the public of the upcoming improvements and changes to travel routes. Public meetings and media releases are examples of techniques for public involvement activities during this phase.

44.3.6 Relationship of Required Coordination Activities to Can-Do Process

Appendix A of the *Can-Do Manual* illustrates the integration of public involvement activities in the project development process. The first exhibit in Appendix A illustrates the typical Can-Do development schedule based on a project with an EA. The second exhibit illustrates the typical Can-Do development schedule based on a project with an EIS/ Record of Decision (ROD). Public involvement activities are shown at several key points within both development schedules.

44.4 Additional References

Public Involvement Techniques for Transportation Decision-Making, Federal Highway Administration, September 1996.

Community Involvement in Highway Planning and Design, A Manual of Techniques, U.S. Department of Transportation, Federal Highway Administration, Office of Environmental Policy, January 1977.

Public Outreach Handbook for Department of Transportation, Frank Wilson & Associates, Inc., National Research Council, Transportation Research Board, NCHRP Report 364, 1994.

Guidance Material on Public Hearings & Other Public Involvement, Memorandum, U.S. DOT, FHWA, HEV-12, October 8, 1982. http://www.fhwa.dot.gov/.

Iowa Department of Transportation's Policy 510.02-*Project Development Public Involvement Plan.*

Iowa Department of Transportation, *Can-Do Manual*:

- Chapter 2—Can-Do Scheduling
- Chapter 5—Guide to Public Involvement
- Chapter 7—Statewide Implementation Agreement to Merge the NEPA and Section 404 Processes

Consultation with Native American tribes contained in the Programmatic Agreement and Procedures for Implementation of Section 106 Requirements http://www.dot.iowa.gov/.

The Administrative Record and the Freedom of Information Act

CHAPTER 45

This chapter covers two distinct, yet related topics: the construction of the administrative record for a project and responding to requests under the Freedom of Information Act (FOIA). These topics are important for their role in creating a record of the decision-making process employed on a project (the administrative record) and responding to public requests for information contained in that record (FOIA requests).

A properly constructed administrative record is important for its ability to document how a project was developed, particularly demonstrating compliance with the National Environmental Policy Act (NEPA) process. The public's access to information contained in the record is controlled by the Freedom of Information Act. The final part of this chapter details the procedures for responding to requests for information under the Act.

45.1 Administrative Record

ⓘ ***AASHTO Practitioner's Handbook 01: Maintaining a Project File and Preparing an Administrative Record for a NEPA Study. AASHTO Center for Environmental Excellence. July 2006.***

An administrative record is essentially made up of the decision-making documents that were produced during the project development process (i.e., Iowa DOT's working file or project file). It indicates how the agency reached its decision for a proposed action (i.e., reaching a Record of Decision [ROD] or Finding of No Significant Impact [FONSI]). Following are three typical examples of how to assemble an administrative record, in the event of litigation. There may be others depending on the case[1].

- One chronological (by date) record of all documents regardless of who has possession of the document (e.g., FHWA, DOT, or local municipality).
- One record of all documents separated by owner (i.e., duplicate records are removed from Iowa DOT's records if more than one agency has a copy in their files). The first set of documents entered into the record belongs to FHWA. A complete set of their documents is entered into the record. The second set of documents entered into the record belongs to DOT. Duplicate records with FHWA are removed from the DOT's records and a page is inserted in its place indicating to see FHWA's document. All other agency documents (e.g., local municipality) are then added to the record, although typically these records are added as part of the DOT's documents.
- One record for each agency or a combined record for the agencies.

[1] An administrative record is only developed following a lawsuit on a decision (i.e., a FONSI or ROD)—until that point you have a project file.

The Administrative Record and FOIA are important for their roles in creating a record of the decision-making process and being responsive to the public.

- The Office of General Counsel, working with FHWA, will determine which type of administrative record is most appropriate. See Table 45-1 for additional information on planning a formalized administrative record.

The General Counsel will review documents for confidentiality issues prior to assembling the administrative record. As a general rule, duplicate documents should be removed, post-it notes should be positioned so that no text is covered (if this is not possible copy the page with the post-it note, then follow the page with a copy of the page without the post-it note, and then replace the post-it note on the document), and sequentially Bates stamp[2] all pages.

FHWA receives 3 copies (FHWA Iowa Division Office, Resource Center Legal Counsel, and U.S. Department of Justice). Iowa DOT maintains 3 copies (Office of General Counsel, OLE, and District Office). The reviewing court and the plaintiff determine the number of additional copies to be reproduced. The original documents are sent to the FHWA Iowa Division Office until litigation is resolved. In some cases, the reviewing court could ask to have an electronic copy filed. Further, in some cases, if all parties agree, an electronic copy can be created and distributed instead of a paper copy. A copy of this agreement must be filed in court.

45.2 Freedom of Information Act

ⓘ ***Freedom of Information Act, 5 USC 552.***

ⓘ ***Electronic Freedom of Information Act Amendments of 1996, Public Law 104-231.***

ⓘ ***Freedom of Information Act, 49 Part 7.***

ⓘ ***Iowa Code, Chapter 22 (Examination of Public Records [Open Records]).***

The FOIA (5 USC 552) and the *Electronic Freedom of Information Act Amendments of 1996* (Public Law 104-231) require Executive Branch agencies, such as FHWA, to make certain organizational and policy records available through publication in the *Federal Register* and other policy and adjudicatory records available in document inspection facilities (reading rooms) for public inspection and copying. All other releasable records must be made available promptly upon request (49 CFR Part 7).

Table 45-1

Planning for an Administrative Record	
1.	Determine how to handle electronic documents, especially e-mails. A system should be established as to how to print out, save, sort, and include electronic documents into the administrative record.
2.	Determine whose files to include in the administrative record when multiple files exist among the different project parties. If all files are included, determine if the files are to be identified by their owners.
3.	Determine how to organize and index the documents. Determine if this will be done during project development or when litigation is filed or about to be filed. Consideration should be given to the following: What information will be captured in the index? How detailed should the index be? Will FHWA and non-FHWA documents be physically separated or presented in a single integrated series? Will the documents be electronically scanned and entered into a database for easy retrieval? If so, what system will be used for doing so and is it easily accessible to FHWA and FHWA's attorneys?
4.	Coordinate with FHWA to determine how best to integrate FHWA and non-FHWA documents and whether documents should be electronically accessible.
5.	Determine how to ensure that document attachments remain attached and are included in the project file.
6.	Determine how to file privileged (confidential) documents, such as attorney-client communications. Consideration should be given as to whether confidential documents should be filed separately or with the rest of the project file. Confidential documents filed separately from other records would eliminate the need to do so later on.
7.	Coordinate with FHWA as early as possible to determine what to include or exclude in the administrative record, as the record is FHWA's record, so decisions about what to include or exclude are ultimately made by FHWA (with its counsel and the U.S. Department of Justice).
Source: E-mail posted to the FHWA website, bulletin board, on May 17, 2002	

[2] A consecutive numbering system used to identify pages in documents.

Under state code, Iowa DOT is required to make all public records available for public review unless an exception applies (Iowa Code, Chapter 22). One exception may be correspondence with the Office of General Counsel. When a request is made for a project document or record, the request should be made or forwarded to the Office of General Counsel as soon as possible for review. The requestor shall receive prompt access to the record. If a request cannot be filled promptly because additional time is needed to collect or copy the records, the request shall be filled as soon as feasible, and the requestor shall be furnished with an estimate of when the records will be available.

Upon receipt of a request, the Office of General Counsel will forward the request to the Office of Design, Methods Section, which shall be responsible for:

- Tracking timelines
- Collecting data and responding if no further coordination is necessary
- Sending out notices to the offices (District Office, OLE, Office of Design, Office of Right-of-Way, Office of Bridges and Structures, etc.) that may have records relevant to the request
- Making arrangements with the office director if there will be an office visit by the requesting party
- Keeping track of where records come from so documents can be returned to the proper office

The offices' (District Office, OLE, Office of Design, Office of Right-of-Way, Office of Bridges and Structures, Office of Systems Planning, etc.) responsibilities include:

- Assembling and arranging requested information
- Asking General Counsel if they want to review materials
- Arranging for a space for requesting party/visitor to work
- Explaining that requested information cannot leave the premises (If interested, the party/visitor can identify documents to be copied)
- Copying requested documents
- Staying with the visitor while they review the records if the General Counsel does not attend the visit
- Assembling and providing copies of requested data to the Office of Traffic and Safety for packing and transmittal, if the record(s) are to the mailed to the requesting party
- If applicable, collecting fees for reproducing the record(s)

The intent of Iowa DOT's process is to provide the public with materials in a systematic and timely manner. Through the application of the three functions discussed in this section, Iowa DOT is able to relay information about projects to interested parties, gather information from the public and agencies, and document the decision-making process.

NOTES:

PART VI

Geographic Information Systems

Geographic Information Systems

CHAPTER 46

Geographic Information Systems (GIS) provide OLE with technical tools and methods to conduct environmental studies more efficiently and effectively. GIS is a computerized capability used for the entry, management, analysis, and presentation of geospatial information; a GIS comprises software, hardware, data, staff, and processes and procedures. Many state and local departments of transportation use GIS to support several business processes, including performing environmental studies, environmental compliance and permitting, and preparation of environmental documentation for NEPA compliance. In addition, many other state agencies (such as Iowa DNR, Office of the State Archaeologist [OSA], and State Historic Preservation Office [SHPO]), federal agencies, and local governments use GIS and develop GIS databases that are useful to OLE.

The goals of using GIS in OLE include:

- Improved analyses, quantification of potential impacts, and decision-making
- Improved cartographic products
- Staff time-savings through workflow efficiencies and leveraging of databases
- Fast and easy distribution of mapped information to end users
- Contributions of data and resources to Iowa DOT's overall GIS program

The purpose of this chapter is to provide OLE with pertinent information regarding the use of GIS to support planning-level environmental studies and documentation. This information includes general practices and guidelines applicable to any transportation agency and information specific to Iowa DOT's current GIS program. This section describes general applications and approaches, but is not intended to cover all possible GIS uses at OLE, which is beyond the scope of this document.

46.1 Regulations and Guidance

46.1.1 FHWA Guidance

FHWA guidance in the use of GIS for NEPA compliance at state DOTs was summarized in a statement by FHWA on the use of GIS for a highway corridor study in Arkansas (FHWA, 2001):

> *… Early identification of environmental concerns is essential to maximizing the ability to avoid and minimize impacts during alternative development. The GIS approach does not substitute for the public involvement, scoping, alternative development and analysis, and other aspects of the NEPA process. However, it may be a complement to them.*

Many state and local departments of transportation use GIS to support several business processes, including performing environmental studies, environmental compliance and permitting, and preparation of environmental documentation for NEPA compliance.

Neither laws nor regulations governing FHWA responsibilities under NEPA and related laws speak to the use of GIS as a means of gathering and evaluating information. Instead, they address the duty to take a "hard look" at alternatives for meeting the purpose and need for a project, and examining the environmental consequences of the alternatives. It is well established as a matter of law that every conceivable alternative cannot be evaluated in excruciating detail; a mechanism must be employed for screening alternatives so that the best alternatives are given the most detailed evaluation. The CEQ's Questions and Answers about NEPA places emphasis on reasonable alternatives. "Reasonable alternatives include those that are practical or feasible from the technical and economic standpoint and using common sense. (Q.2a)

46.1.2 Benefits

Many DOTs have begun to integrate GIS tools into the transportation planning, decision-making, and environmental assessment processes because of the expected and realized benefits that GIS provides. For example, a case study at the North Carolina DOT showed several benefits from using GIS in the DOT's initiative to integrate environmental issues into the transportation System Planning Process (FHWA, 1998), including:

- Earlier consideration of environmental issues in the planning process,
- Faster, more effective environmental analysis process,
- Enhanced participation of regulatory/ resource agencies,
- Improved data credibility,
- Better decisions at the system planning level,
- Greater commitment to decisions, and
- Savings of time and cost.

In another study, the Arkansas State Highway and Transportation Department used GIS to streamline the decision-making and permitting for the Southeast Arkansas Connector and realized the following benefits (FHWA, March 2002):

1. Mapping and screening project alternatives allowed staff to spend time and resources on the analysis of best alternatives,
2. GIS facilitated early and frequent involvement of resource agencies and the public during project planning and review, and
3. GIS facilitated consultation with Native American tribes, and streamlined future projects from programmatic agreements that addressed effects to areas of cultural significance.

These are just two cases, but the GIS and environmental planning literature contains many such examples of successful DOT use of GIS to support environmental compliance.

46.2 GIS at Iowa DOT

Iowa DOT currently maintains a GIS, called the Coordinated Transportation Analysis and Management System (CTAMS), which is used to store, analyze, and distribute spatial information. Key features of Iowa DOT's GIS program are:

- Planned maintenance of data in a centralized GeoData Library
- Planning and Implementation of a Linear Referencing System (LRS)
- Software that includes GeoMedia, ArcMap, and Oracle Spatial

This system is being replaced in 2009 with GeoNexus. GeoNexus will have an internal and external component and will serve GIS data based on services like Web Feature Service/Web Map Service (WMS/WFS) and ArcGIS services. This system will allow almost any GIS software to communicate with enterprise GIS data in Oracle Spatial and allow easier mashups of data.

OLE's goal is to use GIS in an interoperable fashion, that is, following the standards and processes of Iowa DOT's GIS program. An interoperable environment will allow OLE to develop, own, and maintain GIS data, such as natural resources, that are of

specific use and interest within OLE. An interoperable environment will also promote GIS data sharing among OLE, Iowa DOT GIS, and other DOT offices.

46.2.1 Linear Referencing System Project

In 1999, Iowa DOT began a project to develop a Linear Referencing System (LRS). LRS provides a framework for locating transportation objects and events along a linear network of roads, resulting in improved workflows and decision-making in a GIS environment. The LRS uses the NCHRP 20-27 linear referencing system data model. Activities completed so far include a needs assessment; preparation of conceptual, logical, and physical designs; and a pilot project. Implementation of the LRS is now underway.

A series of reports were produced to document the design and planned implementation of the LRS and are available at http://www.iowadot.gov/gis.

46.2.2 GeoNexus

A new system called GeoNexus is replacing GeoData Library (GDL) for all geospatial information developed by Iowa DOT. The GeoNexus will bring together all enterprise data that resides in Oracle Spatial from LRS centerlines to sign locations to imagery. It is important enterprise GIS data reside in Oracle Spatial because of the multiple benefits of being in a database central software neutral environment.

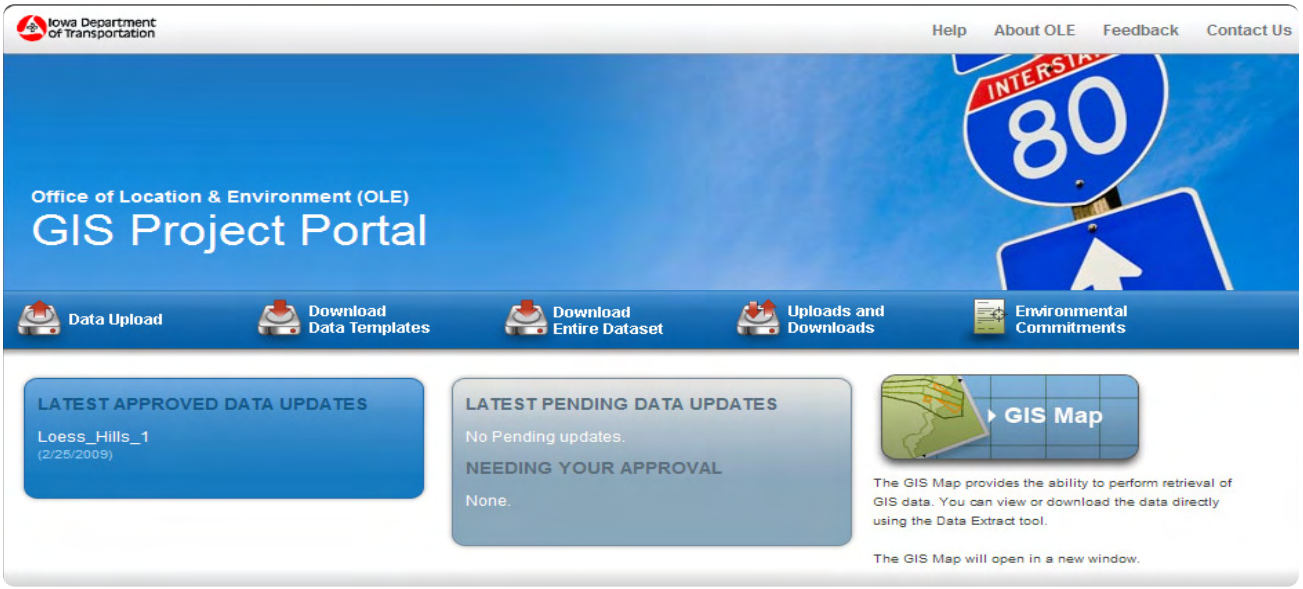
46.2.3 I-80 GIS Portal

OLE is currently working with a consultant on developing a web-based GIS portal to be used both internally and externally by approved users such as DOT consultants, OSA, counties, and municipalities. The portal will give users the ability to upload and extract GIS data to and from the portal. It will serve as a one stop shop for Iowa GIS data and improve data sharing efficiency between DOT and consultants. The portal is scheduled to be implemented in 2009. (See Exhibit 46-1.)

46.3 GIS Data Standards

Iowa DOT is adopting GIS standards to promote an interoperable enterprise, where DOT offices can share and document geospatial information in a common operating environment. This section describes elements of standards (software and file formats, data content and organization, and metadata) that OLE has created for its use of GIS. Standards are especially useful in specifying to contractors how they should deliver GIS data to OLE.

Exhibit 46-1



46.3.1 Software and File Formats

Iowa DOT currently uses a mixture of GIS software that includes Intergraph GeoMedia (Iowa DOT's GIS standard), ESRI ArcGIS, Oracle Spatial, and MicroStation. GIS data are maintained in various file formats, including Oracle Spatial (the LRS), GeoMedia, and ESRI Shapefiles. With software such as GeoMedia, which can read and display a variety of GIS file formats, the source file format of a particular map layer is not a concern to the casual user. OLE will be using the ESRI Shapefile or Geodatabase for the standard submission format. These formats were chosen because their open format makes them easy to convert to other files such as computer-aided drafting (CAD). Several consultants and government resource agencies use ArcGIS software as their desktop GIS software, therefore increasing data sharing efficiency between OLE and outside agencies.

46.3.2 Data Content and Organization

Iowa DOT's GIS program is currently developing standards for data content and organization that should be adopted by OLE. In general, it is advantageous for an organization to adopt industry data standards to facilitate data exchange and efficient development of applications that are based on a single data model. For OLE, standards are desirable to facilitate the incorporation and use of contractor GIS data into GeoNexus and save OLE the time and cost of data file translation and reformatting.

For the LRS, Iowa DOT has adopted the NCHRP Project 20-27 LRS data model. Information on this standard is available by searching the Transportation Research Board website at http://www.trb.org/.

Not all geospatial data are suitable for inclusion in a LRS. Many natural resource features, such as wetlands or wildlife habitat, are more appropriately represented as points, lines, and polygons independent of a linear highway network, since they are irregular and can be located well beyond the centerline or right-of-way associated with such a network. Therefore, it is appropriate that data content standards using Oracle Spatial be developed for such features, in addition to the standards already adopted for the LRS.

Pending the adoption of GIS data content standards by Iowa DOT, OLE has adopted interim standards for the purpose of specification to contractors. The data content standards are discussed in the following sections.

Six different data are commonly delivered to the OLE from the consultants: wetland impacts, wetland mitigation sites, wetland parcels, archaeological survey results, and historic structure survey results and surveyed areas. For these six layers, data standards have either been created by OLE or taken from the SHPO and OSA standards.

Archaeological Survey Results

Spatial data collected for archaeological sites are currently stored in a GIS at the Office of the State Archaeologist. Since OSA is the official keeper of this data, OLE and its consultants will follow the GIS standard they have already created. This website, www.uiowa.edu/~osa/, describes the standards. The standards include descriptions on naming the file, populating the database table, and submitting the data. OLE will distribute the empty GIS file that is the OSA standard. It will be populated and named according to the conventions listed at the website. The GIS file will be submitted to both OLE and OSA. The template file is called *copy_osa.shp*.

Historic Structure Survey Results

As with the archaeological data, a data submission standard already exists for historic structure data. The requirement for these data will be, simply, a mandatory entry in the x, y blanks on the data submission form to SHPO. This entry will provide a latitude-longitude coordinate for each structure and allow OLE and SHPO to plot the locations on a map.

Cultural Resources Surveyed Areas

Traditionally, the boundaries of areas that have been surveyed for archaeologically or historically significant sites have been submitted on paper. The surveyed area is delineated on top of a U.S. Geological Survey (USGS) topographic map with the site information attached. SHPO has

provided OLE with an empty GIS file to use as a template for capturing the survey boundaries. The GIS file will be submitted to both OLE and OSA. The template is called *emptyInten.shp*. Table 46-1 shows the structure of the template file and information that must be included.

Wetland Impacts

Wetland areas affected by transportation projects will be stored in the Wetland Impacts layer. Consultants will be sent the empty template and will then populate it and return to OLE. The file structure is listed in Table 46-2. Two templates have been created for the wetland impacts; one for state plane north and one for state plane south. The templates are called *Wet_Impact_SPFN.shp* and *Wet_Impact_SPFS.shp*.

Wetland Mitigation

Mitigation sites created to replace natural wetlands affected by transportation projects will be stored in the Wetland Mitigation layer. Consultants will be sent the empty template and will then populate it

Table 46-1

Cultural Resources Surveyed Areas (emptyInten.shp)	
Field Name	Data Description
PROJECT _No	The in-house number for the agency doing the project. This number appears in the title of the project report that comes to SHPO. It is a character field since many projects use letters as part of the individual project identifier.
OVERLAY	Describes the situation where multiple surveys overlap each other. The value of overlay is n-1 where n is the total number of surveys overlapping. If it is a single survey, then overlay = 0. Consultants enter a 0.
R&C (Jobid)	This is the Review & Compliance number. It is a 9-digit number. The first 2 digits are the year, the second 2 are the month, and the third 2 are the county number. The last 3 digits are sequentially assigned for the month the report arrives at SHPO. For example, an R&C number of 950551123 is a survey report done in 1995 (95), arrived at SHPO in May (05), and is in Jefferson county (51) and is the 123rd report logged in for the month of May. Consultants can enter the R&C number if it is known, otherwise enter a 0.
IDB, IDC, IDD, etc.	These are the R&C numbers for the overlaying surveys. Consultants enter a 0.
QUADS	This is a Boolean value where 1 indicates the survey goes into another or several other quads and the value of 0 means the survey is all within a single 7.5 minute USGS quad.
NAME	This is the name of the 7.5-minute USGS quad where the survey exists. If it is a multi quad survey, choose one quad name to type in the field as the QUADS field value will show whether or not it is a multi quad project. Do not include the state name for the quad in this field.

Table 46-2

Wetland Impact Data (Wet_Impact_SPFN.shp and Wet_Impact_SPFS.shp)	
Name	Description
ProjNumber	PE number, Bridge or 3R generated by the DOT.
County	County number (1-99).
Route	DOT standard route number (0030 for Highway 30).
Area	Area (in acres) of wetlands impacted by transportation project.
Source	List the organization responsible for creating this polygon (Consultant, in-house, etc.)
Accuracy	This field will categorize the accuracy with which the wetland impact polygon was drawn. Options include: GPS Sub-meter, GPS 1-3 meters, and aerial photography.
Manager	Name of staff assigned to this site. Consultant leaves this field empty.
AccessID	This field will allow OLE to link the wetland polygon to the database where other relevant information is stored: Wetland dbase 2000.mdb. Consultant leaves this field empty.
Type	This field describes the type of wetland impacted by the transportation project as defined by the U.S. Fish & Wildlife Service. Options include: PEM, PSS, PUB, PFO, R2UB, and Other.

and return to OLE. The file structure is shown in Table 46-3. Two templates have been created for the wetland mitigation sites; one for state plane north and one for state plane south. The templates are called *Wet_Mit_SPFN.shp and Wet_Mit_SPFS.shp.*

Wetland Parcels

The parcel of land containing a mitigation site is larger than the boundaries of the mitigation site itself. The wetland parcels layers will contain the property boundary for the wetland mitigation parcel as it is recorded in the county courthouse. Consultants will be sent the empty template, will populate it and return to OLE. The file structure is listed in Table 46-4. Two templates have been created for the wetland parcels layer; one for state plane north and one for state plane south. The templates are called *Wet_ParcelsSPFN.shp and Wet_ParcelsSPFS.shp.*

Other Data

For other data, until a standard has been established for it, the minimum attributes shown in Table 46-5 should be collected.

Table 46-3

Wetland Mitigation Data (Wet_Mit_SPFN.shp and Wet_Mit_SPFS.shp)	
Name	Data Description
ProjNumber	PE number, Bridge or 3R generated by the DOT.
County	County number (1-99).
Route	DOT standard route number (0030 for Highway 30).
Area	Area (in acres) of a wetland polygon mitigated for the transportation project.
Source	List the organization responsible for creating the polygon (Consultant, in-house, etc.).
Accuracy	This field will categorize the accuracy with which the wetland mitigation polygon was drawn. Options include: GPS Sub-meter, GPS 1-3 meters, and aerial photography.
Manager	Name of staff assigned to this site. Consultant leaves this field empty.
AccessID	This field will allow OLE to link the wetland polygon to the database where other relevant information is stored: Wetland dbase 2000.mdb. Consultant leaves this field empty.
Type	This field describes the type of wetland mitigated by the transportation project as defined by the US Fish & Wildlife Service. Options include: PEM, PSS, PUB, PFO, R2UB, and Other.

Table 46-4

Wetland Parcel Data (Wet_ParcelsSPFN.shp and Wet_ParcelsSPFS.shp)	
Name	Description
ProjNumber	PE number, Bridge or 3R generated by the DOT.
County	County number (1-99).
Route	DOT standard route number (0030 for Highway 30).
Area	Area (in acres) of entire parcel containing mitigation site.
Source	List the organization responsible for creating the polygon (Consultant, in-house, etc.).
ROWid	Unique ID used by DOT Office of ROW. Consultant leave blank, unless known.
Tier	List the tier the parcel is in based on the Public Land Survey System (65-99).
Range	List the range the parcel is in based on the Public Land Survey System (07E–49W).
Section	List the section the parcel is in based on the Public Land Survey System (1-36).
Ownership	This field lists the owner of the parcel. Options include: DOT, PermanentEasement, CCB, and DNR.

46.3.3 Mapping Standards: Projection and Coordinate Systems

Standard map projections and coordinate systems are often adopted by organizations to facilitate the overlay of data from disparate sources and minimize the need to project and reproject GIS data files. The statewide display standard within Iowa DOT GIS is Lambert Conformal Conic projection, NAD 83, meters. However, several GIS and CAD files are stored in other projections and coordinate systems, such as State Plane.

New data layers in Oracle Spatial should be developed Lambert Conformal Conic projection, NAD 83. OLE has chosen the Iowa State Plane, NAD 83, survey foot projection as its standard for shape file data. Contractors shall deliver geospatial data registered to that projection and coordinate system (and not in an arbitrary local system) and mapping parameters should be included in the metadata.

46.3.4 Metadata and Documentation

Metadata, or "data about data," describe the content, quality, condition, and other characteristics of GIS data. Metadata is required by OLE because it helps staff trace data sources and understand the fitness-for-use and limits of data for supporting environmental analyses. An absence of metadata can render a data file virtually useless, or at least limit the confidence of its use by OLE staff. OLE has adopted the Federal Geographic Data Committee's (FGDC's) Content Standard for Digital Geospatial Metadata (FGDC-STD-001-1998): http://www.fgdc.gov/. OLE staff should use this standard when developing geospatial data; Iowa DOT GIS maintains an Intergraph product called Spatial Metadata Management System (SMMS), which facilitates this process.

OLE requires that metadata received from contractors either meet the FGDC standard, or match the metadata style commonly distributed with data created by the Iowa Department of Natural Resources. Data developed internally will match the same standards.

46.3.5 Project Approach Standards General Steps

In addition to data content and format standards, OLE has adopted a standard approach for conducting a GIS project. Regardless of the specific application (corridor study, Environmental Impact Statement, etc.), the successful use of GIS for a project requires careful planning and execution. For each type of application, the following steps should generally be taken:

1. A fitness-for-use assessment to ascertain whether GIS is an appropriate tool for the particular project or task
2. GIS scope development that includes a user-needs assessment, GIS analysis methodology, and definition of products
3. A carefully developed methodology based on the needs of the task and input from the appropriate resource investigators
4. Full documentation of the process

Table 46-5

Other Data	
Name	Description.
ProjNumber	PE number, Bridge, or 3R generated by the DOT.
County	County number (1-99).
Route	DOT standard route number (0030 for Highway 30).
Source	List the organization responsible for collecting this data.
Accuracy	This field will categorize the accuracy with which the data were collected. Options are 1 (GPS sub-meter), 2 (GPS 1-3 meters), or 3 (greater than 3 meters).
****	Any other useful categorical or quantitative data normally collected.

5. Database development to support the application, including the assembly of other agency data and possibly digitization and/or field data collection

6. Execution of the project methodology by qualified staff with proper quality control

7. Generation of GIS output in the form of maps, reports, tables, and charts

GIS Scoping

Before undertaking a GIS effort to support a transportation project, it is advisable to develop and document a scope of GIS-related tasks that will satisfy project needs. A large part of GIS scoping is a needs assessment to determine what the project manager and resource investigators need from the GIS to fulfill project requirements. Because GIS is a tool that brings together a variety of data from many disciplines in a shared-user environment, this scoping effort involves input from the full project team. GIS scoping is often best performed in a workshop setting, where resource investigators can express their needs and share ideas on products, analyses, and source data. The outcome of the GIS scoping process is a clear statement on:

1. Required GIS data layers and attributes, prioritized by benefit to the project and characterized in terms of the following:
   - Resolution and accuracy
   - Required attributes
   - Potential sources
2. A carefully developed methodology for the project as a whole and for individual resource-specific analyses as required; individual GIS analyses can be developed for each of the following topics:
   - Land use
   - Natural resources (wetlands, floodplains, threatened and endangered species, etc.)
   - Socioeconomics (including visual resources and environmental justice)
   - Air quality
   - Noise
   - Agriculture
   - Regulated substances
   - Public lands resources
   - Cultural resources
3. A list of desired products and their specifications, such as:
   - Hardcopy maps (size, scale, format, general graphic design, etc.)
   - Electronic maps
   - GIS Website (intranet, extranet, or public)
   - Reports
   - Database
4. Interface and integration of GIS data to other applications to be deployed on the project, such as:
   - Travel demand models
   - Noise models
   - Air quality models
   - CADD/design packages
   - Visualization and animation
   - Project website
   - Project management/project controls

The above information should be documented as part of the project plan and serve as a guide for executing GIS tasks on the project. An effective method to document the GIS project approach is through a set of GIS project notebooks that retain the project plan and other pieces of hard-copy information, such as data sources, communications, and data flow diagrams. Project websites are also effective ways to document and communicate the GIS project plan to management and staff.

46.3.6 Database Development Standards

The greatest cost and effort of GIS implementation, whether for a whole program or a specific project, is often found in database development. An explicit definition of data needs is gained from the scoping task described above. For specific projects or studies, it is necessary to assemble a GIS dataset, accomplished through the acquisition of data from other state, federal, and local agencies, and possibly requiring data conversion (e.g., digitizing hardcopy or importing data from spreadsheets or databases) and new field data collection. Standard approaches help ensure efficient data development.

Public Data

The general approach for GIS database development is to first acquire data that are available and of suitable content and quality from other public and/or private sources; many of these data can be downloaded in GIS format from public websites. The reuse of available data reduces the time and cost of GIS data development. Table 46-6 provides a list of potential federal and state sources of environmental and socioeconomic data for Iowa. In addition, many local entities such as municipal planning organizations, municipalities, and county governments maintain GIS databases and should be contacted for projects located within their areas of jurisdiction. GIS data-sharing agreements are common among state departments of transportation and other government agencies, and are effective ways to streamline data acquisition.

In some cases, it is appropriate to purchase GIS data from private data vendors. For example, hazardous waste site information is available from EPA, but some private data vendors refine and update the data, and resell data in a more usable form.

Table 46-6

Potential Public GIS Data Sources		
Agency	**Type of Data**	**Contact Information**
Federal		
U.S. Geological Survey (Upper Midwest Environmental Sciences Center)	Base map; hydrography; digital terrain models; digital raster graphs (DRG)	http://www.umesc.usgs.gov/
U.S. Fish and Wildlife Service	National Wetland Inventory	http://www.fws.gov/data/
U.S. Census Bureau	Population; roads	http://tiger.census.gov/
U.S. Army Corps of Engineers	Waterways	http://www.mvr.usace.army.mil/pdw/gis_home.htm
FEMA	Floodplains; floodzones	http://www.gismaps.fema.gov/
U.S. Natural Resource Conservation Service	Soils; Prime Agricultural Lands	http://www.ia.nrcs.usda.gov/Technical/gis_data.html
U.S. Environmental Protection Agency	Hazardous waste sites	http://www10.giscafe.com/goto.php?http://www.epa.gov/
State		
Iowa Department of Natural Resources	Natural resources	http://www.igsb.uiowa.edu/nrgis/gishome.htm
Iowa Geographic Map Server	Various	http://ortho.gis.iastate.edu/
Iowa GIS Clearinghouse	Various	http://www.iowagis.org/
Iowa State University Geographic Information Systems Support and Research Facility (GISU)	Various	http://www.gis.iastate.edu/
Iowa Cooperative Soil Survey	Soils	http://icss.agron.iastate.edu/
Iowa Office of the State Archaeologist (note: data may not be of a public nature)	Archaeological sites	http://www.uiowa.edu/~osa/focus/information/isf.htm
State Historical Society of Iowa (note: data may not be of a public nature)	Cultural resources	http://www.iowahistory.org/

Internal Data Development

GIS data that cannot be obtained in a suitable form from public or private organizations may need to be developed internally by OLE or contracted to consultants. Data can be obtained from the DOT's consultants performing environmental and/or engineering studies. Public data also can be enhanced to meet project needs.

OLE has identified the following methods for collecting and compiling geospatial information:

- GPS
- Aerial and satellite imagery
- Photogrammetry
- Traditional surveys
- Existing maps

Each of these data collection methods requires a set of technical processes and specifications that are beyond the scope of this document; OLE staff should consult with specialists in survey, photogrammetric mapping, and remote sensing, as appropriate, when proposing these technologies.

46.4 GIS Analysis Methodologies

This section describes some of the methods by which GIS can be analytically applied by OLE to support environmental studies and decision-making, with a focus on NEPA-related activities. In many cases, these applications do not follow rigid methodologies, but rather are tailored to the specific project location, issues, and needs.

46.4.1 System Performance Assessment

GIS can help assess the performance of existing transportation systems to help support purpose and need statements. As the interoperability of travel demand model software and GIS improves, it is possible to analyze the model results in GIS, and in the context of other data layers such as demographics and land use. See Exhibits 46-2 and 46-3.

46.4.2 Suitability Assessment

GIS is often used to assess areas for suitability for transportation development. The goal in these studies is to develop one or more maps that depict the relative suitability for new highway development based on a composite analysis of various site selection criteria. GIS suitability models are comprised of data layers and GIS operations that derive decision-making information from source data.

Exhibit 46-4 provides a data flow diagram for a simple hypothetical suitability model. In this model, source GIS layers are combined or integrated through use of GIS operators to produce suitability maps. Specific GIS operators, not explicitly shown on the diagram, could include:

- Reclassification of thematic categories into relative suitability values; for example, classifying land-use categories—residential, industrial, agricultural, etc.—into values on a 1-to-10 scale of suitability.
- Buffering from sensitive features, such as wetlands, to establish avoidance areas; different buffered distance zones could be classified into relative suitability values.
- Grid-based spatial analysis, such as calculation of slope and aspect from elevation, viewsheds, runoff from slope and aspect, etc., or grading cost from slope.
- Polygon overlay of features to combine various thematic data layers into composites. For example, an overlay of soils, vegetation, and slope could yield a new composite map showing wetlands potential. Or an overlay of elevation, distance to water bodies, and vegetation could yield a map indicating the potential for cultural resources.
- Composite map overlays that can produce maps showing combined suitability or sensitivity, for example, a composite of biological, socioeconomic, visual, and cultural resources sensitivity maps. These composites can incorporate weighting of input maps so that the relative importance of each input layer can be preserved.

Exhibit 46-2

2030 Travel Forecasts – Data from Johnson County Council of Governments Travel Demand Model imported into GIS to support travel performance evaluations

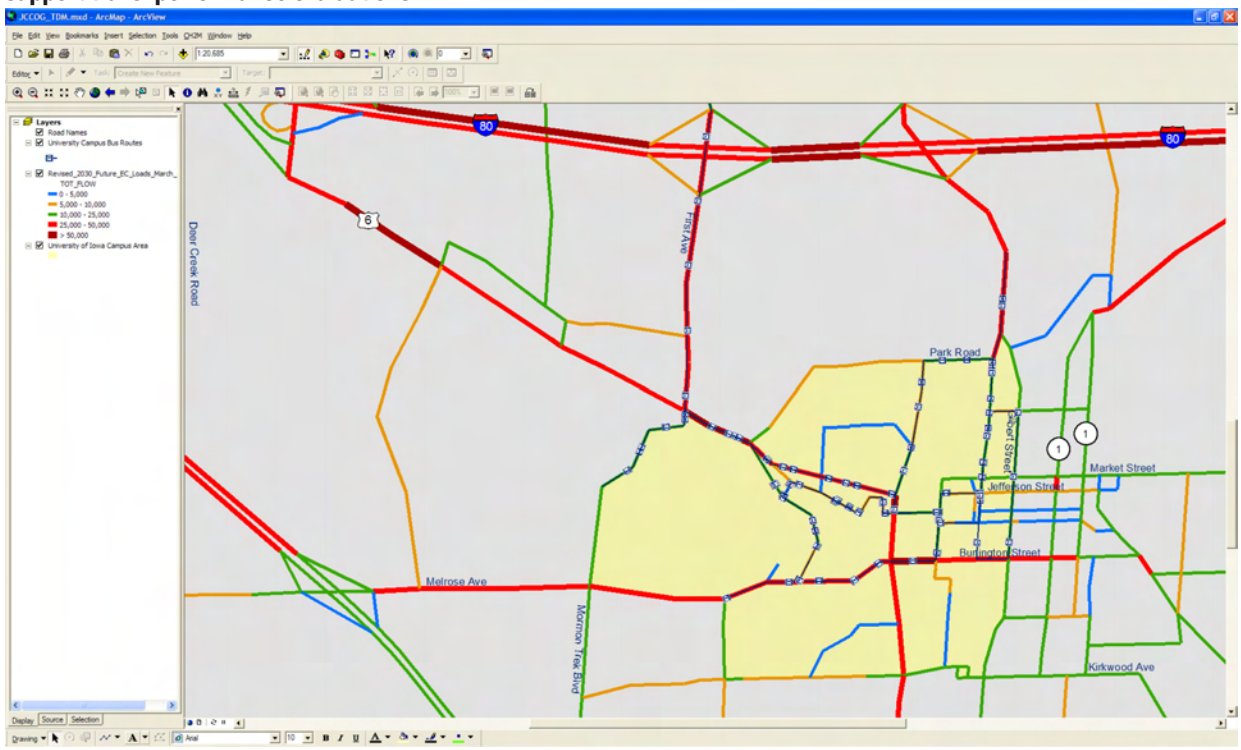


Exhibit 46-3

A Spatial Analysis assessing interchange accessibility during PM peak periods based on travel time, depicted on a data layer showing the potential population and employment base being served.

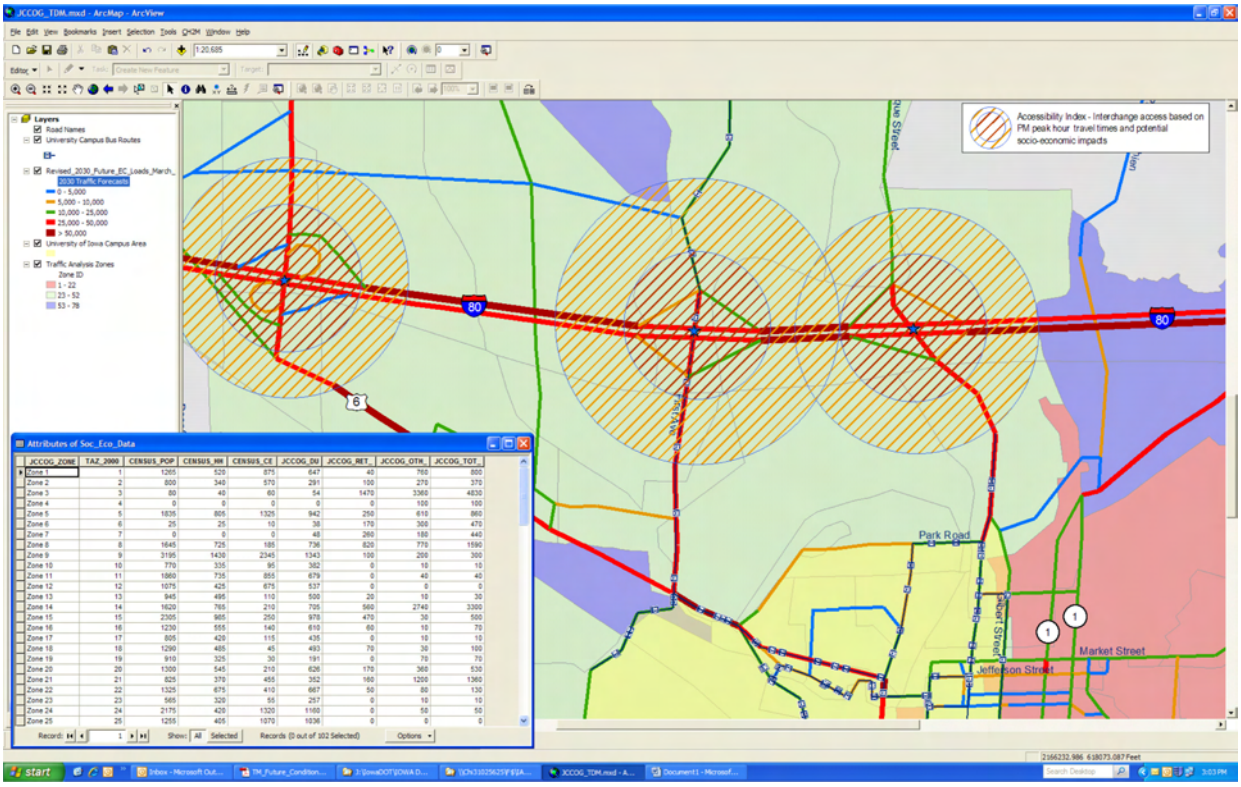
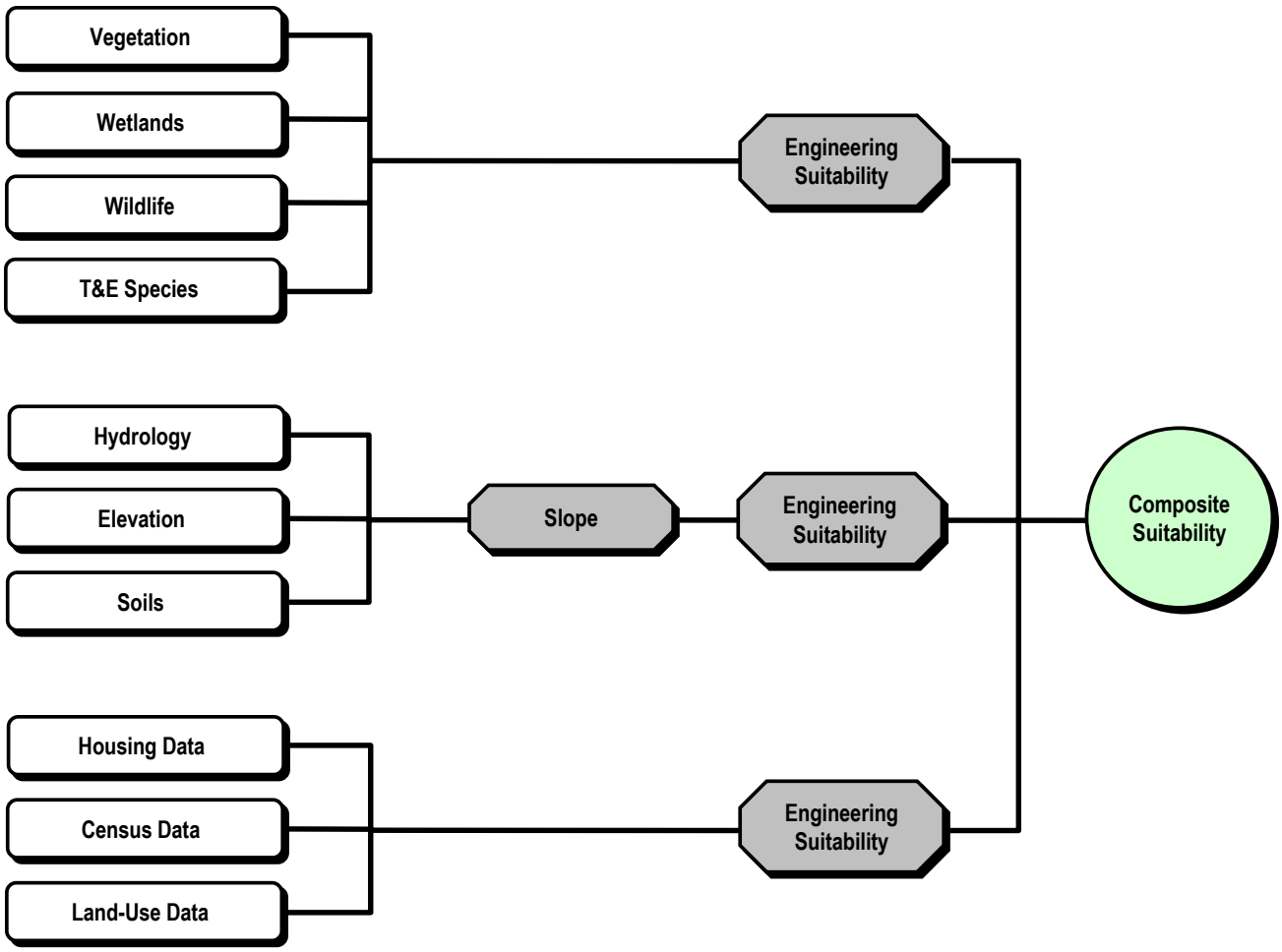


Exhibit 46-4
Suitability Model



Suitability models are typically developed in greater detail than that shown in Exhibit 46-4 so that explicit GIS operations can be described. Developing these models as diagrams requires the collective expertise of subject-matter experts and a GIS specialist to formulate. Models that incorporate weighting individual resource layers with importance ratios require professional judgements and group consensus (to state, for example, that Resource X is three times more important or sensitive than Resource Y).

Additional analyses can be performed on the derived suitability map. For example, if a new highway will connect points A and B, a GIS routing operation can be performed to find the most suitable routes between the two points.

Many examples of suitability modeling in a GIS are available from the GIS and environmental planning literature.

46.4.3 Environmental Impact Assessment

GIS is used to model, document, map, and report potential effects of transportation alternatives to the natural and human environment.

Impact assessment relies on an accurate representation of the proposed action in the GIS. Highway design files developed in CAD software can be easily imported into the GIS (GeoMedia or ArcView) and represented as a GIS layer. Developing CAD-GIS exchange standards facilitates this process.

In general, roadway designers can prepare design files using methods that make the files more suitable for import into a GIS (such as closing topology and using layering strategies that accommodate the impact assessment methodology). It is assumed that OLE staff will have access to highway design CAD files that are easily imported into the GIS. A highway design file that provides the centerline, right-of-way, and area of disturbance in separate layers will allow OLE staff to assess the impacts of each feature.

In general, GIS analyses support two types of impact assessment:

1. On-site or coincident assessment, where there is a direct effect to a resource at the location of the proposed facility (a roadway crosses a wetland).

2. Off-site or regional assessment, where there is an effect to a resource located in proximity to, or some distance away from the proposed facility (e.g., noise, traffic, or visual impacts).

Coincident Impacts

One use of GIS feature-on-feature overlays is to assess direct coincident effects of proposed facilities. Some common examples are shown in Table 46-7.

The results of these types of GIS overlays are both graphic and tabular—maps showing the locations of impacts (see Exhibit 46-5), and reports that tabulate the amount of the resource (number of occurrences, linear feet, or acreages) that is affected (see Table 46-8). These products are quite effective for environmental documentation and as a basis for evaluation of alternatives.

Regional Impacts

Environmental impacts can occur well beyond the immediate location of a facility. Many GIS functions are available to estimate impacts that occur in proximity to, or downstream or downwind of, a proposed facility.

Examples of regional impacts that can be assessed with GIS include:

- Visual impacts (see Chapter 37, *Visual Impacts*). The viewshed of a proposed roadway (that is, the area from which a person could see the roadway) can be calculated by the GIS, based on a data layer representing the roadway and an elevation grid. Elevation can be refined by adding tree canopy from a vegetation layer (for project areas that contain significant tree cover). The viewshed map can then be overlaid onto other GIS layers, such as population, land use, and recreational areas to identify the size of the population affected, and the context in which they are viewing the facility. See Exhibit 46-6.
- Noise impacts. Output from noise models can be input into the GIS as noise contours, which can be overlaid onto population, land use, property parcels, or individual buildings to identify potential receptors. This analysis helps identify mitigation, such as sound walls.
- Stormwater impacts. Potential runoff caused by proposed improvements and impacts to the regional stormwater system can be modeled in the GIS. Inputs to the model can include slope, permeability, the natural stream system, and the constructed stormwater control system.
- Air quality impacts. Output from air dispersion models can be input into the GIS and overlaid onto potential receptors.

Table 46-7

Coincidental Impacts	
GIS Operation	Example
Line-on-polygon overlay	Assess impacts of roadway (centerline) on crossing natural resources (habitat, wetlands, vegetation types, etc.)
Line-on-line overlay	Assess impacts of roadway (centerline) crossing streams, power lines, railroads, other roads, etc.
Polygon-on-polygon overlay	Assess impacts of disturbed area or ROW on natural resources
Point-on-polygon overlay	Count the number of houses within ROW or disturbed area

- Growth impacts. The impacts of growth due to transportation improvements can be input on the basis of mapping of existing land use, developable land, zoning, and population.
- Traffic impacts. Integration of GIS with travel demand models, using a GIS street network, can model the changes in traffic volumes and patterns as a result of proposed improvements.

46.4.4 Public Involvement Support

GIS is a useful tool for supporting various public involvement programs and tasks. At its simplest level, GIS maps and reports help communicate project issues to the public. Well-designed GIS maps shown at public meetings and in newsletters can help agencies and the public better understand a project and potential issues. A GIS website allows this audience to navigate a map of the project area, view data layers of interest, and perform simple queries (e.g., "Show me all schools within 5 miles of the project alternatives.") using a common web browser, see Exhibit 46-7.

GIS can also be used by the project team to better manage the public involvement program. Members of the public are geographically distributed in the same way that other project information is—they have homes, schools, places of employment, etc., that have locations with spatial relationships to the project and to valued resources. A valuable GIS tool in this context is "geocoding"— the translation of textual addresses (e.g., 1234 Oak St.) stored in a spreadsheet or database table, into X,Y point locations. GIS mapping of these locations shows geographic distributions that would otherwise not be evident—for example, areas of the county that geographically show either adequate or inadequate public participation. Successful geocoding depends upon accurate addresses (e.g., proper spelling of street names) and street data layers, and often requires additional manual correction of mismatched addresses. See Exhibit 46-8.

The locations of public participants can be characterized by the nature of their comments or concerns. For example, in Exhibit 46-8, the dots could show the locations of households that have provided comments on a project; these dots could be further symbolized according to whether the comments were favorable or negative to the project, or whether the comment pertained to traffic, noise, etc. Such a map provides the public involvement team with a geographic understanding of how the public is reacting to a project. Because of the sensitive nature of individual public comments, it may be preferable to aggregate the comments by geographic areas—zip codes or census units—and characterize the nature of comments according to those areas; this method should be used especially when information on public comments is returned back to the public.

GIS mapping of addresses also can help analyze environmental justice issues, as described in Chapter 33. Locations of public participants (e.g., households on a mailing list or attendees of public meetings) can be plotted on demographic maps (showing income and ethnicity) to help test whether adequate participation occurs in disadvantaged neighborhoods. If such mapping shows low participation by disadvantaged groups, then additional outreach can be conducted in those neighborhoods.

46.4.5 Visualization

Visualization is a computerized method for graphically rendering a proposed project or an element of a proposed project (e.g., a bridge or overpass) to provide the project team, agencies, and the public with a better understanding of how the facility will look in its environment. Visualization techniques include simulations (static images resembling a photograph of the built facility) and animations (computer-generated video, as in a drive-through or fly-through rendition, that places either the viewer or landscape features in motion). Visualizations can be generated within GIS software such as ArcView 3-D Analyst or by other specialized software such as Autodesk 3-D Studio Max or Visual Nature Studio.

If visualizations are desired on a project, an effective method is to export the GIS database to the visualization software (providing the GIS

Table 46-8

Impact Assessment Report Resulting from GIS Overlay Analysis																					
	Comparative Cost	Residential Relocations		Relocations—Other			Documented Wetlands				Speculative Wetlands				Cemeteries		NRHP Properties		Stream Crossings		
	Dollars	Number		Number		Notes	Acres		Number		Acres		Number		Number		Number		Number		
Link/Unit		500'	1000'	500'	1000'	0	500'	1000'	500'	1000	500'	1000'	500'	1000'	500'	1000'	500'	1000'	Line	500'	1000'
1		0	8	0	0	0	0	0	0	0	0.126	1.491	1	3	0	0	0	0	1	2	2
2		0	4	0	0	0	0	0.001	0	1	0	0.893	0	3	0	0	0	0	2	6	2
3		0	0	0	0	0	0.265	0.265	1	1	3.032	5.569	1	2	0	0	0	0	2	3	3
4		20	26	0	0	0	0	0.124	0	1	2.626	4.991	1	2	0	0	0	0	3	3	3
5		96	94	0	0	0	2.927	4.249	3	5	19.878	32.501	2	3	0	1	0	0	9	14	11
6		69	47	0	5	businesses	0.834	0.884	2	2	15.312	27.105	3	8	0	0	0	0	2	3	3
7		15	10	1	1	businesses	0	0	0	0	12.044	21.629	6	11	1	1	0	0	0	0	0
8		15	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5	4
9		29	44	0	0	0	0.443	0.84	1	2	1.571	2.513	1	1	0	0	0	0	5	10	9
10		10	13	0	0	0	0.265	0.265	1	1	0	0	0	0	0	0	0	0	2	3	5

Exhibit 46-5
A polygon overlay of a proposed highway right-of-way with natural resource layers shows the locations of potential impacts.

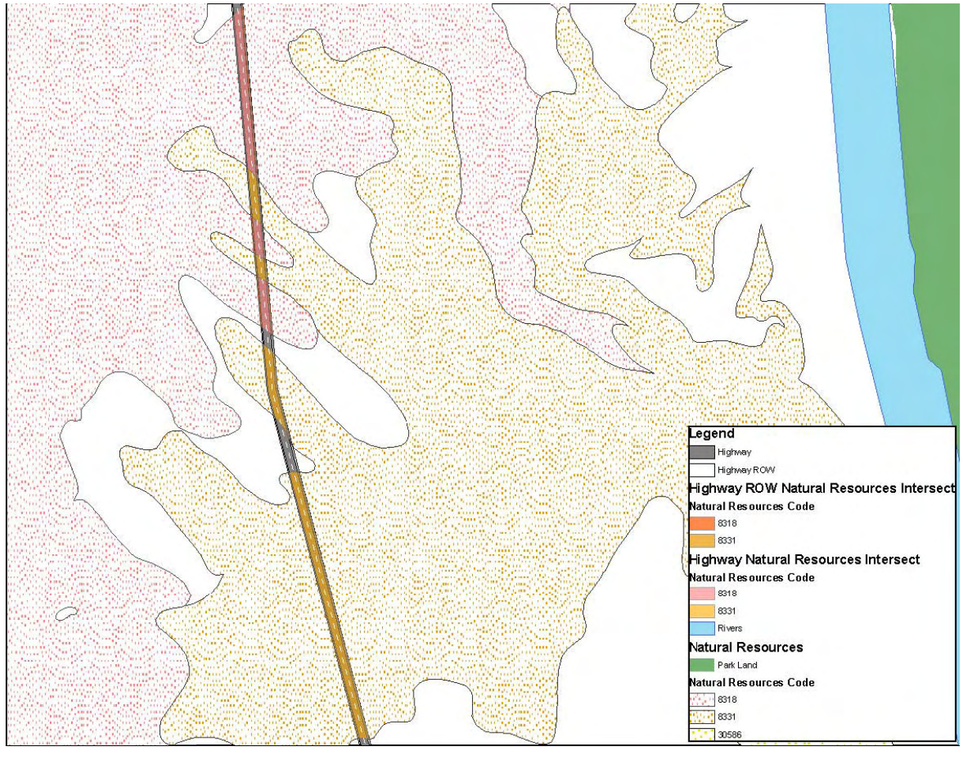


Exhibit 46-6
A GIS viewshed operation shows the areas from which a proposed highway can be seen.

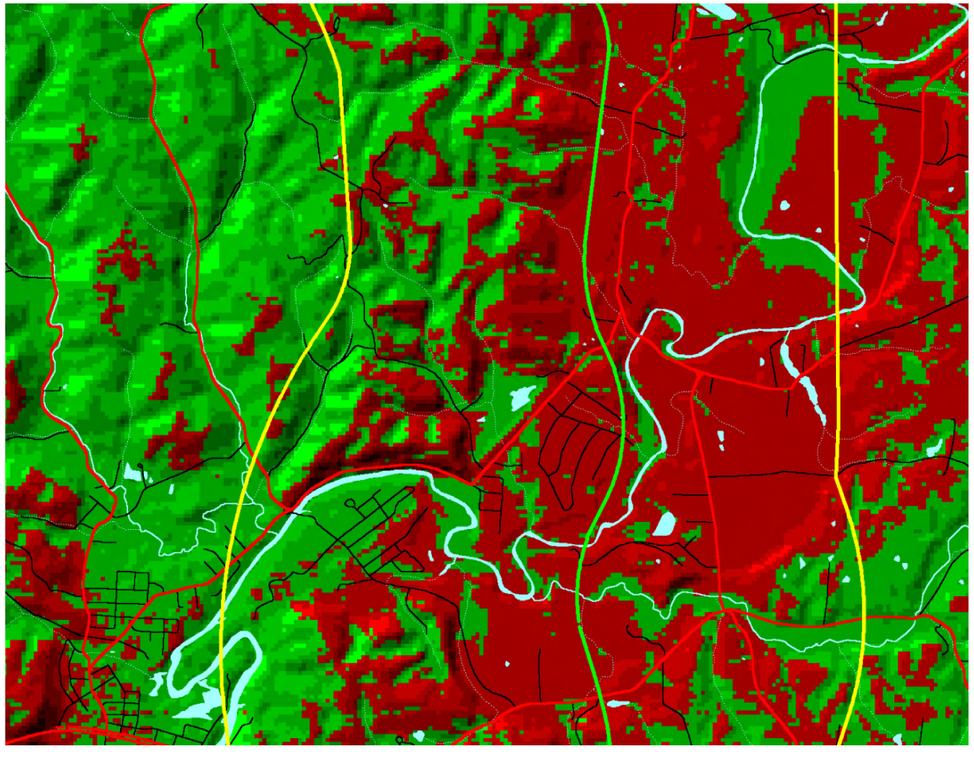


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EXHIBIT 46-7

A GIS public website gives the project team, resource agencies, and the public access to project information through a map interface.

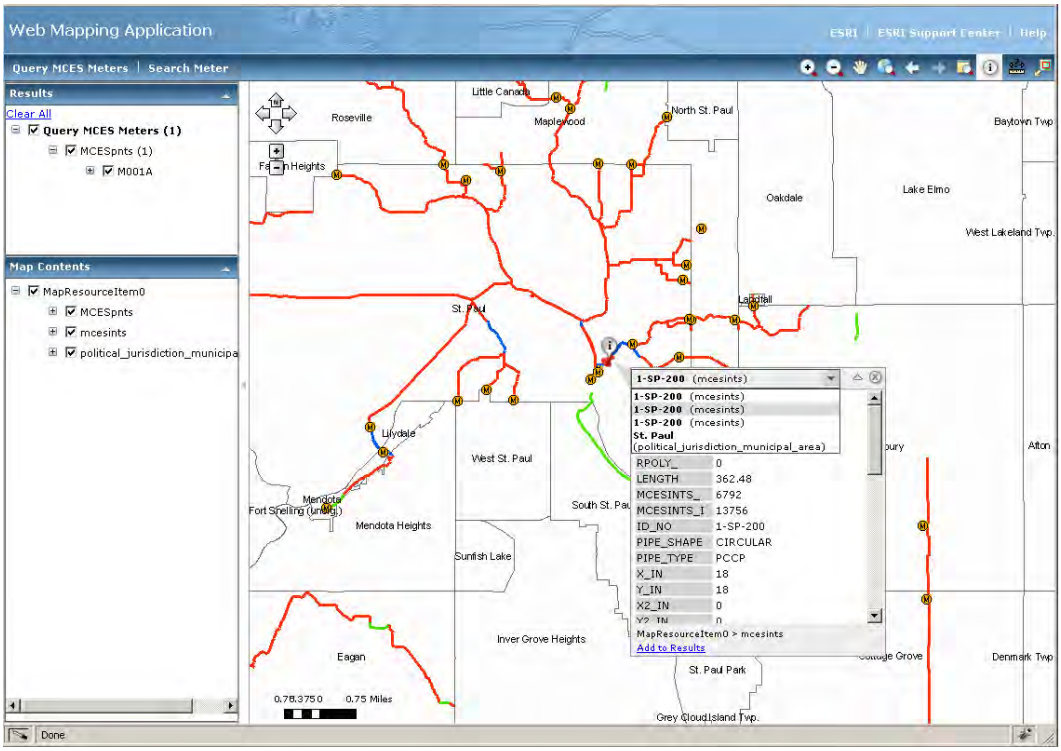
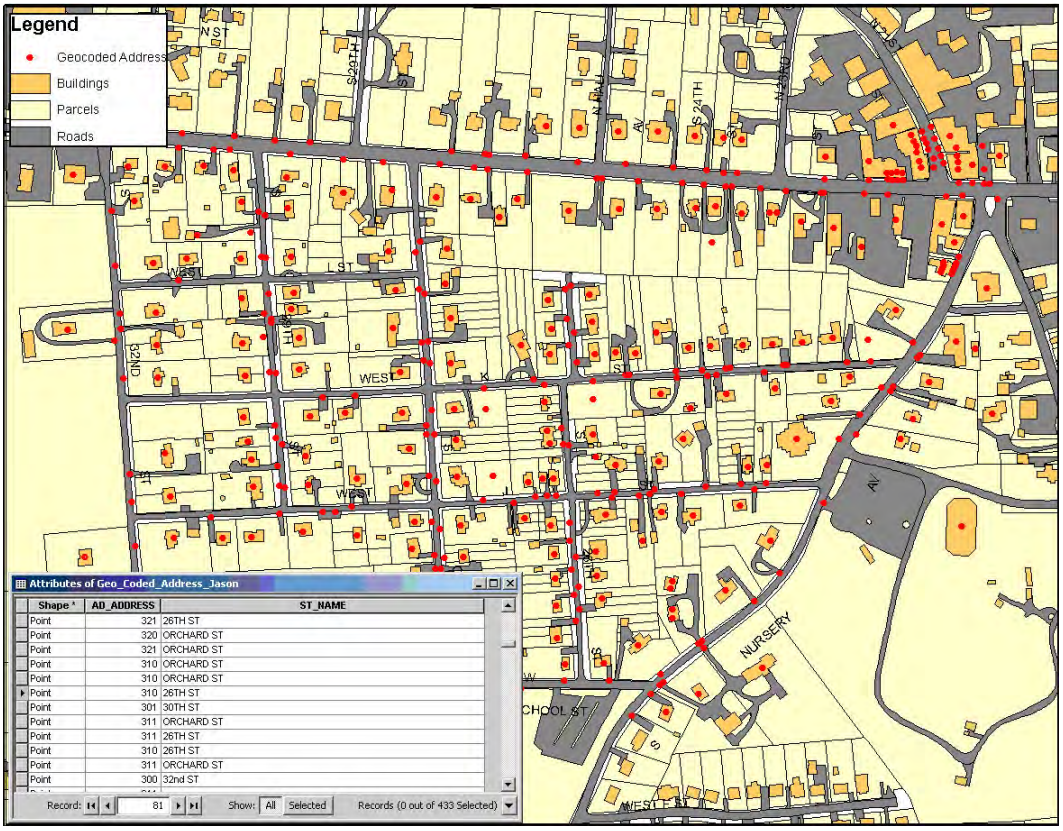


EXHIBIT 46-8

Geocoding an address list allows the locations of public participants to be mapped and presents a view of spatial distributions.



data is of sufficient quality and detail). GIS data that contribute to visualizations include terrain, vegetation, hydrography, land use/land cover, existing transportation facilities, above-ground utilities, and proposed facilities. See Exhibit 46-9.

46.4.6 Context-Sensitive Design

Much has been written in the current transportation-planning literature about context-sensitive design. Context-sensitive design is a concept whereby the designer of roadway improvements considers the environmental, scenic, aesthetic, historic, community, and preservation impacts of the activity (FHWA, 2002). To implement context-sensitive design, the roadway designer must have access to geospatial information about the natural environment, cultural resources, socioeconomics, etc. Giving the design engineer this information helps avoid situations where environmental "fatal flaws" are discovered late in the planning-design process, causing delays and additional costs in project development.

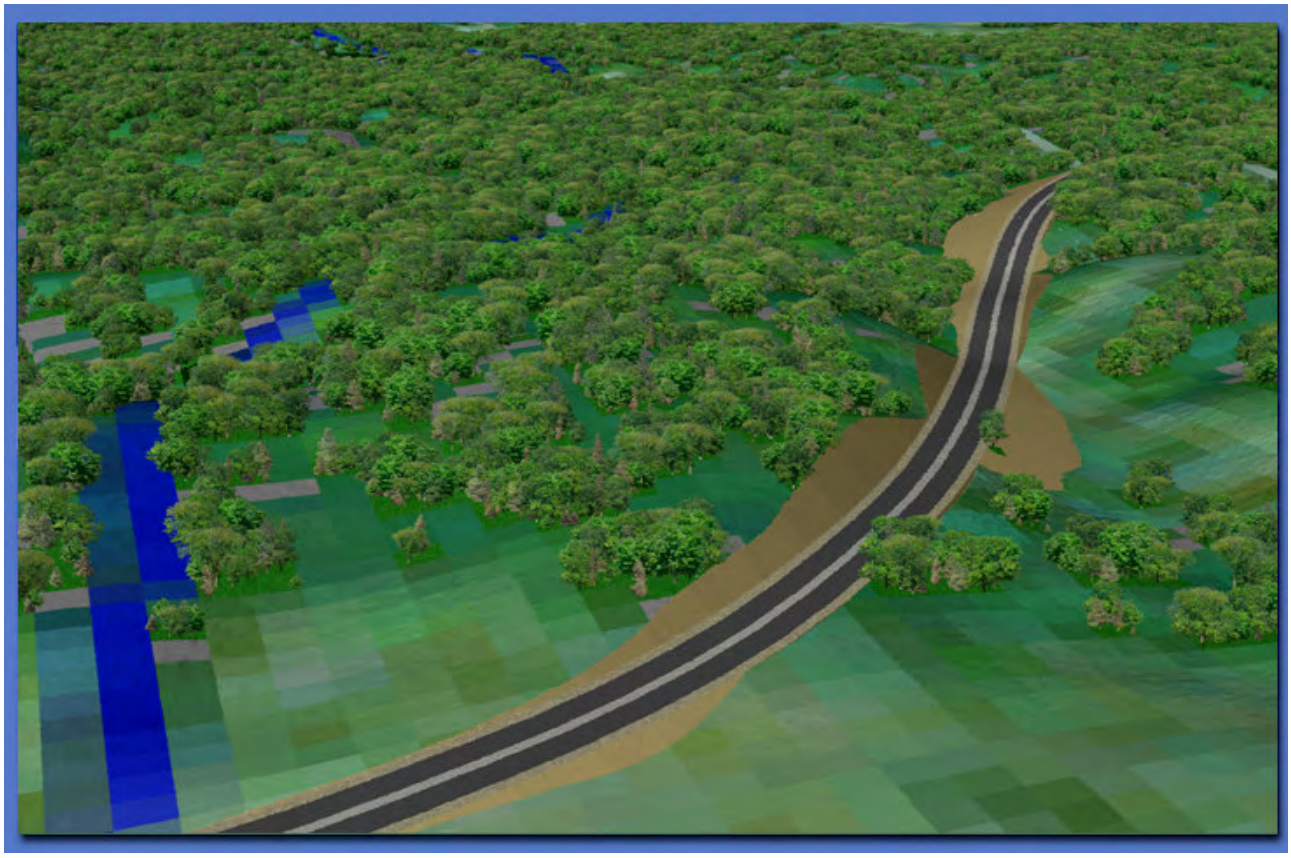
OLE staff can support context-sensitive design through the practice of incorporating environmental resource data layers into the designers' CAD drawing files as early as practical. The limitations in accuracy and resolution of typical statewide natural resources layers should be well documented and understood by the design staff.

46.5 Additional References

Federal Highway Administration, Context Sensitive Design: Thinking Beyond the Pavement, website, http://www.fhwa.dot.gov/.

Federal Highway Administration, Resource Mapping and Early Involvement: Arkansas'

Exhibit 46-9
GIS data files, obtained free from public websites, were imported into visualization software to produce this simulated view of a proposed highway.



Southeast Connector to Interstate 69, Successes in Streamlining, March 2002: http://www.fhwa.dot.gov/.

Iowa DOT OLE, Environmental Database Development Project, March 2001.

U.S. Department of Transportation, Federal Highway Administration, Office of Environment and Planning, Transportation Case Studies in GIS, Case Study 3: NCDOT: User of GIS to Support Environmental Analysis During System Planning, September 1998.

U.S. Department of Transportation, Federal Highway Administration, Memorandum, April 2001.

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APPENDICES

IOWA DEPARTMENT OF TRANSPORTATION

To Office Federal Highway Administration **Date** October 7, 2004

Attention Philip Barnes, Division Administrator

James Rost, Director

Location & Environment

Subject Iowa Programmatic Categorical Exclusion Actions and Process

As part of our joint efforts to streamline the environmental process, we propose to implement the "Iowa Programmatic Categorical Exclusion Agreement and Process" for actions currently addressed by the "Programmatic Memorandum of Understanding" (PMOU), jointly prepared and signed by FHWA, SHPO, and Iowa DOT and the action types identified in 23 CFR 771.117 (c) and (d). The actions [as described in 23 CFR 771.117 (a)] addressed by this process are non-controversial, they are consistent with federal, state, and local laws and plans. It is our determination that the projects cause no significant environmental or social impact. As such, they are appropriately classified as Categorical Exclusion (CE) Actions (as referenced in the Office of Location and Environment Manual Part III Chapter 17). There are two (2) types of CE actions that fit this programmatic agreement:

Non-evaluated Programmatic CE – Action types that have 'No Potential for Significant Environmental Effect' (attachment A). The action types are non-construction actions, construction projects within the previously disturbed right-of-way or actions that transfer the use rights of a property.

Evaluated Programmatic CE – Action types listed in 23 CFR 771.117 (c) and (d), but not included as a Non-evaluated Programmatic CE.

For these actions the process is:

Project information will be reviewed for all action types. Action types fitting Non-evaluated Programmatic CE will have concluded the environmental review process.

A project summary (attachment B) will be prepared for Evaluated Programmatic CE action types, when the pertinent environmental issues have been addressed. The action will have concluded the environmental review process when Office of Location & Environment staff signs the project summary.

Upon concluding the environmental review process, Location & Environment staff will prepare a notification memo advising of the completion of the environmental review process and noting that project development may continue toward letting. This memo will be sent to the project sponsor and appropriate Iowa DOT offices.

The CE date will be included in the letter requesting authorization for right of way acquisition, final design or project construction by the appropriate Iowa DOT offices. In the cases of disposal of excess right of way, joint use or change in access control, the determination date will be included in the approval request letter by the appropriate Iowa DOT office.

If the details of the action change, the previous CE will be re-visited to determine if the action continues to fit the classification. The CE classification will either be re-confirmed, or it will be re-classified.

All specific environmental surveys or permits will continue to be accomplished by the project sponsor. Copies of SHPO comments, Farmland Impact Ratings, etc, will be retained in the project file.

Location & Environment staff will develop and maintain a listing of all projects reviewed using this process. A copy of this list will be forwarded to the FHWA as requested. The list will identify future additions to the action types covered by the PMOU as agreed to by the signatories.

Actions that have unusual circumstances [as identified in 23 CFR 771.117 (b)], or involve other issues that warrant more intensive evaluation will continue to be processed by an individual CE submittal.

Your concurrence on the process for these project types is requested.

James Rost, Director
Office of Location and Environment

Concur _____ Date 10/7/04
For the Division Administrator
Federal Highway Administration

JPR:KDR
Attachments (2)

10/07/04 Agreement
Previous Version's Signature date
07/30/04
10/29/02
03/11/02
03/11/99

Attachment A - No Potential for Significant Environmental Effect Actions

The listed action types have 'No Potential for Significant Environmental Effect', and are currently addressed as 'No Potential to Cause Effect' by the PMOU.

1. Non-Construction Actions - These actions do not directly lead to construction activity that would cause ground disturbance or right-of-way acquisition. *

- State Planning and Research Funds Projects
- Intelligent Transportation Systems (ITS)/ Seatbelt Incentive Projects
- Funding for Planning Studies, Corridor Management Plans, and Preliminary Engineering
- Research and Development
- Publications
- Local Technical Assistance Program (LTAP)
- Urban Youth Corps
- Technology Transfer
- Pooled Fund Studies (TPF)
- On The Job Training (OJT)/ Supportive Services
- Motor Carrier Safety Assistance Program (MCSAP)

2. Construction Actions - These action types are completed within the previously disturbed right-of-way limits. *

- Traffic Signalization, Signing, and Lighting
- Railroad warning devices
- Maintenance Vehicles (Trail Groomer)
- Landscaping (Tree Plantings or Seeding)
- Emergency Relief funds projects
- Roadway or trail way Patching
- Roadway or trail way 3R or 4R type pavement projects (Resurfacing, Restoration, Rehabilitation, and Reconstruction)
- Railroad bed and track maintenance
- Rest Area repair

3. These action types change the use rights for a property. These actions will not limit the evaluation of alternatives, including shifts in the alignment for planned construction projects, which maybe required for the NEPA process. No project development on such land may proceed until the NEPA process has been completed.

- Purchase Scenic and Rails-to-Trails Easements
- Purchase of land (Protective and Hardship Acquisitions)

* In some cases, these action types could require right-of-way acquisition. If so, the action will require additional environmental review, and a project summary will need to be completed.

PROJECT SUMMARY

County: _____ Project #: _____

Action type identified in 23 CFR 771.117 (c) or (d)? yes or no
Comments:

2. Project description addressed by "Programmatic Memorandum of Understanding" (PMOU)? yes or no
Comments:

If either 1 or 2 are no, an individual categorical exclusion action (CE) must be completed.

3. Does the project require more than a minor amount of right of way? yes or no
Comments:

If the answer to 3 is yes, an individual CE must be completed.

4. Involve acquisition of homes or businesses? yes or no
If yes,
   a) number of homes_____businesses_____
   b) is there adequate available replacement housing/commercial buildings to absorb this number of displacements? yes or no
   Comments:

If the answer to 4b) is no, Office of Right of Way Relocation Assistance Agent must be contacted, and an individual CE must be completed.

5 Involve land that has <u>not</u> been previously disturbed? yes or no
Comments:

If the answer to 5 is yes, a cultural resource survey needs to be completed and submitted for SHPO and Tribal comments/concurrence.

6. Involve acquisition of a house, building or structure more than 50 years old? yes or no
   Comments:

If the answer to 6 is yes, a cultural resource survey needs to be completed and submitted for SHPO comments/concurrence.

7. Affect an NRHP listed or eligible historic structure, district, and/or archaeology site, which warrants preservation in place? yes or no
   If yes, does it involve use of the property? yes or no
   Comments:

8. Affect a public park? yes or no
   If yes, does it involve:
   a) use of the property? yes or no
   b) Land and Water Conservation Act funds? yes or no
   Comments:

If the answer of 8 b) is yes, this constitutes 6(f) involvement.

9. Affect a wildlife or waterfowl refuge? yes or no
   If yes, does it involve use of the property? yes or no
   Comments:

If the answers to 7, 8, or, 9 are yes for a use of the property, an individual CE must be completed and begin consultation with FHWA on 4(f) applicability.

10. Involve an adverse affect to a threatened or endangered species? yes or no
    Comments:

If the answer to 10 is yes, an individual CE must be completed.

11. Involve more than a minimal amount of wetlands or stream channelization? yes or no
    Comments:

If the answer to 11 is yes, an individual CE must be completed.

12. Involve more than a minimal affect on a floodplain or floodway? yes or no
    Comments:

If the answer to 12 is yes, an individual CE must be completed.

13. Involve an impact to a high-risk regulated material site? yes or no
    Comments:

If the answer to 13 is yes, an individual CE must be completed.

14. Involve more than a minor impact on:
    a) a noise sensitive area? yes or no
    b) air quality? yes or no
    c) water quality? yes or no
    Comments:

If any answer to 14 is yes, an individual CE must be completed.

15. Involve the acquisition of more than five acres of farmland in any one-mile (or less) length of project? yes or no

    If yes, has form AD-1006, Farmland Conversion Impact Rating been completed? yes or no
    Comments:

Prepared by:_____

Date:_____

Office of Location and Environment

Date Received:_____

Checked By:_____

Action:

Department of Transportation

Federal Highway Administration

Environmental Impact Statement: [Insert Project Location]

AGENCY: Federal Highway Administration (FHWA), Iowa Department of Transportation (Iowa DOT).

ACTION: Notice of Intent

SUMMARY: The FHWA, the Iowa DOT are issuing this notice to advise the public that an environmental impact statement (EIS) will be prepared for a proposed transportation project in [Insert Project Location], Iowa.

FOR FURTHER INFORMATION CONTACT: Michael LaPietra, Environment and Realty Manager, FHWA Iowa Division Office, 105 Sixth Street, Ames, IA 50010, Phone 515-233-7302; or James P. Rost, Director, Office of Location and Environment, Iowa Department of Transportation, 800 Lincoln Way, Ames, IA 50010, Phone 515-239-1225.

SUPPLEMENTARY INFORMATION:

Electronic Access

An electronic copy of this document is available for free download from the Federal Bulletin Board (FBB). The FBB is a free electronic bulletin board service of the Superintendent of Documents, U.S. Government Printing Office (GPO).

The FBB may be accessed in four ways: (1) Via telephone in dial-up mode or via the Internet through (2) telnet, (3) FTP, and (4) the World Wide Web. For dial-up mode a user needs a personal computer, modem, telecommunications software package, and telephone line. A hard disk is recommended for file transfers.

For Internet access a user needs Internet connectivity. Users can telnet or FTP to: fedbbs.access.gpo.gov. Users can access the FBB via the World Wide Web at *http://fedbbs.access.gpo.gov*.

User assistance for the FBB is available from 7 a.m. until 5 p.m., Eastern Standard Time (EST), Monday through Friday (except federal holidays) by calling the GPO Office of Electronic Information Dissemination Services at 202-512-1530, toll-free at 888-293-6498; sending an e-mail to *gpoaccess@gpo.gov*; or sending a fax to 202-512-1262.

Access to this notice is also available to Internet users through the **Federal Register's** home page at *http://www.nara.gov/fedreg.*

Project Background

The FHWA, in cooperation with the Iowa Department of Transportation (Iowa DOT) will be preparing an EIS for the proposed [Insert Project Description and Location]. The proposed project includes [Insert Project Description and Location]. The purpose of the [Insert Project Name] is [Insert Project Problem Statement].

Potential alternatives and combinations thereof will include but are not limited to: (1) Taking no action, *i.e.*, the No-Build Alternative; {2} strategies to better manage transportation demand; (3) improving existing roadways, pedestrian walkways, and bikeways; and, (4) constructing a new roadway connection.

The build alternative will include consideration of various alignments and grades in order to minimize potential environmental impacts. Letters describing the proposed action and soliciting comments will be sent to appropriate Federal, State, and local agencies, and to private organizations and citizens who have previously expressed or are known to have interest in the proposed project.

The EIS will be initiated with a scoping process. The scoping process will include public outreach and agency coordination that will be conducted over the next several months in order to elicit input on the project purpose and need, potential alternatives, significant and insignificant issues, and collaborative methods for analyzing transportation alternatives and environmental impacts.

As part of the scoping process, public meetings will be held in [Insert city or County Name] to meet with federal, state, and local agencies, as well as private individuals and organizations concerned with the project. In addition, a public hearing will be held in connection with the circulation of the draft EIS (DEIS). Public notice will be given concerning the date and location of the public meeting(s) and public hearing.

The information gained during the scoping process will be disseminated and used to guide the development of the EIS. Comments and input received during the scoping and subsequent steps of the EIS process will be considered. Beginning with scoping, public involvement and agency coordination will continue throughout the preparation of the EIS.

To ensure that a full range of issues are addressed in relation to the proposed action and that significant issues are identified, interested parties are invited to submit comments and suggestions. Comments or questions concerning the proposed action and the EIS should be directed to the FHWA or Iowa Department of Transportation at the address provided on page one in the section titled “FOR FURTHER INFORMATION CONTACT.”

(Catalog of Federal Domestic Assistance Program Number 20.205, Highway Planning and Construction. The regulations implementing Executive Order 12372 regarding intergovernmental consultation on Federal programs and activities apply to this program.)

(**Authority:** 23 U.S.C. 315; 49 CFR 1.48)

_____

DATE

_____

Lubin Quinones, P.E.
Division Administrator
FHWA, Iowa Division

FHWA-IOWA-EIS-03-01-D

Interstate 74 Quad Cities Corridor Study
Scott County, Iowa and Rock Island County, Illinois

Project Number: IM-74-1(122)0-13-82

DRAFT ENVIRONMENTAL IMPACT STATEMENT
AND SECTION 4(f) STATEMENT

Prepared in Accordance with:
The National Environmental Policy Act, as amended
42 USC 4332(2)(c)
and
Section 4(f) of the U.S. Department of Transportation Act, as amended
49 USC 303

by the
U.S. DEPARTMENT OF TRANSPORTATION, FEDERAL HIGHWAY ADMINISTRATION,
IOWA DEPARTMENT OF TRANSPORTATION and
ILLINOIS DEPARTMENT OF TRANSPORTATION

Cooperating Agency
U.S. DEPARTMENT OF HOMELAND SECURITY, UNITED STATES COAST GUARD

The signatures are considered acceptance of the general project location and concepts described in the environmental document unless otherwise specified by the approving officials. However, such approval does not commit to approve any future grant request to fund the preferred alternative.

_____	_____	_____
For Federal Highway Administration	**For Iowa Department of Transportation**	**For Illinois Department of Transportation**

_____
Date of Approval

The following persons may be contacted for additional information concerning this document:

Philip Barnes, P.E.
Division Administrator
Federal Highway Administration
105 6th Street
Ames, IA 50010
Telephone: 515-233-7300

James P. Rost, Director
Office of Location and Environment
Iowa Department of Transportation
800 Lincoln Way
Ames, IA 50010
Telephone: 515-239-1225

Gregory L. Mounts, P.E.
District Engineer
Illinois Department of Transportation, District 2
819 Depot Ave.
Dixon, IL 61021
Telephone: 815-284-2271

The Iowa and Illinois Departments of Transportation, in conjunction with the Federal Highway Administration (FHWA), have initiated planning and preliminary design studies for the improvement of Interstate 74 in Scott County, Iowa and Rock Island County, Illinois. The project begins at the I-74 interchange with 23rd Avenue in Moline, Illinois, and continues north across the Mississippi River to the I-74 interchange with 53rd Street in Davenport, Iowa. The proposed work consists of upgrading the existing 4-lane interstate by providing mainline capacity improvements, interchange modifications, and realigning I-74 across the Mississippi River. This Draft Environmental Impact Statement (DEIS) considers location alternatives for the bridge alignment, alternative interchange configurations, optional lane configurations to increase the mainline capacity, and a No-Action alternative. Potential impacts of the alternatives have been evaluated and include those to wetlands, water resources, historic buildings, homes and businesses, and public facilities and services.

Comments on this draft EIS are due by January 9, 2004, and should be sent to James P. Rost, Iowa DOT, as listed above.

FHWA-IOWA-EIS-02-01-F

AVENUE G VIADUCT AND CONNECTING CORRIDOR
CITY OF COUNCIL BLUFFS
POTTAWATTAMIE COUNTY, IOWA

Iowa DOT Project Number
STP-U-1642 (2)--70-78

FINAL

ENVIRONMENTAL IMPACT STATEMENT

Submitted Pursuant to 42 U.S.C. 4332(2)(c)

By the

U.S. Department of Transportation
Federal Highway Administration

and

IOWA DEPARTMENT OF TRANSPORTATION
Highway Division
Office of Location & Environment

The signatures are considered acceptance of the general project location and concepts described in the environmental document unless otherwise specified by the approving officials. However, such approval does not commit to approve any future grant request to fund the preferred alternative.

For Federal Highway Administration

For Iowa Department of Transportation

1/30/2003
Date of Approval

The following persons may be contacted for additional information concerning this document:

Bobby Blackmon
Division Administrator
Federal Highway Administration
105 6th Street
Ames, IA 50010
Tele. (515) 233-7300

James Rost, Director
Office of Location & Environment
Iowa Department of Transportation
800 Lincoln Way
Ames, IA 50010
Tele. (515) 239-1225

The purpose of the Project is to improve access for local emergency services and to improve safety through expanded capacity across the rail corridor. The project is in the community of Council Bluffs, Iowa, Pottawattamie County, and consists of a viaduct on Avenue G seven blocks north of Broadway and a roadway connection to Kanesville Boulevard. Avenue G is an east-west arterial street, parallel to Broadway. The proposed viaduct and roadway connection would provide improved emergency service, safety, transportation continuity, community service and enhanced economic stability and development. Avenue G is an important link in the commercial, industrial and residential network of roadways within Council Bluffs. Alternative 1 (North 6th/North 7th One-way Pair) was identified as the preferred alternative in the Draft EIS. This remains the preferred alternative in the Final EIS.

Comments on this Final EIS are due by March 17, 2003, and should be sent to James Rost, Iowa DOT, as listed above.

Record of Decision

AVENUE G VIADUCT AND CONNECTING CORRIDOR
CITY OF COUNCIL BLUFFS
POTTAWATTAMIE COUNTY, IOWA

FHWA-IOWA-EIS-02-01-F

Iowa DOT Project Number
STP-U-1642 (22)--70-78

Submitted Pursuant to 42 U.S.C. 4332(2)(c)

By the

U.S. Department of Transportation
Federal Highway Administration

DESCRIPTION OF PROPOSED ACTION

The proposed action (the Project) is in the community of Council Bluffs, Iowa, Pottawattamie County, and consists of a viaduct on Avenue G seven blocks north of Broadway and a roadway connection to Kanesville Boulevard. Avenue G is an east-west arterial street, parallel to Broadway and is an important link in the commercial, industrial and residential network of roadways within Council Bluffs.

Specifically, the Project consists of:

- *A new viaduct along Avenue G from North 8th Street to North 16th Street (the Avenue G viaduct) over the main north-south rail corridor that bisects the City of Council Bluffs (the City) (Figure 1)*
- *An improved roadway connection (North 6th Street and North 7th Street, One way Pair) from the viaduct's eastern terminus (North 8th Street and Avenue G) to Kanesville Boulevard (Figure 2)*

The purpose of the Project is to improve access for local emergency services and to improve safety through expanded capacity across the rail corridor. In addition, the proposed viaduct and roadway connection will improve transportation continuity and community service, and enhance economic stability and development.

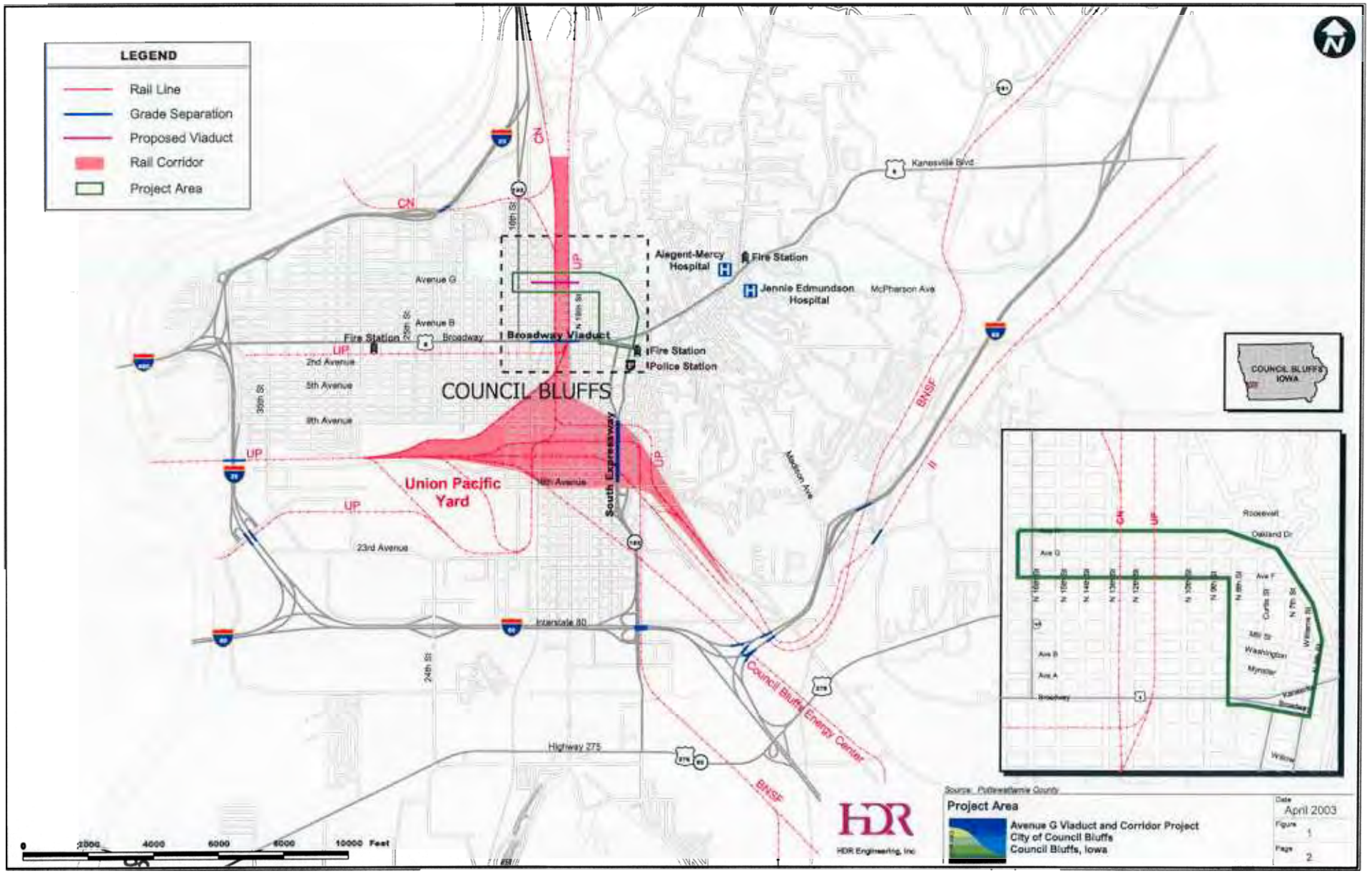
As shown in Figure 2, the Preferred Alternative would begin at Kanesville Boulevard and continue the 6th Street/7th Street one-way pair that exists south of Kanesville Boulevard, north through the Project Area. North 6th Street would be one-way northbound, while North 7th Street would be one-way southbound. This would match the existing street orientation in the Project Area. The two streets would join at Avenue F. There, the alignment would curve along new alignment to the North 8th Street and Avenue G intersection, where it would join the viaduct segment. The viaduct will have a travel width of 50 feet and a 10-foot sidewalk separated from the travel lanes by a concrete barrier. The structure will have a total length of 1,550 feet and will span from North 10th Street and North 13th Street.

The proposed cross section will be built within the existing North 7th Street curb line from Avenue F to Kanesville Boulevard. From Kanesville Boulevard to Mill Street, the cross section will be built within the existing North 6th Street curb lines. From Mill Street to Avenue F, the cross section will have to be widened to 31 feet. This keeps the sidewalks in their current locations. Where the two one-way pairs join at Avenue F, however, the proposed roadway will curve along the new alignment to North 8th Street at Avenue G.

Two 12-foot travel lanes with a 7-foot parking lane will be provided. A trail system will be constructed along the west side of North 7th Street and continue across the viaduct on the bicycle/pedestrian lane.

PREFERRED ALTERNATIVE DECISION

Because the Project is located in a fully developed urban environment, impacts on natural resources are nonexistent or minimal. Project impacts were more concentrated in the manmade and social environment, specifically, the impacts from right of way acquisition. The Preferred Alternative was chosen as the environmentally preferred alternative based on fewer impacts identified throughout the preparation of the Draft Environmental Impact Statement (DEIS), especially relocation and cultural resource impacts. The selection of the Preferred Alternative was then reaffirmed by comments received on the DEIS and Final Environmental Impact Statement (FEIS).


LEGEND
Rail Line
Grade Separation
Proposed Viaduct
Rail Corridor
Project Area
CN
UP
BNSF
COUNCIL BLUFFS
Broadway Viaduct
Union Pacific Yard
South Expressway
Avenue G
Avenue B
Broadway
2nd Avenue
5th Avenue
8th Avenue
16th Avenue
23rd Avenue
Interstate 80
Highway 275
Kanesville Blvd
McPherson Ave
Madison Ave
Council Bluffs Energy Center
Aegent-Mercy Hospital
Jennie Edmundson Hospital
Fire Station
Police Station
COUNCIL BLUFFS IOWA
0 2000 4000 6000 8000 10000 Feet
HDR
HDR Engineering, Inc
Source: Pottawattamie County
Project Area
Avenue G Viaduct and Corridor Project
City of Council Bluffs
Council Bluffs, Iowa
Date
April 2003
Figure
1
Page
2

Source: Pottawattamie County (April 1998)

Alternative 1 (One-way Pair - North 6th/7th Streets) with Avenue G Viaduct

HDR Engineering, Inc.

Avenue G Viaduct and Corridor Project
City of Council Bluffs
Council Bluffs, Iowa

Date: April 2003
Figure: 2

PREFERRED ALTERNATIVE – BASIS FOR SELECTION

The process used to select the Preferred Alternative for this Project was based on the consideration of social, economic, and environmental impacts, engineering evaluation, agency coordination, and public input. The preliminary alternatives were screened with respect to their ability to meet the Project Purpose and Need. Alternatives were retained through the application of criteria tied to the Project Purpose and Need and to major resource categories. This process included several public open house workshops as described in the Comments and Coordination section of the DEIS.

A Community Resource Committee (CRC), the affected public, and over 20 federal, state, and local governmental bodies, resource agencies, environmental groups, and area citizen groups were involved in the project development. Chapter 5 of the DEIS contains more detail on public involvement. The FEIS updates the public involvement process following the release of the DEIS.

Connecting Corridor

Alternative 1 (One-way Pair) was selected as the preferred roadway connection between the east terminus of the viaduct and Kanesville. Although structures would need to be removed on the curve from Avenue G to North 6th/7th Streets, the segment along North 6th/7th would not require removal of any structures. Though the Preferred Alternative would traverse through an eligible historic district, it would remain within the existing curb lines and would have no effect on historic structures.

Viaduct Segment

The reason for selecting the connecting viaduct between North 8th Street and North 16th Street was because this was the location where the rail corridor is at its most narrow point north of Broadway and because it would meet the Project's Purpose and Need. It would improve emergency service by providing a second grade-separated crossing of the rail corridor and it would also improve the function of the Broadway viaduct as an emergency service route by diverting traffic from Broadway.

OTHER ALTERNATIVES CONSIDERED

The initial range of alternatives was evaluated with respect to a common set of criteria and reduced to a limited number that best fit the Project's Purpose and Need. The results of this process are summarized below.

Preliminary Alternatives

The following alternatives were initially considered:

No-Build Alternative. Under the No-Build Alternative, no redundant facilities would be developed as an alternative to the Broadway viaduct, and Avenue G would remain an at-grade crossing. The corridor would be subject to only minor rehabilitation activities to support continuing operation. The No-Build Alternative does not meet the Purpose and Need, but serves as a baseline for comparison to the build alternatives.

Transportation Demand Management (TDM) Alternative. TDM relates to the potential to reduce the number of vehicles on the existing roadway network by expanding public transit service and/or increasing auto occupancy rates. TDM measures typically reduce the number of vehicles by only 1 to 2 percent, and they do not improve the accident experience. In addition, these measures would not provide a needed second grade-separated crossing of the rail corridor. Therefore, TDM will not meet the Project Purpose and Need and was eliminated from further consideration.

Transportation System Management (TSM) Alternative. TSM generally incorporates relatively low-cost, low-impact changes to the transportation system, such as intersection improvements. There are limited opportunities for TSM measures beyond those the City currently uses to benefit the Broadway corridor. The TSM alternative would not improve emergency service because it would neither improve congestion

on Broadway nor provide a second crossing of the rail corridor. As a result, it was eliminated from further consideration.

Build Alternatives. The following alternatives were initially considered:

Viaduct Segment

- A viaduct along 9th Avenue, nine blocks south of Broadway and 17 blocks south of Avenue G. Several issues led to the elimination of this alternative from further consideration. At this location, the railroad tracks are wider apart than north of Broadway, which would require a much longer, and much more expensive, viaduct to span the tracks. Also, tying into the elevated portion of the South Expressway would complicate the Project and further increase costs. There are also historical properties near its proposed east terminus. The potential to reduce traffic on Broadway is less for this alternative than for a viaduct north of Broadway. This viaduct would provide a second grade separated crossing of the rail corridor. This alternative was dismissed due to unreasonable project costs and impacts to historic properties.
- Widening or reconstruction of the Broadway viaduct. Although this alternative offers an opportunity to reduce congestion on Broadway, it would perpetuate reliance on a single grade separation over the rail corridor. Therefore, this alternative would not meet the purpose and need and was eliminated from further consideration.
- A viaduct along Avenue G, within the segment bounded by North 8th Street and North 16th Street, where the rail corridor is at its most narrow point north of Broadway. This alternative was retained for further study because it would meet the Project Purpose and Need. It would improve emergency service by providing a second grade-separated crossing of the rail corridor and it would also improve the function of the Broadway viaduct as an emergency service route by diverting traffic from Broadway.

Connecting Corridor Segment

- Ten preliminary alternatives were developed to provide a connecting route between the east terminus of the viaduct, near the intersection of North 8th Street and Avenue G, and Kanesville Boulevard. This route would need to manage increased connecting traffic safely and prevent its dispersal through the residential neighborhoods within the Project Area. Appendix A of the DEIS contains aerial maps of these preliminary alternatives. During the preliminary alternative evaluation process, the alternatives were assessed with respect to their ability to meet the Project Purpose and Need. All but three of the preliminary alternatives were eliminated because they would cause a high number of relocations, have potential impacts on historic properties, and/or have undesirable roadway geometry.

Alternatives Retained for Detailed analysis

The following alternatives were analyzed in detail:

- *No-Build Alternative*
- *Alternative 1 (North 6th/North 7th One-way Pair with Avenue G Viaduct)*
- *Alternative 5 (North 8th Street with Avenue G Viaduct)*
- *Alternative 11 (North 7th Street with Avenue G Viaduct)*

Though the least expensive option, the No-Build Alternative would not address the need for improving emergency response within the City. As train traffic increases, some of the vehicles currently using at-grade crossings are likely to divert to the congested Broadway corridor, further congesting the Broadway viaduct and making the emergency service response times longer. Consequently, the No-Build

Alternative would not meet the Project Purpose and Need. It was retained as a baseline to compare the impacts of the build alternatives.

Alternatives 1, 5 and 11 differ with respect to the corridor connecting the viaduct to Kanesville Boulevard. They would, however, have a common segment on Avenue G from North 8th Street to North 16th Street, which would contain the Avenue G viaduct.

PROJECT MITIGATION – MEASURES TO MINIMIZE HARM

The primary areas of impact associated with the Preferred Alternative include relocations and economics. Minor impacts are likely to occur to surface water, regulated materials, and visual quality. Temporary impacts due to construction are also likely to occur to air, noise, water quality, businesses and residences, utility service, railroad operations, and traffic. The Preferred Alternative will not adversely impact the natural environment, including fish and wildlife habitats, wetland impacts, and threatened or endangered species. In addition, no adverse impacts will occur to historic and archaeological resources.

Relocations

The Preferred Alternative right-of-way is within a developed urban environment. The Project Area contains a mixture of single-family housing, duplexes, and apartment buildings. Overall, the condition of the houses in the area varies; some are well maintained while many others are run down, vacant, and/or boarded up. The Preferred Alternative will require the relocation of 75 households, with approximately 19 of these having a household income below the poverty level. These households include both owner-occupied residences and rental units.

A study of the available owner-occupied and rental residential units was conducted to determine the availability of replacement housing within the City of Council Bluffs. It was concluded that all people displaced from their residences could be relocated within the construction time period without depleting the supply of owner-occupied and rental residential units.

The Preferred Alternative will also impact two businesses. A fabricated metal office building belonging to Bartlett Grain Company will be relocated. There appears to be sufficient land on the existing site to move the building, if desired, without undue disruption of business operations. The eastern units of the Best Western Chalet Motel will be acquired. This will eliminate a portion of the motel's rooms, with the consequent loss of future revenue from these rooms.

Residential and commercial displacements will be mitigated in accordance with the Uniform Relocation Assistance and Real Property Acquisition Act of 1970, as amended in 1987 (also known as the Uniform Relocation Assistance Act [UA]).

Pedestrians

Due to concern that the Preferred Alternative would increase traffic on North 6th and 7th Streets, which would increase the probability of conflicts between pedestrians and vehicles, traffic signals with pedestrian crossing lights will be constructed at North 6th and North 7th Streets and Mills Streets.

Economics

The Preferred Alternative will result in adverse economic impacts with respect to the local tax base. The City would acquire the properties necessary to construct the Project, and these properties will drop off the local tax base because of their public ownership. Local property tax assessments will be reduced by approximately $120,000 to $125,000 annually. This loss will be felt by the City's General Fund and the County's General Fund. Because the City plans to relocate these residents within Council Bluffs, there is not likely to be a drop in the demand for public services to offset these reductions in revenue. This is a small percentage of the City's and County's annual budget. Therefore, no mitigation measures are planned to offset the impacts to the local tax base. No other economic impacts are anticipated.

Water Quality

The Preferred Alternative is not expected to have a significant impact on the amount of surface water because no additional impervious surfaces would be constructed. However, the viaduct might change the surface drainage pattern. Improvement to the stormwater drainage system will be designed to accommodate any changes in the drainage pattern.

Regulated Materials

Due to the age of the homes that are proposed for demolition, potential for adverse impacts due to asbestos-containing materials being found in the older homes exists. In accordance with the asbestos national emission standard for hazardous air pollutants, and EPA's recommendation for the thorough asbestos inspection of properties proposed for demolition, the City will ensure that the owner or operator of the demolition activity will conduct a thorough inspection of each household for the presence of asbestos. These inspections will be conducted prior to commencement of the demolition activity and will be conducted by a licensed inspector for the City.

Visual

The visual impact of the proposed Project will be most noticeable at residences near the viaduct, at residences close to the connecting corridor, and at Kanesville Alternative High School. The limited number of residences remaining on Avenue G will be close to the viaduct and will experience adverse visual impacts from its construction. Landscaping features and a pedestrian/ bicycle trail are planned for the entire length of the Project and will soften the visual impacts and help blend the Project into a natural landscape. However, little mitigation will be available to those remaining close to the viaduct. Densely planted trees and shrub will buffer their view of the structure, but will not eliminate it. No other mitigation measures are planned.

Construction

The Preferred Alternative will require new construction in residential neighborhoods and in an industrial corridor, and will create temporary construction-related impacts that result from ground disturbance and the operation of construction equipment. Such impacts include air, noise, water quality, businesses and residences, utility service, railroad operations, and traffic. The severity of these impacts will be related to the construction methods and sequencing used for the Project.

A thorough public information program will be implemented to alert the community of construction activities and to minimize impacts. Information will include scheduled work hours in areas where construction is needed and any alternative routes needed to maintain travel to businesses and residences. Construction signs will also be used to notify motorists about work activities and changes in traffic patterns. To minimize the temporary impacts of construction of structures, the contractor will be required to follow best management practices.

Air Quality

Air quality impacts during construction will be minor and are limited to short-term increases of fugitive dust, particulates, and emissions from mobile sources. They will be dealt with using current city construction regulations.

Water Quality

The water quality of surface water runoff can be affected by soil erosion caused by excavation, grading, and other activities. These conditions will exist until completion of the Project and installation of permanent protective measures. Because the Project is likely to expose more than one acre of soil, it will require a Section 402 National Pollution Discharge Elimination System (NPDES) permit from Iowa Department of Natural Resources. Usually mitigation measures are associated with these permits.

Noise

Noise impacts will be created by the operation of machinery and other construction activities during daylight hours. To prevent noise impacts on nearby residences and businesses during the night, construction activities will be limited to daylight hours.

Access During Construction

The contractor will be required to follow the maintenance of traffic (MOT) plans that are included with the design documents. The MOT plans specify construction sequencing and measures to minimize impacts by road users, businesses, and residential property owners during Project construction. A goal of the MOT plans will be to maintain access to businesses and residences to the extent possible and to keep existing roads open to traffic. Therefore, commercial sales and services losses are expected to be minimal.

Traffic on local streets in this area will be affected where the proposed viaduct will be located and where existing roads need to be reconstructed to accommodate the new viaduct. The contractor will be required to keep access to local residences and businesses available. Avenue G will need to be closed between North 8th Street and North 14th Street for an extended period of time. During this time, Avenue G traffic would be diverted to Broadway and other east-west arterials. After project design and before project construction, suitable detour routes for the community will be identified, advertised, and provided with signage.

Utilities

The City will consult with all utilities affected by construction of the Project and will complete agreements with the utilities before construction. Utility service will continue to be provided to local businesses and residences throughout the construction period, but there may be periods of brief service interruptions for line relocations in accordance with the utility agreements. These interruptions will be advertised and conducted during times that minimize disruptions to local businesses and residents.

Railroad Operations

Schedules for railroad-related work, and work windows for Project construction, will be coordinated between the City and the railroads prior to implementation of the construction contract. The contract documents will stipulate these conditions.

SECTION 4(f)

The Preferred Alternative will have no effect on historic properties. Noise on the one-way pair will increase as a result of increased traffic. However, the noise threshold, requiring mitigation, will extend only to the sidewalks in the neighborhood with historic structures (North 6th Street between Mill Street and Washington Avenue). This increase in noise will not impact the aesthetic characteristics of these historical sites, and therefore, will not cause a constructive use impact on these Section 4(f) resources.

Since the Preferred Alternative does not use any Section 4(f) resources, a Section 4(f) compliance document is not required.

MONITORING – ENFORCEMENT PROGRAM

Because the impacts associated with the Project are not substantial enough to warrant long-term mitigation, no formal monitoring or enforcement program will be developed. However, in conjunction with construction activities, the contractor will develop an environmental monitoring program designed to address best management practices, which will be approved by the City.

TRIBAL COORDINATION

Tribal notification was made under the Iowa DOT policy on Tribal Coordination. Example Tribal Notification and transmittal letter are attached, as is a list of the Tribes receiving the project information.

Tribal Comments

The following Tribal comments were received. The comment letters and notification are provided in Attachment A.

- **SAC and Fox Nation of Missouri** – M. Deanne Bahr, NAGPRA Representative, indicated letter sent from Iowa DOT is in compliance with Section 106 of the Nation Historic Preservation Act and the main contact for the SAC and Fox Tribe of Mississippi in Iowa is Johnathan Buffalo. *Response* – No response requested.

  Winnebago Tribe of Nebraska – Mr. David Lee Smith, Cultural Preservation Officer, indicated that the Winnebago Tribe of Nebraska has no cultural or sacred sites in the Project area and may proceed with construction. *Response* – No response requested.

- **Tribal Notification from the Otoe-Missouri Tribe of Okalahoma** – Ms. Mildred Hudson, NAGPRA Coordinator, Otoe-Missouria Tribe, sent Tribal Notification indicating no American Indian sites found and no comment at this time, but request continued notification on this Project. *Response* –The Iowa DOT will continue to coordinate with the Otoe-Missouria Tribe on the Project as requested.

COMMENTS ON THE FEIS

This section describes the public and agency during the comment period for the FEIS.

Summary of Public Comments and Responses

No comments were received.

Agency Comments

The following Agency comments were received. The comment letters and notification are provided in Attachment A.

- **U.S. Environmental Protection Agency, Region VII** – EPA has no objections to the project as described in the FEIS. EPA does however, recommend that in addition to the thorough asbestos inspection of properties proposed for demolition, asbestos removal should also be accomplished by a contractor licensed for such activities. *Response* –A contractor licensed for such activities will be used for the asbestos removal of those properties proposed for demolition.

- **U.S. Department of the Army, Rock Island District** – The U.S. Department of the Army, Rock Island District, determined that the Project, as proposed, does not require a Department of Army (DA) Section 404 Permit. *Response* – Comment noted.

- **State of Iowa Department of Natural Resources** – Department indicated that no site-specific records of rare species or significant communities existed. If listed species or rare communities are found during the planning or construction phases, additional studies and/or mitigation may be required. *Response* – The Iowa DOT will coordinate with the Department of Natural Resources on the Project if such species or communities are located.

  State of Iowa Department of Natural Resources – Department indicated additional information that may contain more specific information than was covered in the Final EIS relative to the air quality program administered by the Department. *Response* – Comment noted.

U.S. Department of Housing and Urban Development – Office no longer has staff expertise to review document and has no comments. *Response* – Comment noted.

Iowa Department of Economic Development – (three letters) Department found no serious environmental problems that may result from the Project and indicated that the proposed Project conforms to pertinent planning to this area. Recommended approval of project. Those comments indicated in the Department's March 5, 2003 and February 7, 2003 letter refers to the February 18, 2003 letter from the Iowa Department of Natural Resources. *Response* – Comment noted.

CONCLUSION

Based on the analysis and evaluation contained in the FEIS, along with input from the public, local governments, and regulatory agencies, it has been determined to proceed with implementation of the Avenue G Viaduct and Connecting Corridor Project using the Preferred Alternative.

Completion of the FEIS and Record of Decision for the Avenue G Viaduct and Connecting Corridor denotes completion of the location study phase of project development. The final design and construction phases will follow. As the development of the Project continues, FHWA will monitor changes during the final design process so that appropriate follow-up evaluations are completed and NEPA compliance is maintained.

Bobby W Blackmon

For Federal Highway Administration

4/17/03

Date of Approval

ATTACHMENT A
Agency and Tribal Comment Letters

SAC AND FOX NAGPRA CONFEDERACY

"MESKWAKI"
Sac and Fox of the
Mississippi in Iowa
349 Meskwaki Rd
Tama, IA 52339-9629
641-484-4678
Fax: 641-484-5424
Contact:
Johnathan L. Buffalo

Sac and Fox Nation
of Missouri
in Kansas and Nebraska
305 N Main
Reserve, KS 66434
785-742-7471
Fax: 785-742-2979
Contact: Deanne Bahr

Sac and Fox Nation of
Oklahoma
Rt. 2 Box 246
Stroud, OK 74079
918-968-2353
Fax: 918-968-2353
Contact: Sandra Massey

April 2, 2003

Judy McDonald
Office of Environmental Services
Iowa Department of Transportation
800 Lincoln Way
Ames, IA 50010-9902

Dear Ms. McDonald

Thank you for your letter, which is in compliance with Section 106 of the National Historic Preservation Act, and Section 110.

The main contact group of the Sac and Fox in issues that result in inadvertent finds of human remains or funerary objects pertaining to following project:

STP-U-1642(22)—70-78

will be Johnathan Buffalo of the Sac and Fox Tribe of Mississippi in Iowa. Mr. Buffalo's address is listed on this letterhead.

Sincerely,

Deanne Bahr
Sac and Fox Nation of Missouri
NAGPRA Contact Representative

Fields of Opportunities

STATE OF IOWA

THOMAS J. VILSACK, GOVERNOR
SALLY J. PEDERSON, LT. GOVERNOR

DEPARTMENT OF NATURAL RESOURCES
JEFFREY R. VONK, DIRECTOR

RECEIVED
MAR 27 2003
OFFICE OF LOCATION & ENVIRONMENT

March 26, 2003

James Rost, Director
Office of Location & Environment
Iowa Department of Transportation
800 Lincoln Way
Ames, IA 50010

Re: Final Environmental Impact Statement
Avenue G Viaduct and Connecting Corridor, City of Council Bluffs
Pottawattamie County, Iowa

Iowa DOT Project Number
STP-U-1642(2)—70-78

Dear Mr. Rost

I have reviewed a copy of the final EIS report and have enclosed information that may provide your staff with additional information about what permits or approvals could possibly be needed, relative to the air quality program administered by the Iowa Department of Natural Resources. This attachment may contain more specific information than was covered in the final EIS.

If you need any further information I can be reached at (515)281-7212

Sincerely

Monica M. Wnuk

Monica Wnuk

Enclosure

7900 Hickman Road, Suite 1 / Urbandale, Iowa 50322 — Report Smoking Vehicles 1-866-TAILPIPE
515-242-5100 FAX 515-242-5094 http://www.iowacleanair.com/

Potential Air Quality related Approvals or Permits Required of Construction Projects

Programs are administered by the Air Quality Bureau of the Iowa Department of Natural Resources

Demolition of any buildings will trigger the National Emission Standards for Hazardous Air Pollutants (NESHAPS) for asbestos. Regulations apply before renovation and demolition projects begin. Before renovation or demolition, a thorough asbestos inspection is required. Thorough inspection means all suspect asbestos containing materials require sampling and laboratory analysis or are assumed to contain asbestos and handled in accordance with the regulation. All facility demolitions require submission of a two-page demolition notification form to the Department of Natural Resources (DNR), even if no asbestos is found. Upon postdate of submitted forms, ten working days must pass before any disturbance of asbestos containing material takes place. Before demolition or renovation occurs, asbestos-containing materials must be removed. If you need more information, the Department's Asbestos Program Coordinator is Marion Burnside, (515) 281-8443.

The department regulates open burning. "Open burning" is the burning of combustible materials where the products of combustion are emitted into the open air without passing through a chimney or stack. The regulations are contained in 567 Iowa Administrative Code rule 23.2 [567] and are provided below.

567—23.2(455B) Open burning.

23.2(1) *Prohibition.* No person shall allow, cause or permit open burning of combustible materials, except as provided in 23.2(2) and 23.2(3).

23.2(2) *Variances from rules.* Any person wishing to conduct open burning of materials not exempted in 23.2(3) may make application for a variance as specified in 567—subrule 21.2(1).

23.2(3) *Exemptions.* The following shall be permitted unless prohibited by local ordinances or regulations.

a. Disaster rubbish. The open burning of rubbish, including landscape waste, for the duration of the community disaster period in cases where an officially declared emergency condition exists.

b. Trees and tree trimmings. The open burning of trees and tree trimmings not originated on the premises provided that the burning site is operated by a local governmental entity, the burning site is fenced and access is controlled, burning is conducted on a regularly scheduled basis and is supervised at all times, burning is conducted only when weather conditions are favorable with respect to surrounding property, and the burning site is limited to areas at least one-quarter mile from any inhabited building unless a written waiver in the form of an affidavit is submitted by the owner of the building to the department and to the local governmental entity prior to the first instance of open burning at the site which occurs after November 13, 1996. The written waiver shall become effective only upon recording in the office of the recorder of deeds of the county in which the inhabited building is located. How ever, when the open burning of trees and tree trimmings causes air pollution as defined in Iowa Code section 455B.131(3), the department may take appropriate action to secure relocation of the burning operation. Rubber tires shall not be used to ignite trees and tree trimmings.

This exemption shall not apply within the area classified as the PM10 (inhalable) particulate Group II area of Mason City. This Group II area is described as follows: the area in Cerro Gordo County, Iowa, in Lincoln Township including Sections 13, 24 and 25; in Lime Creek Township including Sections 18, 19, 20, 21, 27, 28, 29, 30, 31, 32, 33, 34 and 35; in Mason Township the W ½ of Section 1, Sections 2, 3, 4, 5, 8, 9, the N ½ of Section 11, the NW ¼ of Section 12, the N ½ of Section 16, the N ½ of Section 17 and the portions of Sections 10 and 15 north and west of the line from U.S. Highway 18 south on Kentucky Avenue to 9th Street SE; thence west on 9th Street SE to the Minneapolis and St. Louis railroad tracks; thence south on Minneapolis and St. Louis railroad tracks to 19th Street SE; thence west on 19th Street SE to the section line between Sections 15 and 16.

c. Flare stacks. The open burning or flaring of waste gases, providing such open burning or flaring is conducted in compliance with 23.3(2)*"d"* and 23.3(3)*"e."*

d. Landscape waste. The disposal by open burning of landscape waste originating on the premises. However, the burning of landscape waste produced in clearing, grubbing and construction operations shall be limited to areas located at least one-fourth mile from any building inhabited by other than the

landowner or tenant conducting the open burning. Rubber tires shall not be used to ignite landscape waste.

e. Recreational fires. Open fires for cooking, heating, recreation and ceremonies, provided they comply with 23.3(2)*"d."* Burning rubber tires is prohibited from this activity.

f. Residential waste. Backyard burning of residential waste at dwellings of four-family units or less. The adoption of more restrictive ordinances or regulations of a governing body of the political subdivision, relating to control of backyard burning, shall not be precluded by these rules.

g. Training fires. Fires set for the purpose of bona fide training of public or industrial employees in firefighting methods, provided that written notification is postmarked or delivered to the director at least ten working days before such action commences. Notification shall be made in accordance with 40 CFR Section 61.145, "Standard for demolition and renovation," of the asbestos National Emission Standards for Hazardous Air Pollutants, as amended through January 16, 1991. All asbestos-containing materials shall be removed prior to the training fire. Asphalt shingles may be burned in a training fire only if the notification to the director contains testing results indicating that none of the layers of the asphalt shingles contain asbestos. Each fire department may conduct no more than two training fires per calendar year where asphalt roofing has not been removed, provided that for each of those training fires the asphalt roofing material present has been tested to ensure that it does not contain asbestos. Rubber tires may not be burned during a training fire.

h. Paper or plastic pesticide containers and seed corn bags. The disposal by open burning of paper or plastic pesticide containers (except those formerly containing organic forms of beryllium, selenium, mercury, lead, cadmium or arsenic) and seed corn bags resulting from farming activities occurring on the premises. Such open burning shall be limited to areas located at least one-fourth mile from any building inhabited by other than the landowner or tenant conducting the open burning, livestock area, wildlife area, or water source. The amount of paper or plastic pesticide containers and seed corn bags that can be disposed of by open burning shall not exceed one day's accumulation or 50 pounds, whichever is less. However, when the burning of paper or plastic pesticide containers or seed corn bags causes a nuisance, the director may take action to secure relocation of the burning operation. Since the concentration levels of pesticide combustion products near the fire may be hazardous, the person conducting the open burning should take precautions to avoid inhalation of the pesticide combustion products.

i. Agricultural structures. The open burning of agricultural structures, provided that the open burning occurs on the premises and, for agricultural structures located within a city or town, at least one-fourth mile from any building inhabited by a person other than the landowner, a tenant, or an employee of the landowner or tenant conducting the open burning unless a written waiver in the form of an affidavit is submitted by the owner of the building to the department prior to the open burning; all chemicals and asphalt shingles are removed; burning is conducted only when weather conditions are favorable with respect to surrounding property; and permission from the local fire chief is secured in advance of the burning. Rubber tires shall not be used to ignite agricultural structures.

For the purposes of this subrule, "agricultural structures" means barns, machine sheds, storage cribs, animal confinement buildings, and homes located on the premises and used in conjunction with crop production, livestock or poultry raising and feeding operations.

23.2(4) *Unavailability of exemptions in certain areas.* Notwithstanding 23.2(2) and 23.2(3)*"b," "d," "f,"* and *"i,"* no person shall allow, cause or permit the open burning of trees or tree trimmings, residential or landscape waste or agricultural structures in the cities of: Cedar Rapids, Marion, Hiawatha, Council Bluffs, Carter Lake, Des Moines, West Des Moines, Clive, Windsor Heights, Urbandale, and Pleasant Hill.

This rule is intended to implement Iowa Code section 455B.133.

- The department administers regulations that pertain to fugitive dust. These regulations are contained in 567 Iowa Administrative Code[567] paragraph 23.3(2)"c" as follows:

c. Fugitive dust.

(1) Attainment and unclassified areas. No person shall allow, cause or permit any materials to be handled, transported or stored; or a building, its appurtenances or a construction haul road to be used, constructed, altered, repaired or demolished, with the exception of farming operations or dust generated by ordinary travel on unpaved public roads, without taking reasonable precautions to prevent particulate matter in quantities sufficient to create a nuisance, as defined in Iowa Code section 657.1. from

becoming airborne. All persons, with the above exceptions, shall take reasonable precautions to prevent the discharge of visible emissions of fugitive dusts beyond the lot line of the property on which the emissions originate. The public highway authority shall be responsible for taking corrective action in those cases where said authority has received complaints of or has actual knowledge of dust conditions which require abatement pursuant to this subrule. Reasonable precautions may include, but not be limited to, the following procedures.

1. Use, where practical, of water or chemicals for control of dusts in the demolition of existing buildings or structures, construction operations, the grading of roads or the clearing of land.

2. Application of suitable materials, such as but not limited to asphalt, oil, water or chemicals on unpaved roads, material stockpiles, race tracks and other surfaces which can give rise to airborne dusts.

3. Installation and use of containment or control equipment, to enclose or otherwise limit the emissions resulting from the handling and transfer of dusty materials, such as but not limited to grain, fertilizer or limestone.

4. Covering, at all times when in motion, open-bodied vehicles transporting materials likely to give rise to airborne dusts.

5. Prompt removal of earth or other material from paved streets or to which earth or other material has been transported by trucking or earth-moving equipment, erosion by water or other means.

- Sources of air emissions are required to be covered by an air quality construction permit. An example of a possible emission source from the construction activities that would need a permit include a portable asphalt, rock crushing or a concrete batch plant. The regulations that cover the permitting requirements are found in Chapter 22 [IAC 567].

If you have any questions please feel free to contact me at (515) 281-7212 or via e-mail at monica.wnuk@dnr.state.ia.us.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VII
901 NORTH 5TH STREET
KANSAS CITY, KANSAS 66101

MAR 12 2003

Mr. James Rost, Director
Office of Location & Environment
Iowa Department of Transportation
800 Lincoln Way
Ames, Iowa 50010

Dear Mr. Rost:

Re: Avenue G Viaduct and Connecting Corridor, City of Council Bluffs, Pottawattamie County, Iowa

The Environmental Protection Agency (EPA) has reviewed the Final Environmental Impact Statement (FEIS) for Avenue G Viaduct and Connecting Corridor, City of Council Bluffs, Pottawattamie County, Iowa. Our review is provided pursuant to the National Environmental Policy Act (NEPA) 42 U.S.C. 4231, Council on Environmental Quality (CEQ) regulations 40 C.F.R. Parts 1500-1508, and Section 309 of the Clean Air Act (CAA). The Final EIS was assigned a CEQ number of 030053.

The FEIS adequately supplements information needs and addresses the concerns that EPA had expressed in the review of the FEIS for this project, therefore, EPA has no objections to the project as described in the FEIS. EPA does however, recommend that in addition to the thorough asbestos inspection of properties proposed for demolition, asbestos removal should also be accomplished by a contractor licensed for such activities.

The EPA would like to commend the Federal Highway Administration and the Iowa Department of Transportation for their efforts in thoroughly addressing the human environmental impacts along with impacts to the natural environment in the NEPA process. If you have any questions, please contact me at (913) 551-7975.

Sincerely,

Kim Johnson
NEPA Reviewer

cc: Mr. Bobby Blackman
Division Administrator
Federal Highway Administration

DEPARTMENT OF THE ARMY
ROCK ISLAND DISTRICT, CORPS OF ENGINEERS
CLOCK TOWER BUILDING - P.O. BOX 2004
ROCK ISLAND, ILLINOIS 61204-2004

REPLY TO
ATTENTION OF

http://www.mvr.usace.army.mil

March 10, 2003

SUBJECT: CEMVR-OD-P-441840

Mr. Matthew Tondl
HDR Engineering, Inc.
8404 Indian Hills Drive
Omaha, Nebraska 68114-4098

Dear Mr. Tondl:

Thank you for the opportunity to comment on the Final Environmental Impact Statement (FEIS) for the Avenue G Viaduct and Connecting Corridor in Sections 25 and 26, Township 75 North, Range 44 West, Pottawattamie County, Iowa. The Rock Island District has regulatory responsibilities under Section 404 of the Clean Water Act in Pottawattamie County. Any other issues that may be Corps-related should be submitted to our Omaha District office for review and comment.

According to the "Wetland Impacts and Mitigation" paragraph on page 23 of the FEIS, this office previously issued a letter stating that no permit is required for this project. Based on the FEIS, a determination that no permit is required may be correct. However, we have no record or any letter sent by this office with that determination. Even so, we have now officially determined that the project as proposed does not require a Department of the Army (DA) Section 404 permit. The decision regarding this action is based on information found in the administrative record, which documents the District's decision-making process, the basis for the decision, and the final decision. No indication of discharge of dredged or fill material was found to occur in waters of the United States (including wetlands). Therefore, this determination resulted.

You are advised that this determination for the project is valid for five years from the date of this letter. If the project plans change, our office should be contacted for another determination.

Although a DA Section 404 permit is not required for the project as proposed, you must still acquire other applicable Federal, state, and local permits.

Should you have any questions, please contact me by letter or telephone me at 309/794-5379.

Sincerely,

Neal Johnson
Project Manager
Regulatory Branch

Copies Furnished:

Mr. Kelly Stone
Iowa Department of Natural Resources
Flood Plain Section
Henry A. Wallace Building
900 East Grand Avenue
Des Moines, Iowa 50319-0034

Mr. James Rost
Iowa Department of Transportation
800 Lincoln Way
Ames, Iowa 50010

Mr. Ralph Roza
U.S. Army Corps of Engineers, Omaha District
215 North 17 Street
Omaha, Nebraska 68102

Department of Economic Development
iowa
SMART IDEA™

March 5, 2003

Mr. Matthew Tondl
Enviornmental Study Manager
HDR Engineering, Inc.
8404 Indian Hills Drive
Omaha, NE 68114-4098

IA030207-212

Dear Mr. Tondl:

The Iowa State Clearinghouse has performed the required review of your grant application for the Avenue G Viaduct and Connecting Corridor funding in accordance with the Iowa Intergovernmental Review System.

The review:
-- did not generate any comments from those who examined the file.
-- found no serious environmental problems which may result from the project or program.
-- indicated that the proposal conforms to pertinent planning to this area.
-- did not show that the proposal would result in duplicating any existing activity or project.

The Clearinghouse is pleased to recommend that the application be approved for funding. A copy of this letter must be sent to the federal agency as evidence that the review has been performed.

Sincerely,

Steven R. McCann

Steven McCann
Federal Funds Coordinator
515/242-4719
SRM:rao

Department of
Economic Development
IOWA
SMART IDEA™

March 5, 2003

Mr. Matthew Tondl
Enviornmental Study Manager
HDR Engineering, Inc.
8404 Indian Hills Drive
Omaha, NE 68114-4098

IA030207-212

Dear Mr. Tondl:

The Iowa State Clearinghouse has performed the required review of your grant application for the Avenue G Viaduct and Connecting Corridor funding in accordance with the Iowa Intergovernmental Review System. The review generated comments from the Department of Natural Resources. Those comments are attached for your review.

Sincerely,

Steven R. McCann

Steven McCann
Federal Funds Coordinator
515/242-4719
SRM:rao

Department of Economic Development
Iowa
SMART IDEA™

February 7, 2003

Mr. Keith Dohrmann
Iowa Dept. of Natural Resources
Wallace Building
502 E 9th Street
Des Moines, IA 50319

RE: Intergovernmental Review of File No. IA030207-212
Avenue G Viaduct and Connecting Corridor

Deadline Date: February 21, 2003

Dear Mr. Dohrmann:

The attached material has been submitted for review under the Iowa Intergovernmental Review System. It is being sent to you to determine if your agency has an interest in the proposal and decides to submit comments. The comments must reach the clearinghouse by the deadline date shown above. If this does not permit sufficient time, please telephone the clearinghouse at 515/242-4719 in order to have the review period extended. If you have comments, please return this letter and indicate that fact.

If you have any questions concerning this review, call Steve McCann at 515/242-4719.

Sincerely,

Steven R. McCann

Steve McCann
Iowa Economic Development

Reply from Iowa Department of Natural Resources
Re: Intergovernmental Review File No. IA030207-212

X 1. Comments concerning the above-named review are attached.

2. Our agency would prefer to talk to the applicant or submitting agency prior to submitting comments to the federal agency. The clearinghouse will arrange for such a meeting.

3. We have no reason to comment on this proposal.

Completed by: Keith L. Dohrmann Telephone: 515/281-8967

February 20, 2003

Fields of Opportunities

STATE OF IOWA

THOMAS J. VILSACK, GOVERNOR
SALLY J. PEDERSON, LT. GOVERNOR

DEPARTMENT OF NATURAL RESOURCES
JEFFREY R. VONK, DIRECTOR

February 18, 2003

Mr. Matthew Tondl
HDR Engineering, Inc.
8404 Indian Hills Drive
Omaha, NE 68114-4098

RE: Final Environmental Impact Statement, Avenue G Viaduct and Connecting Corridor, City of Council Bluffs, Pottawattamie County, Iowa dated January 30, 2003

Dear Mr. Tondl:

Thank you for inviting our comments on the impact of the above referenced project on protected species and rare natural communities.

We have searched our records of the project area and found no site-specific records of rare species or significant natural communities. However, our data are not the result of thorough field surveys. If listed species or rare communities are found during the planning or construction phases, additional studies and/or mitigation may be required.

This letter is a record of review for protected species, rare natural communities, state lands and waters in the project area, including review by personnel representing state parks, preserves, recreation areas, wetlands, fisheries and wildlife. It does not constitute a permit and before proceeding with the project, you may need to obtain permits from state and federal agencies.

If you have any questions about this letter or if you require further information, please contact me at (515) 281-8967.

Sincerely,

Keith L. Dohrmann

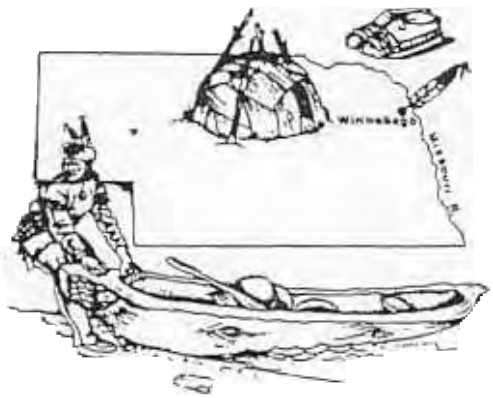
KEITH L. DOHRMANN, ENVIRONMENTAL SPECIALIST
POLICY AND COORDINATION SECTION
CONSERVATION AND RECREATION DIVISION

03-1604L

WINNEBAGO TRIBE of NEBRASKA

WINNEBAGO TRIBAL COUNCIL P.O. BOX 687 WINNEBAGO, NEBRASKA 68071

RECEIVED
FEB 28 2003
OFFICE OF LOCATION & ENVIRONMENT



February 24, 2003

Judy McDonald
Office of Location and Environment
Iowa Department of Transportation
800 Lincoln Way
Ames, IA 50010

Ms. McDonald:

The Winnebago Tribe of Nebraska has no cultural or sacred sites in the area of your construction. You may proceed with your construction. Thank you for your notification in this matter.

Sincerely,

David Lee Smith
Repatriation Director
Cultural Preservation Officer

Form 536002
10-01

Iowa Department of Transportation
TRIBAL NOTIFICATION

Date FEB 13, 2003

IADOT project # STP-U-1642(22)--70-78

Location Council Bluffs, Ia

Description construct viaduct & street improvement

IA DOT contact Judy McDonald

Phone # 515-239-1795

E-mail judy.mcdonald@DOT.state.ia.us

Type of Project *(see map)*

- ☐ VERY SMALL - Disturb less than 12 inch depth *(plow zone)*
- ☐ SMALL - Grading on existing road, shouldering, ditching, etc.
- ☐ SMALL - Bridge or culvert replacement
- ☐ LARGE - Improve existing road from 2-lanes to 4-lanes
- ☐ LARGE - New alignment
- ☒ OTHER reconstruct street

Type of Coordination/Consultation Points

- ☐ 1--Early project notification *(project map and description)*
- ☒ 2--Notification of survey findings *(Phase I)*
- ☐ 2a--Notification of site evaluation *(Phase II)*
- ☐ 3--Consultation regarding site treatment
- ☐ 4--Final Data Recovery Report

Type of Findings

- ☒ No American Indian sites found
  --Section 106 Consultation Process ends *
- ☐ No significant American Indian sites eligible for National Register listing found--Section 106 Consultation Process ends *
- ☐ Avoided American Indian sites eligible for National Register listing *(see map and list of sites)*
  --Section 106 Consultation Process may or may not end

  in the event of a late discovery consultation will be reopened
- ☐ Potentially significant American Indian sites found
  Phase II evaluation conducted *(see map and list of sites)*
- ☐ American Indian sites eligible for National Register listing cannot be avoided *(see map)*
- ☐ Burial site found

  _____ # of non-significant prehistoric sites
  _____ # of potentially significant prehistoric sites
  _____ # of National Register eligible prehistoric sites

Affected National Register Properties

- ☐ Investigating avoidance or minimizing harm options
- ☐ Avoided
- ☐ Protected
- ☐ Data Recovery/MOA

Please Respond

Who should we contact for site/project related discussions?

Mildred M. Hudson (Name) 612 South 9th St. (Street Address) Ponca City, Oklahoma 74601 (City, Zip Code)

580-765-2265 (Phone)

(E-mail)

Do you know of any sensitive areas within or near the project the FHWA/DOT should avoid *(please describe)*?

- ☐ Thank you for the information; however, we do not need to consult on this particular project.
- ☒ We do not have a comment at this time but request continued notification on this project.
- ☒ Please send a copy of the archaeology report.
- ☐ Thank you for the information. We are satisfied with the planned site treatment.
- ☐ We have concerns and wish to consult.
- ☐ We wish to participate in the Memorandum of Agreement for this project.

Comments _____

Mildred M. Hudson (Name) NAGPRA Rep. | Otoe-Missouria Tribe of Okla. (Tribal Name) | 3/17/03 (Date)

(Comments continued on back)

USE THIS COVERSHEET FOR IOWA DOT PROJECTS

IA X

FROM X TO X

X COUNTY, IOWA

Project #

ENVIRONMENTAL ASSESSMENT

Submitted Pursuant to 42 USC 4332(2)(c)

By The

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
And
IOWA DEPARTMENT OF TRANSPORTATION
OFFICE OF LOCATION AND ENVIRONMENT

The signatures are considered acceptance of the general project location and concepts described in the environmental document unless otherwise specified by the approving officials. However, such approval does not commit to approve any future grant requests to fund the preferred alternative.

For the Iowa Division Administrator Federal Highway Administration	For the Office of Location and Environment Iowa Department of Transportation

Date of Approval for Public Availability

The following persons may be contacted for additional information:

Mr. Lubin Quinones, P.E.
Iowa Division Administrator
Federal Highway Administration
105 6th Street
Ames, Iowa 50010
Telephone: 515-233-7300

Mr. Jim Rost
Office of Location and Environment
Iowa Department of Transportation
800 Lincoln Way
Ames, Iowa 50010
Telephone: 515-239-1225

USE THIS COVERSHEET FOR LOCAL PROJECTS

Hwy/Rd/Ave X
FROM X TO X
X COUNTY, IOWA
Project #

ENVIRONMENTAL ASSESSMENT

Submitted Pursuant to 42 USC 4332(2)(c)

By The

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
And
IOWA DEPARTMENT OF TRANSPORTATION
OFFICE OF LOCATION AND ENVIRONMENT
And
X CITY/X COUNTY, IOWA

The signatures are considered acceptance of the general project location and concepts described in the environmental document unless otherwise specified by the approving officials. However, such approval does not commit to approve any future grant requests to fund the preferred alternative.

For the Iowa Division Administrator Federal Highway Administration	For the Office of Location and Environment Iowa Department of Transportation	For the X X City/X County, Iowa

Date of Approval for Public Availability

The following persons may be contacted for additional information:

Mr. Philip Barnes Iowa Division Administrator Federal Highway Administration 105 6th Street Ames, Iowa 50010 Telephone: 515-233-7300	Mr. Jim Rost Office of Location and Environment Iowa Department of Transportation 800 Lincoln Way Ames, Iowa 50010 Telephone: 515-239-1225	X X County Supervisor/X City X City/X County, Iowa X. X, Iowa X Telephone: X

PREFACE

The Transportation Equity Act of the 21st Century (TEA-21) (23 CFR) mandated environmental streamlining in order to improve transportation project delivery without compromising environmental protection. In accordance with TEA-21, the environmental review process for this project has been documented as a Streamlined Environmental Assessment (EA). This document addresses only those resources or features that apply to the project. This allowed study and discussion of resources present in the study area, rather than expend effort on resources that were either not present or not impacted. Although not all resources are discussed in the EA, they were considered during the planning process and are documented in the Streamlined Resource Summary, shown in Appendix A.

The following table shows the resources considered during the environmental review for this project. The first column with a check means the resource is present in the project area. The second column with a check means the impact to the resource warrants more discussion in this document. The other listed resources have been reviewed and are included in the Streamlined Resource Summary.

Table 1: Resources Considered

SOCIOECONOMIC		NATURAL ENVIRONMENT	
☐	☐ Land Use	☐	☐ Wetlands
☐	☐ Community Cohesion	☐	☐ Surface Waters and Water Quality
☐	☐ Churches and Schools	☐	☐ Wild and Scenic Rivers
☐	☐ Environmental Justice	☐	☐ Floodplains
☐	☐ Economic	☐	☐ Wildlife and Habitat
☐	☐ Joint Development	☐	☐ Threatened and Endangered Species
☐	☐ Parklands and Recreational Areas	☐	☐ Woodlands
☐	☐ Bicycle and Pedestrian Facilities	☐	☐ Farmlands
☐	☐ Right-of-Way		
☐	☐ Relocation Potential		
☐	☐ Construction and Emergency Routes		
☐	☐ Transportation		
CULTURAL		**PHYSICAL**	
☐	☐ Historical Sites or Districts	☐	☐ Noise
☐	☐ Archaeological Sites	☐	☐ Air Quality
☐	☐ Cemeteries	☐	☐ Mobile Source Air Toxics (MSATs)
		☐	☐ Energy
		☐	☐ Contaminated and Regulated Materials Sites
		☐	☐ Visual
		☐	☐ Utilities
☐ **CONTROVERSY POTENTIAL**			
☐ **Section 4(f): Specify details**			

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Completed by and Date:	
Community Cohesion	
Evaluation:	
Method of Evaluation:	
Completed by and Date:	
Churches and Schools	
Evaluation:	
Method of Evaluation:	
Completed by and Date:	
Environmental Justice	
Evaluation:	
Method of Evaluation:	
Completed by and Date:	
Economic	
Evaluation:	
Method of Evaluation:	
Completed by and Date:	
Joint Development	
Evaluation:	
Method of Evaluation:	
Completed by and Date:	
Parklands and Recreational Areas	
Evaluation:	
Method of Evaluation:	
Completed by and Date:	
Bicycle and Pedestrian Facilities	
Evaluation:	
Method of Evaluation:	
Completed by and Date:	
Right-of-Way	
Evaluation:	
Method of Evaluation:	
Completed by and Date:	
Relocation Potential	
Evaluation:	
Method of Evaluation:	
Completed by and Date:	

SOCIOECONOMIC IMPACTS SECTION Continued:

Construction and Emergency Routes	
Evaluation:	
Method of Evaluation:	
Completed by and Date:	
Transportation	
Evaluation:	
Method of Evaluation:	
Completed by and Date:	

CULTURAL IMPACTS SECTION:

Historic Sites or Districts	
Evaluation:	
Method of Evaluation:	
Completed by and Date:	
Archaeological Sites	
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Method of Evaluation:	
Completed by and Date:	
Cemeteries	
Evaluation:	
Method of Evaluation:	
Completed by and Date:	

NATURAL ENVIRONMENT IMPACTS SECTION:

Wetlands	
Evaluation:	
Method of Evaluation:	
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Surface Waters and Water Quality	
Evaluation:	
Method of Evaluation:	
Completed by and Date:	
Wild and Scenic Rivers	

Evaluation:	
Method of Evaluation:	
Completed by and Date:	
Floodplains	
Evaluation:	
Method of Evaluation:	
Completed by and Date:	
Wildlife and Habitat	
Evaluation:	
Method of Evaluation:	
Completed by and Date:	
Threatened and Endangered Species	
Evaluation:	
Method of Evaluation:	
Completed by and Date:	
Woodlands	
Evaluation:	
Method of Evaluation:	
Completed by and Date:	
Farmlands	
Evaluation:	
Method of Evaluation:	
Completed by and Date:	

PHYSICAL IMPACTS SECTION:

Noise
Evaluation:

Method of Evaluation:	
Completed by and Date:	
Air Quality	
Evaluation:	
Method of Evaluation:	
Completed by and Date:	
MSATs	
Evaluation:	This project will not result in any meaningful changes in traffic volumes, vehicle mix, location of the existing facility, or any other factor that would cause an increase in emissions impacts relative to the no-build alternative. As such, FHWA has determined that this project will generate minimal air quality impacts for Clean Air Act criteria pollutants and has not been linked with any special MSAT concerns. Consequently, this effort is exempt from analysis for MSATs. Moreover, EPA regulations for vehicle engines and fuels will cause overall MSATs to decline significantly over the next 20 years. Even after accounting for a 64 percent increase in VMT, FHWA predicts MSATs will decline in the range of 57 percent to 87 percent, from 2000 to 2020, based on regulations now in effect. This will both reduce the background level of MSATs as well as the possibility of even minor MSAT emissions from this project.
Method of Evaluation:	FHWA Interim Guidance on Air Toxic Analysis in NEPA Documents, February 3, 2006
Completed by and Date:	
Energy	
Evaluation:	
Method of Evaluation:	
Completed by and Date:	
Contaminated and Regulated Materials Sites	
Evaluation:	
Method of Evaluation:	
Completed by and Date:	
Visual	
Evaluation:	
Method of Evaluation:	
Completed by and Date:	
Utilities	
Evaluation:	
Method of Evaluation:	
Completed by and Date:	

West 1st Street (Iowa 57) Improvements
Union Road to Hudson Road
Cedar Falls, Iowa

Project Number
STP-U-1185(625)--70-07

ENVIRONMENTAL ASSESSMENT

Submitted Pursuant to 42 USC 4332(2)(c)

By The

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
IOWA DEPARTMENT OF TRANSPORTATION

Office of Location and Environment

And

CITY OF CEDAR FALLS, IOWA

The signatures are considered acceptance of the general project location and concepts described in the environmental document unless otherwise specified by the approving officials.[1] However, such approval does not commit to approve any future grant request to fund the preferred alternative.

For the Iowa Division Administrator
Federal Highway Administration

Director, Office of Location and Environment
Iowa Department of Transportation

March 20, 2003
Date of Approval
For Public Availability

The following persons may be contacted
for additional information:

Mr. Bobby W. Blackmon
Iowa Division Administrator
Federal Highway Administration
Ames, Iowa 50010
105 Sixth Street
Telephone: 515-233-7300

Mr. James P. Rost
Director
Office of Location and Environment
Iowa Department of Transportation
800 Lincoln Way
Ames, Iowa 50010
Telephone: 515-239-1798

Mr. Larry Buchholz
City Engineer
220 Clay Street
Cedar Falls, Iowa 50613
Telephone: 319-268-5171

[1] On Local Systems projects, the local representative must also sign the EA or EIS.

FEDERAL HIGHWAY ADMINISTRATION

FINDING OF NO SIGNIFICANT IMPACT FOR IMPROVEMENTS TO I-35 FROM THE NORTHEAST MIXMASTER INTERCHANGE AT INTERSTATES 80/35/235 TO THE EAST FIRST STREET INTERCHANGE POLK COUNTY, IOWA

IM-35-4(98)88--13-77

The Federal Highway Administration (FHWA) has determined that this project would not have any significant impact on the human environment. The finding of no significant impact is based on the attached Environmental Assessment, which has been independently evaluated by the FHWA and determined to discuss adequately and accurately the environmental issues and impacts of the proposed project. The Environmental Assessment provides sufficient evidence and analysis for determining that an Environmental Impact Statement is not required.

The FHWA takes full responsibility for the accuracy, scope, and content of the attached Environmental Assessment.

Date

For Division Administrator
Federal Highway Administration

Federal Highway Administration

Finding Of No Significant Impact for Improvements to I-35 from the Northeast Mixmaster Interchange at Interstates 80/35/235 to the East First Street Interchange Polk County, Iowa

The proposed action consists of improvements to I-35 from the Northeast Mixmaster Interchange at Interstates 80/35/235 to the East First Street Interchange in Polk County, Iowa (Figure 1). The proposed improvements would consist of improving 5.2 miles of I-35 from a four-lane to a six-lane facility through a combination of widening and reconstruction. The improvements would also consist of overlaying existing pavement with 5.5 inches of Asphalt Cement Concrete (ACC), the reconstruction and realignment of approximately 5,640 feet of roadway, the replacement of two bridges over the Union Pacific Railroad (UPRR), removal of the NE 62nd Avenue bridge over I-35, and realignment of an unnamed tributary to Four-Mile Creek.

The 5.2-mile improvement is best described as three segments: the north, middle, and south. The first segment, north, extends from East First Street to just north of NE 62nd Avenue. This segment, shown in yellow on Figure 1, maintains the existing alignment with new travel lanes added to the outside of the existing roadway.

The middle segment extends from approximately 810 feet north of NE 62nd Avenue to approximately 4,830 feet south of NE 62nd Avenue. This segment includes construction of six lanes, three in each direction, on a new alignment slightly east of the existing alignment. Additional improvements in this segment include the replacement of two freeway bridges over the UPRR, removal of the NE 62nd Avenue bridge over I-35, and realignment of an unnamed tributary to Four-Mile Creek (see discussion of Water Resources). The tributary realignment is necessitated by the replacement of substandard bridges over the Union Pacific Railroad. The new bridges would allow for future widening to either the inside or outside of the existing lanes in the northbound direction, and widening to the inside southbound. This segment is illustrated in red on Figure 1.

The remainder of the I-35 project, the south segment, consists of upgrading I-35 from a four-lane to a six-lane facility, with widening to the inside (median side) of the existing travel lanes. This segment extends from south of the reconstruction area (approximately 4,830 feet south of the NE 62nd Avenue interchange) to the north bridges over the westbound I-80 traffic lanes in the NE Mixmaster Interchange; see blue segment on Figure 1. Widening to the median side in this segment allows for preservation of the NE 54th Avenue bridge over I-35.

Since the publication of the Draft Environmental Assessment (August, 2001), no design refinements or modifications have occurred; however further clarification of the tributary relocation is now available (Figure 2). Based on this clarification, and a letter received from the United States Environmental Protection Agency (EPA), further analysis of water quality impacts and mitigation has occurred, and is discussed later in this document.

The public had opportunity to provide comment and input on the project at a public meeting on August 30. This meeting was held at the Best Western Starlite Village Motel in

Ankeny from 5:00 to 7:00 PM. Fifty-seven people attended the meeting, with approximately 25 people entering formal comments. Nearly all of the comments reflected moderate to high support of the project.

The public comment period on the Environmental Assessment ended October 22, 2001. Only four comment letters were received during the comment period. One letter, from the Maplewood Village Condominium Association reflected concerns about noise, and potential noise abatement measures. A letter was received from the Iowa DNR regarding Blackbird Wildlife Management Area. The other correspondence came from Federal Agencies: the aforementioned letter from the EPA concerning water quality, and a letter from the US Fish and Wildlife Service concurring with our finding of no effect on federally listed endangered species.

Right-of-way requirements for this project include impacts to six properties (land only). The project does not require relocation or displacement of any residential dwelling or commercial/industrial building. All right-of-way for this improvement would be in accordance with the Iowa DOT Acquisition and Relocation Assistance laws and the Uniform Relocation Assistance and Real Property and Acquisition Act of 1970, as amended.

The proposed project does require the acquisition of the Blackbird Wildlife Management Area, which has historically been managed by the Iowa Department of Natural Resources (Iowa DNR). The management area is located east of I-35 just south of NE 62nd Avenue. The 9.9-acre parcel is a former excess right-of-way parcel that was acquired by the Iowa DOT in the 1960s as part of the initial construction of I-35 in Polk County, and was transferred to the Iowa DNR in 1967.

The FHWA reviewed this property for potential Section 4(f) involvement, and while it was concluded that the property did not satisfy the appropriate criteria for classification as a 4(f) property, it would nonetheless be granted full consideration and mitigation as such. Since the construction of the proposed improvements to I-35 would encroach upon this area, and reduce its use and value as a wildlife habitat, a Memorandum of Agreement (See Appendix B) between the Iowa DNR and Iowa DOT was developed. In this document, the Iowa DNR has agreed to remove the Blackbird Wildlife Management Area designation, close this parcel to public uses, and transfer the property to the Iowa DOT. The agreement also specifies that the Iowa DOT will provide Iowa DNR with appropriate replacement land.

Other protected resources such as state or federal protected plant or animal species, wetland resources, and public parks would not be impacted by the proposed action.

Based on a review of the Federal Emergency Management Agency (FEMA) floodplain mapping, the proposed alternative is not located within the 100-year floodplain of any waterway. According to the Iowa DNR, project construction would not require a federal floodplain development permit and would be consistent with national floodplain insurance requirements. In addition, no local floodplain permits would be required, but the Army Corps of Engineers will require a Section 401 Water Quality Certification from the Iowa DNR prior to construction.

In response to comments received from the EPA dated October 17, 2001 further analysis of water quality impacts and mitigation has occurred. The proposed roadway improvements can impact water quality through temporary construction impacts, roadway operations, and runoff. Motor vehicle operations cause the accumulation of pollutants on road surfaces such

as solids, heavy metals (lead, zinc and copper), and oil and grease. Additionally, deicing chemicals and nutrients from fertilizers are commonly found in roadway runoff. The concentrations of these pollutants in roadway runoff are highly variable and affected by numerous factors, such as traffic characteristics (volume and speed), climate, maintenance practices and adjacent land uses.

Roadway runoff may affect the quality of receiving waters with a temporary increase in pollutant loading during storms or with a chronic accumulation of heavy metals. The degree of pollutant loading from roadway runoff can be linked to roadway traffic. Research has shown that water quality impacts from roadway runoff are associated primarily with roadways with a volume of at least 30,000 vehicles per day (vpd) (Young 1996).

Since the volume along I-35 exceeds the 30,000 vpd threshold, appropriate stormwater management practices, known as best management practices (BMPs) will be needed to mitigate potential water quality impacts associated with run-off. In addition to detention facilities, other BMPs, such as vegetated strips, will be incorporated to minimize transport of sediment and heavy metals. In particular, the use of roadside vegetation minimizes the transport of sediment and heavy metals. The standard Iowa DOT Ditch-Bottom Vegetation Treatment System works as a runoff filtration system removing pollutants before they reach adjacent water resources. In addition to these strategies, efforts have already been made within the study corridor to properly manage stormwater runoff: portions of Tributary 4 and 5 have been impounded for stormwater retention purposes, and five stormwater ponds within the study corridor currently accommodate ornamental and stormwater management needs for area businesses.

To avoid short-term increased water quality impacts associated with construction and resurfacing, temporary erosion control measures would be employed. During construction, the potential contaminant of greatest concern is sediment, measured as Total Suspended Solids (TSS). Sediment has the potential to enter streams via roadside ditches, thereby reducing water quality and habitat for aquatic organisms. Best Management Practices (BMP's) are recommended to counter the influx of TSS. These measures are prescribed in design and construction guidance by the Iowa DOT, and will be coordinated with the local Soil & Water Conservation District (SWCD). Erosion control devices will be installed before commencing construction that could cause erosion. Temporary or permanent erosion control measures to be used will include such measures as silt fencing, sediment basins, detention basins, interceptor ditches, seeding and sodding, rip-rap on exposed banks, erosion mats and mulching. Disturbance of stream vegetation would be kept to a minimum. Construction activities near special or sensitive streams would be conducted during low or normal flow periods if necessary.

In addition to the standard pollutant loading associated with increased traffic volumes, operational impacts can also include accidental spills during the operation of the facility. Any such spill of hazardous materials and wastes during construction or operation of the facility would require special response measures. These occurrences would be handled in accordance with local government response procedures. The first response typically is through the fire department and emergency service personnel to ensure public safety and to prevent harm to the environment. Depending on the nature of the spill, Iowa DNR and EPA would be notified to provide additional instructions regarding cleanup. Refueling or maintenance of construction equipment would not be allowed within 30.5 m (100 ft) of wetlands or water bodies to avoid other accidental spills. Deicing management practices,

such as anti-icing and the use of additives, can also minimize salt application quantities. Evaluation of these practices would occur as the preferred alternative is further refined.

Three known hazardous waste sites have been identified within the study corridor. One property was identified as low-risk: Helena (728 Creekview Drive, Ankeny). Two sites were identified as having moderate risk: Casey's General Store(1010 Oralabor Road, Ankeny), and Kum & Go (1025 East First Street, Ankeny). Based on the results of the Phase I ESA the following actions are recommended:

- Subsurface excavations for roadway construction in the vicinity of Helena should be monitored during construction.
- Subsurface excavations should be carefully monitored adjacent to Casey's General Store and Kum & Go during roadway construction.
- If any precast concrete structures are to be cut. Cutting should be done so as to minimize the generation of dust by wetting the exterior of the concrete, and workers should wear a dust particulate make to prevent inhalation of potential airborne contaminants.
- Only permitted landfills should be used to dispose of construction and demolition debris.

Project related traffic noise impacts were evaluated using the standard FHWA traffic noise analysis criteria, traffic noise level measurements and concurrent counts for existing traffic conditions in the project area, predicted future traffic noise levels using projected future traffic data, and proposed roadway improvements, and the FHWA Traffic Noise Model (TNM) highway noise prediction computer program. Three receptor locations were identified for analysis: Mallard Creek (residential), Mill Pond Care Center (residential), and Meadow Ridge (residential).

Existing noise conditions, and predicted traffic noise levels for the 2025 No Action, and 2025 Build scenarios were examined at the three receptor locations. Analysis showed that traffic noise levels would approach or exceed the noise abatement criteria (NAC) regardless of whether the proposed alternative is implemented. In fact, existing peak-hour noise levels at Sites 1 and 2 are already in excess of the NAC (67 and 70dBA respectively). During future peak-hour traffic conditions, noise-sensitive areas within the project corridor are not expected to experience "substantial" increases in noise levels as a result of the project.

Addressing concerns raised by the Maplewood Village Condominium Association in their August 23, 2001 letter, according to Iowa DOT Policy 500.07 (Iowa DOT, 1997), a minimum of 5 dBA noise reduction must be achieved at the impacted receptors in order for a proposed noise abatement measure to be considered "feasible." Furthermore, noise barriers would have to be evaluated in terms of their "reasonableness" by determining their costs per benefited home. A benefited home is defined as one for which the barrier provides a minimum noise reduction of 5 dBA. If a barrier exceeds the Iowa DOT's allowance of $20,000 per benefited residence, it may be eliminated from further consideration. For this reason, noise barriers are generally not constructed for individual residences.

The FHWA TNM was used to determine the noise level reduction provided by various barrier heights for a barrier placed along the proposed I-35 right-of-way between the highway and noise-sensitive receptors. The analysis showed that a barrier of a minimum height of 8 feet above the ground elevation of the residential receptors would be required to reduce future peak-hour traffic noise levels at the exterior of residential uses west of I-35 and south of First Street to levels below the NAC. Given the required length of such a barrier and the

limited number of receptor locations benefited by the barrier, its construction would not be "reasonable." The cost of such a barrier would exceed the $20,000 threshold per benefited residence. The Iowa DOT has concluded that noise abatement in the vicinity of the sensitive receptor would not be cost-effective.

The State Historic Preservation Office has determined that no potentially historic structures or archaeologically significant sites would be affected by the proposed project. Standard archeological survey techniques, consisting of surface examination, subsurface shovel testing, and soil probing, were completed in the undeveloped and less developed areas of the I-35 project corridor in March and April of 2001. Four archeological sites were recorded in the project corridor. Two of these sites were previously recorded and are no longer extant. The two newly recorded sites are both recommended as not eligible for listing on the National Register of Historic Places. At this time, no additional cultural resource examinations are recommended; however, additional investigations would be completed if any cultural resources are identified during the construction period or if project modifications require encroachment on existing known sites.

Also, as codified in Executive Order 13007, *Indian Sacred Sites*, the FHWA has provided notice of the proposed improvement to Indian tribes. The correspondence is included in Appendix A. No response was received.

The Federal Highway Administration (FHWA) has determined that this project would not have any significant impact on the human environment. The finding of no significant impact is based on the attached Environmental Assessment, which has been independently evaluated by the FHWA and determined to discuss adequately and accurately the environmental issues and impacts of the proposed project. The Environmental Assessment provides sufficient evidence and analysis for determining that an Environmental Impact Statement is not required.

The FHWA takes full responsibility for the accuracy, scope, and content of the attached Environmental Assessment.

Appendix A

Correspondence after publication of I-35 Environmental Assessment

Appendix B

Memorandum of Agreement
Blackbird Wildlife Management Area

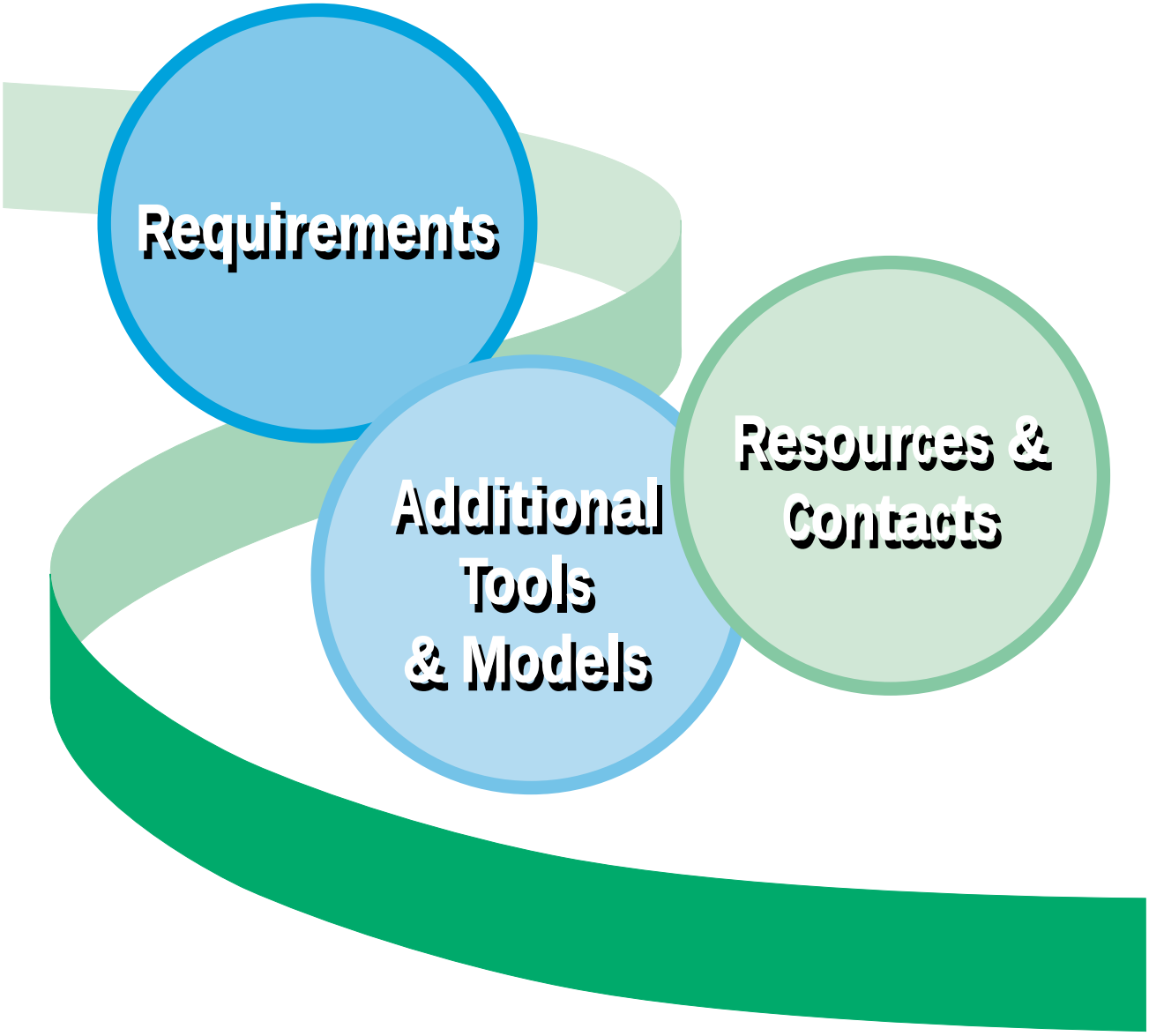
United States
Environmental Protection
Agency

Office of Solid Waste
and Emergency Response
(5103)

EPA-500-R-00-007
August 2000
www.epa.gov/permits

EPA

Public Involvement in Environmental Permits



A REFERENCE GUIDE

NOTICE

This document is a reference guide on public involvement requirements and effective strategies for states and tribes authorized to implement environmental permitting programs. It contains summaries of U.S. Environmental Protection Agency (EPA) statutory authorities, regulations, and guidance materials. This document does not substitute for any of these authorities or materials. In addition, this document is not an EPA regulation and therefore cannot impose legally binding requirements on EPA, States, or the regulated community. EPA may change this document in the future, as appropriate.

ACKNOWLEDGMENTS

This document was prepared under the direction of a cross-Agency workgroup, chaired by the Office of Solid Waste and Emergency Response as part of the Second Generation of Environmental Permitting Action Plan. Many valuable contributions were made from government and private organizations who reviewed this document. The workgroup would like to thank all the participants in the focus group sessions held in Washington DC, and Houston, Texas, for their important advice and input as well as those who provided comments through the reviews conducted by the National Environmental Justice Advisory Council and Environmental Council Of States.

SUGGESTED IMPROVEMENTS

This is the first edition of the Reference Guide and every effort was made to ensure its usefulness to state program staff, communities, and regulated facilities. However, additional improvements are always possible. Comments are welcome and should be directed to:

U.S. Environmental Protection Agency
OSWER/OPM/PARMS/mc 5103
1200 Pennsylvania Avenue, NW
Washington, DC 20460

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Reference Guide for Public Involvement in Environmental Permits

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Section 1 - Introduction

This *Reference Guide for Public Involvement in Environmental Permits (Reference Guide)* was developed by EPA to help make it easier for you and your agency to facilitate public participation in environmental permitting decisions for businesses and facilities under your authority. The *Reference Guide* provides basic information about public participation requirements and gives examples under several major permits issued by EPA's air, water, and waste programs. The *Reference Guide* details what public participation activities are required under these programs, as a minimum, as well as those suggested activities that serve to augment the regulatory requirements. While this document will be available to the public and to regulated entities, and their input will be sought, the primary audience for the *Reference Guide* is the regulating community. Thus, the public and permitted facilities are necessarily addressed as the secondary audience.

What Information Does this Reference Guide Contain?

This *Reference Guide* is divided into six sections to help you identify public participation activities required under federal regulations and how you and your agency can get the public involved. In addition, it provides useful tips, based on the experience of public participation practitioners, on how regulators, the public, and facility operators seeking permits can interact. The following is a summary of the information contained within each of the six *Reference Guide* sections.

Section 1: Introduction. This section provides a brief introduction to the purpose and scope of the *Reference Guide*, and provides information and referral to other sources for programs not covered in this document.

Section 2: Permit Processes Overview. This section provides a brief overview of several major permitting programs for which EPA has either direct responsibility or oversight authority. These programs are used to highlight public participation activities associated with permitting activities. The permitting programs outlined include: air programs under the Clean Air Act (CAA); water programs under the Safe Drinking Water Act (SDWA) and the Clean Water Act (CWA); and hazardous waste programs under the Resource Conservation and Recovery Act (RCRA). Each overview has a brief description of the statute, the associated permits, and the resulting permitting programs. Included is a list of public participation activities required by each permitting program, as well as regulatory citations that should be referred to for specific provisions.

Section 3: Required Public Involvement Activities in Environmental Permits. This section presents detailed information about public participation activities you, your agency, the EPA, the public, and facilities seeking permits are required to use during the permitting process.

These activities are broken down into two categories, namely: (1) disseminating information, and (2) gathering and exchanging

information. Required activities include public notices, fact sheets, notices of decision, public meetings, and public hearings.

Each public participation activity is presented in a similar format. The parts to the presentation for each public participation activity are as follows:

- a brief overview of the public participation activity;
- a summary of the federal regulatory requirements for using the activity in each permitting program;
- a detailed description of the activity; and
- a discussion that includes opportunities for participation and other tips.

Section 4: Additional Tools to Facilitate Public Involvement Activities in Environmental Permits. This section presents detailed information about additional public participation tools that you, your agency, the EPA, the public, and facilities seeking permits can use to better facilitate public participation during the permitting process. These activities are also broken down into (1) disseminating information and (2) gathering and exchanging information. Suggested public participation tools include, but are not limited to, the following: project newsletters, presentations, facility tours, citizens advisory groups, and dispute resolution.

These tools supplement, and should be used in conjunction with, the required public participation activities. These additional tools have been helpful in avoiding potential controversies or when an agency has gone through the required process (described in Section 3) and issues still remain surrounding the permitted activity.

Each public participation activity is presented in a similar format. The three parts for each activity are as follows:

- a brief overview of the public participation activity;
- a detailed description of the activity; and
- discussion that includes opportunities for participation and other tips.

Section 5: Resources and Contacts. This section presents information on a variety of resources that are available to help facilitate public participation activities. It includes telephone hotlines, information on the Internet, a list of RCRA public participation contacts at EPA and in selected states, and Internet links to EPA, tribal, and state home pages. This section also includes a two-page excerpt from a brochure produced by EPA for users of the RCRA Information Center (RIC) that describes the RIC, its purpose, and services.

Section 6: Acronyms and Glossary. This section presents a list of acronyms and a glossary of commonly used terms for each of the different programs.

Where Can I Find Additional Public Involvement Information?

Although this *Reference Guide* provides a list of resources, **it does not address every situation that requires a permit**. It is important to note that zoning and land use decisions are made at the local level; this *Reference Guide* will not address those issues. Consult your local authorities directly for any zoning questions. The following are several suggestions for places to look for related information:

- If you are trying to learn more about public participation in the Superfund program, refer to *Community Relations in Superfund: A Handbook*, (USEPA, EPA/540/R-92/009, OSWER Directive 9230.0-3C, January 1992). Order: http://www.epa.gov/ncepihom/Catalog/EPA540R92009.html

- If you are trying to learn more about siting hazardous waste management facilities before permitting, you will most likely need to contact your local or state environmental officials. Please refer to the information in Section 5 of this *Reference Guide* to find the right organization.

- Most states are authorized to carry out the National Pollutant Discharge Elimination System (NPDES), and RCRA hazardous waste program, and these states may choose to impose more stringent requirements than the federal program. If you want to learn about the public participation requirements for other states, you should contact state environmental officials. Internet links to individual state web sites are provided in Section 5 of this *Reference Guide*.

- If you are trying to learn about hazardous substances (other than wastes) stored by facilities or amounts of toxic substances released to the environment, you should find out more about the Emergency Planning and Community Right-to-Know Act (EPCRA) www.epa.gov/swercepp/crtk and the Toxics Release Inventory (TRI) www.epa.gov/tri. Call EPA Headquarters, your EPA Regional Office, or the RCRA/Superfund Hotline (see Section 5 of this *Reference Guide*) for more information.

There are other programs administered by EPA that have a direct bearing on permit programs, but are not covered in detail in this *Reference Guide*. All users of this *Reference Guide* should be sure to consider the impact of other programs and the public participation requirements associated with them.

For example, the State Implementation Plan (SIP) process under the Clean Air Act (CAA) includes at least two public comment periods and a public hearing. The emission limitations established by the SIP process often are some of the components of the CAA Title V operating permits. Details on how to participate in the determination of emissions limits for a source are provided in the CAA portion of Section 2.

The Freedom of Information Act (FOIA) is an additional program or authority through which the public may have access to permit information or any other information maintained by you, your agency, the EPA, or a facility. An explanation of this authority and the public's rights under its provisions is at 40 CFR Part 2. These regulations require the federal government to provide access to documents in its possession. Part 2 lists addresses for each EPA Region's FOIA office.

Most, if not all, states have laws similar to FOIA often known as Open Record Acts, and state information can similarly be accessed through these state provisions. The public may wish to contact your agency or other appropriate state agencies for more information on its particular information access requirements. Certain information in EPA and/or state files, however, is not available because it is claimed as Confidential Business Information (CBI) or as a Trade Secret. In addition, facilities have the right to claim some types of information as confidential, but under fairly narrow circumstances.

Be sure to know whether or not you, your agency, or the facilities under your authority possess confidential information. If such information exists, you may wish to further inquire whether your agency, the relevant state agency, or the EPA has formally determined the validity of any such claim of confidentiality. If this formal review has not been done, then under the federal requirements and under most State provisions the public is entitled to have such a review. If it is determined that the claim is incorrect or overly broad, the information may then be made available to the public.

Key Resources*

Siting Our Solid Waste: Making Public Involvement Work (EPA 530-SW-90-020, March 1990)

Social Aspects of Siting RCRA Facilities (EPA 530-K-00-005, April 2000)

NEJAC Model Plan for Public Participation (EPA 300-K-96-003, November 1996)

Section 2 - Permit Process Overview

How did the Current Permit Programs Develop?

Since 1970, EPA has continually strived to find the best ways to protect the environment. Among the most successful methods have been EPA's programs requiring industrial and municipal facilities to obtain permits to control their pollutant emissions to the air, land, and water. Various permitting programs under the Clean Air Act (CAA), such as the New Source Review (NSR) and Title V, for air emissions, the National Pollutant Discharge Elimination System (NPDES) for discharges of pollutants into surface water, and the Resource Conservation and Recovery Act (RCRA) for waste management have in many ways reduced the negative impacts of industrial and municipal facilities on human health and the environment.

Each permitting program implemented by EPA is based on legal requirements defined in the at (or statute) passed by Congress. The statute explains the legislative goals for the program, describes the major program components to achieve the goals, and provides EPA with authority to develop rules for implementing the program. Regulations developed by EPA contain details on how the program will be carried out. Regulations are found in the Code of Federal Regulations (CFR) and are detailed definitions, procedures, and requirements that indicate how the statute's broad directives will be implemented. In general, permit programs are defined in the regulations, versus in the statute, to ensure that the requirements of the statute are properly implemented.

What is EPA's Relationship with State, Tribal, and Local Environmental Agencies?

It is important to understand EPA's relationship with state, tribal, and local agencies within the context that permits are issued. Rather than issuing most permits itself, EPA generally has established programs to authorize state, tribal, and local permitting authorities to perform most permitting activities. Once EPA has delegated its authority for a permitting program to a state or tribe, they can then implement their own version of the permit program as long as it meets the minimum requirements stated in the governing statutes and regulations.

EPA has delegated authority to most states for implementing part or all of the major permit programs. Some states have enacted provisions that are more stringent than federal requirements, while other states have adopted the federal requirements without revision. Therefore, you should always make sure you are in compliance with any state-specific permitting and public participation requirements before undertaking permitting activities.

A list of EPA Headquarters and Regional contacts, as well as state and tribal environmental contacts including web site information, is provided in Section 5 as a reference.

Tribes are sovereign governments that have a special trust relationship with the federal

government based on treaties, statutes, executive orders, and history. There are currently about 560 federally-recognized tribes in the United States. Consistent with the federal trust responsibility and EPA's Indian Policy, EPA is committed to working with tribes on a government-to-government basis. EPA also recognizes tribes as primary parties for setting standards, making environmental policy decisions, and managing programs for reservations, consistent with EPA standards. In an effort to meet these standards, tribes are beginning to develop their own regulatory programs.

Tribal governments generally have the ability to acquire regulatory authority over environmental quality within Indian country. In general, states do not have jurisdiction in Indian country. EPA encourages tribes to assume regulatory and program management responsibilities for reservation lands. In the absence of an EPA-approved tribal program in Indian country, EPA will directly implement federal environmental statutes. For tribes to assume authority for implementing many of EPA's major grant or regulatory programs, they usually must meet criteria for "Treatment in the Same Manner as a State" (TAS). Generally, the TAS criteria require that the tribe must:

- be federally recognized;
- have or be able to exercise substantial governmental powers;
- have or have been delegated jurisdiction over the area in question; and
- be reasonably expected to have financial, physical, and human resource capability to effectively implement a program.

The EPA statutes that specifically allow for EPA authorization of tribal programs or a substantial role for tribes are:

- Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA);
- Safe Drinking Water Act (SDWA);
- Comprehensive Environmental Recovery, Compensation, and Liability Act (CERCLA);
- Clean Water Act (CWA); and
- Clean Air Act (CAA).

In addition, even though Congress has not specifically provided for tribal assumption of environmental programs in the Toxic Substances Control Act (TSCA) and the Emergency Planning and Community Right-to-Know Act (EPCRA), EPA has exercised discretion to allow for tribal programs under these statutes.

Many tribes own or operate businesses or facilities. Therefore, in terms of public involvement in environmental permits, tribes may own facilities applying for permits or a tribe may wish to comment on a proposed permit for a facility located in or adjacent to tribal lands.

While EPA is generally not authorized to include local governments in permitting decisions and in the delegated programs, it is important to recognize the benefits of coordinating permit processes with all stakeholders. Building local capacity to participate in permitting processes can ensure that local officials become full

partners in protecting human health and the environment. Engaging local officials early in the process and sharing the resources listed in Section 5 of this *Reference Guide* can help build an effective relationship.

What are the Major Milestones in the Permitting Process?

While each permitting program is unique in its specific requirements, most follow a similar process for permit application submittal, agency review, and final decision. In general, there are four major milestones in the permitting process:

- The permitting authority receives and reviews the permit application (pre-application activities are included in this milestone);
- A draft permit or notice of intent to deny the permit is issued by the permitting authority;
- A public comment period of at least 30 days is *provided* to allow the public to comment on the draft permit; and
- The permitting authority *makes a final determination on the permit application.*[1]

Section 4 of this *Reference Guide* contains a model plan with additional steps (see part IV of the outline) that can supplement these milestones in the core permitting process.

After you, your agency or the EPA makes a decision, both the facility and the public have the opportunity to challenge the decision. While this manual does not address permit appeals, most permitting programs include procedures for administrative appeal by any person who files comments on the draft permit or participates in any public hearing. Once the administrative appeal process is exhausted, judicial appeals are generally available.

In addition, there are limited situations where an interested person may petition the permitting authority, usually for cause, to reopen and revisit a permit. (Please see individual statutes and EPA or state regulations for specific provisions.) Judicial challenge to final permit determinations are provided for by the environmental programs.

The following is an overview of the major air, water, and solid waste permitting programs implemented by EPA. Each overview begins with a brief description of the statute and resulting permitting programs, including regulatory citations that should be referred to if you are interested in complete regulatory requirements. In addition, there is a list of public involvement activities required by each permitting program. (See Section 3 of this *Reference Guide* for a detailed description of the public involvement requirements and a description of the activity.) If you have further questions about a particular permitting program, refer to the list of contacts and resources in Section 5.

[1] There is a different process in seeking coverage under general permits under NPDES.

Clean Air Act (CAA)

Public involvement requirements under CAA are found at: 40 CFR Part 51 Sec. 51.102, 51.161, 51.285, 51.368, 51.856, 51.112, 51.116, 51.118, 51.121, 51.152, 51.160, 51.164, 51.166, 51.230, 51.302-304, 51.306-309, 51.369, and 51.853; 40 CFR Part 52 Sec. 52.5 and 52.15; 40 CFR Part 60 Sec. 60.22, 60.23, and 60.210; 40 CFR Part 63.43; 40 CFR Part 71 Sec. 71.11 and 71.27; 40 CFR Part 72 Sec. 72.65-67; 40 CFR Part 85 Sec. 85.1807; 40 CFR Part 89 Sec. 89.512, 40 CFR Part 90 Sec. 90.512; 40 CFR Part 91 Sec. 91.512 and 91.513; 40 CFR Part 92 Sec. 92.709; and 40 CFR

The Clean Air Act (CAA) was passed to establish the basic air quality management system under which the EPA promulgates National Ambient Air Quality Standards (NAAQSs) and programs to meet air quality goals, and requires states to develop and adopt plans to implement them known as State Implementation Plans (SIPs). In addition, the CAA requires EPA to promulgate emission standards for hazardous air pollutants and also requires special regulation of new or modified sources of air pollution.

The CAA also establishes two different types of permits for air pollution sources — preconstruction permits for new and modified sources, and operating permits for existing sources. For the most part these programs are run by state and local agencies.

However, if the state or local program is not approved, EPA must run the program and issue the permits.

Air Pollution Permits for New and Modified Sources

- **What is the Purpose of the CAA's New Source Review Permit Programs?**

The purpose of the CAA's new source review permit programs for new or modified sources is to ensure that a new or modified source installs the appropriate control technologies, that they do not interfere with or violate the control strategy for meeting the NAAQSs, and that they do not contribute to new or existing air pollution problems, such as violations of the NAAQSs.

There are four different permit programs for new and modified air pollution sources:

- The New Source Review (NSR) program for major sources located in areas that are attaining the NAAQS for the particular pollutant being discharged is commonly referred to as the **Prevention of Significant Deterioration (PSD)** program. (A federal PSD program is in place in Indian Country and in those cases where an approved state or local PSD program does not exist.)

- The **New Source Review (NSR)** program is for major sources locating in areas designated as non-attainment for the particular pollutant.

- Minor source NSR programs are for non-major sources.

- Review of new and reconstructed sources of air toxics.

Since many major sources emit more than one pollutant, some sources are required to obtain both a PSD and a non-attainment NSR permit.

Some states have, and other states are moving toward combining their new source air pollution permit programs with the operating permit program under Title V of the Clean Air Act. Thus, a notice of a permit action might not specifically state that the permit is being issued under one of the new source programs, but that the source must meet all applicable new source requirements.

• What are the Key Components of the New Source Review Permit Programs?

In clean areas, or "attainment areas," the NSR program limits degradation of air quality. In these situations, the NSR program, commonly referred to as the PSD program, requires major new and modified sources located in areas that are attaining the NAAQSs to install equipment that represents the Best Available Control Technology (BACT); and ensure that the emissions from the new or modified source will not cause or contribute to a violation of the NAAQS; or will not deteriorate the air quality more than some prescribed increment.

The non-attainment NSR program requires major new or modified sources in areas not meeting NAAQS to install equipment representing the lowest achievable emission rate (LAER), to offset the remaining emissions by reducing existing emissions at the facility or at another facility in the non-attainment area, and to ensure that the emissions do not contribute to other air quality problems.

Many states have minor source NSR programs to cover sources not large enough to be subject to NSR regulations. Minor NSR programs may utilize different application and public notification procedures form those required for major source NSR programs.

In these cases, the states develop these programs as part of their air pollution control plans and submit them to EPA as part of the SIP. Once this program becomes part of an approved SIP, the minor source NSR programs become federally enforceable. In some cases, these minor source NSR programs are used to limit the hours of operations or other parameters at the source to keep the source below the applicability requirements of the non-attainment NSR programs. This type of permit action is called "establishing potential-to-emit (PTE) limits."

• What are the Opportunities for Public Involvement in the CAA's New Source Review Permit Programs?

There are many opportunities for interested parties to participate in the permitting of a new or modified source, depending on the type of permit being sought. Public involvement opportunities include public comment periods, public hearings and meetings, and appeals.

For example, state or local air pollution control

agencies have the responsibility for determining the emission limitation for the sources. This is done through several mechanisms. For new or modified sources agencies follow NSR procedures or the minor source NSR procedures. Public participation activities related to these programs are discussed in Section 3.

For existing sources or other sources not subject to the NSR requirements, the state or local agency follows a process defined for SIPs, referred to as the SIP process to develop emission limitations.

The agencies use information on both available technology and ambient conditions to establish an emission limitation for air pollution sources. In developing the emission limitations, the agencies are required to have public comment periods and public hearings. In addition, many agencies also have public meetings and provide other opportunities for the public to comment on the emission limitations.

In addition, all new source review permit programs require permitting authorities (EPA, state, tribal or local agency) to notify the public when a permit is issued. Generally notice is also published when the permitting authority proposes action on a permit, holds a public hearing, renews or reopens a permit, or makes a significant modification to a permit. Notices are published in a newspaper of general circulation in the area where the facility is located or in a state publication designed to give public notice, such as a state register.

The permitting agencies generally make the information submitted by the source and its evaluation of that material, including analysis of the data and air quality impact, available to the public in the area affected as well. This includes any draft permit or preliminary determination. Copies of the materials must be available in at least one location in the region where the source is located. The information is generally placed in the local offices of the agency or in a local library.

Once a final determination has been made, in addition to notifying the applicant in writing of that final determination, the permitting authority must make such notification available for public inspection at the same location where it made available the preconstruction material and the public comments.

EPA regulations do not require the permitting authority to notify the commenters concerning the final determination; however, some states mail copies of the permitting decision to those who request it.

And finally, decisions made regarding permitting activities may be appealed by the public. Permits issued under the federal PSD provisions may be appealed to the Environmental Appeals Board (EAB). Procedures for filing an appeal can be found in 40 CFR 124. Permits issued through a SIP program must be appealed to the state under state-specific procedures.

- ## When in the Permitting Process do These Opportunities Usually Occur?

Again, when developing the emission limitations, agencies are required to have public comment periods and public hearings.

Once a state adopts revised emission limitations or other changes, it submits the changes to EPA for approval as a revision to the SIP. The process that EPA follows to approve the revisions to the SIP also involves a public comment period. If the state fails to adopt and submit an adequate SIP, then EPA must promulgate a Federal Implementation Plan (FIP). When developing a FIP, EPA generally has a 60-day comment period and offers an opportunity for a public hearing.

Once the permitting authority has been established, public participation requirements are triggered when a permitting authority issues a draft permit, holds a public hearing, renews or reopens a permit, or makes a significant modification to a permit.

Before the permitting authority issues the permit, a public notice and comment period is provided, usually 30 days, to allow comments regarding the proposed permit, including source information and agency analyses.

When EPA is the issuing agency, it follows the 30-day notice and comment period requirements as well as a 30-day notice requirement for public hearings under the federal PSD program (such a program exists in Indian country or where no approved state or local PSD effort is in place). The notice must identify:

- the permitting authority;
- the name and address of the permittee;
- the location of the proposed facility;
- what activities are involved in the permit action;
- the emissions from the new activities;
- the location where the information submitted by the source and the agency's analysis can be inspected;
- the name, address, and telephone number of a person whom interested parties can contact for additional information, such as a copy of the draft permit, the statement of basis, the application, relevant supporting materials, and other materials available to the permitting authority that are relevant to the permitting decision;
- the deadline for submitting comments; and
- procedures for requesting a public hearing.

In general, state and local agencies follow similar procedures. In some cases, a permit authority announces that a hearing will be held, if one is requested, at the same time as the authority announces the public comment period on the proposed permit.

And while state programs are not required to give a specific 30-day advance notice of public hearings, most do.

The public hearing provides a formal opportunity to present comments and oral testimony on a proposed permitting action. The notice that announces the public comment period for the draft permit will also mention that the public may request a public hearing. A public hearing will be held if the request is received before a deadline set in the notice.

Note that a pubic hearing is **not** the same as a public meeting, which is simply an informal forum for discussing issues and opening lines of communication. Comments made at a public meeting do not become part of the official administrative record as they do during a public

hearing. In addition, public hearings are generally recorded by a court reporter. As stated above, under federal guidelines (which most states have adopted), once the permitting agency decides to hold a public hearing, a 30-day, or more, advance notice of the hearing is provided. The notice will provide information on the time, date, and place.

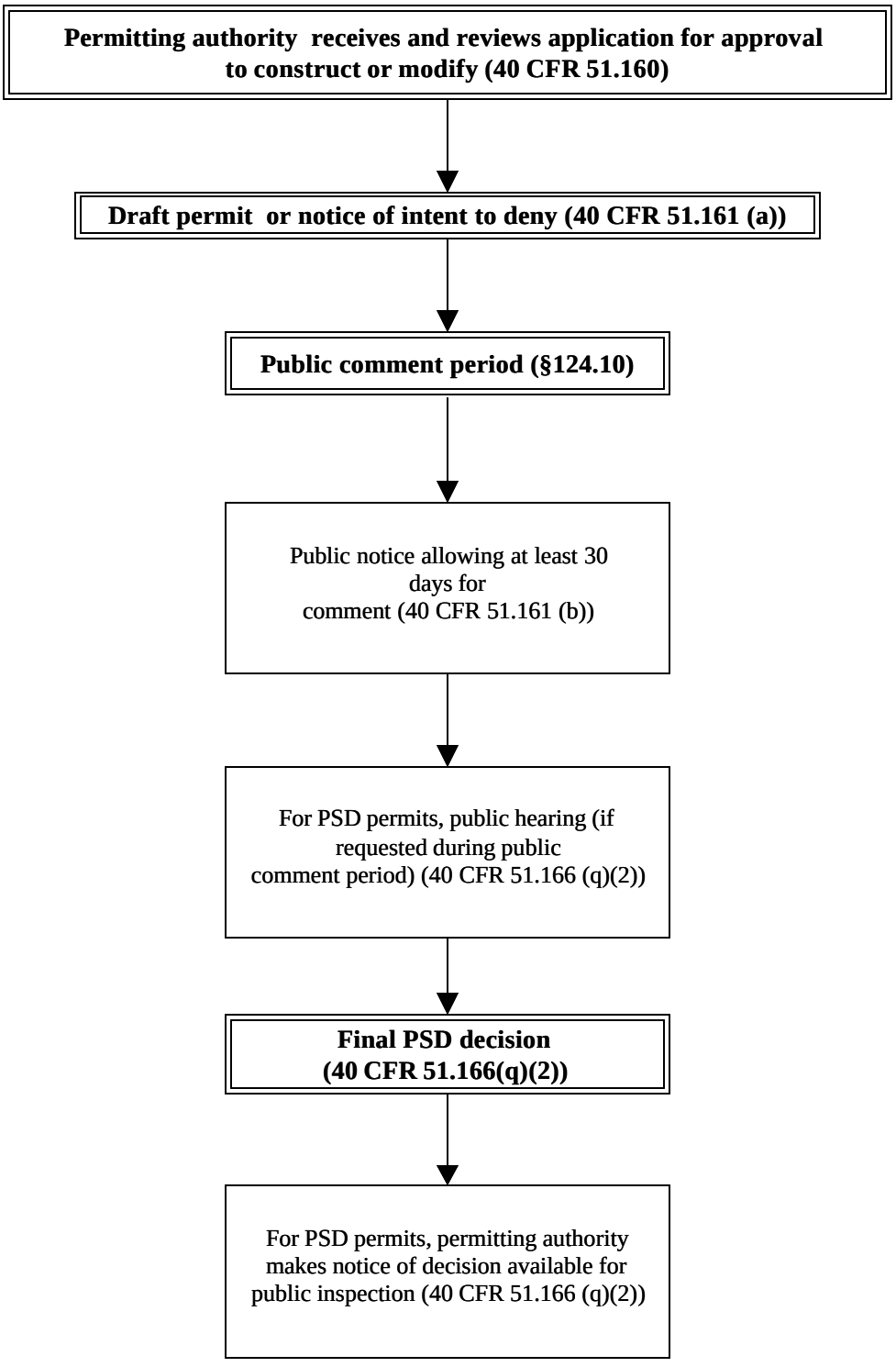
The permitting authority must keep a record of public comments and of issues raised during the public involvement process. All comments must be made available for public inspection at the same location where the permitting authority made available the preconstruction information related to the source. (40 CFR 51.166(q)(vi))

After a permit or modification has been issued, during a specified time frame, public citizens who commented on the proposed permit may appeal the agencies' decision. Procedures for filing a federal appeal can be found in 40 CFR 124.

State permits issued must be appealed following state guidelines.

Figure 1 (next page) presents an overview of the *Prevention of Significant Deterioration (PSD) Permit Process*.

Figure 1 - Prevention of Significant Deterioration (PSD) Permit Process



Title V Operating Permits

- **What is the Purpose of the CAA's Title V Operating Permits Program?**

Title V of the Clean Air Act requires permitting authorities to adopt permit programs (often called Part 70 programs) for all large sources of air pollution and many smaller sources of hazardous air pollutants in order to improve compliance with and enforcement of CAA requirements. All stationary sources are required by federal law to get operating permits that incorporate the rules that apply to the day-to-day operations at a facility. Generally these permits are issued by states, local governments, and tribes. A detailed set of federal regulations that sets standards for permitting programs is found at 40 CFR Part 70.

- **What are the Key Components of the CAA's Title V Operating Permits Program?**

The Title V program provides for the compliance and enforcement of CAA goals in several ways. First, the program enhances compliance and enforcement by including all of the CAA's requirements that apply to a facility in one document — the operating permit. For example, terms from the facility's preconstruction permit and requirements from the SIP that apply to the facility are included in the permit, along with all federal standards that apply.

Through the permit, the permitting agency has a record that describes exactly what rules apply to the facility.

The facility and the public also have a clear understanding of what the facility's obligations are. In this way, operating permits lead to better compliance, better oversight by the public, and more effective enforcement.

Second, although the operating permit generally does not create emissions limits, where necessary, the permit will add monitoring, record-keeping, and reporting requirements. The permit will require the facility to regularly provide the permitting agency with information that establishes whether or not the facility is in compliance with all of its applicable requirements. In other words, the facility must submit reports to you or your agency that contain the results of the facility's monitoring (e.g., monitoring the levels of pollutants emitted) or other required record-keeping at least semiannually.

In addition, when a permitted facility is not in compliance with all of its applicable requirements at the time it obtains its permit, the facility must submit annual progress reports to the permitting agency that document whether the facility is meeting its previously agreed to milestones for achieving compliance. All required reports, records, and notices are public information. The permit itself and the permit application (except confidential business information) are also public information.

Third, a responsible official at the facility must certify whether or not the facility is in compliance with all applicable requirements.

Also, a responsible official must certify whether the facility is in compliance with its permit each year after the permit is issued. These certifications are public information.

• What are the Opportunities For Public Involvement in the CAA's Operating Permits Program?

The public involvement requirements found in 40 CFR Part 70 (and adopted into state, local and tribal Part 70 programs) provide interested parties the opportunity to participate by:

1. commenting on a draft of the facility's operating permit (and significant changes or modifications to its permit) (40 CFR 70.7(h));

2. keeping track of whether the facility is meeting its emission limits and other requirements (by reviewing the reports that the facility submits) (40 CFR 70.6 (a)(3)(iii), 70.6(c)(4), 70.6(c)(5)); and

3. challenging the permit in court (or before a tribal review body) (40 CFR 70.4(b)(3)(x)).

Enforcement Actions may be brought against facilities that are not complying with their permits (using the citizen suit provisions of Section 304 of the CAA).

All Part 70 programs provide the following specific opportunities for public involvement:

- Public notice
- Public comment periods
- Response to comments
- Mailing lists
- Statements of Basis
- Contact persons
- Petitions to the EPA Administrator to object to the permit (discussed below)

A general description of these concepts (except petitions to EPA) as they apply to many federal programs is found in Section 3 of this *Reference Guide*.

• When in the Permitting Process do These Opportunities Usually Occur?

The permitting agency must provide a public notice and an opportunity to comment on a draft permit when:

- a facility applies for its first Title V permit;
- a Title V permit is renewed (5 years after issuance);
- the permit is reopened because there is a material mistake in the permit or to update the permit because of new requirements (review is limited to the part of the permit that is being revised); and
- the facility makes a significant change in its operations and applies for a revision to its permit (review is limited to the part of the permit that is being revised.

Public notice is required when a facility applies for its first permit, the permitting agency issues a draft permit, holds a public hearing, renews or reopens a permit, or makes a significant modification to a permit. The permitting authority may elect to reopen a permit if it

contains a material mistake or is otherwise not in compliance with applicable requirements of the Clean Air Act. The public can also request a reopening based on material mistake. This request may be made at any time.

Notices must be published in a newspaper of general circulation in the area where the facility is located or in a state publication designed to give general public notice, such as a state register. In addition, permitting agencies must send notices to persons who have indicated that they want to be on a mailing list for receiving notices of permitting actions.

Public notice must include at least the following:

- the identity of the permitting agency;
- the name and address of the permittee;
- the name and location of the facility;
- the activities involved in the permit action, including the change in emissions levels involved in any permit revision;
- the name, address, and telephone number of a person whom interested persons may contact for additional information such as a copy of the draft permit, the statement of basis, the application, relevant supporting materials, and other materials available to the permitting authority that are relevant to the permitting decision;
- the date the public comment period ends; and
- instruction on how to request a public hearing.

Members of the public who feel that they need more than 30 days in which to review a draft permit may request that the permitting agency extend the time for public comment (but there is no requirement that you or your agency agree to the request). Therefore, it makes sense for you to involve interested citizens early in the process, so that the public has the opportunity to review the facility file and the Part 70 permit application well in advance of the comment period on the draft permit.

Members of the public may also want to look at a copy of the statement of basis for the permit, which describes the factual and legal justification for the permit.

Federal regulations do not require the permitting agency to provide a written response to comments, but state law may require such a response. The permitting authority must, however, keep a record of public comments and of issues raised during the public involvement process. The permitting agency must provide EPA and the public with a copy of this record if requested to do so.

A public hearing provides another opportunity for public participation. The notice that announces the public comment period for the draft permit will also mention that the public may request a public hearing. A public hearing may be held if the request is received before a deadline set in the notice.

As stated above, a public hearing provides a formal opportunity to present comments and oral testimony on a proposed permitting action.

Note that a public hearing is **not**, however, the same as a public meeting, which is simply an informal forum for discussing issues and opening lines of communication. Comments made at a public meeting do not become part of the official administrative record as they do during a public

hearing. In addition, public hearings are generally recorded by a court reporter. Under federal guidelines (which most states have adopted), once the permitting agency decides to hold a public hearing, it must provide a 30-day advance notice of the time, date, and place.

The decision of the permitting agency is public information, but Part 70 does not require that the permitting agency send out notice of the decision except to the permitted facility. Some states are required by state law to mail a copy of the permitting decision to persons who submitted comments.

The petition process of Title V gives the public an extra opportunity for involvement, compared to most permit programs. After the permitting agency has issued the draft permit and has taken into account any comments, it drafts a proposed permit, which it sends to the EPA. EPA has 45 days in which to review the permit.

EPA may object to the permit if there are grounds to do so. If EPA does not object, however, and a member of the public believes EPA should have objected to the permit, he or she can petition the EPA to change its decision. The petition (which can be a letter to the EPA) must be sent within 60 days after the end of EPA's 45-day review period.

It may be necessary for interested parties to contact you or your agency to learn the date on which the 45-day review period ends, so that date should be readily available.

If EPA reverses the decision, then the permit will not be issued, or if it has already been issued, it will become ineffective. If EPA does not reverse the decision, EPA's decision can be challenged in federal court.

Whether or not a petition to the EPA has been filed, members of the public may challenge a permit in state court or before a tribal review body (if the permit has been issued by an Indian tribe).

For areas of the country that are not covered by state Part 70 programs (such as Indian country), EPA administers the Federal Operating Permits Program. EPA will issue Title V permits for facilities in Indian country until tribal Part 70 programs are adopted and approved. The public involvement opportunities provided by the Federal Operating Permits Program are modeled on the Part 70 program and are described at 40 CFR Part 71.

- ## How can I Assist Interested Parties in Learning More About CAA Permitting Processes and/or Facilities They are Concerned About?

The permit application on file from the facility is a good source of information. Even a similar permit may help in assisting an interested party in learning more about the process.

Many state permitting agencies put their permits and draft permits on the Internet for easier access. In addition, files for specific facilities should contain background information on the facility, inspection and enforcement history, and

previously issued permits. This information is the best starting place for a person interested in a particular facility.

Other resources you can point interested parties to include:

- To gain a better understanding of the overall structure, purpose, and goals of EPA's regulations for state operating permit programs, interested persons can download EPA's "Air Pollution Operating Permit Program Update — Key Features and Benefits" at the following address: *http://www.epa.gov/oar/oaqps/permitupdate*.

- EPA's Operating Permits Group maintains a web site that provides general information about the program at the following address: *http://www.epa.gov/oar/oaqps/permits*.

- Text versions of policy memos, guidance, white papers, and preamble rule language for the Part 70 program and the Federal Operating Permits Program (Part 71) are found at the following address: *http://www.epa.gov/ttn/oarpg/t5main.html*

- The majority of major industrial groups that have significant emissions, such as power plants, steel mills, and refineries, are described in EPA's sector notebooks. For each industrial group, information is provided on the industrial process, the types of air pollutants released, and compliance/enforcement history for the group as a whole. The reports can be found at the following address: *http://es.epa.gov/oeca/sector/index.html*

- Information regarding health effects of hazardous air pollutants can be found at the following address: *http:///www.epa.gov/ttn/uatw/hapindex.html*

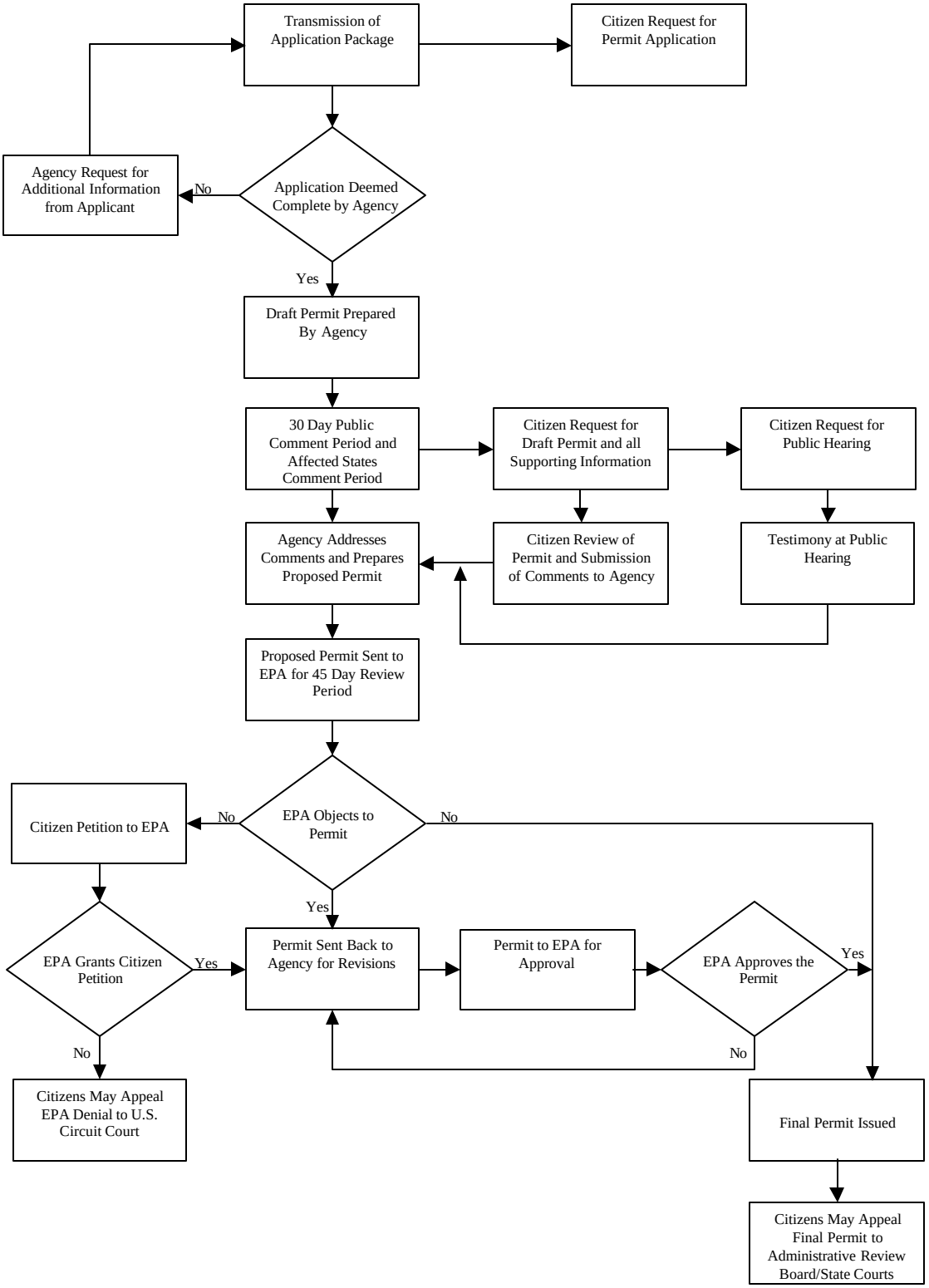
There are a number of sites within EPA's Envirofacts Warehouse that allow interested persons to identify specific facilities and their emissions.

- Interested parties can do a search of EPA's AIRS database for information on specific facilities or all facilities in a given geographic area, see: *http://www.epa.gov/enviro/html/airs_query_java.html.*

- To find information on the toxic chemicals and compounds released by specific facilities, see: *http://www.epa.gov/enviro/html/tris*.

Figure 2 (next page) presents an overview of the *Title V State Operating Permit Process*.

Figure 2 - Title V State Operating Permit Process



Safe Drinking Water Act (SDWA)

Public involvement requirements under SDWA are found at: 40 CFR Part 25 Sec. 25.3 through 25.13, 40 CFR Part 124 Sec. 124.10-14, 124.17, 124.19

The Safe Drinking Water Act (SDWA) provides for control of contaminants in public water systems and also provides authority to regulate underground injection wells. The SDWA uses **Underground Injection Control (UIC)** permits to regulate construction, operation, and closure of wells in order to protect public sources of drinking water.

- ## What is the Purpose of the SDWA's UIC Permit Program?

The **Underground Injection Control (UIC)** permit program regulates the underground injection of wastes or other fluids with the goal of protecting underground sources of drinking water (USDW) from endangerment. A USDW is defined as an aquifer capable of supplying a public water system now or in the future and containing water with a concentration of 10,000 mg/l of total dissolved solids or less.

Injection is prohibited unless it is authorized by permit or rule. No injection is allowed if it endangers underground sources of drinking water (i.e., if the presence of a contaminant in a USDW may result in a public drinking water system not complying with primary drinking water regulations or adversely affecting human health).

- ## What are the Key Components of the SDWA's UIC Permits Program?

The UIC program defines five classes of wells. For Class I-IV wells, all injection activities, including construction of an injection well, are prohibited until the owners or operators of these injection wells receive a permit. Most Class V wells are currently authorized by rule as long as they do not endanger underground sources of drinking water and the well owners submit basic inventory and assessment information (40 CFR 144.24). Existing Class II enhanced recovery wells and hydrocarbon storage wells are authorized by rule for the life of the field or project or until a permit is issued (40 CFR 144.22). Class IV wells, those that inject hazardous waste into or above USDWs, are prohibited unless they are part of an aquifer cleanup operation (40 CFR 144.13).

There are requirements for submitting information to EPA or the primacy state and requirements regarding how wells must be constructed, operated, monitored, and closed in a manner that protects underground sources of drinking water. There may be additional, more stringent requirements imposed by a state or tribe. EPA has recently adopted new regulatory requirements for two types of Class V wells (high risk): large cesspools and motor

vehicle waste disposal wells. Additional requirements are being developed for other high risk Class V wells, including certain industrial waste disposal wells.

Individual or single-family cesspools or septic systems are excluded from regulatory coverage under the federal UIC program. A full description of the regulatory requirements for the UIC permitting program can be found at 40 CFR Parts 144, 145, 146, 147, and 148.

• What are the Opportunities for Public Involvement in the UIC Permitting Process?

The UIC permitting program has several opportunities for public participation, which include:

- Public notice;
- Public comment periods;
- Public hearings;
- Response to Comments;
- Notices of decision; and
- Fact sheets or Statements of Basis.

See 40 CFR Part 124 for specific regulatory language defining the public participation requirements for the UIC permit program.

• When in the Permitting Process do These Opportunities Usually Occur?

Public notice and comment is required in the UIC permitting process after an applicant submits a permit application and the permitting agency either denies the permit or prepares a draft permit. Notice must also be provided of any scheduled public hearings, and when an appeal has been granted. While public notice and comment periods are required for major permit modifications, revocations, reissuances, and terminations, notice is not, however, required when a permit modification, revocation, reissuance or termination is denied.

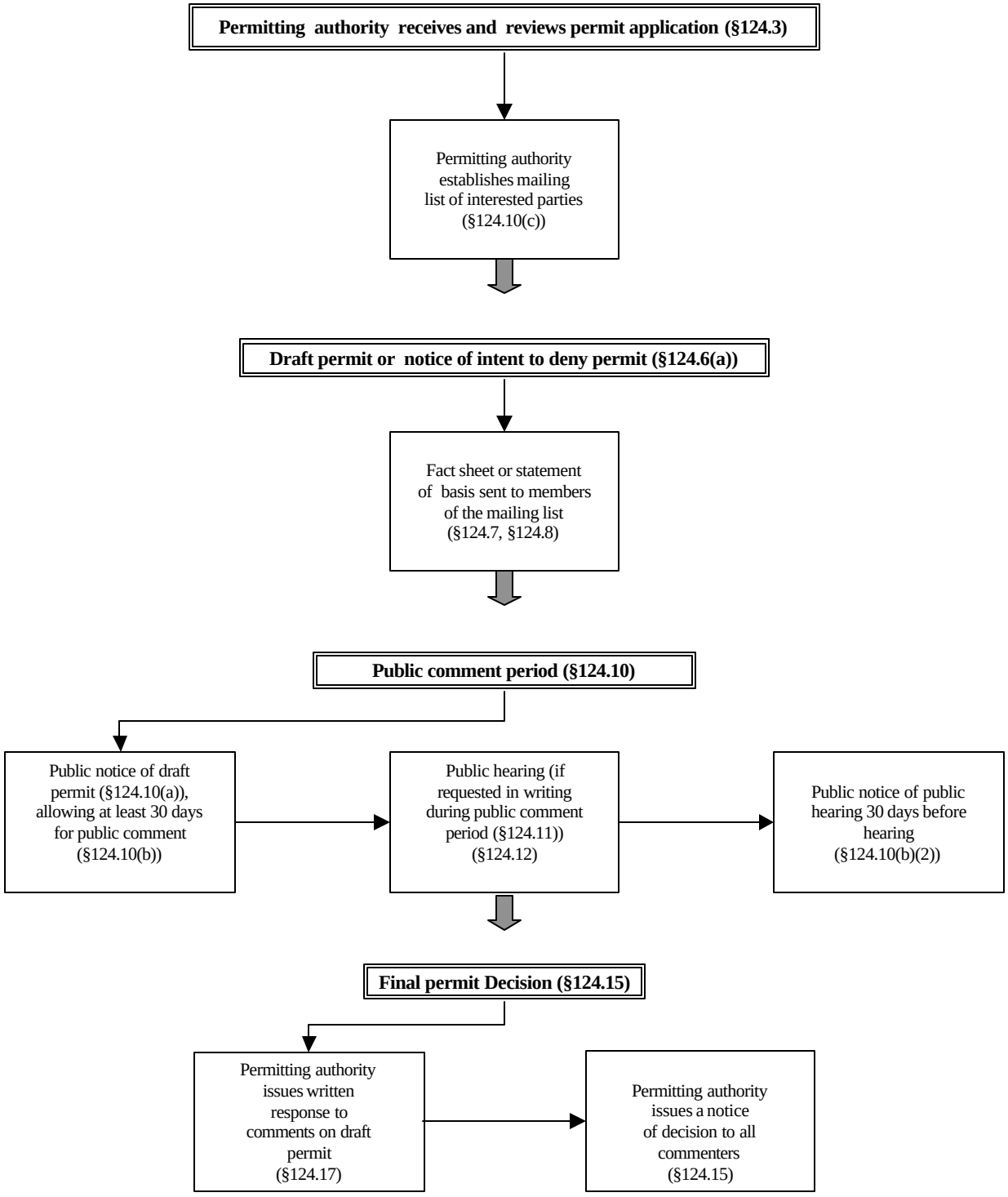
In addition to the general public notices required with permit application and modification processes, the permitting agency must publish, periodically, a notice informing interested parties of the opportunity to be put on a mailing list. Copies of fact sheets, the statement of basis (for EPA issued permits) must be distributed to the applicant and to members of the mailing list.

After the public comment period has taken place and any public hearing held, the agency must respond to the comments and ultimately send a Notice of Decision to the permit applicant as well as any person who requested notification.

Section 3 of this *Reference Guide* provides further description of the requirements and associated activities.

Figure 3 (next page) presents an overview of the *Underground Injection Control (UIC) Permit Process*.

Figure 3 - UIC Permit Process



Clean Water Act (CWA)

Public involvement requirements under CWA are found at: 40 CFR Part 25 Sec. 25.3 through 25.13, 40 CFR Part 124 Sec. 124.10-14, 124.17, 124.19, 124.56-57, 124.62, 124.64

The objective of the Clean Water Act (CWA) is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. EPA implements two permit programs under the CWA: **Section 404** permits, and **National Pollution Discharge Elimination System (NPDES)** permits.

Section 404 Permits

- **What is the Purpose of the CWA's Section 404 Permits Program?**

Section 404 of the Clean Water Act establishes a program to regulate the discharge of dredged or fill materials into waters of the United States, including wetlands. Section 404 permits prohibit the discharge of dredged or fill material if there is a practicable alternative that is less damaging to the aquatic environment or if the discharge would result in significant degradation of waters of the United States.

Section 404 regulates a wide range of activities including discharges into waters associated with:

C residential and commercial development;

C water resource projects such as dams and levees;

C infrastructure development such as highways and airports; and

C conversion of wetlands to uplands for farming and forestry.

- **What are the Key Components of the CWA's Section 404 Permit Program?**

EPA and the U.S. Army Corps of Engineers (Corps) share responsibility for CWA Section 404 program development and implementation. The Corps is the federal agency administering the Section 404 permit program regulating discharges and analyzing permit applications. Under Section 404, EPA issues guidelines for dredging and filling operations. The Corps ensures that Section 404 discharges are in accordance with EPA guidelines.

Depending on the type of resource potentially affected by the proposed discharge, other federal agencies may be involved in Section 404 permitting, including the U.S. Fish and Wildlife Service and the National Marine Fisheries Service.

For most waters on which navigation does not occur, states and tribes are eligible to assume the Section 404 permitting program. As of January 2000, New Jersey and Michigan are the only states to have done so.

- **What are the Opportunities for Public Involvement in the Section 404 Permitting Process?**

Although EPA and the Corps share responsibility for implementing the Section 404 program, public involvement under federal guidelines is governed by the Corps regulations found at 33 CFR parts 325 and 327. EPA approves and oversees state assumption of the CWA Section 404 program, and public involvement requirements applicable to state 404 programs appear at 40 CFR 233.32-233.36. In addition, EPA's guidelines for analyzing permit applications can be found at 40 CFR 230.2, and EPA's regulations for addressing public participation for approval or revisions of state 404 programs can be found at 40 CFR 233.15 and 233.16.

Public participation requirements under state-assumed programs include:

- Public notice;
- Public comment periods;
- Public hearings;
- Contact persons;
- Response to comments;
- Mailing lists; and
- Determinations.

- **When in the Permitting Process do These Opportunities Usually Occur?**

Public notice is required when the permitting agency receives a permit application, prepares a draft permit, considers a major modification to a permit, schedules a public hearing or issues an emergency permit.

A copy of the public notices are mailed to the applicant, any agency with jurisdiction over the activity or disposal site, any adjoining property owners, any persons who have specifically requested notification, and any state whose waters may be affected by the activity. A permitting agency may update their mailing list periodically by requesting written notification of continued interest from those listed. You or your permitting agency may delete those individuals from the list who fail to respond.

After the close of the public comment period and any public hearings, the permitting agency must prepare a determination on each applicant outlining the decision and rational for such. The determination must be dated, signed, and included in the official record prior to any final action on the permit. The official record is open to the public.

The discussion in Section 3 of opportunities for public involvement in the CWA Section 404 program refers to state-assumed programs.

- **How can I Assist Interested Parties in Learning More About Section 404 Permitting Processes?**

Details on the roles of EPA and the Corps: *http://www.epa.gov/owow/wetlands/facts/fact10.html.*

A fact sheet on state/tribal program assumption: *http://www.epa.gov/owow/wetlands/facts/fact23.html.*

National Pollutant Discharge Elimination System (NPDES) Permits

- **What is the Purpose of the CWA's NPDES Permit Program?**

In order to protect public health and aquatic life, the Clean Water Act prohibits discharge of pollutants from any point source into waters of the United States unless the discharge is in compliance with a NPDES permit. Permits regulate discharges with the goals of (1) protecting public health and aquatic life, and (2) assuring that every regulated point source complies with applicable technology based effluent limits and at a minimum treats wastewater. To achieve these ends, permits may include the following terms and conditions:

- site-specific discharge (or effluent) limits;
- standard and site-specific compliance monitoring and reporting requirements; and
- enforcement provisions in cases where the regulated facilities fail to comply with the provisions of their permits.

A full description of the regulatory requirements for the NPDES permitting program can be found at 40 CFR 122, 123, and 124.

- **What are the Key Components of the CWA's NPDES Permit Program?**

NPDES permits establish effluent limits and may specify Best Management Practices (BMPs), as well as monitoring and reporting requirements. The scope of the NPDES program is broad.

Pollutants can enter waters through a variety of pathways from municipal, industrial, and agricultural sources. For regulatory purposes these sources are generally categorized as either "point sources" or "non-point sources." Typical point source discharges include discharges from publicly owned treatment works (POTWs), discharges of process waste water from industrial facilities, and discharges associated with urban storm water runoff.

Under the NPDES program, all facilities that discharge pollutants from any point source into waters of the United States are required to obtain a NPDES permit. The term "pollutant" is defined very broadly by the NPDES regulations and includes industrial, municipal, or agricultural waste discharged into water. Where such pollutants are discharged from a point source, that discharge is subject to NPDES regulation.

Provisions of the NPDES program also address certain specific types of agricultural activities referred to as concentrated animal feeding

operations (CAFOs). The majority of other agricultural facilities, however, are categorized as non-point sources and are exempt from NPDES regulation.

Pollutant contributions to waters of the United States may come from both direct and indirect sources, as well.

Direct sources discharge wastewater directly into the receiving water body, whereas indirect sources discharge wastewater to a POTW, which in turn discharges into the receiving water body.

Under the national program, NPDES permits are issued only to direct point source discharges. Industrial and commercial indirect discharges are controlled by the national pretreatment program. More than 200,000 sources are regulated by NPDES permits nationwide. Sources that discharge indirectly into United States waters (e.g., facilities that discharge wastewater through a POTW with a NPDES permit) must themselves be controlled by the POTW.

• What are the Opportunities for Public Involvement in the NPDES Permitting Process?

The NPDES permitting program has several opportunities for public involvement, which include:

- Public notice;
- Mailing lists;
- Notices of decision;
- Fact sheets or statements of basis;
- Response to comments;
- Public comment periods;
- Contact persons; and
- Public hearings.

See 40 CFR 124 for specific regulatory language defining the public participation requirements for the NPDES permit program.

• When in the Permitting Process do These Opportunities Usually Occur?

While public notice requirements may differ in each state, public notice and opportunity for comment is generally required when a permit application has been denied, a draft permit has been issued, a public hearing has been scheduled, an appeal granted, or a NPDES new source determination has been made. While many activities with respect to permit modification, revocation, reissuance and termination will require public notice, it is not required where such revisions or modifications are minor or administrative changes. For EPA-issued permits, public notice is not given until a draft Environmental Impact Statement (EIS), if necessary, has been issued.

Notice must be periodically published by the permitting authority informing the public of the opportunity to be placed on a mailing list. You or your permitting agency may remove people from the mailing list who do not respond to a request for indication of continued interest.

The permitting agency is required to distribute a fact sheet to the applicant and any interested parties who request information for several classes of permits. If the permit does not warrant a fact sheet, a statement of basis must be prepared.

Notice of decision must be sent to the permit applicant and any person who submitted written comments or requested notification. Notice of decision must also be published in a newspaper of general circulation within the affected area.

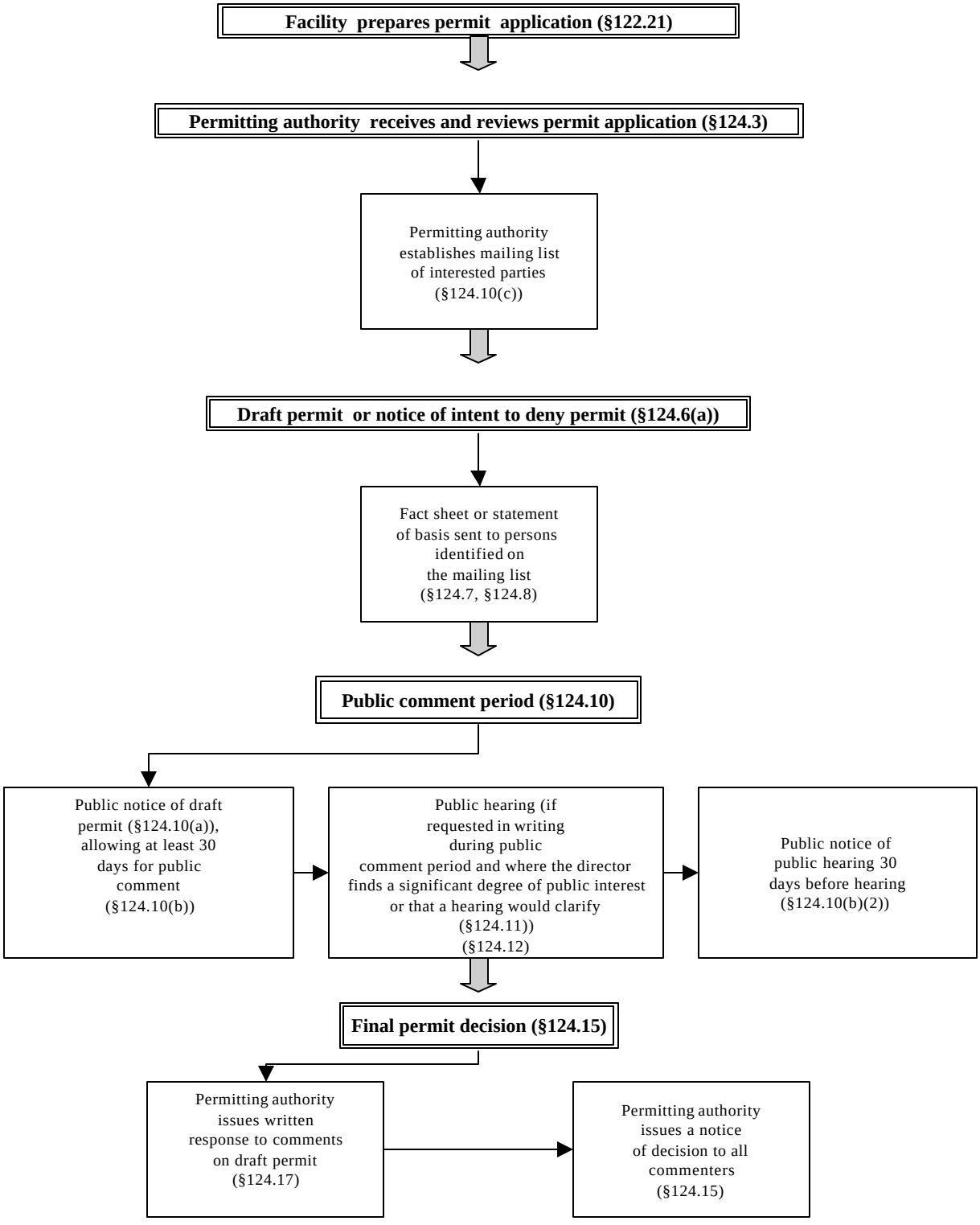
Once a final permit decision is issued, the permitting agency must issue a response to written comments. The response must be available to the public.

Since public notice requirements do differ depending on which state the facility is located in, the local permitting authority should be familiar with applicable state public participation requirements.

Section 3 of this *Reference Guide* provides further description of the requirements and associated activities.

Figure 4 (next page) provides an overview of the *NPDES Permit Process*.

Figure 4 - NPDES Permit Process



Resource Conservation and Recovery Act (RCRA)

Public participation requirements under RCRA are found at: 40 CFR Part 25 Sec. 25.3 through 25.13; 40 CFR Part 124 Sec. 124.8,10-14, 124.17, 124.19, 124.31, 124.32, and 124.33 Federal requirements for public participation are in Parts 270 270.30(m), 270.62(b)(6) and 270.66(d)(3). Part 271 contains requirements for state authority (eg.. 271.14, 271.17, and 271.20)

The Resource Conservation and Recovery Act (RCRA) was enacted to ensure safe disposal of the huge volumes of solid waste generated nationwide. The broad goals of RCRA are to protect human health and the environment, to conserve energy and natural resources and to reduce or eliminate the amount of waste generated, including hazardous waste. Subtitle C of RCRA, which establishes a "cradle to grave" system for controlling hazardous waste, requires **Operating Permits for Treatment, Storage and Disposal Facilities (TSDFs)**.

Several categories of permits are issued and regulatory standards for each category define operating requirements and various provisions specific to the permitting need. Categories include: operating permits, research, development, and demonstration permits; post-closure permits; emergency permits; permit-by-rule permits; combustion permits, land treatment demonstration permits, and remedial action plans.

Permits are required for most handlers of hazardous waste with few exceptions, such as small quantity generators who store waste on site for less than 180 days.

• What Is The Purpose of RCRA's TSDF Permit Program?

TSDFs are required to obtain permission, in the form of a permit, that establishes the administrative and technical conditions under which waste at the facility must be managed. Permits provide TSDF owners and operators with the legal authority to treat, store, or dispose of hazardous waste and detail how the facility must comply with the RCRA regulations. Compliance with the permit ensures that hazardous waste is handled in a controlled manner that is protective of human health and the environment. Permits also serve as an implementation mechanism, and as a means by which EPA can track waste management at facilities that choose to handle hazardous waste.

• What Are the Key Components of RCRA's TSDF Permit Program?

TSDF owners and operators must submit a comprehensive permit application that covers the full range of TSDF standards, including general facility provisions, unit-specific requirements, closure and financial assurance standards, and any applicable ground water monitoring and air emissions provisions.

The permit application must demonstrate that the methods of handling the waste are consistent with the level of protection of human health and the environment required by RCRA.

The permit application procedures under RCRA include an informal public meeting prior to application submission, a public notice when the application is submitted, and issuing a draft permit, which initiates a 45-day public review period during which interested parties may submit comments and/or request a hearing, and agency response to comments. Once the application procedures are met, the permitting agency either issues or denies the permit. The permit decision may be appealed administratively, and judicially once the administrative appeal process is exhausted.

Permits are limited to a maximum term of 10 years, but once issued, permits may be modified for a number of reasons, such as substantial alteration or additions to the facility, new information about the facility becoming available, or new statutory or regulatory requirements that affect the facility.

Permit modifications are categorized as:

- Class 1: routine changes and correction of errors;
- Class 2: common or frequently occurring changes needed to maintain a facility's capability to manage wastes safely or conform to new requirements; and
- Class 3: major changes that substantially alter the facility or its operations.

A full description of the regulatory requirements for the RCRA permitting program can be found at 40 CFR 270.

• What are the Opportunities for Public Involvement in RCRA's TSDF Permitting Process?

Each step in the RCRA permit decision process is accompanied by public involvement requirements. Public participation activities include:

- Public notice;
- Public meetings;
- Public comment periods;
- Contact persons;
- Information repositories;
- Mailing lists;
- Notices of decision;
- Fact sheets or statements of basis;
- Response to comments; and
- Public hearings.

• When in the Permitting Process do These Opportunities Usually Occur?

The public involvement provisions under RCRA's 1995 expanded public participation rule require prospective TSDF permit applicants to hold an informal public meeting before submitting their permit application. The permit applicant must provide notice of the pre-application meeting to the public in a manner that is likely to reach all members of the affected community.

Pre-application meeting requirements are defined in 40 CFR 124.31.

The 1995 RCRA expanded public participation rule imposed additional requirements throughout the permitting process, and the life of the permit, to promote EPA objectives for "early and often" public involvement. These additional requirements include: issuing a public notice when an application is received by the regulatory agency (Sec. 124.32); providing discretion to the director of a permitting agency to require a facility to set up and maintain an information repository, either during the permitting process (Sec. 124.33), or during the life of the permit (Sec. 270.30(m)), and requiring the director to provide public notice of upcoming trial burns at combustion facilities (Sec. 270.62 and 270.66).

Once an application is complete the permitting agency will issue a draft permit, or notice of intent to deny. In either case, a public comment period is opened and notice is given. The permitting agency also prepares a fact sheet or statement of basis regarding its decision. At this time the public may request, in writing, a formal hearing. The permitting agency must then respond to all significant comments and hold a public hearing if requested.

Once the application procedures are met and the public comment period closes, the permitting agency either issues or denies the permit. Notice of the decision must be sent to the facility and any person who submitted comments or requested notice.

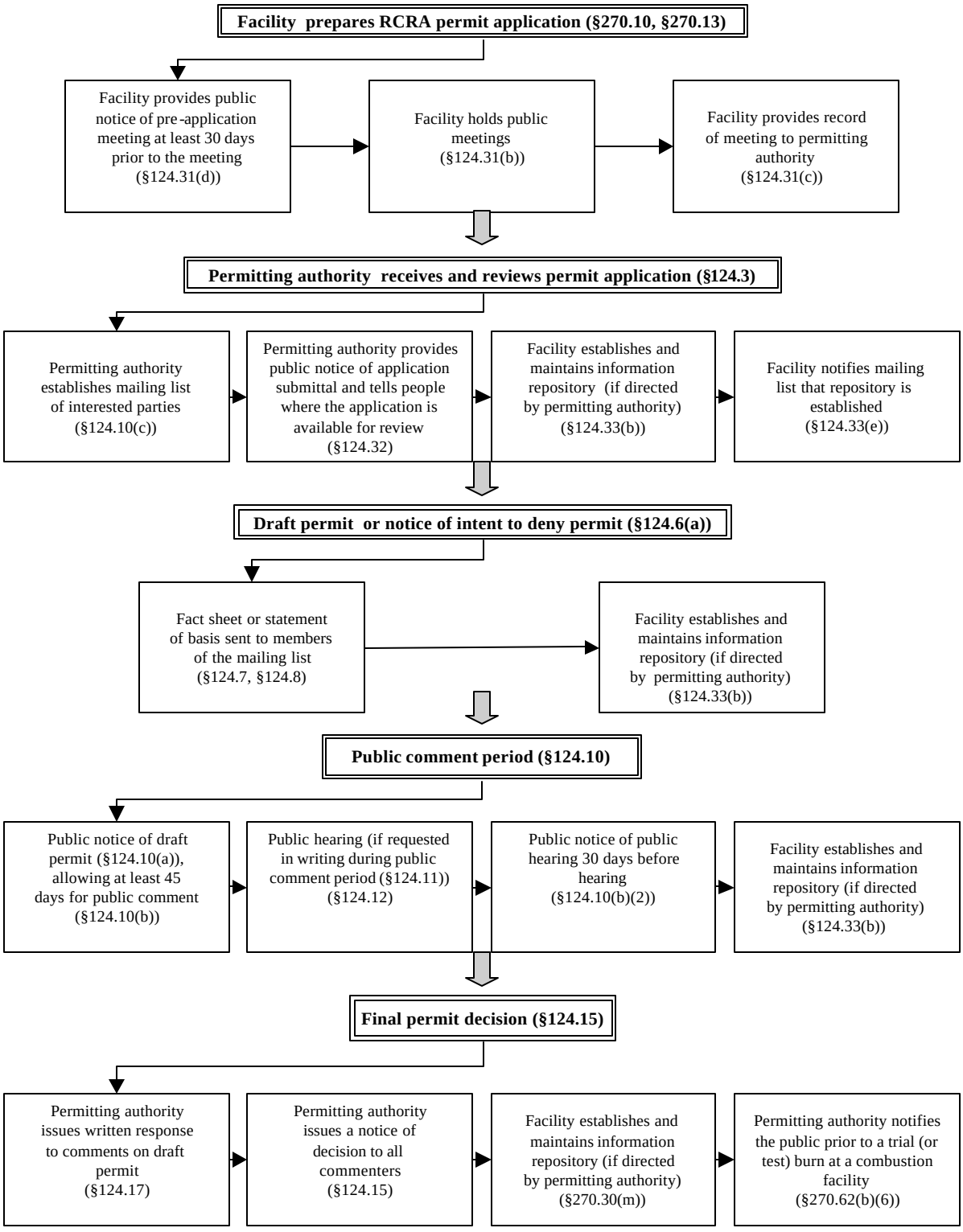
Any person who filed comments on the draft permit or participated in the public hearing may file an administrative appeal. The permitting agency's notice of the permit decision should identify the relevant procedures for filing an administrative appeal. Interested parties who did not comment or participate in the public hearing may also petition for administrative review, but that review extends only to the changes between the draft permit and final permit. The administrative appeal process must be exhausted before judicial review can be sought.

In addition, when a permit is modified, public involvement requirements are again triggered. These responsibilities and activities vary depending on who initiated the modification, but in general only the permit conditions subject to modification are reopened for public comment.

Section 3 of this *Reference Guide* provides further description of the requirements and associated activities.

Figure 5 (see next page) provides and overview of the *RCRA Operating Permit Process*.

Figure 5 - RCRA Operating Permit Process



Section 3 - Required Public Involvement Activities in Environmental Permits

The public involvement activities summarized in this section include required activities under regulation, as well as suggestions and best practices outlined in policy and guidance. The activities are divided into two categories: a) disseminating information and b) gathering and exchanging information.

Activities summarized under the *disseminating information* category are used by permitting authorities and owners or operators of facilities seeking permits to distribute information about the facility, permit, permit status, or other aspect of the permit process to members of the community. Activities summarized under the *gathering and exchanging information* category are typically used by permitting authorities as a way both to solicit the views and opinions of members of the community and to provide forums for discussions between members of the community and the permitting agency and facility about issues related to the permit application, the draft permit, and other aspects of the permit issuance process.

Additionally, there can be public participation in enforcement actions. Administrative assessments and civil penalties taken under RCRA, CWA, CAA, and SDWA include a *Federal Register* notice and comment period. Details on the public involvement role in the judicial area can be found at 28 CFR section 50.7.

Furthermore, some environmental statutes, such as CAA and CWA, have specific provisions that provide for public involvement in certain enforcement
actions.

Additional tools and suggested activities that you can use to augment the required processes are discussed in Section 4.

What are the Required Public Involvement Activities for Disseminating Information?

The following are required activities for disseminating information to the public:

1. Public notice;
2. Mailing lists;
3. Fact sheets/statement of basis; and
4. Response to comments.

What are the Required Public Involvement Activities for Gathering and Exchanging Information?

The following are required activities for gathering and exchanging information:

1. Public comment periods;
2. Contact persons; and
3. Public hearings.

Required Public Involvement Activities for Disseminating Information

1. Public Notices

Public notices are required at various points in the public involvement process for certain activities, conducted by the regulating agency and by facilities being regulated. Most notices contain essentially the same information, but differ in how and under what circumstances they are distributed.

• What are the Regulatory Requirements for Public Notices?

Below is a summary of public notice regulatory requirements for various permitting programs.

Clean Air Act (CAA) New Source Review (NSR)

Under NSR permitting requirements, a permitting official is required to give notice to the public of the opportunity to review a draft permit. The notice should provide information on the opportunities for public review and comment, and the opportunity for a public hearing. Public notices can be for the issuance or denial of more than one draft permit. No public notice is required when amendment, revision, revocation, reissuance, or termination has been denied. State and local programs usually publish such notice in a newspaper of general circulation.

CAA Title V Operating Permits

Public notices are required for permit issuance, renewal, reopenings, and all significant modifications of the permit. Notices must be published in a newspaper of general circulation in the area where the source is located or in a state publication designed to give general public notice. There is also an opportunity for citizen petition to the EPA Administrator.

Safe Drinking Water Act (SDWA) Underground Injection Control (UIC)

Public notice is required under four circumstances: (1) a permit application has been denied, (2) a draft permit has been prepared, (3) a hearing has been scheduled, and (4) an appeal has been granted. Public notice is not required when a request for permit modification, revocation, reissuance, or termination is denied. In addition to the general public notice, copies of fact sheets, the statement of basis (for EPA-issued permits), and the permit application (or draft) should be distributed to members of the mailing list.

State/Tribal Assumed Clean Water Act (CWA) Section 404 Permit Program

Public notice is required under five circumstances: (1) receipt of a permit application; (2) preparation of a draft general permit; (3) consideration of a major modification to an issued permit; (4) scheduling of a public hearing; or (5) issuance of an emergency permit.

CWA National Pollutant Discharge Elimination System (NPDES) Permits

Public notice is required under five circumstances: (1) the permitting agency receives a permit application from a perspective facility; (2) a permit application has been denied; (3) a draft permit has been prepared; (4) a hearing has been scheduled; (5) an appeal has been granted; or (6) an NPDES new source determination has been made. Public notice is not required when a request for permit modification, revocation, reissuance, or termination is denied. For EPA-issued permits involving new sources, public notice of a draft permit should not be given until a draft Environmental Impact Statement (EIS), if necessary, has been issued.
Since requirements in each state may differ, the permitting authority in the state where the facility is located should be consulted on their public notice requirements.

Resource Conservation and Recovery Act (RCRA) Hazardous Waste Facility Permits

Public notice is required under several situations: (1) the permitting agency issues a draft permit, grants an appeal, or holds a public hearing; (2) a prospective permit applicant plans a pre-application meeting; (3) a facility owner/operator proposes permit modifications (level of effort varies depending on class of modification); (4) the permitting agency initiates a permit modification; (5) the permitting agency requires a facility to establish an information repository; or (6) a facility conducts a trial burn or undergoes closure or post-closure.

• What Information Should Typically Appear in a Public Notice?

Public notices provide an official announcement of proposed agency decisions or facility activities. Notices often provide the public with the opportunity to comment on a proposed action. Public notices usually contain the same types of information. However, it is always wise to consult the requirements of a specific permitting program if any doubt exists over whether additional information should be included. Listed below are several items that typically appear in a public notice:

- Name and address of the facility and the facility owner/operator;
- A brief description of the processes conducted at the facility;
- Name, address, and toll free telephone number of an individual at the permitting authority who can be contacted for further information on the facility;
- An overview of the public involvement process, including the comment procedures, and the date, time, and place of any hearing (Section 4 contains a model process that could be shared at this early stage);
- The opening and closing dates for comment periods;
- Description and contact information for all sources of state or EPA technial or legal assistance available to the public;

- The location of the administrative record and the times when it is open for public inspection;

- Any supporting information that will be considered when making a permit decision; and

- Relevant web site addresses for the facility, regulating authority (specific permitting division or other branch), and EPA.

Organizations should attempt to make sure that the date and time do not conflict with other public meetings, religious or nonreligious holidays, or other important community events.

Organizations should provide ample notice of the permitting activity. Most programs require 30 days notice be given for public hearings and public comment periods. For instance, the RCRA permitting requirements specify that at least 45 days must be allowed for public comment. Public notice of a public hearing must be given at least 30 days prior to the hearing.

• How Should Public Notices be Distributed?

Most notices contain essentially the same types of information. They differ in how the permitting agency and facility distribute them. Certain permitting programs require notices to be distributed to members of a mailing list, some require legal advertisements in the newspaper, and others require signs or radio advertisements. While some organizations will only conduct required activities, EPA encourages facilities and permitting agencies to make a good faith effort to reach all segments of the affected community with these notices.

Organizations often attempt to identify the information pathways that will be most effective in a particular community. Public interest groups, the facility, and the permitting agency frequently seek community input on this topic because the citizens of that community are the most qualified people to explain what methods will work best.

Organizations may conduct community interviews to learn more about how citizens communicate.

The list below identifies some of the most common ways public notice is conducted. Interested parties can generally find information regarding permitting activities in the following places:

- **Newspaper Advertisements**. Traditionally, public notices appear as legal advertisements in the classified section of a newspaper. In addition, public notices may be placed in display advertisements (located with other commercial advertisements).

- **Newspaper Inserts**.* Inserts stand out from other newspaper advertisements; they often come as a "loose" section of the newspaper (a format often used for glossy advertisements or other solicitations).

- **Free Publications and Existing Newsletters**.* Public notices in newsletters or bulletins sent by local

government agencies to their entire constituency. In addition, planning commissions, zoning boards, or utilities often distribute regular newsletters; they may include information about permitting activities. Newsletters distributed by civic, trade, agricultural, religious, or community organizations are also used to disseminate information.

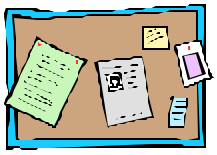
Some organizations may rely on a free local flyer, magazine, or independent or commercial newspaper to share information.

- **Public Service Announcements**. Radio and television stations often broadcast announcements on behalf of charities, government agencies, and community groups. In particular, they are likely to run announcements of public meetings, events, or other opportunities for the public to participate.

One drawback with public service announcements is that they may be aired at odd hours when the audience is relatively small.

- **Broadcast Announcements and Advertisements**.* A number of RCRA notices must be broadcast over radio or another medium. Notice is sometimes provided via a paid TV advertisement or over a local cable TV station. Some local access cable TV stations run a text-based community bulletin board.

- **Signs and Bulletin Boards**.* Some notice requirements include posting of a visible and accessible sign. Signs are frequently posted at an existing or planned facility. If few people are likely to pass by the site, a sign may be posted at the nearest major intersection.



Other areas where signs may be found include community bulletin boards in community centers, town halls, grocery stores, or on heavily traveled streets.

- **Telephone Networks or Phone Trees**.* This method provides an inexpensive, yet personal, manner of spreading information. The lead agency, facility, or organization calls the first list of people, who, in turn, are responsible for calling an additional number of interested people. As an alternative to calling the first tier, the lead agency, facility, or organization might distribute a short written notice.

* *These are more elaborate forms of public notice, perhaps where a state has requirements to go further than the minimum federal requirements.*

2. Mailing Lists

In general, requirements for mailing lists under different permitting programs are very similar. Variation occurs in whether the list

must contain only those who express an interest in being on the mailing list, or include all parties who may be affected by an agency activity. Some programs require specific agencies or organizations be contacted for public notices.

- **What are the Regulatory Requirements for Mailing Lists?**

Below is a summary of mailing list regulatory requirements for various programs.

CAA Title V Operating Permits

The permitting agency must develop and maintain a list of individuals or organizations that have an interest in any activity covered by the agency. The list should include both those who have expressed an interest in, and those that may be affected by, the activity.

SDWA UIC

Notice informing the public of the opportunity to be put on the mailing list must be published periodically in the public press and in such publications as regional- and state-funded newsletters, environmental bulletins, or state law journals. The director of a permitting agency may remove people from the mailing list who do not respond to a request for a written indication of continued interest.

State/Tribal Assumed CWA Section 404 Permit Program

A copy of the public notice is mailed to the following: (1) the applicant, (2) any agency with jurisdiction over the activity or disposal site, (3) adjoining property owners, (4) all persons who have specifically requested copies of public notices, and (5) any state whose waters may be affected by the activity.
The state director may update the mailing list from time to time by requesting written indication of continued interest from those listed. The director may delete from the list the name of any person who fails to respond to such a request.

CWA NPDES Permits

A notice informing the public of the opportunity to be put on the mailing list must periodically be published in the public press and in such publications as Regional- and state-funded newsletters, environmental bulletins, or state law journals.

The director of a permitting agency may remove people from the mailing list who do not respond to a request for a written indication of continued interest.

RCRA Hazardous Waste Facility Permits

The permitting agency must establish and maintain the facility mailing list. The agency must develop the list by: (1) including people who request in writing to be on the list, (2) soliciting persons for “area lists” from participants in past permit proceedings in that area, and (3) notifying the public of the opportunity to be put on the mailing list through periodic publication in the public press and in such publications as

Regional- and state-funded newsletters, environmental bulletins, or state law journals.

• Why are Mailing Lists Created?

You, as well as facilities and other organizations involved in the permitting process, use mailing lists to inform all interested parties of developments as they occur during the permitting process.

Mailing lists are therefore an important means of communication, and are the principle method by which many of the parties involved in public participation activities obtain their information. Mailing lists are used to reach both broad and targeted audiences. The better the mailing list, the better the public outreach and delivery of information.

Mailing lists typically include concerned residents; elected officials; appropriate federal, state, and local government contacts; local media; organized environmental groups; civic, religious, and community organizations; facility employees; and local businesses.

• Who Should be Included on a Mailing List?

There are a number of ways for interested persons to be included on a mailing list. Include a contact for further information on the public notice of permitting activities so individuals can call this person and ask to be placed on the mailing list. In addition, you, or your agency, should work to solicit names, addresses, and phone numbers of individuals to be included on the list. In general, try to include the following individuals:

- People who put their names and addresses on the sign-in sheet at the preapplication meeting, if applicable;
- People interviewed during community interviews, as well as other names these people recommend;
- All nearby residents and owners of land adjacent to the facility;
- Representatives of organizations with a potential interest in an agency program or action (e.g., outdoor recreation organizations, commerce and business groups, professional or trade associations, environmental and community organizations, environmental justice (EJ) networks, health organizations, religious groups, civic and educational organizations, state organizations, universities, local development and planning boards, emergency planning committees and response personnel, facility employees);
- Any individual who attends a public meeting, workshop, or informal meeting related to the facility, or who contacts the agency regarding the facility;
- Media representatives;
- City and county officials;
- State and federal agencies with jurisdiction over wildlife resources;
- Key agency officials;
- Tribes (if appropriate);

- EJ Communities; and
- The facility owner/operator.

You or your agency should frequently send a letter or fact sheet to the preliminary mailing list developed. This letter or fact sheet informs potentially interested parties of activities and the status of upcoming permit applications or corrective actions. It may also ask whether an individual or organization wishes to receive further information about permitting activities at a particular facility.

Some permitting programs allow the director of an agency to remove from the mailing list any individual or organization who does not respond.

This also serves as an opportunity for interested parties to provide the permitting agency with accurate addresses and phone numbers for themselves and others who might be interested in the activity.

In general, mailing lists should be updated at least annually to ensure they contain correct contact information. You can update mailing lists by telephoning each individual on the list, or use local telephone and city directories as references. In addition, you can update your official mailing list from time to time by requesting written indication of continued interest from those listed.

3. Notices of Decision

Requirements for notices of decision during the public participation process are generally very similar. This type of public notice serves as a record of an agency's final decision regarding permit issuance, denial, or modification.

• What are the Regulatory Requirements for Notices of Decision?

Below is a summary of notice of decision regulatory requirements for various programs.

CAA NSR

A written notice of final determination must be given to the permit applicant, and made available for public inspection at the same location where the reviewing authority made available preconstruction information and public comments relating to the source (see 40 CFR 51.166(q)(2)(vii)).

CAA Title V Operating Permits

The permitting agency is not required by federal law to give final permit notice of decision to members of the public. However, state law may contain a notice requirement.

SDWA UIC

After the close of a public comment period, notice of decision must be sent to the permit applicant as well as any person who requested notification. The notice is required to contain instructions for appealing the agency decision.

State/Tribal Assumed CWA Section 404 Permit Program

The state program director shall prepare a written determination on each application outlining the decision and rationale for decision.

The determination shall be dated, signed, and included in the official record prior to final action on the permit. The official record shall be open to the public.

CWA NPDES Permits

Notice of decision must be sent to the permit applicant and any person who submitted written comments or requested notification. Notice of decision must also be published in a newspaper of general circulation within the affected area. The notice must include instructions for contesting the agency decision. Most NPDES permits have either a fact sheet or statement of basis that explains how the permit limits were derived.

RCRA Hazardous Waste Facility Permits

The permitting agency must send notices of decision to the permit applicant as well as any persons who submitted written comments or requested notice of the final permit decision. The notice of decision shall include instructions for appealing the agency decision.

- ### What Information is Included in a Notice of Decision?

A notice of decision presents the agency's decision regarding permit issuance, denial, or modification of the permit to incorporate changes such as the corrective action remedy. Notices of decision should provide a clear, concise public record of a permitting agency's decision regarding whether to grant or modify a permit. The notice of decision should also include procedures for appealing a decision.

In addition to the permit decision, agencies should draft a response to comment document that identifies any changes in the final permit from the draft permit. Time frames vary for the final permit decision. For instance, the agency's decision may be affected by the quantity and substance of comments received during the public comment period.

- ### How can Interested Parties Receive a Notice of Decision?

In addition to the permit applicant, a copy of the notice of decision should be sent to anyone who submitted written comments, requested notification of the decision, or is on the agency mailing list. Notices of decision are public records and should be made available at local document repositories.

4. Fact Sheets/Statements of Basis

Fact sheets and statements of basis are produced throughout the permitting process and inform the public about the regulatory process as well as technical issues surrounding a draft permit. They are helpful in establishing a general community understanding about a project.

- ### What are the Regulatory Requirements for Fact Sheets/Statements of Basis?

Fact sheet/statement of basis regulatory requirements for various programs are:

CAA NSR

The permitting agency is required to produce a statement of basis for all NSR/PSD draft

permits.

In addition to describing the principal facts and considerations, the fact sheet must explain the allowable increase of ambient concentrations of a pollutant, without exceeding the National Ambient Air Quality Standards (NAAQS), expected to result from the operation of the activity.

CAA Title V Operating Permits

Once the draft permit is complete, a statement of basis describing the legal and factual justification for the permit must be made publicly available.

SDWA UIC

A fact sheet describing the conditions and basis for the draft permit must be sent to the permit applicant and any interested persons.

State/Tribal Assumed CWA Section 404 Permit Program

There is no federal requirement for a fact sheet in state-assumed programs, although the state may require one.

CWA NPDES Permits

The permitting agency is required to distribute a fact sheet to the applicant as well as any person who requests a copy.

In addition to describing the facts and considerations surrounding the basis for the application, fact sheets for NPDES permits also must include any calculations or explanations relevant to the source of specific effluent limitations, as well as conditions or standards for sewage sludge use or disposal.

Fact sheets are required for:

- major facilities;
- permits incorporating a variance;
- permits incorporating sewage sludge land application plans;
- NPDES general permits; and
- permits subject to widespread public interest or ones raising major issues.

Permit writers must prepare a statement of basis for all permits that do not merit the detail of a fact sheet.

RCRA Hazardous Waste Facility Permits

The permitting agency is required to develop a fact sheet, or statement of basis when a fact sheet is not prepared, for every draft permit for major hazardous waste facilities or facilities raising significant public interest.

While fact sheets/statement of basis are required for draft permits, they can also be very helpful at other times throughout the permitting process by providing a summary of the status of a draft permit application. The fact sheet/statement of basis must be sent to the permit applicant as well as any other persons who request it. (see 40 CFR part 124.8 for more detailed information what should be included in a fact sheet or statement of basis.)

• What Information Should be Included in a Required Fact Sheet or Statement of Basis?

Fact sheets (generally 1 or 2 pages front and back), and statements of basis summarize the

current status of a permit application. This kind of fact sheet (or statement of basis) is probably different than the commonly used informational fact sheets that most people recognize. Fact sheets/statements of basis must explain the principal facts and the significant factual, legal, methodological, and policy questions considered in preparing the draft permit.

Permitting agencies should publish fact sheets and statements of basis frequently throughout the permitting process to summarize the status of a draft permit or permit application. Fact sheets are useful for informing all interested parties about the basis for the permitting agency's decision regarding a facility's permit activities. They ensure that information is distributed in a consistent fashion and that citizens understand the issues associated with permitting programs.

Fact sheets should contain the following information:

- A brief description of the type of facility or activity that is the subject of the draft permit;
- The type and quantity of wastes or activities covered by the permit;
- A brief summary of the basis for the draft permit conditions and the reasons why any variances or alternatives to the proposed standards do or do not appear justified;
- A description of the agency procedures for reaching a final decision;
- The beginning and ending dates of the public comment period and the address where individuals can send comments;
- Procedures for requesting a public hearing; and
- Name and telephone number of an agency contact for additional information.

Statements of basis are generally shorter than fact sheets and summarize the basis for a permitting agency's decision. Statements of basis are prepared the same way as fact sheets.

Both fact sheets and statements of basis should be presented in a simple, easy-to-follow format. Permitting agencies should avoid using bureaucratic jargon and technical language. This is particularly important in certain environmental justice communities where English is not the primary language.

While fact sheets and statements of basis are required for draft permits, they can also be found or used during other stages of the permitting process such as:

- during technical review of the permit application;
- at the beginning of a facility investigation;
- when findings of a facility investigation are available;
- before a meeting or hearing to provide background information;
- at the completion of the corrective action; and
- when the Notice of Decision is released.

- **Where can Interested Parties Receive Fact Sheets and Statement of Basis?**

Individuals on the facility mailing list should be sent fact sheets and statements of basis by mail. Extra copies should be made available at the information repository or at public meetings and hearings. Fact sheets and statements of basis should contain the name and telephone number of a person to contact for additional information, comments, or questions.

5. Response to Comments

Response to comment documents should identify and describe public involvement activities and summarize the public's significant comments. In addition, the document should provide specific responses to the comments, in terms of modifications to the permit, or explain why comments were not incorporated into the permit. Again, the language, terms, and tone of the response are important considerations based on who is submitting comments (e.g., bureaucratic and technical language should be avoided in most cases).

- **What are the Regulatory Requirements for Response to Comment Documents?**

Regulatory requirements for response to comment documents are:

CAA NSR

The permitting authority must consider all comments in making a final decision on approvability of an application. All comments are to be made available for public inspection.

CAA Title V Permits

The permitting agency must keep a record of public comments and issues raised during the public involvement process. These records help the EPA Administrator determine whether a citizen petition to object to a permit should be granted. Records must also be available to the public.

SDWA UIC

When a final permit decision is issued, the permitting agency must issue a response to comments. The response must be available to the public.

State/Tribal Assumed CWA Section 404 Permit Program

The State Program Director shall consider all comments received in response to a public notice or public hearing.

All comments, as well as the record of a public hearing, shall be made a part of the official record of the application.

CWA NPDES Permits

When a final permit decision is issued, the permitting agency must issue a response to written comments. The response must be available to the public.

RCRA Hazardous Waste Facility Permits

RCRA requires the permitting agency to prepare a response to comments when it issues a final

permit decision. The agency must also issue a response to all significant comments when making final decisions on requested Class 2 and Class 3 permit modifications and agency-initiated modifications.

• What Information is Provided in a Response to Comments Document?

A response to comments provides a clear record of community concerns. It provides the public with evidence that their input was considered in the decision process.

The summary also is an aid in evaluating past public involvement efforts and planning for subsequent activities. A response to comments identifies all provisions of the draft permit or modification that were changed as a result of public comments and the reasons for those changes. It should also briefly describe and respond to all significant comments received during the comment period.

The response to comments should be written in a clear and understandable style so that it is easy for the community to understand the reasons for the final decision and how public comments were considered.

• How are Response to Comment Documents Organized?

The response to comments should state clearly any points of conflict or ambiguity. While their forms differ, all response to comment documents should include the following:

Overview

- Describe of the number of meetings, mailings, public notices, and hearings at which the public was informed or consulted about the permitting activity;
- Describe the extent to which citizens' views were taken into account in decision-making;
- List a summary of commenters' major issues and concerns; and
- Identify the specific changes, if any, in the permit design or scope that occurred as a result of citizen input.

Detailed Response

- Answer specific legal and technical questions.

Comments may be difficult to respond to at times, such as when the public raises new issues, questions, or technical evidence during the public comment period. The permitting agency may have to develop new materials to respond to these questions.

• How can Interested Parties Obtain a Response to Comment Document?

Response to comment documents can take several forms. Some agencies will prepare formal "Responsiveness Summaries." At other times, such as publication of a final rule, responses appear in a *Federal Register* notice.

Response to comments documents should be sent to the facility owner/operator and to each person who submitted written comments or requested notice of the final permit decision.

6. Information Repositories

An information repository is a collection of documents related to a permitting activity. A repository provides local officials, citizens, and the media with easy access to accurate, detailed, and current data about the permitting activity.

• What are the Regulatory Requirements for Information Repositories?

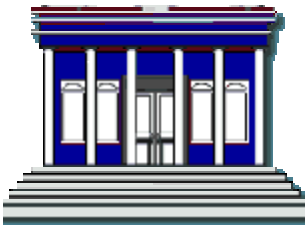
RCRA Hazardous Waste Facility Permits

Permitting agencies are authorized to require a facility to establish an information repository during the permitting process or during the active life of the facility.

• Are Information Repositories Required for Every Permitting Activity?

Information repositories are not mandatory activities in every situation. As mentioned above, RCRA regulations give the permitting agency the authority to require a facility to set up and maintain an information repository.

The agency does not have to require a repository for every permitting activity. Alternatively, a facility or an environmental group may voluntarily set up a repository to make it easier for people in the community to access information.



The information that actually goes in the repository can differ from case to case, depending on why the repository was established. The agency should suggest which documents and other information must be included in the repository, depending on the specifics of the permitting activity. For instance, multilingual fact sheets and other documents should be provided where there are many non-English speakers in the affected community.

Similarly, if the community needs assistance in understanding a very technical permitting situation, then the agency and the facility should provide fact sheets and other forms of information that are more accessible to the nontechnical reader.

Several factors affect the establishment of an information repository, including: the level of public interest, the type of facility, the presence of an existing repository, and the proximity to the nearest copy of the administrative record.

Any of these other factors may indicate that the community already has adequate access to information. Repositories are resource-intensive, and permitting agencies will require them to be established only in cases where the community has a significant need for additional access to information.

The permitting agency will try to gauge the public's interest in the permitting activity before making final decisions about an information repository.

For instance, the permitting agency will consider turnout at public meetings and responses during community interviews. Other factors include level of media attention, level of community involvement and/or controversy in previous facility and local environmental matters, and whether an existing repository can be augmented with materials to meet the information needs of the current permitting activity.

• Where are Information Repositories Generally Located?

The information repository should be convenient and accessible for people in the community. Community residents should suggest locations to the facility. Typical locations include local public libraries, town halls, or public health offices.

A facility may choose to set up the repository at its own offices. Before doing so, the facility owner or operator should discuss his or her intent with community representatives and/or the agency. Members of the community should be made comfortable about coming onto facility property. If members of the community feel uncomfortable at the facility, then the repository should be located in a suitable off-site location.

The public's access to the information repository is extremely important. It should be easily accessible by public transportation (if most people in the community rely on public transportation). The length of the trip should not be overly burdensome.

The location should have adequate access for disabled users, and should be open after normal working hours at least one night a week or on one weekend day. Repositories should be well lit and secure.

A facility also should ensure that someone in its company and someone at the repository location are identified as the information repository contacts—to make sure that the information is kept up to date, orderly, and accessible.

• What Information Should Be Included in the Repository?

The permitting agency will decide, on a case-by-case basis, what documents, reports, data, and information are necessary to help the repository fulfill its intended purposes and to ensure that people in the community are provided with adequate information. The agency will provide a list of the materials to the facility. The agency may also consult the public regarding what materials would be most useful to members of the surrounding community.

Such consultation is more important where the public has expressed significant interest or where site activities are viewed as, or are expected to be, controversial.

The following are examples of materials that may be included in the information repository:

- Background information on the company or facility;
- Fact sheets on the permitting or corrective action process;
- Summary from the preapplication meeting (if one was conducted);
- Public involvement plan (if developed);

- The draft permit;
- Reports prepared as part of the facility investigations;
- Fact sheets prepared on the draft permit or corrective action plan;
- Notice of decision;
- Response to comments;
- Copies of relevant guidance and regulations;
- A copy of the cooperative agreement, if the state is the lead agency for the project;
- Documentation of site sampling results;
- Brochures, fact sheets, and other information about the specific facility (including past enforcement history);
- Copies of news releases and clippings referring to the site;
- Names and phone numbers of a contact person at the facility and at the permitting agency who would be available to answer questions people may have on the materials in the repository; and
- Any other relevant material (e.g., published studies on the potential risks associated with specific chemicals that have been found stored at the facility).

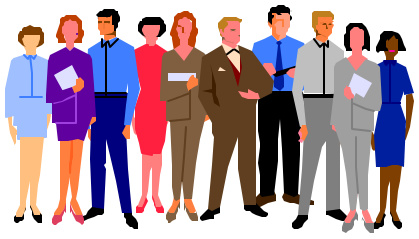
Documents should be organized in binders that are easy to use and convenient. For projects that involve a large number of documents, separate file boxes should be provided as a convenience to the repository host to ensure that the documents remain organized.

If the permitting activity is controversial or raises a lot of community interest, several copies of key documents should be provided so that community members can check them out for circulation. The facility shall maintain the repository by updating it with appropriate information throughout the specified time requested by the Director.

• How is the Public Notified That an Information Repository Exists?

Notice of the repository identifying its location and hours of availability should be sent to everyone on the facility mailing list. Other organizations that should be notified include local government officials, citizen groups, and the local media.

Articles or notices about the repository published in newsletters of local community organizations and church groups are another means of notifying the public.



Required Public Involvement Activities for Gathering and Exchanging Information

1. Public Comment Periods

Public comment periods are required after the issuance of a draft permit application. They allow citizens to comment on agency and facility proposals and have their comments incorporated into the formal public record.

• What are the Regulatory Requirements for Public Comment Periods?

Regulatory requirements for various permitting programs implemented by EPA are:

CAA NSR

Notice of the public comment period must be sent to the permit applicant, members of the mailing list, all other agencies required to issue NSR permits for the same facility or activity, all affected state and local air pollution control agencies, and any interested persons.

A minimum of 30 days is provided for submittal of public comments, beginning from the date of publication of the public notice (see 40 CFR 51.161(b)).

CAA Title V Operating Permits

Following the issuance of a draft permit, the permitting agency is required to give notice of the public comment period. From the date the notice is published, citizens have at least 30 days to submit written comments. During this time, any interested person may request a public hearing.

SDWA UIC

The public has 30 days from the date of notification of the public comment period to submit written comments on a draft permit. Notification of the public comment period must be sent to the permit applicant, all other agencies required to issue UIC permits for the same facility or activity, federal and state agencies (including Indian tribes) with jurisdiction over fish, shellfish, and wildlife resources and over coastal management plans, state and local oil and gas regulatory agencies, state agencies regulating mineral exploration and recovery, members of the mailing list, and any interested persons.

State/Tribal Assumed CWA Section 404 Permit Program

The public notice shall provide a reasonable period of time, normally at least 30 days, within which interested parties may express their views concerning the application.

The EPA Regional Administrator may approve a state program with a shorter public notice period if he determines sufficient public notice is provided for. Public notice of a public hearing shall be given at least 30 days before the hearing. The public comment period shall automatically be extended until the close of any public hearing.

CWA NPDES Permits

After the permitting agency gives public notice of the preparation of a draft permit (including the intent to deny a permit), the public must have at least 30 days to comment. Notification of public

comment periods must contain a brief description of the comment process, as well as a contact name and address where citizens should send their written comments. The name and address of the office processing the permit action and of the permittee, and the facility location are required. Brief descriptions of the business conducted at the facility, as well as the comment procedures, are required.

RCRA Hazardous Waste Facility Permits

The permitting agency is required to send notice of the public comment period to the permit applicant, members of the mailing list, and all other agencies required to issue permits for the same facility or activity. Citizens have 45 days to submit to the agency written comments on the draft permit or intent to deny a permit application. During this time, any interested person also may request a public hearing.

After the close of the public comment period, the permitting agency must send a notice of decision to the permit applicant and any persons who submitted written comments or requested notice of the decision.

- ### What is the Purpose of a Public Comment Period?

A public comment period is a designated time period in which citizens can formally review and comment on the agency's or facility's proposed course of action or decision.
Public comment periods are typically 30 to 45 days long. Public comment periods cannot begin until notice of the permitting activity is given. If written comments are submitted during the public comment period, the permitting agency is required to discuss them in the response to comments.

Commenters can request a public hearing during the public comment period. Public hearings provide an opportunity to give formal comments and oral testimony on proposed permitting activities.

- ### How is the Public Notified about Public Comment Periods?

Notice of a public comment period should be announced in a local newspaper of general circulation and in some cases, when the permitting activity is, or has the potential to be, controversial, on local radio stations. The notice should provide the beginning and ending dates of the public comment period and specify where the community members can send their written comments and/or requests for a public hearing.

As with all public notices, notification for public comment periods must contain a name and telephone number of the person to contact for additional information.

2. Contact Persons/Offices

A contact person assures that a permitting agency is actively listening to citizens' concerns and provides the community with consistent information from a reliable source.

In general, requirements are very similar for contact persons/offices under different permitting programs.

• What are the Regulatory Requirements for Contact Persons/Offices?

Below is a summary of contact person/office regulatory requirements for various programs.

CAA NSR

The permitting agency is required to include the name, address, and telephone number of a person to contact for additional information on all public notices, fact sheets, and statements of basis.

CAA Title V Operating Permits

The permitting agency is required to include the name, address, and telephone number of a person to contact for additional information on all public notices.

SDWA UIC

A contact name, address, and telephone number must be included on all public notices, fact sheets, and statements of basis.

State/Tribal Assumed CWA Section 404 Permit Program

The public notice shall contain the name, address, and phone number of a person to contact for further information.

CWA NPDES Permits

The permitting agency is required to include the name, address, and telephone number of a person to contact for additional information on all public notices, fact sheets, and statements of basis.

RCRA Hazardous Waste Facility Permits

The permitting agency is required to include the name, address, and telephone number of a person to contact for additional information on all public notices, fact sheets, and statements of basis.

• What is the Role of a Designated Contact Person?

Agencies should designate a staff member who will be responsible for responding to questions and inquiries from the public and the media. A contact person should be able to respond to any questions or concerns interested persons may have about the permitting process. The same person should remain the contact throughout the permitting process. If, however, the contact person changes, the agency should notify citizens and agencies as soon as possible.

The agency contact should also maintain a log book of all citizen requests and comments received during the process.

This ensures that all requests are handled in a timely and efficient manner.

• How can Interested Parties Locate the Contact Person?

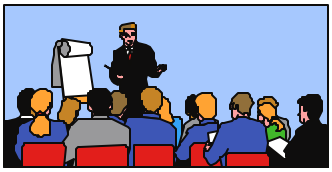
Organizations, such as community, local government, and citizen/environmental groups, should be encouraged to distribute lists of contact persons who are responsible for answering questions in certain topic areas. Announcement of the contact person should be distributed to all local newspapers, radio

stations, and television stations. The contact person's telephone number and mailing address should be included in all news releases, fact sheets, and mailings.

Permitting agencies should distribute self-mailers, which can be a separate flyer or a designated cutaway section of the fact sheet that is addressed to the contact person. This is a convenient way for interested parties to submit comments or request additional information at any point during the permitting process.

3. Public Meetings

A public meeting provides a forum where interested persons can ask questions and discuss issues outside of the formality of a public hearing. Public meetings are flexible tools that are open to everyone. Regulatory requirements for public meetings vary across different permitting programs.



- **What are the Regulatory Requirements for Public Meetings?**

To provide an example, below is a summary of public meeting regulatory requirements for the RCRA hazardous waste facility permits:

RCRA Hazardous Waste Facility Permits

The permit applicant is required to conduct a preapplication meeting prior to submitting a permit application. This type of public meeting must be announced at least 30 days prior to the event.

- **What is the Purpose of a Public Meeting?**

Public meetings allow all interested parties to ask questions and raise issues in an informal setting. A public meeting can provide a useful means of two-way communication at any significant stage during the permitting process.

- **What are the Differences Between Public Meetings and Public Hearings?**

Public meetings are not public hearings. *Public hearings* are required by regulations and provide a formal opportunity for the public to present comments and oral testimony on a proposed agency action. *Public meetings*, on the other hand, are less formal, anyone can attend, there are no formal time limits on statements, and the facility or the permitting agency usually answers questions. The purpose of the meeting is to share information and discuss issues, not to make decisions.
Due to their openness and flexibility, public meetings are preferable to hearings as a forum for discussing issues. Importantly, comments made during a public meeting do not become part of the official administrative record as they do during a hearing.

- **What Factors Should be Considered When Planning a Public Meeting?**

Public meetings can be arranged by the facility, the permitting agency or a citizens' or

community-based group. Agencies, interested citizens, or community-based groups should consider the following when coordinating a public meeting:

- **Community objectives, expectations, and desired results should be established**. If a community group decides to host a meeting, the group should decide prior to the event what it wants to accomplish and cover at the meeting.

- **A public meeting is an opportunity to exchange information, not make decisions.** As noted above and in Section 4, the public should understand the benefits and limitations of public meetings at the outset. If a more structured approach of obtaining advice/input from the community is sought, a Community Advisory Group (CAG) can be organized.

- **Use a meeting facilitator where controversy exists.** This can be a member of the community, an agency official, or a neutral third party. Where the situation is controversial or a history of mistrust between the parties exists, it can be helpful to utilize a person who is perceived as neutral by all parties.

- **Schedule a convenient location and time for the meeting**. The location of the public meeting should have seating, microphones, lighting, and recorders, as well as handicapped access. If the meeting is in conflict with other community events, you should be prepared to discuss an alternative time or location. The group should provide a translator for community residents who do not speak English.

- **The meeting should be announced 30 days in advance.** Citizens planning a meeting will need to provide notice of the meeting in local newspapers, broadcast media, signs, and mailings. Permitting agencies can assist by providing a mailing list. The name and telephone number of a contact person should appear on all notices and mailings.

If a portion of the community does not speak English, meeting coordinators should consider producing multilingual notices.

- **All documents relevant to the permitting activity should be made available for review at the information repository or on-site office prior to the meeting.** If interested persons have problems locating a document or do not have access to either the information repository or on-site office, the permitting agency should assist in providing copies.

- **Allow ample opportunity for citizens to submit written questions and comments prior to the meeting.** Public notices and mailings will give citizens the name, address, and telephone number of the contact person accepting questions and comments. Citizens who have specific questions or concerns for the permitting agency should send them to the agency contact

to ensure that they get answered in a timely fashion.

- **A sign-in sheet should be posted**. This allows attendees to voluntarily provide their names and addresses. The sign-in sheet can also be used by the permitting agency to update the mailing list.

Meeting organizers should keep in mind that some citizens may be reluctant to speak up at a public meeting. Agency contacts should set up an information table where people who may feel uneasy speaking during the meeting can ask questions and pick up project information.

• How can Interested Parties Obtain Information About Public Meetings?

They can get information from local newspapers, broadcast media, signs, and mailings at least 30 days prior to the meeting.
The permitting agency may send notice to those individuals on the agency mailing list.

4. Public Hearings

A public hearing provides a record of communication so citizens can be sure that their concerns and ideas reach the permitting agency.

Public hearings generally should not serve as the only forum for citizen input, since they usually occur at the end of the permitting process. As noted above, given that permittees are not typically formally involved, public *meetings* may provide the opportunity for a more open exchange of ideas between the various parties; consequently, having a public meeting prior to a public hearing can be beneficial. Generally, regulatory requirements for public hearings under different permitting programs are very similar.

• What are the Regulatory Requirements for Public Hearings?

Below is a summary of public hearing regulatory requirements for various permitting programs implemented by EPA. A state may opt to run the public comment period and request for hearing period simultaneously rather than concurrently.

In addition, while most states follow the 30-day advance notice requirement for public hearings, some do not.

CAA NSR

The permitting agency shall provide an opportunity for a public hearing to consider the air quality impact of the source, alternatives to it, the control technology required, and other appropriate considerations (see 40 CFR 51.166(q)(2)).

CAA Title V Operating Permits

During the public comment period, anyone may make a request for a public hearing. Public notice of the hearing must be given at least 30 days in advance.

SDWA UIC

During the 30-day public comment period, anyone may submit a written request for a public hearing. The permitting agency may also call a

hearing if there is a high level of public interest or concern. Notification of the hearing must be given at least 30 days in advance. A tape recording or written transcript of the hearing must be made available to the public.

State/Tribal Assumed CWA Section 404 Permit Program

Any interested person may request a public hearing during the public comment period. The request shall be in writing and shall state the nature of the issues proposed to be raised at the hearing.

The State Tribal Program Director shall hold a hearing whenever it is determined there is significant public interest in the permit application or draft general permit. The director may also hold a hearing whenever a hearing may be useful in making a decision on the permit application.

CWA NPDES Permits

The permitting agency may hold a public hearing when there is significant public interest in the draft permit, to clarify a permit decision, or when requested in writing during the public comment period. Public notice of the hearing must be given at least 30 days prior to the event. A tape recording or written transcript of the hearing must be made available to the public.

RCRA Hazardous Waste Facility Permits

The permitting agency is required to conduct a public hearing if requested in writing during the 45-day public comment period.

The agency also will hold a hearing during the draft permit stage when there is a high level of public interest or when the agency feels that the hearing might clarify relevant issues. Notification of the hearing must be given at least 45 days in advance. A tape-recording or written transcript of the hearing proceedings must be made available.

• What is the Purpose of Public Hearings?

Public hearings provide an opportunity for the public to provide formal comments and oral testimony on proposed agency actions.

Occasionally the agency will present introductory information prior to receiving comments. All testimony received becomes part of the public record. Most hearings last between 2 and 5 hours; however, for very controversial topics, public hearings have been known to extend over a period of days.

Permittees and facility staff have no official role during a public hearing. Generally, a moderator will handle all the scheduling for the event, and ensure that the proceedings are conducted in an orderly fashion.

Public hearings are held:

- when requested by a member of the public during a public comment period;
- during the public comment period following the issuance of a draft permit, major permit modification, or at the selection of a proposed corrective measure; and
- when the level of community concern warrants a formal record of communication.

• How Should Permitting Agencies Prepare for Public Hearings?

Permitting agencies should prepare for public hearings as follows:

- **Anticipate the audience and the issues of concern.** The audience's objectives, expectations, and desired results are identified through community feedback, such as telephone interviews or written comments. The agency should arrange for a translator for community members who do not speak English.

- **Schedule a convenient location and time for the meeting.** The hearing room should have seating, microphones, lighting, and recorders, as well as handicapped access. Schedule the meeting during evening hours or on a weekend so that the meeting does not conflict with the working hours of likely community participants. If the meeting conflicts with other community events, propose/find an alternative time or location.

- **Arrange for a court reporter to record and prepare a transcript of the hearing.** Encourage citizens to bring extra copies of prepared comments to submit to the court reporter to be included in the public record.

- **Announce the public hearing at least 30 days before the event.** Notice should be given in local newspapers and mailed to interested parties.

- **Provide an opportunity for people to submit written comments.** The permitting agency should recognize that not all people will want to give oral testimony. Agencies should provide notification of where to send written comments.

- **Prepare a transcript of all oral and written comments.** Permitting agencies should announce when the transcript will be available for review.

Agencies should remind citizens that all comments made during the hearing will become part of the public record, so comments must usually be kept to 5 minutes or less.

Encourage citizens to submit more detailed comments in writing or make arrangements to speak with them individually after the hearing.

• How do Interested Parties Obtain Information About Public Hearings?

Interested parties can obtain information from local newspapers and mailings to interested citizens and members of the mailing list at least 30 days before the event.

STATUTORY AND REGULATORY AUTHORITY					
PUBLIC PARTICIPATION ACTIVITY Required Activities - Disseminating Information **L**	**Clean Air Act (CAA)**	**Safe Drinking Water Act (SDWA)**	**Clean Water Act (CWA)**		**Resource Conservation & Recovery Act (RCRA)**
	Air Permits	**UIC**	**404**	**NPDES**	**TSDF**
Public Notice	§124.10; §70.7(h)(1)	§124.10	§124.10**,** §231.3	§124.10, §124.57	§124.10, §124.19, §270.42
Mailing Lists	§124.10(c); §70.7(h)(1)	§124.10(c)	§124.10(c)	§124.10(c)	§124.10(c)
Notices of Decision	§124.15; §70.7(h)(5)	§124.15	§124.15**,** §231.6	§124.15	§124.15
Fact Sheets/ Statements of Basis	§124.7, §124.8; §70.7(a)(5)	§124.7, §124.8	§124.7, §124.8,	§124.7, §124.8	§124.7, §124.8
Response to Comments	§124.17; §70.7(h)(5)	§124.17	§124.17	§124.17	§124.17, §270.41, §270.4
Information Repositories					§124.33, §270.30(m)

NOTE: Citation (40 CFR) indicates that public participation activities are required. A blank box means that the activities, although suggested, are not required.

STATUTORY AND REGULATORY AUTHORITY					
PUBLIC PARTICIPATION ACTIVITY Required Activities - Gathering and Exchanging Information **L**	**Clean Air Act (CAA)**	**Safe Drinking Water Act (SDWA)**	**Clean Water Act (CWA)**		**Resource Conservation & Recovery Act (RCRA)**
	Air Permits	**UIC**	**404**	**NPDES**	**TSDF**
Public Comment Periods	§124.10(b)(1); §70.7(h)(4)	§124.10 (b)(1)	§124.10 (b)(1)	§124.10 (b)(1)	§124.10(b)(1), §270.41, §270.42, §265.112(d)(4), §265.118(f)
Contact Persons	§124.10(d)(1)(iv); §70.7(h)(2)	§124.10(d) (1)(iv)	§124.10(d) (1)(iv)	§124.10(d) (1)(iv)	§124.10(d)(1)(iv), §270.41, §270.62(b), (d), §270.66(d)(3), (g)
Public Meetings					§124.31
Public Hearings	§124.12; §70.7(h)(2)	§124.12	§124.12, §231.4	§124.12	§124.12, §265.112(d)(4), §265.118(f), §270.41, §270.42(c)(6)

STATUTORY AND REGULATORY AUTHORITY					
PUBLIC PARTICIPATION ACTIVITY Non-Required Activities- Disseminating Information **L**	**Clean Air Act (CAA)**	**Safe Drinking Water Act (SDWA)**	**Clean Water Act (CWA)**		**Resource Conservation & Recovery Act (RCRA)**
	Air Permits	**UIC**	**404**	**NPDES**	**TSDF**
Introductory Notices					
Project Newsletter					
Exhibits					
Briefings					
Presentations					
Facility Tours					
Observation Decks					
News Releases & Press Kits					
News Conferences					

STATUTORY AND REGULATORY AUTHORITY					
PUBLIC PARTICIPATION ACTIVITY Non-Required Activities- Gathering and Exchanging Information **L**	**Clean Air Act (CAA)**	**Safe Drinking Water Act (SDWA)**	**Clean Water Act (CWA)**		**Resource Conservation & Recovery Act (RCRA)**
	Air Permits	**UIC**	**404**	**NPDES**	**TSDF**
Community Interviews					
Focus Groups					
Door-to-Door Canvassing					
Unsolicited Info./Office Visits					
Surveys/Telephone Polls					
Telephone Contacts					
Telephone Hotlines					
On-Scene Info. Offices					

STATUTORY AND REGULATORY AUTHORITY					
PUBLIC PARTICIPATION ACTIVITY Non-Required Activities- Gathering and Exchanging Information **L**	**Clean Air Act (CAA)**	**Safe Drinking Water Act (SDWA)**	**Clean Water Act (CWA)**		**Resource Conservation & Recovery Act (RCRA)**
	Air Permits	**UIC**	**404**	**NPDES**	**TSDF**
Q & A Sessions					
Information Tables					
Informal Mtgs. With Other Stakeholders					
Open Houses					
Workshops					
Attending Other Meetings					
Citizen Advisory Groups					

Section 4 - Additional Tools and a Guideline to Facilitate Public Involvement in Environmental Permits

This section summarizes additional tools to facilitate public involvement in environmental permits, which are not required by regulation. Similar to the required activities, they are divided into two categories: a) disseminating information; and b) gathering and exchanging information.

Tools summarized under the *disseminating information* category are used by permitting agencies and organizations seeking permits to distribute information about the facility, permit, or other aspects of the permit process to interested individuals and the affected community.

The tools summarized under the *gathering and exchanging information* category are typically used both (1) as a way to solicit the views and opinions from members of the community regarding the permit application and (2) to provide forums for discussions between members of the community, the permitting agency, and the facility about issues related to the permit application.

This section concludes with guidelines for developing a model plan for public involvement. It includes a sample annotated outline which can be adapted to different situations. This guideline, taken together with the additional tools listed in this section, is offered as some of the best practices for public involvement in environmental permitting.

What Are Examples of Additional Tools That Can Be Used for Disseminating Information?

1. Language translations
2. Project newsletters and reports
3. Introductory notices
4. Exhibits
5. Briefings
6. Presentations
7. Facility tours
8. Observation decks
9. News releases and press kits
10. News conferences
11. Independent technical experts
12. Information booklets/brochures

What Are Examples of Additional Tools That Can Be Used for Gathering and Exchanging Information?

1. Community interviews
2. Focus groups
3. Door-to-door canvassing
4. Surveys and telephone polls
5. Telephone contacts
6. Telephone hotlines

7. On-scene information offices
8. Question & answer sessions
9. Information tables
10. Informal meetings with other stakeholders
11. Attending stakeholder meetings and functions
12. Availability sessions/open houses
13. Citizen advisory groups
14. Workshops

Additional Tools That Can Be Used for Disseminating Information

1. Language Translations

There are currently no regulatory requirements for translations, although EPA strongly recommends using multilingual fact sheets, notices, and other resources to provide equal access to information. Oral translations are also suggested for public meetings, hearings, and news conferences when a large portion of the community does not speak English as their first language.

Translations provide written or oral information to communities where there is a significant number of residents who are non- English speaking. Translations ensure that all community members are informed of activities and have the opportunity to participate in the decision-making process.

- **What are the Advantages of Written and Oral Translations?**

Both written and oral translations provide the non-English speaking community a greater opportunity to be active in the public participation process. The need for translation is usually determined during the assessment of community needs, and through community interviews. When a large part of the community does not speak English as their first language, multilingual outreach materials, such as fact sheets, notices, newsletters and reports should be made available.

Oral translations are suitable for public meetings, hearings and news conferences, or when the agencies publicly need to reach out and communicate with the community.

2. Project Newsletters and Reports

Project newsletters and reports are excellent activities for sharing detailed or highly technical information with the affected members of the public. Project newsletters and reports are a means of communicating important information about a permit or applications to interested persons. Project newsletters use a more reader-friendly tone than reports. In addition to keeping citizens updated on permitting activities, newsletters provide brief summaries of technical reports or studies. Sending project newsletters directly to stakeholders and interested persons is an efficient way to distribute important information about detailed or highly technical projects.

- **What are the Advantages of Using Newsletters and Reports to Disseminate Information?**

Newsletters and reports are useful ways to disseminate information to stakeholders and interested persons in the community. They help keep citizens aware of activities and provide names of persons to contact to obtain additional information. To ensure that newsletters are distributed to all stakeholders and interested persons, it is important to maintain an updated mailing list.

Agencies should use availability sessions, open houses, or informal meetings to further explain the results of detailed reports and studies.

3. Introductory Notices

While there are no regulatory requirements for introductory notices, some agencies may provide them at the time a permit application is submitted to explain the permitting process and public participation opportunities.

- **When are Introductory Notices Used?**

Introductory notices are another way the permitting agency can build its mailing list. For instance, a return slip that the public can complete and return to be placed on a mailing list could be included with the notice. The return slip could also be used to ask questions about the process or the specific facility.

They are used when the permitting agency believes that the community knows little or nothing about the permitting process or when the permitting agency needs to notify the public of how they can become involved in the permitting process.

- **What Information is Provided in an Introductory Notice?**

An introductory notice can be presented as a public notice, a fact sheet or a flier distributed to the facility mailing list. It should explain, as clearly as possible, the permit application review or corrective action process. In addition, the permitting agency should try to avoid technical terms, jargon, and unexplained acronyms.

Introductory notices also should identify an agency contact who can answer additional questions about the permitting process either in general or pertaining to the specific permitting activity. It should provide the name, address, and phone number of a contact person who can be called with questions or for additional information about the facility.

4. Exhibits

Exhibits are very helpful in making technical information more understandable. Since they are generally visually appealing, exhibits tend to stimulate public interest in a project.

Exhibits are visual displays such as diagrams, photographs or computer displays accompanied by a brief description or introduction. They can provide a creative and informative way to explain technical projects.

- **What are the Advantages to Using an Exhibit?**

Exhibits tend to spark public interest and understanding. While public notices and fact sheets are useful, they may be glanced over quickly and easily forgotten. Exhibits have visual impact and can leave a lasting impression.

Exhibits work well with public meetings, hearings, and availability sessions/open houses. Agencies also can use surveys or comment cards at the display to encourage citizens to comment or request additional information.

When used in conjunction with other activities, exhibits help to enhance the overall understanding and interest in a program.

5. Briefings

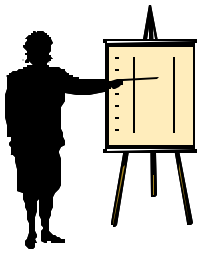
Briefings can be extremely useful for maintaining or initiating rapport with key stakeholders. Briefings are useful for sharing important information with key stakeholders prior to releasing the information to the media and general public. Briefing key stakeholders is particularly important if an upcoming action might result in political controversy.

- **What is the Purpose of Briefings?**

Briefings update key stakeholders on important information, such as a change in permit status or new technological research. They allow stakeholders the opportunity to ask agencies questions prior to the release of information to the public and media. By providing a "heads up," stakeholders are better prepared to answer questions from their constituents when the information becomes public. Since briefings are usually offered to small, select groups, they allow for the exchange of stakeholder information and concerns.

A permitting agency may hold a briefing to clear up visible stakeholder concerns before hosting a larger, more publicly visible event. Briefings generally precede news conferences, press releases, or meetings.

6. Presentations



Although there are no regulatory requirements for presentations, they can be helpful in reaching a large audience during any stage of the permitting process. Permitting agencies may schedule presentations (e.g., speeches, panel discussions, videotapes, or slide shows) for local clubs, civic or church organizations, school classes, or concerned groups of citizens. They provide a description of current permitting activities, while helping to improve public understanding of the issues associated with a permitting action. A community-based contact also may request that an agency contact arrange for a presentation.

- **When Should a Permitting Agency Schedule a Presentation?**

Presentations can be used:

- when there is moderate public interest in

a facility;

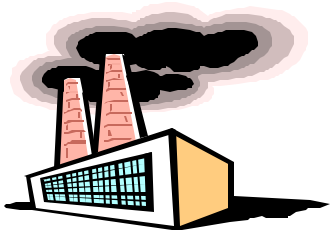
- when it is practical to integrate short presentations into meetings on other subjects; or
- when a major milestone in the permitting process is reached.

Citizens may request that the agency contact make a presentation during a regularly scheduled meeting.

The agency should provide an agenda or time frame for the presentation to allow ample time for group members to ask questions and voice their opinions at the conclusion of the delivery.

It is a good idea to use visual aids, such as slides and exhibits, during presentations to stimulate public interest and understanding. Handouts, such as fact sheets or news releases, should also be distributed so attendees have something to refer to after the presentation. At the conclusion of the presentation, the agency presenter should provide the name and telephone number of the person to contact for further information.

7. Facility Tours



Facility tours familiarize the media, local officials and citizens with the operations and the individuals involved at the facility. Facility tours are scheduled trips to the facility for media representatives, local officials, and citizens during which technical and public outreach staff answer questions. Facility tours increase understanding of the issues and operations at a facility and the permit process under way. Often, better understanding between stakeholders results because of facility tours.

Tours are usually arranged by the facility in conjunction with the permitting agency or a citizen's group. Tours are particularly helpful:

- when viewing activities at the facility can help increase public understanding or decrease public concern; and

- when it is practical and safe to have visitors on facility grounds.

• How Should Facility Tours be Organized?

Often a citizen's group assists in planning the facility tour. Facility tours require considerable time to arrange, prepare, and coordinate. Facilities are not required to conduct tours. Citizen's groups may be most successful in participating in tours when good relations have previously been established with the facility.

Facility safety guidelines cannot be violated during the tour. Insurance regulations for the facility and liability, safety, and injury considerations may make tours impossible. Citizen's groups should recognize this responsibility and not demand access to areas that are not safe for the general public. However, unwarranted secrecy may cause suspicion on the part of the community. The permitting agency may be able to help facilitate appropriate access during the tour.

The following should be considered when organizing a tour:

- Determine objectives/results of the tour;

- **Plan the tour ahead of time.** The facility, agency, and citizen's group should work together to arrange a tour that fairly presents appropriate information and provides the community an opportunity to learn about facility operations. Proper planning significantly improves the quality of the tour.

  Before the tour, facility personnel should determine tour routes and availability of facility personnel to answer questions and demonstrate technologies.

  If a facility cannot arrange a tour (e.g., the facility is under construction or not yet built), it may be possible to arrange a tour at one like it. Interested community members may benefit from touring a facility that has similar operations or where similar technologies have been applied and may get a clearer perception of what to expect at the local site.

- **Develop a list of individuals who might be interested in participating in a tour.** The facility tour should include:

  – individual citizens or nearby residents who have expressed concern about the site;

  – representatives of public interest or environmental groups that have expressed interest in the site;

  – interested local officials and regulators;

  – representatives of local citizen or service groups; and

  – representatives of local newspapers, TV and radio stations.

- **Identify the maximum number that can be taken through the facility safely.** The facility should determine a reasonable number.

  Keep the group small so that all who wish to ask questions may do so. Schedule additional tours as needed.

- **Be creative in involving tour participants.** A "hands-on" demonstration of how to read monitoring devices is one example.

- **Anticipate questions.** Have someone from the facility available to answer technical questions in nontechnical terms.

8. Observation Decks

An observation deck allows citizens and media representatives to observe site activities without hindering the activities. An observation deck is generally an elevated deck on the facility property near the area where the permitted activities are in progress. The deck enables the public and media to observe facility activities directly, thereby removing some of the unfamiliarity with the activities. In addition, citizens may have previously toured the facility, and are able to monitor the progress of permitting activities at their convenience from the observation deck.

- **When Should an Observation Deck be Used?**

An observation deck may be used when:

- community interest or concern is high;
- the community's understanding of facility operations will be enhanced by direct observation;
- there will be sufficient activity at the site to promote the community's interest;
- staff are available to supervise public use of the deck and answer questions; and
- it is physically possible to set up an observation deck in a place where there is no danger to the public.

Constructing and supervising an observation deck is expensive. Further, health and safety issues must be considered thoroughly so that visitors to the observation deck are not endangered by activities at the facility. Because of these constraints, and because there are no regulatory requirements for observation decks, facilities may be reluctant to construct one unless there is sufficient community interest.

Location of the observation deck will depend on:

- best location for viewing facility activities;
- public safety; and
- public access.

Hours of operation will vary, depending on availability of staff to supervise the observation deck and to answer questions from the public. The observation deck should be supplemented with an informational/interpretive program so that citizens understand what they see. Fact sheets or an informative exhibit placed near the deck could further aid in explaining facility activities.

Notice of the observation deck should appear in public notices, fact sheets, and in a mailing to the facility mailing list.

9. News Releases and Press Kits

News releases and press kits are communication tools used to disseminate important information about the permitting activity. They can be used by all participants in the permitting process, including citizens' groups, facilities, and permitting agencies.

News releases are statements sent to the news media (e.g., newspapers, television, radio), generally to publicize progress or key milestones in the permitting process. News releases, when carried by the media, can effectively and quickly disseminate information to large numbers of people. They also may be used to announce public meetings, report the results of public meetings or studies, and describe how citizen concerns were considered in the permit decision or corrective action.

Press kits consist of a packet of relevant information distributed to reporters summarizing key information about the permitting activity. Typically a press kit is a folder with pockets for short summaries of the permitting process, technical studies, newsletters, press releases, and

other background materials.

The press kit and the news release can be complementary activities, though either one can be issued separately. They can be issued by a facility, permitting agency community or citizen's group.

• When are News Releases and Press Kits Used?

Some of the occasions when news release or a press kit are used include:

- when significant findings are made at the site, during the process or after a study;
- when program milestones are reached or when schedules are delayed;
- in response to growing public or media interest or after a new policy stance has been adopted; and
- when there is a need to increase public interest in a facility.

A news release should not be issued at times when it may be difficult to get in touch with responsible officials (e.g., Friday afternoons or the day before a holiday).

• Who can Issue News Releases and Press Kits?

Facilities or permitting agencies can distribute news releases or press kits to citizens' groups or community-based committees to share information about the permitting activity. Groups that most likely will use them include organizations that sponsor community newsletters, bulletin boards, or other public information media.

Alternatively, citizens' groups may want to issue their own news releases or press kits if their organization has sponsored or conducted a study or event that directly relates to the permitting activity.
A news release to the local media can reach a large audience quickly and inexpensively.
Press kits allow reporters to put the issues in context. If a reporter is trying to meet a deadline and cannot contact the permitting agency, he or she can turn to the press kit as an authoritative source of information. If the name, address and phone number of a contact person are included, reporters can obtain answers to their questions about the information in the release.

Because news releases must be brief, they often exclude details in which the public may be interested. A news release should therefore be used in conjunction with other methods of communication that allow more detailed information. A news release is not an appropriate vehicle for transmitting sensitive information. Frequent use of news releases to announce smaller actions may reduce the impact of news releases concerning more significant activities.

• How are News Releases and Press Kits Prepared?

News releases and press kits are prepared as follows:

- **Consult a person who regularly works with the local media**, **such as a public affairs specialist**. The public affairs specialist will ensure adherence to

internal policies on media relations. The specialist can help draft the news release and provide other helpful suggestions about the release and the materials for the press kit.

If an organization does not have a public affairs specialist, make sure to receive approval from the director or other person with significant organizational responsibility.

- **Identify the relevant regional and local newspapers and broadcast media, and learn their deadlines.** Get to know the editor or environmental reporter who might cover the issue. Determine what sorts of information will be useful to them.

- **Contact related organizations to ensure coordination.** For instance, other groups may be working together on a citywide issue. Agencies should ensure that all facts are correct, and procedures are coordinated between groups before releasing any statement or other materials. Agencies may want to consider discussing the news release with interested stakeholders. Do not distribute to the public draft news releases—they are internal documents only.

- **Select the information to be communicated.** Press releases place the most important and newsworthy elements up front and present additional information in descending order of importance. Use supporting paragraphs to elaborate on other pertinent information. If presenting study findings or other technical information, present it in understandable terms along with any important qualifying information (e.g., reliability of numbers or risk factors).

The press kit should contain materials that elaborate on the information in the press release. Include basic information about the permitting agency, such as mission statement, goals, and organization activities. Background reports or studies may also be useful.

- **Keep the news release brief.** Limit it to essential facts and issues. One page.

- **Use simple language.** Avoid the use of professional jargon, overly technical words, and undefined acronyms.

- **Identify who is issuing the news release.** The letterhead or top of the sheet should include:

  – name and address of the organization;

  – release time ("For Immediate Release" or "Please Observe Embargo Until") and date;

  – name and phone number of the contact person for further information; and

  – a headline summarizing the information in the release.

- **In some cases, send copies of the release and the press kit to interested stakeholders at the same time that it is submitted to the news**

media. Coordinate with the public affairs specialist to determine the appropriateness.

10. News Conferences

News conferences provide a major public forum for announcing plans, findings, policies and other developments. They are an efficient way to reach a large audience in a short period of time.

While news conferences are information sessions or briefings held for representatives of the news media, they may also be open to the general public. News conferences provide all interested local media and members of the public with accurate information concerning important developments during the permitting process.

• When Should News Conferences be Used?

News conferences can be used:

- when time-sensitive information needs to reach media and the public, and a news release may not be able to address key issues for the community;
- when staff are well-prepared to answer questions; and
- during any phase of the permit application.

Agencies should coordinate news conferences through their public outreach staff. In addition to making logistical arrangements, the staff can help notify members of the local and regional media, and any interested local officials of the time, location, and topics of the conference.

During the conference, the agency should present a short, official statement, both written and spoken, about developments and findings, followed by a question and answer period. News conferences are often supplemented with fact sheets or news releases, so that citizens can refer to them for technical information after the conference.

11. Independent Technical Experts

Communities may mistrust the information provided by industry or permitting authorities. Under some circumstances the community may require impartial independent technical assistance to ensure unbiased, informed opinions and information. Many case studies report successes when grants are awarded to allow a community to hire independent technical consultants. Success is attributed to:

- creating the same degree of technical credibility as other stakeholders; and
- decreasing frustration levels, because consultants can "translate" community quality of life concerns into terms that are commonly used within the siting or permitting process.

12. Information Booklets/Brochures

Information booklets or brochures are other ways of obtaining information regarding how to choose possible locations for potential sites and

how to involve neighboring communities near those potential sites into the site selection and permitting process.

Some informational booklets discuss land composition, setback distances and other important factors that should be considered before selecting sites for hazardous waste management facilities. Other booklets address quality of life issues of concern to communities near potential or existing hazardous waste management facilities. Such informational booklets may serve as aids to industry and government agencies to help them find out the character of a community (cultural composition, concerns, lifestyles, etc.) and offer creative mechanisms on how to involve and effectively work with neighboring communities to address quality of life concerns before the permitting process begins.

These booklets may also discuss the incentives and benefits to industry of going the extra mile and doing more than what is required in the regulations, by establishing partnerships and promoting constructive dialogue with communities. Some sample EPA Reference documents include:

1. *Sensitive Environments and the Siting of Hazardous Waste Management Facilities*, (May 1997, EPA530-K-97-003)

2. *Social Aspects of Siting RCRA Hazardous Waste Facilities*, (April 2000, EPA530-K-00-005)

Additional Tools That Can Be Used for Gathering and Exchanging Information

1. Community Interviews

Community interviews are a valuable source of opinions, expectations and concerns regarding the permitting process and often provide insights and views that are not presented in the media. Community interviews are informal, face-to-face or telephone interviews held with local residents, elected officials, community groups, and other individuals, to acquire information on citizen concerns and attitudes about a permitting program. The interviews may be conducted by the facility, public interest groups, or a third-party representative, such as a contractor or community organization, as part of the community assessment.

Community interviews allow facilities and agencies to tailor activities to the needs of a community. Information obtained through these interviews is typically used to assess the community's concerns and information needs, and to prepare a public participation plan which outlines a community-specific strategy for responding to the concerns identified in the interview process.

• When Should Community Interviews be Conducted?

Community interviews are conducted at the beginning of the permitting process or before major permit modifications. Community interviews are not conducted in every community for every permitting activity. For instance, routine or noncontroversial activities may not require community interviews. They are more likely if a permitting process is controversial or receives high levels of public interest. Activities ranging between these situations may require some interviews beginning with a survey of community representatives and group leaders.

Community interviews should be conducted:

- to find out about community concerns at the **outset** of a major permitting activity; and

- before **revising** a public participation strategy because months or perhaps years may have elapsed since the first round of interviews and community concerns may have changed.

How many community interviews are conducted, and how in-depth they are depends on the level of community concern and involvement. If there has been a lot of interaction between the community and the facility, only a few informal discussions may need to be conducted either in person or by telephone with selected, informed individuals who clearly represent the community. This is to verify, update, or round out the information already available.

• Who Participates in Community Interviews?

Potential individuals or groups that may be interviewed include:

- local residents;
- elected officials;
- community groups; and
- any other individuals in the affected area.

Before the interview, the interviewer should provide a brief description of the permitting process as well as an explanation of the purpose of the interview. The interviewer should look for perceptions of past public participation activities conducted in the community. Comments received will help develop an appropriate public participation strategy.

The interviewer should gauge concerns to the following factors:

- *Threat to Health* - Does the citizen believe his/her health is or has been affected by activities at the facility?

- *Economic Concerns* - How does the public believe the facility affects the local economy and the economic well-being of community residents?

- *Agency/Facility/Interest Group Credibility* - Does the public have confidence in the capabilities of the facility or agency? What are the public's opinions of the facility owner/operator and involved environmental/public interest organizations?

- *Involvement* - What groups or organizations in the community have shown an interest in the facility? How have interested community groups worked with the agency in the past? Have community concerns been considered in the past?

- *Media* - Have events at the facility received substantial coverage by local, state, or national media? Do local residents believe that media coverage accurately reflects the nature and intensity of their concerns?

- *Number Affected* - How many households or businesses perceive themselves as affected by the facility (adversely or positively)?

At the beginning of the interview, the interviewer should explain the public participation process and ask the interviewee how he/she would like to be involved and informed of progress and future developments. The interviewer should ask the interviewee to recommend convenient locations for setting up an information repository or holding public meetings.

Finally, the interviewer should ask for the names and telephone numbers of other persons who may be interested in permitting activities.

All comments should remain confidential! The interviewer should explain how he/she will ensure anonymity of respondents.
If persons feel uncomfortable sharing concerns and issues one-on-one, the interviewer should recommend other means of expressing their viewpoints, such as anonymous surveys or focus groups.

2. Focus Groups

Focus groups provide an opportunity to gain in-depth public reaction to permitting issues. Focus groups are small discussion groups led by a facilitator who draws out participants' reactions to an issue. The group is selected either to be random or to approximate the demographics of the community. Some organizations use focus groups as a way of gathering information on community opinion.

• When do Facilities or Permitting Agencies Use Focus Groups?

Facilities or permitting agencies may use focus groups when there is a high degree of public interest in a permitting activity. Focus groups provide a quick means of feedback from a representative group and can be a good supplementary activity to community interviews, especially if such group discussions will make some members of the public feel more comfortable.

• How Should Agencies Prepare for Focus Groups?

Agencies should prepare for focus groups by:

- **Selecting focus groups.** Contact stakeholders and community leaders get input on who to include in the focus groups.

- **Using community interview techniques to get input from the focus group.**

- **Using the information obtained from the focus group in forming a public participation plan.**

3. Door-to-Door Canvassing

Door-to-door canvassing involves face-to-face contact, thereby ensuring that citizens' questions can be directly and individually answered. Canvassing demonstrates a commitment to public participation and is a very effective means of gathering accurate, detailed information while determining the level of public concern.

Door-to-door canvassing is used by facilities and sometimes permitting agencies to collect and distribute information by calling on community members individually and directly. During these interactions, canvassers should ask questions about the permitting activity, discuss concerns, and provide fact sheets or other materials.

Interested persons should be informed that they can find out more about the permitting activity by signing up for mailing lists or by attending an upcoming event.

• When Should Door-to-Door Canvassing be Used?

Door-to-door canvassing may be used:

- when there is a high level of concern about the site;
- when there is a need to notify citizens about an event or an upcoming permitting issue;
- when communication is needed between a specific group of people for a specific purpose, such as getting signatures to allow access to properties adjacent to the facility;
- when the community has a low literacy rate, rendering written materials ineffective;
- when the area consists of a population whose primary language is not English, but it is important to pass information to the area; and
- when there is an emergency situation that the community needs to know about.

Canvassers should generally try to inform residents (e.g., by distributing a flyer) when door-to-door calling will occur in their area.

The notice should inform the community of the time the canvassers will be in the neighborhood and explain the purpose of the canvassing program.

• What Types of Questions Should Door-to-door Canvassers be Trained to Answer?

Door-to-door canvassers should be trained to answer questions about what is happening at the facility and may provide general information about possible health effects associated with various activities.

Some questions, however, may need to be referred to technical staff (e.g., highly technical questions concerning hazardous waste or agency policies). If necessary, a translator should accompany the canvasser, and materials in languages other than English should be provided. In addition, the canvasser should tell citizens when and how they will next be contacted (i.e., by telephone, by letter, or in person).

All canvassers should have an official badge to identify themselves and should respect a citizen's right not to be contacted. Safety and security is crucial for citizens and canvassers. Do not conduct any door-to-door interview that endangers anyone.

4. Surveys and Telephone Polls

Surveys and questionnaires are useful for gathering general impressions about specific permitting activities or public participation events. Frequently, they are used when an anonymous method for submitting information is needed.

Public participation is a dialogue, and citizens need ways to provide feedback to facilities, public interest organizations and permitting agencies. Surveys and polls are designed to solicit specific types of feedback from a targeted audience, such as public opinion about a permitting activity, the effectiveness of public participation activities or what could be done to improve distributed materials.

Surveys can be either oral or written, used in person or by mail, and distributed either to the entire community or specific segments or representative samples of the community.

Facility owners can use surveys and polls during a community assessment to gauge public sentiment about constructing or expanding a facility or as a complement to direct community interviews. The permitting agency can use surveys and polls in a similar fashion especially during major projects and at facilities that raise controversy. The agency, public interest groups and the facility can use surveys and polls to find out if citizens are receiving enough information about the activity and are being reached by public notices or other outreach methods.

• When Should Surveys and Telephone Polls be Used?

Surveys and telephone polls are used:

- when specific information is sought from a targeted community or audience; or
- as a means of giving anonymous feedback during the permitting process is needed.

• How are Surveys and Telephone Polls Conducted?

Written surveys may be distributed in person or by mail. Alternatively, they may be distributed after a meeting or distributed by hand to community members' homes. Surveys can be distributed to a representative sample of the community. In some cases, surveyors may "blanket" a community, distributing the survey to all homes and businesses within a certain distance of the facility.

Telephone polls are generally conducted with a random sample, a representative sample or a targeted segment of the community.

Permitting agencies or facilities can contact community leaders and local officials to determine the demographics of the area.

Survey questions should not be biased. In other words, the wording of a question should not influence how the question is answered. If anyone in the community feels that the survey is biased, they should bring their concerns to the attention of the permitting agency contact or whomever is conducting the survey.

5. Telephone Contacts

Telephone contacts are a quick means of informing key persons about facility activities and for monitoring any shifts in community concerns. There are no regulatory requirements for telephone contacts.

Telephone contacts are used to gather information about the community or to provide updates of the status of permitting activities.

If individuals feel uncomfortable discussing their concerns or perceptions about the permitting activity over the phone, encourage them to find other means of expressing their viewpoint like attending public meetings or responding to notices.

• When are Telephone Contacts Used?

Telephone contacts are usually made to arrange or conduct community interviews, develop mailing lists and arrange for other public participation activities such as news briefings, informal meetings and presentations.

Permitting agencies should investigate using this method of obtaining information because it is a relatively inexpensive and expedient method of acquiring initial information about a community.

Telephone contacts can be used:

- in the early stages of the permitting process to identify key officials, citizens and other stakeholders who have a high interest in the activity;
- to gather information when face-to-face community interviews are not possible;
- when new and time-sensitive material becomes available; and
- when there is a high level of community interest in the activity and it is important to keep key players informed.

6. Telephone Hotlines

A hotline can provide interested persons with a relatively quick means of expressing their concerns directly to the permitting organization and obtaining answers to questions. A hotline is a toll-free or local telephone number people can call to ask questions and obtain information promptly about permitting activities. Some hotlines are set so that callers can order documents.

• When Should Permitting Agencies Use a Telephone Hotline?

A telephone hotline can be used:

- when community interest or concern is

moderate to high;

- when emergencies or unexpected events occur or when a situation is changing rapidly;
- when there is a high potential for complaints (e.g., about dust or noise);
- where literacy rates are low and written information must be supplemented; and
- where the community is isolated and has little opportunity for face-to-face contact with project staff (e.g., rural areas, areas far from regional offices).

• Who Operates the Telephone Hotline?

Telephone hotlines can either be installed as a semipermanent fixture, for use throughout the permitting process, or as a temporary measure at a time when major community feedback is desired.

The permitting agency should usually staff the hotline with at least one staff member. If no one is available to answer calls throughout the day, the agency might consider installing an answering machine directing citizens to leave their name, number, and brief statement of concern, and informing them that someone will return their call promptly.

A voice mail system could also be used to provide information on commonly requested information such as meeting dates and locations, and the permit status. Permitting agencies should check the answering machine for messages at least once a day. If the level of concern is high, consider checking for messages more frequently.

Notification of the availability of new telephone hotlines should be provided in news releases to local newspapers, radio stations and television stations as well as in permitting fact sheets, publications and public notices.

7. On-Scene Information Offices

An on-scene information office helps ensure that citizens are adequately informed about permitting activities and that their concerns are addressed immediately. An on-scene information office is typically a trailer, small building or office space. It will be located near the site or activity for which the permit is being sought or at a location that is most convenient and accessible to the community. Usually such an office is staffed by full-time or part-time personnel who respond to citizens' inquiries and prepare information releases. The on-scene staff can conduct meetings and question and answer sessions to inform citizens about the status of the permitting process and answer any questions or concerns. Working with the facility in question, the staff may also be able to arrange or conduct facility tours.

• When Should an On-Scene Information Office be Used?

An on-scene information office can be used when:

- community interest or concern is high;
- activities involve complex technologies

or processes;

- the community perceives a high level of risk to health;
- activities may disrupt the community (e.g., traffic patterns); and
- the area near the activity is densely populated.

Since expenses for operating an on-scene information office can be large, facilities generally establish them when community interest is high.

• What Kind of Services Should an On-Scene Information Office Provide?

The on-scene office should be established in a convenient and accessible location for the community. A telephone and answering machine should be installed to respond to citizen inquiries and information requests. Regular business hours should be established in addition to some weekend and evening hours.

The on-scene office should contain the same materials found in an information repository. If there is a high level of public interest, the agency may locate the information repository at the on-scene office.

A copy machine should be available for citizens to make copies of documents.

The address and telephone number of the on-scene office, as well as the hours of operation should be provided in a public notice in a local newspaper.

8. Question and Answer (Q&A) Sessions

Question and answer sessions provide direct communication between a permitting agency and citizens. They are a useful, easy, and inexpensive way of providing one-on-one explanations in an informal or formal setting. A Q&A session brings facility and agency staff and interested citizens together to discuss questions and concerns about the permitting process. Q&A sessions typically follow an event such as a presentation, briefing, or meeting.

Representatives should be available after the event to answer additional questions.

• When Should a Question and Answer Session be Used?

Question and answer sessions may be used:

- after an event when participants need more information;
- when citizens feel uncomfortable discussing their questions or concerns during a large event; and
- after an event to clarify any issues or conflicts that were skimmed over in order to maintain the flow of events.

Since Q&A sessions typically follow other activities, such as presentations, exhibits, or meetings, they are a convenient and effective way to answer citizens' questions regarding the permitting process in general. A facility or agency representative should announce that

someone will be available to answer questions at a designated area immediately following the presentation. The designated person should be knowledgeable about the specific permitting activity and the process in general. In general, the facility or agency should try to respond to unanswered questions as quickly as possible.

9. Information Tables

An information table is a convenient way for the facility or permitting agency to obtain community feedback on permitting activities. It provides a comfortable atmosphere for the public to approach project staff and ask questions.

An information table consists of a table or booth set up at a meeting, hearing, or other event (e.g., a community fair or civic gathering). It is staffed by at least one person who is available to answer questions about the permitting process. Pamphlets, fact sheets, and brochures are available on the table, along with a sign-up sheet for interested people to add their names to the mailing list. An information table is a simple public participation tool that can be used by staff to interact one-on-one with interested citizens.

• When Should an Information Table be Used?

An information table can be used when:

- facilities or permitting agencies want community feedback after a public event;
- the permitting activity has raised significant public interest or technical issues raise questions among the public; and
- names need to be compiled for the mailing list.

Tables are often made available at local events that will attract a significant portion of the community.

An information table is a convenient place for citizens to obtain information, fact sheets, newsletters, and project reports about permitting activities. A contact person from the facility or permitting agency should be present to respond to questions and concerns. Information tables are also a great place for citizens to sign up for mailing lists; answer questionnaires and surveys; and obtain the name and telephone number of the persons they can contact for additional information. Exhibits and diagrams may also be displayed at an information table to help explain the permitting process or specific technical issues.

Citizens should be encouraged to contact the facility or agency to set up an information table if they know of a public event that will be well attended by community members.

10. Informal Meetings with Stakeholders

Informal meetings offer citizens, permitting agency staff, and officials the opportunity to increase their familiarity with the permitting process, increase awareness of each other's viewpoints and actively promote public participation. Informal meetings can be held to discuss permitting activities by either the facility, the permitting agency or an interested community group. Informal meetings allow interested

citizens and local officials to discuss issues and concerns in an informal, comfortable setting such as a resident's home or a local meeting place.

Agency staff receive first-hand information from interested community members, special interest groups and elected officials while citizens have the opportunity to ask questions and explore topics of interest regarding the permitting process.

• What are the Benefits to Informal Meetings?

The primary benefit of informal meetings is that they allow two-way interaction between citizens, local officials, the facility and the permitting agency. Citizens will not only learn about developments, but also be able to voice their perceptions of the permitting activity. Informal meetings also add a personal dimension to what might otherwise be treated as a purely technical problem.

• When Should Informal Meetings be Held?

They are most commonly held when:

- there is a wide range of knowledge among community members;
- the level of tension is high and large meetings may not be appropriate;
- the facility or permitting agency wants to learn more about the community and their perceptions of the activity; and
- groups want to discuss specific issues in which the community as a whole is not interested.

• How Should Informal Meetings be Organized?

Informal meetings can be arranged by the facility, the permitting agency or a citizens' or community-based group. If a community group decides to host a meeting, they should speak with the facility and agency contacts prior to the event to discuss what they want to accomplish. Meeting organizers may wish to enlist a neutral, third party dispute resolution professional in order to facilitate the meeting.

To maximize effectiveness, informal meetings are generally kept small (e.g., 5 to 20 people). Schedule additional meetings if some people are unable to attend because of limited space available. These meetings usually occur in informal settings, such as a private home, public library meeting room, community center, or church hall.

They should be scheduled in convenient locations and should not conflict with other public meetings (e.g., town council meetings), holidays, or other special occasions.

The permitting agency should respond promptly to any unanswered questions. The meeting should open with a brief presentation of the permitting process and how the community can be involved in the decision-making. The opening remarks should be kept to a minimum to allow maximum opportunity for open discussion.

Possible discussion topics include the following:

- Extent of the activity;

- Safety, health, and environmental implications;
- Factors that might speed up or delay the regulatory and technical process; and
- How community concerns are considered in making decisions on permits actions.

Facility and agency contact persons, to whom interested citizens can direct further questions or voice new ideas or suggestions after the meeting, should be identified.

11. Attending Stakeholders' Meetings and Functions

Attending meetings or functions held by stakeholders can provide insight into other opinions and concerns. Facilities, local governments, environmental organizations, religious and civic groups may all hold meetings or other gatherings during the permitting process. Some may be required by regulation and others may be informational meetings or discussions of important issues. Permitting agencies can learn more about the views of other stakeholders by attending their meetings. Agency representatives can join important discussions and provide information. Some groups may invite permitting agencies to give a presentation or briefing.

• What Should Permitting Agencies do if They Decide to Attend Stakeholder Meetings?

Permitting agencies should inform the host organization if they decide to attend stakeholder meetings. If agency representatives choose to identify themselves at the meeting they should be prepared to answer questions.

Other groups or individuals may want to attend meetings sponsored by the permitting agency. Be clear about which meetings are open to others and which are not.

Agency representatives should provide advanced notice of their upcoming meetings and invite groups to make presentations.

12. Availability Sessions/Open Houses

The one-to-one conversations during an availability session/open house can help establish rapport between citizens and project staff.

The informal, neutral setting of availability sessions/open houses also keeps officials and citizens relaxed to help smooth the communication process.

Availability sessions/open houses are informal meetings in a public location where people can talk to involved officials on a one-to-one basis. The meetings allow citizens to ask questions and express concerns directly to project staff. This type of gathering is helpful in accommodating individual schedules.

Availability sessions and open houses can be set up to allow informal conversations between representatives of all interested organizations. Citizens can find out more about all sides of a permitting issue through conversations with agency officials, facility staff, and representatives of involved interest groups and civic

organizations.

- **When is an Availability Session/Open House Appropriate?**

An availability session/open house is most appropriate when:

- scheduling meetings is difficult because of community members' schedules;
- new information is available on several different technical or regulatory issues that would make explaining it in its entirety too long for a more formal meeting;
- community members have widely varying interests or levels of knowledge; and
- larger crowds will make it difficult for certain citizens to raise questions.

Availability sessions/open houses require significant preparation and are typically held only when community interest in the site is significant.

- **What Information is Available at Availability Sessions/Open Houses?**

Availability sessions/open houses are usually scheduled during the evening at a local public library, school, or meeting room. Knowledgeable facility staff should be present to respond to questions and concerns. Handouts and fact sheets containing the name and telephone number of the person interested citizens can contact for additional information after the event should be made available.

- **How can Interested Parties Find out About Availability Sessions/Open Houses?**

Agencies should notify everyone on the mailing list for the permitting activity, interested persons should receive an announcement for the availability session/open house at least 2 weeks prior to the event. In addition, agencies should include announcements in local newspapers, on television and radio stations, and in community newsletters.

13. Citizen Advisory Groups

Citizen advisory groups (CAGs) can increase active community participation in permit decision-making and provide a voice for affected community members and groups. They promote direct, two-way communication among the community, the facility and the permitting agency. *CAGs have traditionally been used in the Superfund program. In the context of environmental permitting, the Technical Outreach Services for Communities program would be an appropriate resource to consider: www.toscprogram.org.*

A CAG provides a public forum for representatives of diverse community interests to present and discuss their needs and concerns with government and/or the permitting agency. CAGs come in many different forms and have different responsibilities and roles. They are generally comprised of stakeholders that meet routinely to discuss issues involving a particular facility.

• When Should a CAG be Developed?

CAGs can be developed based on individual situations. Community organizations may create a CAG to provide an official voice for the community. Facility owner/operators may create a CAG of affected community members to provide informal or formal advice. A permitting agency may form a CAG that includes stakeholders from the facility, the community and the agency.

Size of CAGs will also vary. The size of a group can often have an impact on its effectiveness. For example, too large a group can inhibit how efficiently it can work and come to consensus on issues.

On the other hand, too small a group may not be adequate to represent diverse community concerns.

Forming a CAG does not necessarily mean that there will be universal agreement about permitting issues. Nor does having a CAG mean there will not be controversy during the process. In addition, it should be noted that community trust of CAGs can vary widely depending on their structure (i.e., who sponsors the hiring and selection of facilitators) and when in the process they are introduced. You, your agency, or the EPA may make a decision that differs from the stated preferences of a CAG. Agencies should offer an explanation of decisions that differ significantly.

• At What Point in the Permitting Process can a CAG be Formed?

A CAG can be formed at any point in the permitting process, but they are most effective when formed in the early stages. Generally, the earlier a CAG is formed, the more its members can participate in and impact decision-making.

CAGs can be very time-consuming and expensive. They may not be appropriate in every situation.

• What Factors Should be Considered When Forming a CAG?

Agencies should consider the following factors when forming a CAG:

- Level of community interest and concern about the permit or facility;
- Community interest in forming a CAG;
- Existence of groups with competing agendas in the community;
- Environmental justice issues or concerns regarding the agency;
- The history of community involvement with the agency or with environmental issues in general; and
- The working relationship between the facility, the community, and the permitting agency.

If a permitting agency forms a CAG, it may announce it at a public notice, at a public meeting, or by issuing a press release. Communities should investigate whether other successful groups addressing similar issues exist before forming a new one. If a group decides to organize a CAG, encourage them to coordinate with the facility and agency contacts. Contacts should be familiar with the process and helpful resources, such as EPA's *Guidance for Community Advisory Groups at Superfund Sites.*

14. Workshops

Workshops foster two-way communication between members of the community and the permitting agency. They have proven successful in familiarizing citizens with technical terms and concepts prior to a formal public meeting. Workshops are seminars or gatherings of small groups of people (usually between 10 and 30), typically led by one or two specialists with technical expertise in a specific area. Experts may be invited to explain the problems associated with releases of hazardous substances and possible remedies for these problems. Workshops may help to improve public understanding of permit conditions and may prevent or correct misconceptions. Workshops also help to identify citizen concerns and encourage public input.

• When Are Workshops Generally Conducted?

Workshops are generally conducted before formal public hearings or during public comment periods to help interested citizens develop and present testimony. A convenient location and time should be chosen for the workshop.

• When are Workshops Appropriate?

Workshops are appropriate when:

- the permitting process needs to be explained to community members interested in participating in the process;
- specific topics need to be discussed in detail, especially health, risk assessment issues or complex technical details; and
- technical material needs to be explained and feedback from the community is important to make sure that citizens understand the material.

• How is the Public Notified of Workshops?

In addition to sending notice of the time and location to members of the mailing list, posters should be distributed around the area well in advance of the event. Notification of the workshop should also be printed in a local newspaper.

Invitations and registration forms should be sent to concerned citizens of the community. Each form should provide for multiple registrations to accommodate friends and others who also might be interested in the workshop.

Guidelines for a Model Public Involvement Plan

What is a Public Involvement Plan?

The public involvement plan (plan) is a facility-specific set of actions to enable the regulating agency to work effectively with the affected community and the facility applying for a permit. The purpose of the plan is to identify the public concerns and then utilize the existing regulatory requirements as a framework for meaningful public input in the permitting decisions. The guideline below synthesizes some of the best practices EPA has observed and is intended to help state permitting program staff build an effective public involvement plan. These are solely intended as recommendations and do not constitute new requirements.

Two additional resources can supplement these guidelines and should be reviewed when developing a public involvement plan. Both have a focus wider than strictly permitting programs but may still be useful tools. The National Environmental Justice Action Council has developed a model plan for public participation which includes core values and a checklist (EPA-300-K-96-003) or at www.epa.gov/oeca/oej/nejac/pdf/modelbk.pdf. Second, EPA's 1981 Policy on Public Participation Policy is designed to provide guidance and direction to public officials who manage and conduct EPA programs on reasonable and effective means of involving the public in program decisions. This Policy will be updated in FY 2000 and can be found at www.epa.gov/stakeholders/intro.

- **Making it Work**

Preparation: Before starting to write the plan, do some basic research; interviews with local officials and community leaders can be an effective way of gathering information on what the plan needs to address and how it can be implemented effectively. Consult the LandView database that EPA and the Census Bureau developed at www.epa.gov/swercepp/ds-epds or check EnviroFacts at www.epa.gov/enviro. This will give you an idea of the demographics involved, including the potential need to have the plan or future outreach products translated for local residents. Investing in some research into local newspaper archives to find any past articles, editorials, or letters to the editor, might give some historical perspective on the facility.

- **Audience**

The plan can initially only focus on requirements that the facility needs to meet. However, you may wish to use the plan as a way of communicating and documenting the actions that all stakeholders may undertake. Therefore, it is advisable to write the plan so that it can be readily placed in an information repository for any interested citizen to read.

The plan should plainly be by, and from the agency, rather than some third party. It should be on Agency letterhead, with an Agency cover sheet, and it should state what the Agency *will* do, rather than offer advice on what the Agency *should* do. Identify the issues of concern for *that* community. It is possible for one facility to have multiple affected communities, each with different demographics, and concerns. In such cases, the plan must identify each community and address its issues independently. Public

involvement plans also gather more support with all stakeholders when specific deadlines are established.

Names, addresses, or phone numbers of private citizens consulted during the community interviews should not appear in the Plan. There should be no way to attribute any information or comments to any specific private citizen.

Local officials interviewed in their official capacity should be identified in the list of contacts, and their comments may be attributed. This is also true for any representatives of the facility interviewed in their official capacity. Leaders of local civic clubs, such as the Chamber of Commerce, are considered private citizens and should not be identified.

The annotated outline does not contain any average durations between steps in the process. Each state's requirements are unique, therefore placeholders are inserted in the outline and can be adapted to each situation.

Public Involvement Plan – Annotated Outline

I. Overview

A. Purpose of the Plan
B. Distinctive features of the Plan
C. Special characteristics of the community and the facility

Section I should only be a few paragraphs in length. *This is your opportunity to localize the generic goals of public participation in permitting by identifying facility-specific objectives and any special circumstances that this plan addresses.*

II. Capsule Facility Description

A. History
   1. Facility use
   2. Ownership

B. Technical details
   1. Agency fact sheet on the facility with description of process and control equipment and chemicals in use if possible
   2. Description of applicable emission standards for facility
   3. For combustion facilities; include plans for test burns
   4. Lead agency for issuing the permit

C. Geography
   1. Facility location
   2. Relationship to:
      a. Homes
      b. Businesses
      c. Schools
      d. Playgrounds/Parks
      e. Watersheds (i.e., lakes, streams)
   3. Site maps
      a. Location of facility within state
      b. Location of facility within community
      c. Proximity to elements of concern

Section II should also be relatively short. Its purpose is to set the stage and give the readers enough information to be generally familiar with the facility.

III. Community Background

A. Community profile developed from research in local press
B. Include any relevant data from LandView or other demographics
C. Chronology of public involvement
   1. Plans by regulating Agency and facility for educating the public
D. Key community concerns
   1. Analyze major public concerns
   2. Details on using the permitting process to address those concerns

Section III identifies the context and community perceptions of the events and problems of the facility, not the technical history of the facility or what EPA knows about the facility. *This section draws heavily from the community interviews. It can range from three to seven pages, or more as needed. It details the need for translation services during the permitting process, whether a second language for non-English speaking residents or signing for the hearing-impaired.*

IV. Public Involvement Activities and Timing

A. Activities to be conducted - see major milestones on page 2-3
   1. Required
   2. Supplemental activities
B. Sample time line for those activities:
   1. The permitting authority receives and reviews the permit application (including pre-application activities). Date scheduled: xx/xx/xx
   2. Schedule public meeting to explain the application, impacts, and participation/appeals processes (including available legal assistance) with copies of the complete application available at the meeting. Date scheduled: xx/xx/xx
   3. Draft permit or notice of intent to deny the permit is issued by the permitting authority. Date scheduled: xx/xx/xx
   4. The permitting agency should meet with the citizens to discuss the permit and assess any needs for technical assistance to citizens. Date scheduled: xx/xx/xx
   5. Public comment period of at least 30 days is established to allow the public to comment on the draft permit. Date scheduled: xx/xx/xx
   6. Response to comments to the public and if necessary schedule a meeting to discuss the comments. Date scheduled: xx/xx/xx
   7. The permitting agency issues a final permit decision through a public notice. Date scheduled: xx/xx/xx

This is the core of the plan – what will be done and when. It may be useful to present this timeline as a matrix (similar to the one at the end of Chapter 3 in the Reference Guide) relating the timing of community involvement activities to permitting process milestones. *The items listed above in section*

B are only suggestions, and blend both required and non-required activities together only to illustrate a logical sequence of events.

V. Appendix of Contacts: List of Key Community Leaders

A. Local elected officials
B. State elected officials
C. Federal elected officials
D. Environmental groups or other active citizens groups
E. EPA regional contacts
F. State environmental and health officials
G. Local environmental, health, and safety officials (police chief, fire chief, etc.)
H. Media contacts
   1. Local newspapers, including city desk and display advertising
   2. Local radio stations with popular newscasts
   3. Local broadcast TV stations with local news programming
   4. Local cable access TV stations
   5. Web sites and email groups
I. Local outlets, such as businesses and churches that have agreed to post notices or serve as a distribution point for notices and information

This section consolidates the contact information for all stakeholders to make it easier to share information.

VI. Appendix: Meeting Locations and Repositories

Locations for public meetings should be handicapped-accessible. Appropriate considerations include high school gyms and auditoriums, public library meeting rooms, town halls or other local government facilities, and local churches.

Information repositories also should be handicapped-accessible, and should be accessible to the general public at least a couple of evenings a week and, ideally, Saturdays.

This section should include the address of the facilities as well as name and phone number of the point of contact.

Section 5 - Resources

U.S. Environmental Protection Agency Regions

Region 1 (ME, NH, VT, MA, RI, CT)
Environmental Protection Agency
One Congress Street, Suite 1100
Boston, MA 02114-2023
Phone : (617) 918-1111
Fax : (617) 565-3660

Region 2 (NY, NJ, PR, VI)
Environmental Protection Agency
290 Broadway
New York, NY 10007-1866
Phone : (212) 637-3000
Fax : (212) 637-3526

Region 3 (PA, DE, DC, MD, VA, WV)
Environmental Protection Agency
1650 Arch St.
Philadelphia, PA 19013-2029
Phone : (215) 814-5000
Fax : (215 814-5103

Region 4 (KY, TN, NC, SC, MS, AL, GA, FL)
Environmental Protection Agency
Atlanta Federal Center
61 Forsyth Street, SW
Atlanta, GA 30303-3104
Phone: (404) 562-9900
Fax: (404) 562-8174

Region 5 (MN, WI, IL, MI, IN, OH)
Environmental Protection Agency
77 West Jackson Boulevard
Chicago, IL 60604-3507
Phone : (312) 353-2000
Fax : (312) 353-4135

Region 6 (NM, TX, OK, AR, LA)
Environmental Protection Agency
Fountain Place 12th Floor, Suite 1200
1445 Ross Avenue
Dallas, TX 75202-2733
Phone : (214)665-2200
Fax : (214) 665-7113

Region 7 (NE, KS, IA, MO)
Environmental Protection Agency
901 North 5th Street
Kansas City, KS 66101
Phone : (913) 551-7003
Fax : (913) 551-7467

Region 8 (MT, ND, WY, SD, UT, CO)
Environmental Protection Agency
999 18th Street Suite 500
Denver, CO 80202-2466
Phone : (303) 312-6312
Fax : (303) 312-6339

Region 9 (CA, NV, AZ, HI)
Environmental Protection Agency
75 Hawthorne Street
San Francisco, CA 94105
Phone : (415) 744-1305
Fax : (415) 744-2499

Region 10 (WA, OR, ID, AK)
Environmental Protection Agency
1200 Sixth Avenue
Seattle, WA 98101
Phone : (206) 553-1200
Fax : (206) 553-0149

U.S. Environmental Protection Agency Regional Tribal Program Mangers/Coordinators

Region 1
Regional Indian Program Manager
EPA Region 1 (CSP)
1 Congress Street, Suite 1100
Boston, MA 02114
617-918-1672
Fax 617-918-1505

Region 2
Indian Coordinator
EPA Region 2 (2PM-E1)
290 Broadway
New York, NY 10007-1866
212-637-3564

Indigenous Subcommittee
212-637-3790/Fax 637-3772

Region 4
Indian Coordinator
EPA Region 4 (AMB)
61 Forsyth Street, SW
Atlanta, GA 30303-8930
404-562-9639/Fax 562-9598

Region 5
Indian Coordinator
EPA Region 5 (R 19J)
77 W. Jackson Boulevard
Chicago, IL 60604-3507
312-353-1394/Fax 353-1120

Region 6
Indian Coordinator
EPA Region 6 (6XA)
1445 Ross Avenue
12th Floor, Suite 1200
Dallas, TX 75202-2733
214-665-6778/Fax 665-2118

Lead Coordinator
EPA Region 6
1445 Ross Avenue
12th Floor, Suite 1200
Dallas, TX 75202-2733
214-665-8110/Fax 665-2118

Region 7
Indian Coordinator
EPA Region 7
901 North Fifth Street
Kansas City, KS 66101
913-551-7539/Fax 551-7863

Region 8
Tribal Manager
EPA Region 8 (80EA)
999 18th Street, Suite 500
Denver, CO 80202-2466
303-312-6343/Fax 312-6741

Region 9
Tribal Program Manager
EPA Region 9 (E-4)
75 Hawthorne Street
San Francisco, CA 94105
415-744-1607/Fax 744-1604

Region 10
Tribal Office Director
EPA Region 10
1200 Sixth Avenue
Seattle, WA 98101
206-553-6220/Fax 553-6647

American Indian Environmental Office

The American Indian Environmental Office (AIEO) coordinates the Agency-wide effort to strengthen public health and environmental protection in Indian country, with a special emphasis on building tribal capacity to administer their own environmental programs. AIEO oversees development and implementation of EPA's Indian Policy and strives to ensure that all EPA Headquarters and Regional Offices fulfill EPA's trust responsibility to protect tribal health and environments and work with tribes on a government-to-government basis. For more information and specific contacts, see AIEO's web page http://www.epa.gov/indian or call 202-260-7939.

The Office of Environmental Justice

The Office of Environmental Justice (OEJ) under EPA's Office of Enforcement and Compliance (OECA), oversees the integration of environmental justice into EPA's policies, programs, and activities throughout the Agency; serves as the point of contact for environmental justice outreach and educational activities; provides technical and financial assistance. The Office also serves as the lead on the Interagency Working Group of other federal agencies to incorporate environmental justice into all federal programs. See OEJ's web page http://www.epa.gov/oeca/main/ej/index.html or call 202-564-2606

Draft Guide on Consultation and Collaboration with Indian Tribal Governments And the Public Participation of Indigenous Groups and Tribal Citizens This document was created by the Indigenous Peoples Subcommittee (IPS) of the National Environmental Justice Advisory Council (NEJAC), a federal advisory council to the EPA. This document is intended to serve as a resource for a broad audience involved with environmental justice issues relating to federally recognized tribal governments**.** For more information contact:
IPS Designated Federal Official
OEJ (2201-A)
200 Pennsylvania Avenue, NW
Washington, DC 20460
202-564-2576

EPA Telephone Hotlines

Air Risk Information Support Center (RISC)
Hours of Service: Monday to Friday, 8:00 a.m. to 5:00 p.m. EST
Telephone: 919-541-0888 / 919-541-5742 to connect to Technology Transfer Network

The Air RISC provides technical assistance and information in areas of health, risk, and exposure assessment for toxic and criteria air pollutants. Services include: the hotline for direct access to EPA experts; detailed technical assistance for more in-depth evaluations or information; and general technical guidance in the form of documents, reports and training materials related to health, risk and exposure assessment. Air Risk documents are available on the Unified Air Toxic Website http://www.epa.gov/ttnuatw1/hapindex.html

The Air RISC was developed to assist state and local air pollution control agencies and EPA Regional offices with technical matters pertaining to health, exposure, and risk assessment of air pollutants. Services to others may be limited or provided on a cost reimbursable basis.

Clean Air Technology Center (CATC)
Hours of Service: Monday to Friday, 8:30 a.m. to 4:30 p.m. EST
Telephone: 919-541-0800
Website: http://www.epa.gov/ttn/catc/

The CATC provides technical support and assistance to state and local agencies and others in evaluating air pollution problems and pollution prevention and control technology applications at stationary air pollution sources. Services include: A telephone HOTLINE to provide rapid access to EPA expertise and information; short term engineering assistance to resolve source specific issues; technical guidance documents, case studies, and computer software tools; and an internet world wide web site (CATC Web), which provides around-the-clock access to CTC services and products.

The CATC includes EPA's RACT/BACT/LAER Clearinghouse (RBLC) and Federal Small Business Assistance Program (SBAP), and provides products developed by and access to the International Technical Information Center for Global Greenhouse Gases. The CTC also sponsors and operates the U.S. Mexico Border Information center on Air Pollution/Contro de Informacion Sobre Contaminecion deAire (CICA), a bilingual HOTLINE and WEBSITE that supports EPA's Mexican Border Initiative.

Hazardous Waste Ombudsman Program
Hours of Service: Monday to Friday, 8:00 a.m. to 5:30 p.m. EST
Telephone: 202-260-9361/ 800-262-7937

The hazardous waste programs managed by OSWER are some of the most complex developed by EPA. The Ombudsman assists the public and regulated community in resolving problems concerning any requirement under these hazardous waste programs. The Ombudsman Program, located principally within the Headquarters office, handles complaints from citizens and the regulated community, obtains facts, sorts information, substantiates policy, and engages in dispute resolution, shuttle diplomacy functions, and formal investigations.

Inspector General Hotline
Hours of Service: Monday to Friday, 10:00 a.m. to 3:00 p.m. EST
Telephone: 202-260-4977
1-888-546-8740
Website:
http://www.epa.gov/oigearth/hotline.htm

The Inspector General Hotline was established to receive and control complaints alleging fraud, waste, abuse, or mismanagement within the Environmental Protection Agency.

This information is provided to increase federal and public awareness and make available resources to report fraud, waste, abuse and mismanagement.

Resource Conservation and Recovery Act/Underground Storage Tank, Superfund and EPCRA Hotline

Hours of Service: Monday to Friday, 9:00 a.m. to 6:00 p.m. EST
Telephone: 800-424-9346, 703-412-9810 (within the Washington, DC area, or international calls); 800-53-7672 TDD line for the hearing-impaired
Website:
http://www.epa.gov/epaoswer/hotline/

This hotline provides information about the regulations, programs and related documents for the following environmental statutes (translation is available for Spanish-speaking callers):

Resource Conservation and Recovery Act (RCRA) - federal procurement of products that contain recycled material; hazardous waste generators and transporters; land disposal restrictions; municipal solid waste landfill criteria; solid and hazardous waste recycling; treatment, storage and disposal facilities; waste minimization and hazardous waste combustion; underground storage tanks.

Comprehensive Environmental Response Compensation and Liability Act (CERCLA, or Superfund) - applicable or relevant and appropriate requirements (ARARs); the National Contingency Plan (NPL); radiation site cleanup regulations; reportable quantities for hazardous substances.

Emergency Planning and Community Right-to-Know Act (EPCRA)/Superfund Amendments Reauthorization Act (SARA) Title III - emergency planning; hazardous chemical inventory reporting; public access to chemical information; toxic chemical release reporting and the Form R; the toxic release inventory (TRI) database.

Safe Drinking Water Hotline

Hours of Service: Monday to Friday, 9:00 a.m. to 5:30 p.m. EST, except federal holidays.
Telephone: 800-426-4791
E-mail:
hotline-sdwa@epamail.epa.gov
Website:
http://www.epa.gov/OGWDW/drinklink.html

The SDW Hotline provides information about EPA's drinking water regulations and other related drinking water and ground water topics to the regulated community, state and local officials, and the public.

The Hotline clarifies drinking water regulations, provides appropriate 40 CFR and *Federal Register* citations, explains EPA-provided policies and guidelines and gives update information on the status of regulations. The Hotline can also provide state and local contacts. The Hotline can take orders for EPA drinking water publications or (if the publication is not available from the Office of Water) refer callers to the appropriate ordering organization.

Inquiries on EPA's drinking water program, regulations, and standards are now accepted via email. For more information on email access to the hotline, contact Beth Hall at hall.beth@epamail.epa.gov. The Safe Drinking Water (SDW) Hotline assists both the regulated

community (public water systems) and the public with their understanding of the regulations and programs developed in response to the Safe Drinking Water Act Amendments of 1986.

Drinking Water publications (for example, fact sheets, pamphlets, health advisories, and so forth) may be requested through the Safe Drinking Water Hotline or may be ordered from EPA's Office of Water Resource Center at (202) 260-7786.

Small Business Ombudsman Clearinghouse/Hotline

Hours of Service: Message recorder is on 24 hours a day.
Telephone: 703-305-5938/
800-368-5888
Website: http://www.epa.gov/sbo/

The mission of the EPA Small Business Ombudsman Clearinghouse/Hotline is to provide information to private citizens, small communities, small business enterprises, and trade associations representing the small business sector regarding regulatory activities. Mailings are made to update the audience on recent regulatory actions. Special attention is directed to apprizing the trade associations representing small business interests with current regulatory developments. Technical questions are answered following appropriate contacts with program office staff members. Questions addressed cover all media program aspects within EPA. Inquiries are received by mail, telephone, and fax.

Stratospheric Ozone Information Hotline

Hours of Service: Monday to Friday, 10:00 a.m. to 4:00 p.m. EST
Telephone: 800-296-1996
Website:
http://www.epa.gov/ozone/index.html

The Stratospheric Ozone Information Hotline offers consultation on ozone protection regulations and requirements under Title VI of the Clean Air Act Amendments (CAAA) of 1990. Title VI covers the following key aspects of the production, use, and safe disposal of ozone-depleting chemicals: 1) production phaseout and controls; 2) servicing of motor vehicle air conditioners; 3) recycling and emission reduction; 4) technician and equipment certification; 5) approval of alternatives; 6) a ban of nonessential uses; 7) product labeling; and 8) federal procurement. The hotline is a distribution center and referral point for information on other general aspects of stratospheric ozone depletion and its protection. The hotline maintains a library of relevant policy and science documents, reports, articles, and contact lists.

The hotline was developed to assist and educate the regulated community on requirements under Title VI of the Clean Air Act Amendments of 1990.

Wetlands Information Hotline

Hours of Service: Monday to Friday, 9:00 a.m. to 5:30 p.m. EST
Telephone: 800-832-7828
Website:
http://www.epa.gov/OWOW/wetlands/wetline.html

The Environmental Protection Agency's Wetlands Protection Hotline responds to requests for information regarding the values and functions of wetlands and options for their protection. The Hotline acts as a central point of contact for the Wetlands Division of the Office of Wetlands, Oceans, and Watersheds to provide a wide range of information on wetlands protection efforts involving EPA and other organizations. In addition, the Hotline uses an extensive contact list to direct callers to additional sources of information or to appropriate regulatory agencies for assistance. The Hotline also provides information on the availability of wetlands related documents and accepts requests for certain wetlands publications.

RCRA Information Center (RIC)

This section contains reproductions of a brochure produced by EPA for users of the RCRA Information Center (RIC). This brochure describes the RIC, its purpose, and services. In addition, the brochure provides information about various hotlines and dockets related to solid and hazardous waste management and clean-up.

Other EPA information related to permitting and public participation can be found on the Internet at: http://www.epa.gov. Using the EPA Headquarters home page you can access the home pages for each of the ten EPA Regional Offices as well as policy and regulatory information. The RCRA information at the headquarters home page is available through the RCRA Hotline (see brochure below). Also, many businesses and facilities have information available on the Internet.

Congress passed the Resource Conservation and Recovery Act (RCRA) in 1976 to create a framework for the proper management of hazardous and nonhazardous solid waste. The Act is continuously evolving as Congress amends it to reflect the nation's changing solid waste needs.

For each modification to the Act, EPA develops regulations that spell out how the statue's broad policies are to be carried out. The RCRA

Information Center (RIC) was formed to house both documents used in writing these regulations as well as EPA publications produced for public guidance on solid waste issues.

The documents stored in the RIC are divided into two basic categories: (1) documents involved in various stages of rulemaking; and (2) general documents discussing the various aspects of recycling, treatment, and disposal of hazardous and solid waste.

What are the Main Sources of Rulemaking Dockets?

- Docket files generated from RCRA-related rulings. Each file is composed of two sections: (1) technical support documents that were used by EPA in the development of the particular rule; and (2) comments from companies, individuals, environmental organizations, and various levels of government.
- Reprints of Federal Registers containing RCRA-related issues.
- Administrative Records, which are rulemaking documents that have undergone litigation.

What are the Main Sources of General Documents/Collections?

- Catalog of Hazardous and Solid Waste Publications, which lists the RIC's most popular documents. The catalog is updated periodically.
- Guidance documents, which provide directions for implementing the regulations for disposal and treatment of hazardous and solid wastes.
- Brochures, booklets, and executive summaries of reports concerning waste reduction and disposal issues surrounding solid and hazardous wastes.
- A historical collection of Office of Solid Waste documents.
- Selected Office of Solid Waste correspondence written by EPA officials in response to questions from organizations and individuals concerning hazardous and solid waste regulations.
- Health and Environmental Effects Profiles (HEEPs) and Health and Environmental Effects Documents (HEEDs).

Hours and Location

- The RIC is open to the public from 9:00 a.m. to 4:00 p.m., Monday through Friday.
- The RIC is located at:

  Crystal Gateway 1, First Floor
  1235 Jefferson Davis Highway
  Arlington, VA
- It is recommended that visitors make an appointment so that the material they wish to view is ready when they arrive.
- Patrons may call for assistance at 703 603-9230, send a fax to 703 603-9234, or send an e-mail to rcra-docket@epamail.epa.gov.
- Patrons may write to the following address:

  RCRA Information Center (5305W)
  U.S. Environmental Protection Agency
  401 M Street, SW
  Washington, DC 20460
  (Please note that this address is for mailing purposes only.)

Photocopying and Microfilming

Many documents are available only in the original and, therefore, must be photocopied. Patrons are allowed 100 free photocopies Thereafter they are charged 15 cents per page. When necessary, an invoice stating how many copies were made, the cost of the order, and where to send a check will be issued to the patron.

Documents also are available on microfilm. The RIC staff help patrons locate needed documents and operate the microfilm machines. The billing fee for printing microfilm documents is the same as for photocopying documents.

Patrons who are outside of the metropolitan Washington, DC, area can request documents by telephone. The photocopying and microfilming fee is the same as for walk-in patrons. If an invoice is necessary, RIC staff can mail one with the order.

Additional EPA Sources of Hazardous and Solid Waste Information

OSW Methods Information Communication Exchange (MICE)
Hours of Service: Message recorder is on 24 hours a day.
Telephone: 703 821-4690
Website:
http://www.epa.gov/epaoswer/hazwaste/test/txmice.htm

A telephone service implemented by the EPA Office of Solid Waste to answer technical questions on test methods used on organic and inorganic chemicals. These tests are discussed in the EPA document Test Methods for Evaluat-ing Solid Waste: Physical/Chemical Methods (Document Number: SW-846). Patrons can call MICE 24 hours a day and are requested to leave a message stating their name, organization, telephone number, and an explanation of what they need. Questions are usually answered within one business day.

Underground Storage Tank Docket
Hours of Service: Monday to Friday, 9:00 a.m. to 4:00 p.m. EST
Telephone: 703 603-9231
Website:
http://www.epa.gov/swerust1/resource/docket.htm

Provides documents and regulatory information pertinent to RCRA's Subtitle I (the Underground Storage Tank program).

Superfund Docket
Hours of Service: Monday to Friday, 9:00 a.m. to 4:00 p.m. EST
Telephone: 703 603-9232
Website:
http://www.epa.gov/oerrpage/superfund/contacts/docket.htm

Provides rulemaking material pertinent to the Superfund Program and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

Pollution Prevention Information Clearinghouse (PPIC)
Hours of Service: Monday to Friday, 8:30 a.m. - 4:00 p.m. EST
Telephone: 202 260-1023
Website:
http://www.epa.gov/opptintr/cbep/actlocal/ppic-17.htm

A center for dissemination of pollution prevention information. PPIC's services include document distribution, access to a circulating and periodicals collection, and outreach.

Headquarters Information/Resources Center
Hours of Service: Monday to Friday, 8:00 a.m. to 5:00 p.m. EST for phone calls,
Telephone: 202 260-5922
Fax: 202 260-5153
E-mail: library-hq@epa.gov

Provides general, nontechnical environmental information through its brochures, booklets, and pamphlets.

EPA Headquarters Library
Hours of Service: Monday to Friday, 9:00 a.m. to 5:00 p.m. EST for phone calls,
10:00 a.m. to 2:00 p.m. EST for walk-in visitors
Reference Desk: 202 260-5921
Interlibrary Loan Desk: 202 260-5933
Website:
http://www.epa.gov/natlibra/specsort.htm

The Headquarters Library is the reference library for the Agency.

It offers a broad range of sources of environmental information including reports from various EPA offices and trade and environmental journals. The collection also features departments such as the "Water Collection," the "Hazardous Waste Collection," and "Infoterra," which accommodates foreign patrons' requests.

Additional Website Resources

Ocean and Coastal Protection Division homepage is located at **http://www.epa.gov/owow/oceans/.**

Additional information regarding the 403 program (modified NPDES permits for discharges into the territorial seas) and 301(h) program (modifications of secondary treatment for POTWs NDPES permits) is located at **http://www.epa.gov/owow/oceans/regs/index.html**

Social Aspects of Siting RCRA Hazardous Waste Facilities **http://www.epa.gov/epaoswer/hazwaste/tsds/site/k00005.pdf**

Internet Links to EPA and State Homepages

The homepages listed below can provide a wealth of information and documents about permitting in air, water, and waste programs at EPA as well as in the states. Each state's environmental agency organization varies. For example, some states such as California, have air, water, and waste programs located in different agencies within the state government. Some states have very limited environmental agency functions. In addition, some states have limited information available on the internet. In nearly every case, however, there is a list of agency contacts that refer you to the appropriate person or office that manages air, water, or waste programs for the state.

EPA Headquarters http://www.epa.gov

EPA Region 1 http://www.epa.gov/region01/
Connecticut
http://dep.state.ct.us/
Maine
http://www.state.me.us/dep/mdephome.htm
Massachusetts
http://www.magnet.state.ma.us/dep/dephome.htm
New Hampshire
http://www.state.nh.us/des/descover.htm
Rhode Island
http://www.state.ri.us/dem/
Vermont
http://www.anr.state.vt.us/fguide/fguide4.htm

EPA Region 2 http://www.epa.gov/region02/
New Jersey
http://www.state.nj.us/dep/
New York
http://unix2.nysed.gov/ils/executive/encon/dec007.htm
Puerto Rico
Not Available
Virgin Islands
http://www.gov.vi/pnr/

EPA Region 3 http://www.epa.gov/region03/
Delaware
http://www.dnrec.state.de.us/
District of Columbia
Not Available
Maryland
http://www.mde.state.md.us/
Pennsylvania
http://www.dep.state.pa.us/dep/dep.html
Virginia
http://www.deq.state.va.us/
West Virginia
http://www.dep.state.wv.us/

EPA Region 4 http://www.epa.gov/region04/
Alabama
http://www.adem.state.al.us/
Florida
http://www.dep.state.fl.us/
Georgia
http://www.ganet.org/dnr/environ/
Kentucky
http://www.nr.state.ky.us/nrepc/dep/dep2.htm
Mississippi
http://www.deq.state.ms.us/
North Carolina
http://www.ehnr.state.nc.us/EHNR/
South Carolina
http://www.state.sc.us/dhec/eqc/
Tennessee
http://www.state.tn.us/environment/

EPA Region 5 http://www.epa.gov/region5/
Illinois
http://www.epa.state.il.us/
Indiana
http://www.ai.org/idem/index.html
Michigan
http://www.deq.state.mi.us/
Minnesota
http://www.pca.state.mn.us/netscape.shtml
Ohio
http://www.epa.ohio.gov/
Wisconsin
http://www.dnr.state.wi.us/

EPA Region 6 http://www.epa.gov/region06/
Arkansas
http://www.state.ar.us/
Louisiana
http://www.deq.state.la.us/
New Mexico
http://www.nmenv.state.nm.us/
Oklahoma
http://www.state.ok.us/osfdocs/envirhp.html
Texas
http://www.tnrcc.state.tx.us/

EPA Region 7 http://www.epa.gov/region07/
Iowa
http://www.state.ia.us/epd/
Kansas
http://www.ink.org/public/kdhe/environ.html
Missouri
http://www.dnr.state.mo.us/deq/homedeq.htm
Nebraska
http://www.deq.state.ne.us/

EPA Region 8 http://www.epa.gov/region08/
Colorado
http://www.cdphe.state.co.us/cdphehom.asp
Montana
http://www.deq.state.mt.us/
North Dakota
http://www.ehs.health.state.nd.us/ndhd/
South Dakota
http://www.state.sd.us/state/executive/denr/denr.html
Utah
http://www.eq.state.ut.us/
Wyoming
http://deq.state.wy.us/

EPA Region 9 http://www.epa.gov/region09/
Arizona
http://www.adeq.state.az.us/
California
http://www.ca.gov/s/environ/
Hawaii
http://www.hawaii.gov/health/
Nevada
http://www.state.nv.us/ndep/
American Samoa
Not Available
Guam
http://ns.gov.gu/government.html
Northern Marianas Islands
Not Available

EPA Region 10 http://www.epa.gov/region10/
Alaska
http://www.state.ak.us/local/akpages/ENV.CONSERV/home.htm#menu
Idaho
http://www.state.id.us/deq/
Oregon
http://www.deq.state.or.us/
Washington
http://www.wa.gov/ecology/

Tribal Links

EPA's American Indian Environmental Office
http://www.epa.gov/indian

Office of Air and Radiation Tribal Air Homepage
http://www.epa.gov/oar/tribal

Municipal Solid Waste Management in Indian Country
http://www.epa.gov/tribalmsw

Office of Enforcement and Compliance Assurance Tribal Program
http://es.epa.gov/oeca/tribal

Region 2 Indian Program
http://www.epa.gov/region2/nations/indian1.htm

Region 5 Tribal Homepage
http://www.epa.gov/reg5oopa/tribes

Region 6 Native American Office
http://www.epa.gov/earth1r6/6xa/tribal/tribal.htm

Region 8 Tribal Assistance Program
http://www.epa.gov/region8/coop/tribe/tap.html

Region 9 Indian Programs
http://www.epa.gov/region09/cross_pr/indian/index.html

Region 10 Tribal Office Homepage
http://epainotes1.rtpnc.epa.gov:7777/r10/tribal.NSF/webpage/tribal+office+homepage

Section 6 - Acronyms and Glossary

ACRONYMS

BDAT	Best Demonstrated Available Technology
BMP	Best Management Practice
BOD	Biological Oxygen Demand
BRS	Biennial Reporting System
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFCs	Chlorofluorocarbons
CFR	Code of Federal Regulations
CMS	Corrective Measures Study
CSO	Combined Sewer Overflow
CWA	Clean Water Act
CZMP	Coastal Zone Management Plan
DEIS	Draft Environmental Impact Statement
DO	Dissolved Oxygen
DQO	Data Quality Objective
DU	Dobson Unit(s)
EA	Environmental Assessment
EID	Environmental Information Documents
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
FACA	Federal Advisory Committee Act
FCCC	Framework Convention on Climate Change
FEIS	Final Environmental Impact Statement
FONSI	Finding of No Significant Impact
FPPA	Farmland Protection Policy Act
FWPCA	Federal Water Pollution Control Act (now amended and commonly known as the CWA)
HAP	Hazardous Air Pollutants
HFCs	Hydrofluorocarbons
HHW	Household Hazardous Waste
HON	Hazardous Organic NESHAP
HSWA	Hazardous and Solid Waste Amendments
IPCC	Intergovernmental Panel on Climate Change
LAER	Lowest Achievable Emission Rates
MACT	Maximum Achievable Control Technology
MSW	Municipal Solid Waste
NESHAP	National Emission Standard for Hazardous Air Pollutants
NAAQS	National Ambient Air Quality Standard
NCAPS	National Corrective Action Prioritization System
NCPDI	National Coastal Pollutant Discharge Inventory
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NOA	Notices of Availability
NOAA	National Oceanic and Atmospheric Administration
NOI	Notices of Intent
NPDES	National Pollutant Discharge Elimination System
NRC	National Research Council
NSPS	New Source Performance Standards
NSR	New Source Review
NTI	National Toxics Inventory
O_3	Ozone
OAR	Office of Air and Radiation
OEA	Office of External Affairs
ORD	Office of Research and Development
OSW	Office of Solid Waste
OSWER	Office of Solid Waste and Emergency Response
OUST	Office of Underground Storage Tanks
PAMS	Photochemical Assessment Monitoring Stations
PCB	Polychlorinated Biphenyl
PFCs	Perfluorinated Carbons
PM-10	Particulate Matter (diameter of 10 micrometers or less)
POTW	Publicly Owned Treatment Works
PSD	Prevention of Significant Deterioration
QAPP	Quality Assurance Project Plan
RACT	Reasonable Available Control Technology
RCRA	Resource Conservation and Recovery Act
RCRIS	Resource Conservation and Recovery Information System
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
ROD	Record of Decision
SDWA	Safe Drinking Water Act
SIC	Standard Industrial Classification
SIP	State Implementation Plan
TMDL	Total Maximum Daily Load
TRE	Toxicity Reduction Evaluation
TRI	Toxic Release Inventory
TSD	Treatment, Storage, and Disposal
TSDF	Treatment, Storage, and Disposal Facility
TSP	Total Suspended Particulates
UIC	Underground Injection Control
USDW	Underground Sources of Drinking Water
UST	Underground Storage Tank
VOC	Volatile Organic Compounds
WPA	Watershed Protection Approach
WQ	Water Quality
WQS	Water Quality Standard

Acronym Sources

1) Clean Water Act Section
403 Report to Congress
Phase II - Point Source Discharges Inside the Baseline
EPA Office of Water
EPA842-R-94-001

2) 1995 National Air Quality: Status and Trends
EPA Office of Air and Radiation
Air Quality Trends Analysis Group (AQTAG)
Research Triangle Park, NC 27711
(Published Annually)

3) Air Quality Trends - 1994 (ACRONYMS)
EPA-454/F-95-003
EPA Office of Air and Radiation (OAR)
Office of Air Quality Planning and Standards
Research Triangle Park, NC 27711

4) Office of Water, Ocean and Coastal Protection Division
Internet Home Page:
http://www.epa.gov/OWOW/OCPD/

5) 40 CFR Parts 6, 70, 71, 124, 233

GLOSSARY

Acid Deposition

Air pollution produced when acid chemicals are incorporated into rain, snow, fog, or mist. See also acidic pollution in the parks.

Adverse Impact

A determination that an air-quality related value is likely to be degraded within a Class I area. See also Clean Air Act.

Aerometric Information Retrieval System (AIRS)

A computer-based repository of US air pollution information administered by the EPA Office of Air Quality Planning and Standards.

Aerosol

A suspension of microscopic solid or liquid particles in air. See also haze, particulate matter.

Air Pollution

Degradation of air quality resulting from unwanted chemicals or other materials occurring in the air. See also air pollutant.

Air Quality (in context of the national parks)

The properties and degree of purity of air to which people and natural and heritage resources are exposed.

Air Pollution Control Permitting Process

Process by which facilities are permitted to emit specified types and quantities of air pollutants air quality related values (AQRVs): values including visibility, flora, fauna, cultural and historical resources, odor, soil, water, and virtually all resources that are dependent upon and affected by air quality. "These values include visibility and those scenic, cultural, biological, and recreation resources of an area that are affected by air quality" (43 Fed. Reg. 15016).

Air Pollutant

An unwanted chemical or other material found in the air. See also air pollution.

AIRWeb

Air Resources Web, a US National Park-focused air quality information retrieval system developed by the Air Resources Division of the National Park Service.

Ambient Air

Air that is accessible to the public.

Aquatic Ecosystem

Bodies of water, including wetlands, that serve as the habitat for interrelated and interacting communities and populations of plants and animals.

Aquatic Environment

The geochemical environment in which dredged material is submerged under water and remains water saturated after disposal is completed.

Attainment Area

A geographic area in which levels of a criteria air pollutant meet the health-based National Ambient Air Quality Standard for that specific pollutant.

Baseline

Belt of the seas measured from the line of ordinary low water along that portion of the coast that is in direct contact with the open sea and the line marking the seaward limit of inland waters (see Figure 1-1 in the main text).

Beneficial Uses

Placement or use of dredged material for some productive purpose. Beneficial uses may involve either the dredged material or the placement site as the integral component of the beneficial use.

Best Available Control Technology (BACT)

An emission limitation based on the maximum degree of reduction for each pollutant, that must be applied by sources subject to the Prevention of Significant Deterioration program.

Bioaccumulation

The accumulation of contaminants in the tissues of organisms through any route, including respiration, ingestion, or direct contact with contaminated water, sediment, or dredged material.

Biological Effects

Ecological studies to determine the nature or extent of air pollution injury to biological systems. See also biological effects pages.

By-Product Material

A material that is not one of the primary products of a production process. Examples of by-products are process residues such as slags or distillation column bottoms.

Camera

Device for recording visual range on film.

Capping

The controlled, accurate placement of contaminated material at an open-water site, followed by a covering or cap of clean isolating material.

Carbon Monoxide

A criteria air pollutant that is a colorless, odorless, poisonous gas produced by incomplete combustion; particularly, incomplete burning of carbon-based fuels e.g. gasoline, oil, and wood.

Categorical Exclusion (CATEX)

Categories of actions which normally do not individually or cumulatively have a significant effect on the human environment and for which, therefore, an EA or an EIS is not required.

CERCLA (Superfund)

Passed in 1980, the Comprehensive, Emergency Response, and Compensation and Liability Act (also known as Superfund) addresses immediate and long term threats to the public health and the environment from abandoned or active sites contaminated with hazardous or radioactive materials.

Class I

Areas of the country set aside under the Clean Air Act to receive the most stringent degree of air quality protection. See also class II.

Class II

Areas of the country protected under the Clean Air Act, but identified for somewhat less stringent protection from air pollution damage than class I, except in specified cases.

Class V UIC Rule

A rule under development covering wells not included in Class I, II, III or IV in which nonhazardous fluids are injected into or above underground sources of drinking water.

Clean Water Act (CWA)

CWA, formally referred to as the Federal Water Pollution Control Act or Federal Water Pollution Control Act Amendments of 1972, was passed to prohibit the discharge of any pollutant waters of the U.S. from a point source unless the discharge was authorized by a NPDES permit.

Clean Fuels

Low-pollution fuels that can replace ordinary gasoline, including gasohol, and natural and LP gas.

Clean Air Act

Originally passed in 1963, our current national air pollution control program is based on the 1970 version of the law. Substantial revisions were made by the 1990 Clean Air Act Amendments.

Coastal Zone

Includes coastal waters and the adjacent shorelands designated by a state as being included within its approved coastal zone

management program. The coastal zone may include open waters, estuaries, bays, inlets, lagoons, marshes, swamps, mangroves, beaches, dunes, bluffs, and coastal uplands. Coastal-zone uses can include housing, recreation, wildlife habitat, resource extraction, fishing, aquaculture, transportation, energy generation, commercial development, and waste disposal.

Commercial Chemical Product

A chemical substance that is manufactured or formulated for commercial or manufacturing use.

Community Water System

A public water system that serves at least 15 service connections used by year-round residents of the area served by the system or regularly serves at least 25 year-round residents.

Comprehensive State Ground Water Protection Program

The program consists of a set of six strategic activities which foster more efficient and effective ground water protection through more cooperative, consistent, and coordinated operation of all relevant federal, state and local programs within a state. The activities include establishing goals, setting priorities, defining authorities, implementing programs, coordinating information collection and management, and operating public education and participation activities.

Confined Disposal

Placement of dredged material within diked nearshore or upland confined disposal facilities (CDFs) that enclose the disposal area above any adjacent water surface, isolating the dredged material from adjacent waters during placement. Confined disposal does not refer to subaqueous capping or contained aquatic disposal.

Confined Disposal Facility (CDF)

An engineered structure for containment of dredged material consisting of dikes or other structures that enclose a disposal area above any adjacent water surface, isolating the dredged material from adjacent waters during placement. Other terms used for CDFs that appear in the literature include "confined disposal area," "confined disposal site," and "dredged material containment area."

Conservation Easements

Easements are an interest in land that entitles a person to use the land possessed by another (affirmative easement), or to restrict uses of the land subject to the easement (negative easement). A conservation easement restricts the owner to uses that are compatible with conservation environmental values. Easements are governed by state laws and thus there are variations among the states in how they are administered.

Contained Aquatic Disposal

A form of capping which includes the added provision of some form of lateral containment (for example, placement of the contaminated and capping materials in bottom depressions or behind subaqueous berms) to minimize spread of the materials on the bottom.

Container

Any portable device in which a material is stored, transported, treated, disposed of, or otherwise handled.

Contaminant

A chemical or biological substance in a form that can be incorporated into, onto, or be ingested by and that harms aquatic organisms, consumers of aquatic organisms, or users of the aquatic environment.

Contaminated Sediment or Contaminated Dredged Material

Contaminated sediments or contaminated dredged materials are defined as those that have been demonstrated to cause an unacceptable adverse effect on human health or the environment.

Contamination Source Inventory

The process of identifying and inventorying contaminant sources within delineated SWPAs through recording existing data, describing sources within the SWPA, targeting likely sources for further investigation, collecting and interpreting new information on existing or potential sources through surveys, and verifying accuracy and reliability of the information gathered.

Continuous Sampling Device

An air analyzer that measures air quality components continuously. See also monitoring, integrated sampling device.

Criteria Air Pollutant

A group of very common air pollutants regulated by EPA on the basis of criteria, and for which a National Ambient Air Quality Standard is established (SO2, NO2, PM10, Pb, CO, O3).

Criteria (in the context of criteria pollutants)

Information on health and/or environmental effects of pollution.

Cumulative Impact

The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions regardless of what agency, federal or non-federal, or what person undertakes the action.

Department of Energy (DOE)

This state agency's mission is to achieve efficiency in energy use, diversity in energy sources, a more productive and competitive economy, improved environmental quality, and a secure national defense. DOE was created on October 1, 1977 out of the Energy and Research and Development Agency as well as various aspects of non-nuclear federal energy policy and programs. The DOE complex which is located over 22 states with sites that range in size from small to very large produced and tested nuclear weapons.

Disposal Site or Area

A precise geographical area within which disposal of dredged material occurs.

Dose-response

The relationship between the dose of a pollutant and its effect on a biological system.

Emissions

Release of pollutants into the air from a source.

Dredged Material Discharge

The term dredged material discharge as used in this document means any addition of dredged material into waters of the United States or ocean waters. The term includes open- water discharges; discharges resulting from unconfined disposal operations (such as beach nourishment or other beneficial uses); discharges from confined disposal facilities that enter waters of the United States (such as effluent, surface runoff, or leachate); and overflow from dredge hoppers, scows, or other transport vessels.

Dredged Material

Material excavated from waters of the United States or ocean waters. The term dredged material refers to material which has been dredged from a water body, while the term sediment refers to material in a water body prior to the dredging process.

Drinking Water State Revolving Fund

The Fund provides capitalization grants to states to develop drinking water revolving load funds to help finance infrastructure improvements, source water protection, and other activities for public water systems.

Effluent

Water that is discharged from a confined disposal facility during and as a result of the filling or placement of dredged material.

Elementary Neutralization Unit

A tank, tank system, container, transport vehicle, or vessel (including ships) that is designed to contain and neutralize corrosive waste.

Emergency

In dredging operations, emergency is defined in 33 CFR Part 335.7 as a "situation which would result in an unacceptable hazard to life or navigation, a significant loss of property, or an immediate and unforeseen significant economic hardship if corrective action is not taken within a time period of less than the normal time needed under standard procedures."

Enforcement

Legal methods used by EPA, state, and local governments to make polluters obey the Clean Air Act. In the absence of enforcement, citizens can sue EPA or the states to obtain action, and can also sue violating sources apart from any action EPA or state or local governments have taken.

Environmental Protection Agency (EPA)

Created in 1970, the EPA is responsible for working with state and local governments to control and prevent pollution in areas of solid and hazardous waste, pesticides, water, air, drinking water, and toxic and radioactive substances.

Environmental Assessment (EA)

A concise public document that analyzes the environmental impacts of a proposed federal action and provides sufficient evidence to determine the level of significance of the impacts.

Environmental Impact Statement (EIS)

The "detailed statement" required by Section 102(2)(C) of NEPA which an agency prepares when its proposed action significantly affects the quality of the human environment.

Federal Facilities Compliance Act (FFCA or FFCAct)

An amendment to RCRA, the FFCA waives immunity for DOE and other federal agencies, allowing states and the EPA to impose penalties for non-compliance and requires DOE to develop plans for treating the hazardous components of radioactive wastes subject to RCRA requirements.

Federal Standard

The dredged material disposal alternative or alternatives identified by the U.S. Army Corps of Engineers that represent the least costly alternatives consistent with sound engineering practices and meet the environmental standards established by the 404(b)(1) evaluation process or ocean-dumping criteria (33 CFR 335.7).

Finding of No Significant Impact (FONSI)

A public document that briefly presents the reasons why an action will not have a significant impact on the quality of the human environment and therefore will not require preparation of an environmental impact statement.

Fine Particle

Particulate matter less than 2.5 microns in diameter.

Ground Water Disinfection Rule

Under Section 107 of the SDWA Amendments of 1996, the statute reads, "... the Administrator shall also promulgate national primary drinking water regulations requiring disinfection as a treatment technique for all public water systems, including surface water systems, and, as necessary, ground water systems."

Gulf of Maine Oxidant Study (GOMOS)

A study to investigate the sources and transport of pollutants contributing to ozone formation.

Habitat

The specific area or environment in which a particular type of plant or animal lives. An organism's habitat provides all of the basic requirements for the maintenance of life. Typical coastal habitats include beaches, marshes, rocky shores, bottom sediments, mudflats, and the water itself.

Hazardous Air Pollutants (HAP)

Airborne chemicals that cause serious health and environmental effects.

Hazardous and Solid Waste Amendments (HWSA)

This 1984 Act amended RCRA and required phasing out land disposal of untreated hazardous waste by more stringent hazardous waste management standards (broken down into thirds with a time table for each third). Some of the other mandates of this law include increased enforcement authority for EPA and a program requiring corrective action.

Hazardous Waste

A subset of solid wastes that pose substantial or potential threats to public health or the environment.

Haze (Hazy)

A visual phenomenon resulting from scattering of light in a volume of aerosols. In the context of air pollution, haze is caused in large part by man-made air pollutants. See also regional haze and "Visibility on the Colorado Plateau."

Impairment

The degree to which a scenic view or distance of clear visibility is degraded by man-made pollutants.

IMPROVE

Interagency Monitoring of Protected Visual Environments, a collaborative monitoring program to establish present visibility levels and trends, and to identify sources of man-made impairment. See also IMPROVE Newsletter.

Integrated Sampling Device

An air sampling device that allows estimation of air quality components over a period of time (e.g. two weeks) through laboratory analysis of the sampler's medium.

Land Disposal Restrictions (LDR)

These restrictions were mandated by the 1984 HSWA amendments to RCRA. They prohibit the disposal of hazardous wastes into or on the land unless the waste meets treatability standards of lower toxicity.

Leachate

Water or any other liquid that may contain dissolved (leached) soluble materials, such as organic salts and mineral salts, derived from a solid material. For example, rainwater that percolates through a confined disposal facility and picks up dissolved contaminants is considered leachate.

Level Bottom Capping

A form of capping in which the contaminated material is placed on the bottom in a mounded configuration.

Local Sponsor

A public entity (e.g., port district) that sponsors state navigation projects. The sponsor seeks to acquire or hold permits and approvals for disposal of dredged material at a disposal site (USACE 1986).(1)

Major Source

A stationary facility that emits a regulated pollutant in an amount exceeding the threshold level (100 or 250 tons per year, depending on the type of facility).

Management Action

Those actions or measures that may be considered necessary to control or reduce the potential physical or chemical effects of dredged material disposal.

Maximum Contaminant Level(MCL)

In the SDWA, an MCL is defined as "the maximum permissible level of a contaminant in water which is delivered to any user of a public water system."

Mitigation

Defined in the Council on Environmental Quality's regulation 40 CFR 1508.20 (a-e).

Mobile Sources

Moving objects that release regulated air pollutants, e.g. cars, trucks, buses, planes, trains, motorcycles, and gas-powered lawn mowers. See also source; stationary source.

Monitoring

Measurement of air pollution. See also continuous sampling device, integrated sampling device.

National Pollutant Discharge Elimination System (NPDES)

The national program for issuing, modifying, revoking and reissuing, terminating, monitoring, and enforcing permits, and imposing and enforcing pretreatment requirements, under sections 301, 303, 307, 318, 402, 403, and 405 of the Clean Water Act.

National Ambient Air Quality Standards (NAAQS)

Permissible levels of criteria air pollutants established to protect public health and welfare. See also EPA's NAAQS page.

Nephelometer

An optical instrument that measures the scattering coefficient of ambient air.

Nitrogen Oxides

A criteria air pollutant, compounds NO, NO2, NO3, N2O5, alkyl nitrates, etc. See also NOx and NOy.

Non-Community Water System

A public water system that is not a community water system. There are two types of NCWSs : transient and non-transient.

Nonattainment Area

A geographic area in which the level of a criteria air pollutant is higher than the level allowed by the federal standards. See also EPA's nonattainment page.

North Atlantic Regional Experiment (NARE)

A study to assess the contribution of continental air pollution to the North Atlantic Ocean.

Nox

The sum of NO + NO2. See also nitrogen oxides, NOy.

NOy

The sum of all oxidized nitrogen species, i.e. NO, NO2, NO3, HNO3, N205, alkyl nitrates, PAN, etc. Does not include NH3 or N2O. See also nitrogen oxides, NOx.

Open-Water Disposal

Placement of dredged material in rivers, lakes, estuaries, or oceans via pipeline or surface release from hopper dredges or barges.

Operator Certification

Certification of operators of community and nontransient, noncommunity water systems as required by a state implementing an EPA approved Water Operator.

Organic Compounds

Chemicals that contain the element carbon.

Ozone

A gas similar to oxygen that is a criteria air pollutant and a major constituent of smog. See also reactive organic compounds; volatile organic compounds.

Particle Sampler

An instrument to measure particulate matter in ambient air.

Particulate Matter

Dust, soot, other tiny bits of solid materials that are released into and move around in the air. See also fine particle, PM10, Visibility Research Program pages.

Permitting Authority

EPA, or the state, tribal, or local governmental agency that receives delegation to carry out specified activity after meeting EPA's capability criteria.

PM10

A criteria air pollutant that is particulate matter in ambient air exceeding 10 microns in diameter.

Prevention of Significant Deterioration (PSD)

A program established by the Clean Air Act that limits the amount of additional air pollution that is allowed in Class I and Class II areas.

Primacy State

State that has the responsibility for ensuring a law is implemented, and has the authority to enforce the law and related regulations.

Primary Standard

A pollution standard based on human health effects. Primary standards are set for criteria air pollutants. See also secondary standard.

R-MAP

Resource Management Assessment Program.

Reactive Organic Compounds (in the context of photochemically produced air pollution)

Organic compounds that produce ozone in the presence of nitrogen oxides and sunlight. See also Volatile Organic Compounds.

Reclaimed Material

Material that is regenerated or processed to recover a usable product. Examples are the recovery of lead values for spent batteries and the regeneration of spent solvents.

Record of Decision (ROD)

A public document signed by the agency decision-maker at the time of a decision. The ROD states the decision, alternatives considered, the environmentally preferable alternative or alternatives, factors considered in the agency's decision, mitigation measures that will be implemented, and a description of any applicable enforcement and monitoring programs.

Recovered Material

A material or by-product that has been recovered or diverted from solid waste. Does not include materials or by-products generated from, and commonly used within, an original manufacturing process.

Recycled Material

A material that is used, reused, or reclaimed.

Reformulated Gasoline

Specially-refined gasoline with low levels of smog-forming volatile organic compounds and low levels of hazardous air pollutants.

Regional Round Tables for Source Water Protection

EPA's Regional office's meetings with stakeholders interested and involved in source water protection.

Regional Haze

A cloud of aerosols extending up to hundreds of miles across a region and promoting noticeably hazy conditions.

Resource, Conservation, and Recovery Act (RCRA)

RCRA gave EPA authority to control hazardous waste from "cradle-to-grave." This includes the minimization, generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes. RCRA focuses only on active and future facilities and does not address abandoned or historical sites (see CERCLA).

Reused Material

A material that is employed as an ingredient in an industrial process to make a product, or as an effective substitute for a commercial product.

Runoff

The liquid fraction of dredged material or the surface flow caused by precipitation on upland or nearshore dredged material disposal sites.

Safe Drinking Water Act (SDWA)

A law passed by Congress in 1974 and amended in 1986 and 1996 to ensure that public water systems provide safe drinking water to consumers.

Secondary Standard

An air pollution limit based on environmental effects, e.g. damage to property, plants, visibility, etc. Secondary standards are set for criteria air pollutants. See also primary standard.

Sediment

Material, such as sand, silt, or clay, suspended in or settled on the bottom of a water body. Sediment input to a body of water comes from natural sources, such as erosion of soils and weathering of rock, or as the result of anthropogenic activities, such as forest or agricultural practices, or construction activities. The term dredged material refers to material which has been dredged from a water body, while the term sediment refers to material in a water body prior to the dredging process.

Sludge

Any solid, semi-solid, or liquid waste generated from a municipal, commercial, or industrial wastewater treatment plant, water supply treatment plant, or air pollution control facility, exclusive of the treated effluent from a wastewater treatment plant.

Smog

A mixture of air pollutants, principally ground-level ozone, produced by chemical reactions involving smog-forming chemicals. See also haze.

Sole Source Aquifer Designation

The surface area above a sole source aquifer and its recharge area.

Solid Waste

As defined under RCRA, any solid, semi-solid, liquid, or contained gaseous materials discarded from industrial, commercial, mining, or agricultural operations, and from community activities. Solid waste includes garbage, construction debris, commercial refuse, sludge from water supply or waste treatment plants, or air pollution control facilities, and other discarded materials. Solid waste does not include solid or dissolved materials in irrigation return flows or industrial discharges which are point sources subject to permits under section 402 of the Clean Water Act or source, special nuclear, or byproduct material as defined by the AEA.

Source Water Protection Area

The area delineated by the state for a PWS or including numerous PWSs, whether the source is ground water or surface water or both, as part of the State Source Water Assessment Program approved by EPA under Section 1453 of the SDWA.

Source

Any place or object from which air pollutants are released. Sources that are fixed in space are stationary sources; sources that move are mobile sources. See also major source.

Southern Oxidant Study (SOS)

A study to assess the sources and transport of air pollutants contributing to ozone formation.

Spent Material

Any material that has been used and, as a result of contamination, can no longer serve the purpose for which it was produced without first processing it.

State Source Water Petition Programs

A state program implemented in accordance with the statutory language at Section 1454 of the SDWA to establish local voluntary incentive-based partnerships for source water protection and remediation.

State Management Plan Program

A state management plan under FIFRA required by EPA to allow states (e.g. states, tribes and U.S. territories) the flexibility to design and implement approaches to manage the use of certain pesticides to protect ground water.

State Implementation Plan (SIP)

A collection of regulations used by the state to carry out its responsibilities under the Clean Air Act.

Stationary Source

A fixed source of regulated air pollutants (e.g. industrial facility). See also source; mobile sources.

Still Bottom

Residue or by-product of a distillation process such as solvent recycling.

Subwatershed

A topographic boundary that is the perimeter of the catchment area of a tributary of a stream.

Sulfur Dioxide (SO2)

A criteria air pollutant that is a gas produced by burning coal and some industrial processes. See also acid deposition, sulfur dioxide park topics.

SUM60

The daily sum of all valid hourly ozone concentrations equaling or exceeding 60 PPB for the day Statistic is computed for all days with valid hourly ozone concentrations equaling or exceeding 60 PPB during the year or growing season. Units are PPB-HR.

Surface Water Treatment Rule

The rule specified maximum contaminant level goals for Giardia lamblia, viruses and Legionella, and promulgated filtration and disinfection requirements for public water systems using surface water sources or by ground water sources under the direct influence of surface water. The regulations also specified water quality, treatment, and watershed protection criteria under which filtration may be avoided.

Suspended Solids

Organic or inorganic particles that are suspended in water. The term includes sand, silt, and clay particles as well as other solids, such as biological material, suspended in the water column.

Tank

A stationary device designed to contain an accumulation of hazardous waste that is constructed primarily of nonearthen materials (e.g., wood, concrete, steel, plastic).

Technology-Based Treatment Requirements

NPDES permit requirements based on the application of pollution treatment or control technologies including (under 40 CFR Part 125) BPT (best practicable technology), BCT (best conventional technology and secondary treatment for POTWs), BAT (best available technology economically achievable), and NSPS (new source performance standards).

Temperature Inversion

Weather condition in which warm air sits atop cooler air, promoting stagnation and increased concentrations of air pollutants.

Territorial Sea

The strip of water immediately adjacent to the coast of a nation measured from the baseline as determined in accordance with the Convention on the territorial sea and the contiguous zone (15 UST 1606; TIAS 5639), and extending a distance of 3 nmi from the baseline.

Total Suspended Particulates (TSP)

Total particulate matter in a sample of ambient air.

Totally Enclosed Treatment Facility

A facility for the treatment of hazardous waste that is directly connected to an industrial production process and that is constructed and operated so as to prevent the release of hazardous waste into the environment during treatment. An example is a pipe in which waste acid is neutralized.

Toxic Pollutant

Pollutants, or combinations of pollutants, including disease-causing agents, that after discharge and upon exposure, ingestion, inhalation, or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, will, on the basis of information available to the Administrator of the U.S. Environmental Protection Agency, cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions, or physical deformations in such organisms or their offspring.

Toxic Air Pollutants

See hazardous air pollutants.

Toxicity Characteristic Leaching Procedure

A testing procedure used to determine whether a waste is hazardous. The procedure identifies waste that might leach hazardous constituents into groundwater if improperly managed.

Toxicity

Level of mortality or other end point demonstrated by a group of organisms that have been affected by the properties of a substance, such as contaminated water, sediment, or dredged material.

Transient/Non-Transient Water Systems

Water systems that are non-community systems: transient systems serve 25 of the same nonresident persons per day for more than six months per year; nontransient systems regularly serve at least 25 nonresident persons per day for more than six months per year.

Transmissometer

A device for assessing visibility conditions by measuring the amount of light received from a distant light source. See transmissometer exhibit.

Turbidity

An optical measure of the amount of material suspended in the water. Increasing the turbidity of the water decreases the amount of light that penetrates the water column. Very high levels of turbidity can be harmful to aquatic life (USACE 1986).

Underground Injection Control Program

The program is designed to prevent underground injection which endangers drinking water sources. The program applies to injection well owners and operators on federal facilities, Native American lands, and on all U.S. land and territories.

Upland Environment

The geochemical environment in which dredged material may become unsaturated, dried out, and oxidized.

Visual Range

An expression of visibility; the distance at which a large black object just disappears against the horizon.

Visual Air Quality

Air quality evaluated in terms of pollutant particles and gases that affect how well one can see through the atmosphere.

Volatile Organic Compounds (VOC)

Organic compounds that vaporize readily and contribute to the development of ozone. Many VOCs are also hazardous air pollutants. See also reactive organic compounds.

Vulnerability of Aquifer

Vulnerability is the relative ease with which a contaminant applied on or near a land surface can migrate to the aquifer under a given set of agronomic management practices, contaminant characteristics, and aquifer sensitivity conditions.

Vulnerability Assessments

An assessment of the vulnerability of a Public Water System to the sources of contamination found in the contamination source inventory (defined above). These assessments are key to determining how a state or other entities should address the contamination that is or could come from each source found in the inventory.

Wastewater Treatment Unit

A tank or tank system that is subject to regulation under either Section 402 or 307(b) of the Clean Water Act, and that treats and stores an influent wastewater that is hazardous waste, or that treats or stores a wastewater treatment sludge that is hazardous.

Water Quality-Based Toxics Control

An integrated strategy used in NPDES permitting to assess and control the discharge of toxic pollutants to surface waters: the whole-effluent approach involving the use of toxicity tests to measure discharge toxicity and the chemical-specific approach involving the use of water quality criteria or state standards to limit specific toxic pollutants directly.

Watershed Approach

A watershed approach is a coordinating framework for environmental management that focuses public and private sector efforts to address the highest priority problems within hydrologically-defined geographic areas, taking into consideration both ground and surface water flow.

Watershed Area

A topographic area that is within a line drawn connecting the highest points uphill of a drinking water intake, from which overland flow drains to the intake.

Watershed

A topographic boundary area that is the perimeter of the catchment area of a stream.

Wellhead Protection Area

The surface and subsurface area surrounding a well or well field, supplying a public water system, through which contaminants are reasonably likely to move toward and reach such water well or well field.

Wetlands Restoration

Involves either improving the condition of existing degraded wetlands so that the functions that they provide are of a higher quality or reestablishing wetlands where they formerly existed before they were drained or otherwise converted.

Wetlands

Areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support and that, under normal circumstances, do support a prevalence of vegetation typically adapted for life in saturated-soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas (40 CFR Part 230).

Zoning

To designate, by ordinances, areas of land reserved and regulated for specific land uses.

Glossary Sources

1) Understanding the Hazardous Waste Rules: A Handbook for Small Businesses, 1996 Update
EPA 530-K-95-001
U.S. EPA Office of Solid Waste and Emergency Response

2) Office of Water Clean Water Act Section 403 Report to Congress
Phase II - Point Source Discharges Inside the Baseline
EPA842-R-94-001
U.S. EPA Office of Water

3) Drinking Water Infrastructure Needs Survey
EPA 812-R-97-001, January 1997
U.S. EPA Office of Water

4) Framework for Dredged Material Management
November 1992
U.S. EPA Office of Wetlands, Oceans, and Watersheds

5) The National Environmental Policy Act: A Study of Its Effectiveness After Twenty-Five Years January 1997
Council on Environmental Quality
Executive Office of the President

6) Oregon Department of Environmental Quality Air Modeling Internet Home Page
NPS Glossary of Air Pollution Terms:
http://www.teleport.com/%7Ehanrahan/glossary.htm

STATEWIDE IMPLEMENTATION AGREEMENT

NATIONAL ENVIRONMENTAL POLICY ACT
AND
CLEAN WATER ACT SECTION 404

CONCURRENT NEPA/404 PROCESSES
FOR
HIGHWAY PROJECTS
IN
IOWA

I. Background

In a May 1, 1992, agreement, the U.S. Department of Transportation, the Department of the Army, and the U.S. Environmental Protection Agency (EPA) adopted the document "Applying the Section 404 Permit Process to Federal-aid Highway Projects." This document endorsed methods to integrate compliance with the National Environmental Policy Act (NEPA) and the requirements of Section 404 of the Clean Water Act.

In a July 31, 1996, agreement, the Federal Highway Administration (FHWA); the Department of the Army, U.S. Army Corps of Engineers, Rock Island District (Corps); and the Iowa Department of Transportation (Iowa DOT) adopted a document entitled "Iowa Local Operating Procedures for Integrating NEPA/404". This document provided some basic agreements on the mutual goal of concurrently processing NEPA and 404 activities, but did not provide a specific process for accomplishing that goal. Also, other Federal and State agencies that are an integral part of the NEPA and 404 processes were not involved in the development of those agreements and did not adopt the July, 1996 document.

In January of 1997, the Iowa DOT Quality Council's "Process" Subcommittee chartered a review team to review the Iowa DOT project development process with the goal of reducing development time while maintaining program integrity and quality. In November of 1997, the team provided a report which outlined a new development process called "Can-Do." Through a streamlined, non-linear process the proposed development time for a typical, non-controversial project was reduced from slightly over eleven years to about five and one-half years. Iowa DOT management approved the process and implementation began in February of 1998.

II. Purpose

This Statewide Implementation Agreement (SIA) is based on the above referenced guidance, continues the spirit of cooperation and agreement contained in the July, 1996 agreement, and implements a concurrent NEPA/404 process for highway projects in Iowa.

This SIA commits its signatories to the following:

- Potential impacts to waters of the United States, including wetlands, in Iowa shall be considered at the earliest practical time in project development.

- Adverse impacts to such waters and wetlands shall be avoided to the extent practicable, and unavoidable adverse impacts shall be minimized and mitigated to the extent reasonable and practicable.

- Interagency cooperation and consultation shall be diligently pursued throughout the integrated NEPA/404 process to ensure that the concerns of the regulatory and resource agencies are given timely and appropriate consideration and that those agencies are involved at key decision points in project development.

This SIA is intended to:

- Improve cooperation and efficiency of governmental operations at all levels, thereby better serving the public,
- Expedite construction of necessary transportation projects, with benefits to mobility and the economy at large,
- Enable more transportation projects to proceed on budget and on schedule, and
- Protect and enhance wetlands and other waters of the United States in Iowa, which will benefit the State's aquatic ecosystems and the public interest.

Regulatory and resource agency participation in this process does not imply endorsement of a transportation plan or project. ***Nothing in this SIA is intended to diminish, modify, or otherwise affect the statutory or regulatory authorities of the agencies involved.***

III. Applicability

All highway projects in Iowa needing FHWA action under NEPA and a Department of the Army permit under Section 404 of the Clean Water Act are eligible for processing under this SIA. If the NEPA/404 concurrent process is initiated and because of subsequent and more complete information the project is determined to have only very limited impacts, the concurrent process may cease. If it is later determined that more significant project impacts are present, the concurrent process may be reinitiated.

In general, the decision to develop a project using the NEPA/404 concurrent process will be made jointly by the signatory agencies. Eligible projects will be developed using the process unless:

- After consultation with the signatory agencies, it is determined that the project is not of sufficient complexity to warrant additional coordination and handling, or

- After consultation with the signatory agencies, it is determined that the discovery of need for an individual permit is too late in project development to revisit purpose and need or alternative points, or

- After consultation with the signatory agencies it is determined that the project is not suitable for the NEPA/404 process outlined in this agreement.

IV. Implementing Procedures

GENERAL PROCEDURES

A. Concurrence/Concurrence Points

The following definitions for "concurrence" and "concurrence points" are adopted for the purposes of this SIA.

Concurrence- Confirmation by the agency that information to date is adequate to agree that the project can be advanced to the next stage of project development. Concurrence does not imply that the project has been approved by an agency nor that it has released its obligation to determine whether the fully developed project meets statutory review criteria. If substantial new information regarding a concurrence point is brought forward during project development, the adequacy of the prior concurrence statement may be reconsidered. The further refinement of the project, without a substantive change, will not normally be a reason to revisit the concurrence point. Rather, it should help decision makers select the least environmentally damaging, reasonable and practicable alternative.

Concurrence Points- Points within the NEPA process where the transportation agency requests agency concurrence.

The FHWA and the Iowa DOT shall seek concurrence from the other SIA signatories regarding **Purpose and Need, Alternatives to be Considered, Alternatives to be Carried Forward**, **and Preferred Alternative**. The intent of the concurrence points in the process is to preclude the routine revisiting of decisions that have been agreed to earlier in the process and encourage early substantive participation by the agencies. The timing of the concurrence points in the environmental process is reflected in the accompanying Iowa NEPA/404 Merger Concurrence Point Chart dated July, 1999. The chart has a degree of flexibility and range built into it within which concurrence can be reached on each of the concurrence points. The method of accomplishing the concurrence reviews will be through joint meetings of the SIA signatories and other agencies as appropriate. The FHWA and Iowa DOT will schedule meetings approximately every six months, or as mutually agreed upon, at which projects ready for one of the concurrence points will be presented for concurrence. Iowa DOT representatives from the Office of Environmental Services will develop the agendas for the meetings. The agendas will include the time and place of the meeting, descriptions of the projects to be discussed, appropriate background information to explain each project, and an indication of the concurrence point for each. Iowa DOT will provide the agenda to the SIA signatories, and other agencies as appropriate, at least 30 days in advance of the meeting to allow the regulatory and resource agencies sufficient time for review and preparation of their comments.

These meetings will promote efficient use of time and personnel resources by bringing together all of the appropriate parties to focus on multiple projects and facilitate the exchange of information necessary to obtain concurrence at the designated decision points. ***The minutes of the meeting, as revised based on review by the regulatory and resource agencies, will serve as documentation of concurrence.*** For major or complex projects or projects on expedited schedules, separate meetings may be scheduled. The Iowa DOT will provide agendas and notification for such meetings as described above and will document concurrence in the meeting minutes.

B. Resolving Disputes at Concurrence Points

It is anticipated that concurrence at each of the concurrence points will be achieved in most cases.

In more controversial projects, however, the probability of non-concurrence may increase. Therefore, a process is needed to resolve disputes at any one of the concurrence points when one or more agency(ies) does not concur.

Dispute resolution will consist of informal efforts to reach a general consensus among the participating Federal and State agencies regarding the issues involved at the particular concurrence stage. All parties appropriate to this effort should be involved, but formal concurrence will be required from the agencies with jurisdiction by law.

Attempts will be made to resolve issues at the lowest possible level in each agency. Within 30 days of a finding of non-concurrence at one of the designated points, the FHWA and Iowa DOT will meet with the agency(ies) involved to determine the direction for resolution of the dispute. The direction for resolution will be agreed upon through consensus of the agencies involved.

The NEPA/404 process may continue whether or not attempts to reach concurrence are successful. However, if the dispute remains unresolved, any agency in non-concurrence retains the option to elevate its concerns through existing, formalized dispute elevation procedures at the appropriate point in the NEPA or Section 404 permit process in accordance with Section 404(q) procedures. This will encourage all participating agencies to very carefully consider and accommodate the concerns raised by the resource agencies prior to finalization of the NEPA process and proposed issuance of the permit to avoid processing delays.

C. Data Collection and Analysis

The Iowa DOT will ensure that data collection activities will provide the specific items of information the Corps requires for determining compliance with the Section 404(b)(1) guidelines. Data collection will take place early in the coordination process so information will be available for discussion at the concurrence point meetings. The resource and regulatory agencies will be responsible for reviewing the data and evaluations provided by Iowa DOT and providing supplemental information as appropriate.

D. Systems Planning Process

Iowa transportation planning is accomplished under two separate processes. One is for urbanized areas over 50,000 population, where the plans are developed by the Metropolitan Planning Organization (MPO) designated for the area. The other is for the remainder of the state where the plans are developed by the Iowa DOT. The planning processes are to include the development of transportation plans addressing at least a twenty-year planning horizon and include both long and short range strategies/actions and provide for the development of transportation facilities which will function as an intermodal transportation system.

In the planning processes, the MPOs are to develop a transportation improvement program (TIP) for the metropolitan planning areas and the Iowa DOT is to develop a statewide transportation improvement program (STIP) for all areas of the state. The TIP and STIP are to cover a period of not less than 3 years and include a separate priority listing of projects to be carried out in each of those 3 years. In cooperation with the MPOs, the Iowa DOT will incorporate the metropolitan area TIPs into the STIP creating a single statewide transportation improvement program for all areas of the State.

The transportation planning process will generally establish the purpose and need for projects. The TIPs and the STIP will identify the mode of transportation to be funded, i.e., highways or transit, including bicycle and pedestrian needs.

The process for development of the TIPs and STIP allows for input by the public and the resource and regulatory agencies and also for their review of the TIPs and STIP. The resource and regulatory agencies should provide their input into the process and review the TIPs and STIP as appropriate. Agency participation, along with the list of projects included in the STIP for implementation, will assist the agencies in identifying and prioritizing future workloads.

E. Scoping

Scoping is a process that considers a range and extent of action(s), alternatives and impacts, including Section 404 permit issues, to be considered in the environmental review process. It is not a single event or meeting but continues throughout the development of an environmental document and includes public involvement, usually a series of meetings, telephone conversations, or written comments from different individuals and groups. No matter how thorough the scoping process, it may become necessary to modify the scope of an environmental document if new issues surface during project development.

Scoping has specific and fairly limited objectives. They are: 1) to identify the public and agency concerns; 2) to facilitate an efficient environmental documentation process through assembling the cooperating agencies, identifying all the related permits and reviews that must be scheduled concurrently; 3) to define the issues and alternatives that will be examined in detail in the environmental document while simultaneously devoting less attention and time to issues which cause no concern; and 4) to save time in the overall process by helping to ensure that draft documents adequately address relevant issues, reducing the possibility that new comments will cause a statement to be rewritten or supplemented.

Scoping begins when the Iowa DOT identifies the affected parties and presents a proposal with an initial list of environmental issues and alternatives. This basic information is necessary to explain to the public and the agencies what their involvement is expected to be. The first stage is to gather preliminary information and compose a clear picture of the action proposed.

A good scoping process will lay a firm foundation for the rest of the decision making process. If the environmental documentation can be relied upon to include all the necessary information for formulating policies and making rational choices, the agency will be better able to make a sound and prompt decision. In addition, if it is clear that all reasonable alternatives are being seriously considered, the public and agencies will usually be more satisfied with the alternative selection process.

SPECIFIC PROCEDURES

The signatory agencies have identified four concurrence points which occur during the Iowa DOT's project development process. These are strategic points in time when the Iowa DOT will present updated project development information to the resource agencies. The resource

agencies will review this information and provide concurrence that the Iowa DOT is properly considering and addressing potential natural resource impacts related to the project's development in balance with other social and economic impacts. This process will also serve to satisfy the requirements for sequential mitigation (avoid, minimize, and compensate). The goal is to identify and address agency concerns throughout the development process.

The four concurrence points are: 1) Project Purpose and Need (this will equate to the Section 404 Overall Project Purpose), 2) Alternatives to be Analyzed, 3) Alternatives to be Carried Forward, and 4) Preferred Alternative. The final concurrence will be issuance of the required permits. The following describes the information that will be available to the resource agencies at the time the Iowa DOT seeks resource agency concurrence.

1. Purpose and Need-This concurrence point will occur after the Iowa DOT Commission has given approval to begin development of the project, the Iowa DOT has prepared a draft purpose and need statement for review, and the Iowa DOT has held a public meeting for local citizen and governmental input. The Iowa DOT will provide a draft purpose and need statement that will be partly based on information provided from its long-range systems planning office. A summary of input from the public information meeting will be available for the resource agencies. It is anticipated that the discussion on this concurrence point would be held in an environmental scoping meeting, early in the development process.

2. Alternatives to be Analyzed-During the proposed early environmental scoping meeting, the Iowa DOT will present some preliminary draft alignments on aerial photos and USGS quad maps showing beginning and ending points and known sensitive areas. Sensitive areas include wetlands, woodlands, known 4(f) properties, homes, businesses, roads, known Section 106 sites, threatened and endangered species habitats, utilities, unique landforms, sources of pollution, floodplains, prairies, parks, refuges, etc. This resource information will most likely be obtained from secondary sources. Discussion will be based on general environmental knowledge of the area and aerial photo interpretation. The agency concurrence will acknowledge that the range, number and scope of alternatives to be studied is likely adequate to satisfy permitting requirements. The Iowa DOT will seek guidance and agreement from the resource agencies at this point on the scope, duration, and details of any studies that may be required for any of the alternatives to allow a decision to be made at Concurrence Point 3.

3. Alternatives to be Carried Forward-At this point, the Iowa DOT will have preliminary quantitative and qualitative information on the resource impacts for the various alternatives and potential borrow sites. Planning level, field-gathered information will be available for potential impacts to sensitive areas which include wetlands and other waters of the U.S. (including wetland types and boundaries), woodlands (by type), threatened and endangered species habitat, prime agricultural land, known Section 106 properties, resources which include regulated substances, and cultural resources for all alternatives. Based on this information, the Iowa DOT will seek concurrence on alternatives that can be dropped from further consideration. Iowa DOT will identify and provide documentation for those alternatives it feels are not practicable. Following this concurrence point, the Iowa DOT will proceed with more detailed development of the remaining alternatives.

4. Preferred Alternative-This concurrence point will be sought following the Iowa DOT Commission's selection of an alternative. The Iowa DOT will provide materials that support the

preferred alternative. This will include results from any new studies, information developed following concurrence point 3, information from public and resource agency input, minutes of the Commission meeting, documentation of minimization efforts, and conceptual mitigation site alternatives.

NOTE: The Iowa DOT Commission has statutory authority for the route selection of highway improvements. The Commission's decision incorporates:

- Preliminary engineering design showing the actual footprint for the alternative and resulting resource impacts.

- Comments received about the environmental documents completed and circulated prior to Commission approval.

- Comments (both verbal and written) received during the public hearing.

- Potential borrow(s) and compensatory mitigation options for the alternative.

This process only applies to projects being completed under the Iowa DOT's *Can-Do* project development process. Projects that were started under the previous process may attempt to utilize the concepts stated above, but each project will be handled individually based on its complexity and sensitivity.

V. Modification/Termination

This SIA may be modified upon approval of all signatories. Modification may be proposed by one or more signatories. Proposals for modification will be circulated to all signatories for a 30-day period of review. Approval of such proposals will be indicated by written acceptance. A signatory may terminate participation in this agreement upon written notice to all other signatories.

HIGHWAY PROJECTS
IN
IOWA

The Federal agencies and the Iowa Department of Natural Resources in cooperation with the Iowa Department of Transportation (Iowa DOT) agree to implement, to the fullest extent practicable and as funding and staffing level allow, the solutions outlined in the Statewide Implementation Agreement to the extent they are implemented by Iowa DOT.

This agreement becomes effective upon signature of all agencies and may be modified by written approval of each agency. This agreement may be revoked by agreement of all agencies or by any agency upon 30-days written notice to the other agencies.

U.S. Army Corps of Engineers

Edwin J. Arnold, Jr.
Brigadier General, U.S. Army
Division Engineer, Mississippi Valley Division

5 Jul 01
Date

David A. Fastabend
Colonel, Corps of Engineers
Division Engineer, Northwestern Division

24 AUG 2001
Date

Kurt F. Ubbelohde
Lieutenant Colonel (P), U.S. Army
District Engineer, Omaha District

22 August 2001
Date

Torkild P. Brunso
Lieutenant Colonel, U.S. Army
Acting District Engineer, Rock Island District

22 JUN 01
Date

U.S. Fish and Wildlife Service

Richard C. Nelson
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Rock Island Ecological Services Field Office

Federal Highway Administration

Bobby Blackmon
Division Administrator

U.S. Environmental Protection Agency, Region 7

William W. Rice
Deputy Regional Administrator

Iowa Department of Natural Resources

Lyle Asell
Acting Director

Iowa Department of Transportation

Mark Wandro
Director

GLOSSARY

Action - A highway or transit project proposed for the Federal Highway Administration (FHWA) or Federal Transportation Authority (FTA) funding. It also includes activities such as joint and multiple use permits, changes in land use access control, etc., which may or may not involve a commitment of Federal funds (23 CFR 771.107(b)).

Can-Do Process - The Iowa DOT's revised project development process which was adopted in February of 1998. The process is a streamlined and co-development process which minimizes project development time through concurrent activities. The process is designed around a commitment to proactive and continuous public involvement. It incorporates environmental commitments to avoidance in preference to mitigation, to early and continuous consultation with

environmental resource agencies and to early investigation and delineation of sensitive resources.

Intermodal Transportation System - A system for the movement of people and goods that is economically efficient and environmentally sound, provides the foundation for the nation to compete in the global economy, and will move people and goods in an energy efficient manner.

Jurisdiction by Law, Agencies with - Agencies with authority to approve, veto, or finance all or part of the proposal (40 CFR 1508.15).

Metropolitan Planning Organization (MPO) - That organization designated as being responsible, together with the Iowa DOT, for conducting the continuing, cooperative, and comprehensive planning process under 23 U.S.C. 134 and 49 U.S.C. 1607. It is the forum for cooperative transportation decision making for the metropolitan planning area (40 CFR 51.392; 23 CFR 450.104).

Metropolitan Transportation Plan - The official intermodal transportation plan that is developed and adopted through the metropolitan transportation planning process for the metropolitan planning area (23 CFR 450.104).

Mitigation - The CEQ has defined mitigation in its regulations at 40 CFR 1508.20 to include: avoiding impacts, minimizing impacts, rectifying impacts, reducing impacts over time, and compensating for impacts.

Practicable Alternative - Practicable alternatives to a project, as defined in 40 CFR 230.3(q), are those available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes. (40 CFR 230 is also known as the Section 404(b)(1) guidelines)

Public Hearing - A public proceeding conducted for the purpose of acquiring information or evidence which will be considered in evaluating a proposed transportation project and/or a Department of Army permit action and which affords the public an opportunity to present their views, opinions, and information on such projects and permit actions (33 CFR 327.3(a)).

Section 106 - Section 106 of the National Historic Preservation Act of 1966, as amended, requires Federal agencies to take into account the effect of their undertakings on properties included in or eligible for inclusion in the National Register of Historic Places and to afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on such undertakings. The process for accomplishing these requirements is referred to as the 106 process and is contained in Federal rules at 36 CFR Part 800.

Section 404 Permit - A Department of the Army permit authorizing the discharge of dredged or fill material into waters of the United States pursuant to Section 404 of the Clean Water Act (33 U.S.C. 1344).

Special Expertise, Agencies with - Agencies with statutory responsibility, agency mission, or related program experience (40 CFR 1508.26).

Statewide Transportation Improvement Program (STIP) - A staged, multiyear, statewide, intermodal program of transportation projects which is consistent with the statewide transportation plan and planning processes and metropolitan plans, Transportation Improvement Programs (TIPs) and processes (23 CFR 450.104).

Transportation Facilities - Examples include highways, transit systems, pedestrian sidewalks, bicycle paths, and similar types of facilities.

Transportation Improvement Program (TIP) - A staged, multiyear, intermodal program of transportation projects which is consistent with the metropolitan transportation plan (23 CFR 450.104).

Waters of the United States - All waters, lakes, rivers, streams (including intermittent streams), wetlands, sloughs, and the territorial seas, unless excluded from regulation. For a complete definition and exclusions, refer to 33 CFR 328.3(a), 33 CFR 323.4 and 40 CFR 230.3(s).

Wetlands - Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas (33 CFR 328.3(b) and 40 CFR 230.3(t)).

4(f) - Section 4(f) of the Department of Transportation (DOT) Act of 1966. Section 4(f) was originally set forth in Title 49, United States Code, Section 1653(f), and applies only to agencies within the DOT. It provides that the Secretary may approve a transportation program or project requiring the use of publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge, or land of an historic site of national, State, or local significance only if there is no prudent and feasible alternative to using that land and the program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use.

404(q) Elevation Process - Section 404(q) of the CWA requires development of procedures to expedite permit decisions by eliminating duplicative paperwork. The current process allows some Federal agencies to appeal Section 404 permit decisions made by a District Engineer of the USACE. The process is contained in the 404(q) Memorandums of Agreement referenced in Appendix C.

Property Name:

I. STEP 1: IS THE PROPERTY CLASSIFIED AS 4(f)?

Break this into two (2) distinctive parts: 1) Parks (parks, recreation areas, or wildlife and waterfowl refuge) and 2) Historic Buildings and Districts.

A. FOR PARKS (public parks, recreation areas, or wildlife and waterfowl refuge)

1. Is the property a park, recreation area, or wildlife and waterfowl refuge?

a. The land has been officially designated as such.

b. When the Federal, State, or local officials having jurisdiction over the land determine that one of its major purposes or functions is for park, recreation or refuge purposes. Final determination on applicability of Section 4(f) to a particular type of land is made by FHWA.

2. Is the property publicly-owned?

a. Is the deed in public ownership?

b. Public easement in perpetuity can be considered publicly owned.

3. Is the property significant?

a. A property is not a 4(f) property if the property is designated not significant by the agency having jurisdiction over the land.

(1) For single use facilities the entire property must be designated not significant.

(2) For multiple use facilities the entire area for each individual use must be designated not significant.

4. Is the property open to the public (for parks and recreation areas only)?

a. Is the entire public permitted visitation at any time?

(1) This does not mean it has to be open 24 hours a day.

(2) Fees can be charged.

b. A property is not a 4(f) property if only a select group is permitted visitation.

5. Is the property a wildlife or waterfowl refuge?

Refuge properties' primary functions must be a sanctuary or refuge for the protection of species.

B. HISTORIC BUILDINGS AND DISTRICTS.

1. Is the historic property significant?

a. On the National Register of Historic Places

b. Or eligible for the National Register

2. What is the use of historic properties?

a. An "Adverse Effect" under 106 regulations does not automatically mean that 4(f) applies. If the impact would not substantially impair the historic integrity of a historic district, 4(f) does not apply.

b. Determinations of substantial impairment should be made in consultation with SHPO.

3. Archeological resources that are important chiefly because of what can be learned by data recovery and have minimal value for preservation in place are not 4(f).

FHWA CONCURRENCE POINT

II. STEP 2: IS THERE A USE OF THE 4(f) PROPERTY?

23CFR 771.135(p) - Except as set forth in paragraphs (f), (g)(2) and (h) of this section "use" (in paragraph (a)(1) of this section) occurs:

A. When land is permanently incorporated into a transportation facility;

There is a "use" when there will be 4(f) property within the permanent ROW.

B. When there is a temporary occupancy of land that is adverse in terms of the statute's preservationist purposes as determined by the criteria in paragraph (p)(7) of this section; or

There is a "use" when the 4(f) property is within a temporary easement but will sustain permanent adverse physical impacts.

There is not a "use" when the 4(f) property is within a temporary easement if the "use" duration is temporary, scope of work is minor, there is no anticipated permanent adverse physical impacts, property is returned to a condition at least a

good a previously, and there is documented agreement from the jurisdictional officials.

C. When there is a constructive use of land.

Examples of constructive use are noise impacts, aesthetic impacts, reduced access, vibration impact, and ecological intrusion

FHWA CONCURRENCE POINT

III. STEP 3: CAN THE 4(f) PROPERTY BE AVOIDED?

23CFR 771.135 (a)(1) (I) - There is no feasible and prudent alternative to the use of land from the property; and

A. A feasible alternative is one that can be designed to engineering standards and that meets the purpose and need of the project.

B. A prudent alternative is one that does not present unique problems, have unusual factors or that the cost, social, economic or environmental impacts do not reach extraordinary magnitudes.

FHWA CONCURRENCE POINT

IV. STEP 4: CAN THE IMPACTS TO THE 4(f) PROPERTY BE MINIMIZED?

23CFR 771.135 (a)(1)(ii) - The action includes all possible planning to minimize harm to the property resulting from such use.

A. Minimizing harm can include design features that reduce ROW needs such as curb and gutters instead of open ditch sections.

B. After measures to minimize harm have been completed the mitigation plans should be developed.

FHWA CONCURRENCE POINT

V. STEP 5: WHAT DOCUMENTATION IS NEEDED?

A. If the 4(f) impacts meet the negative declaration determination for bikeways and walk-ways or one of the three programmatic 4(f)s (minor involvement with public lands, minor involvement with historic sites, and historic bridges) then documentation as described in the Iowa Division Office Environmental Document Process is required (see Section 5).

B. If the 4(f) impacts do not meet the programmatic requirements, then the formal 4(f) document procedures must be followed. These procedures are included in the Iowa Division Office Environmental Document Process (see Section 4).

FHWA CONCURRENCE POINT

Typically, the FHWA concurrence point will consist of an informal meeting between the Iowa DOT Environmental Services' staff and the TE. The decisions from the meeting will be documented in the meeting minutes.

Occasionally, the informal meeting may find that a formal request for determination is required. The Iowa DOT will provide adequate documentation so a formal request for determination can be made.

LAND AND WATER CONSERVATION FUND

POST COMPLETION RESPONSIBILITIES AND 6(F)(3) CONVERSIONS

A MANUAL FOR LOCAL SPONSORS

Prepared by:

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TABLE OF CONTENTS

This manual is in compliance with the Federal Guidelines under the Department of Interior, National Park Service, as can be found in the Federal Register (9/25/86) 36 CFR Parts 59 and 72, Land & Water Conservation Fund Program of Assistance to States and Urban Park and Recreation Recovery Program: Post Completion Compliance; Final Rule.

INTRODUCTION

The Land & Water Conservation Fund (LWCF) Program was established in 1965 to provide matching funds to the states for the acquisition of lands and development of outdoor recreation areas. Those parks and recreation areas that were acquired and/or developed in whole or in part with LWCF assistance are protected by Section 6(F)(3) of the LWCF Act of 1965, as amended. Furthermore, the LWCF Act requires that project sponsors maintain to acceptable standards the properties or facilities acquired or developed for public outdoor recreation use.

Section 6(F)(3) of the Act states the "No property acquired or developed with assistance under this section shall, without the approval of the Secretary (Department of Interior), be converted to other than public outdoor recreation uses. The Secretary shall approve such conversions only if he/she finds it to be in accord with the then-existing Statewide Comprehensive Outdoor Recreation Plan (SCORP) and only upon such conditions as he/she deems necessary to assure the substitution of other recreation properties of at least equal fair market value and of reasonable equivalent usefulness and location." The Secretary has authority to disapprove conversion requests and/or to reject proposed property substitutions.

The restriction on the use of LWCF assisted properties is a perpetual restriction which can only be removed by an Act of Congress. Conversions are remedies to otherwise unresolvable situations, not vested rights in the program.

The basis for determining the area covered by Section 6(F)(3) is through the LWCF Agreement with the State and any attachments made a part of the agreement and the project boundary map.

POST COMPLETION RESPONSIBILITIES OF LOCAL SPONSORS

Local Project Sponsors are required as recipients of LWCF assistance to maintain assisted sites and facilities in public outdoor recreation use following project completion:

1. Property acquired or developed with LWCF assistance shall be operated and maintained according to the following standards.

   A. All LWCF assisted project sites must be operated and maintained in a manner which encourages public participation.
   B. The property shall be maintained so as to appear attractive and inviting to the public. Staffing and servicing of facilities shall be adequate.
   C. Sanitation and sanitary facilities shall be maintained in accordance with applicable health standards.
   D. Properties, facilities and equipment shall be maintained for proper public safety.
   E. All facilities, roads, trails and other improvements shall be kept in reasonable repair throughout their estimated lifetime to prevent undue deterioration and to encourage public use. Erosion problems shall be corrected.
   F. The facility shall be kept open for public use at reasonable hours and times. Restrooms shall be displayed on site throughout the project life.

2. Property acquired or developed with LWCF assistance shall be available to all persons to use and enjoy. The project sponsor must comply with the following:

   A. Discrimination on the Basis of Race, Color, National Origin, Religion or Sex. Under Title VI of the 1964 Civil Rights Act, property acquired or developed with LWCF assistance shall be open to entry and use by all persons regardless of race, color, or national origin, who are otherwise eligible. The code of Federal Regulations, Title 43, Part 17, effectuates the provisions of Title VI. The prohibitions imposed by Title VI apply to park or recreations areas benefiting from federal assistance an to any other recreation areas administered by the state agency or local agency receiving the assistance. Discrimination is also prohibited on the basis of religion or sex.

   B. Discrimination on the Basis of Residence. Section 6(F)(8) of the LWCF Act provides that with respect to property acquired or developed with LWCF assistance, discrimination on the basis of residence, including preferential

reservation, membership or annual permit systems is prohibited except to the extent that reasonable differences in admission and other fees may be maintained on the basis of residence.

Fees charged to nonresidents cannot exceed twice that charged to residents. Where there is no charge for residents but a fee is charged to nonresidents, nonresident fees cannot exceed fees charged for residents at comparable state or local public facilities. Reservation, membership or annual permit systems available to residents must also be available to nonresidents and the period of availability must be the same for both residents and nonresidents.

These provisions apply only to the recreation areas described in the project agreement. Nonresident fishing and hunting license fees are excluded from these requirements.

C. Discrimination on the Basis of Handicap. Section 504 of the Rehabilitation Act of 1973 requires that no qualified person shall, on the basis of handicap, be excluded from participation in, be denied benefits of , or otherwise be subjected to discrimination under any program or activity which receives or benefits from federal financial assistance.

3. Property acquired or developed with LWCF assistance must be used as outdoor recreation areas. Depending on the area, this use may be restricted.

Project sponsors may impose reasonable limits on the type and extent of use of areas and facilities acquired or developed with LWCF assistance when such a limitation is necessary for maintenance or preservation. Thus, limitations may be imposed on the numbers of persons using an area or facility or the type of users, such as "hunters only" or "hikers only." All limitations shall be in accord with the applicable grant agreement and amendments. A representative with the Iowa Department of Natural Resources (DNR) will be responsible for performing post completion inspections for the life of the project. All items mentioned above will be addressed when theses post completion inspections are made.

CONSTRUCTION ON PARK SITE

When any construction on LWCF assisted park property is necessary, the local sponsor must contact the DNR. Do not begin any work on, or disturbance of the park site until this contact has been made. As soon as the consultant has been contacted, a meeting will be held with the local sponsor to determine if the activity is allowable, or exempt from the Section 6(F)(3) requirements of the LWCF Act. According to LWCF Manual Section 675.9(3)A.(5), exemptions to a conversion may be allowed for the following:

1. Underground utility easements that do not have significant impacts upon the recreational utility of the park will not constitute a conversion.
2. Proposals to construct public facilities where it can be shown that there is a gain or increased benefit to public outdoor recreational opportunity, will not constitute a conversion. Final review and approval of such cases shall be made on a case-by-case basis.

In the event that it is determined that either A or B are applicable, the project sponsor must request, in writing, permission to continue the activity based on their ability to meet the following requirements:

Underground Utility Easements:

1. Written justification for granting easement.
2. Written description of the possible impacts on the park and their effect on the outdoor recreation experiences in the park, both positive and negative.
3. A detailed site plan of the park showing the location of the easement, the current development in the park, and planned future development in the park.
4. A statement of assurance that no rights or interests will be granted in the property by the project sponsor.

5. A statement of assurance that the intended present and future use of the property will be restored to its prior condition.

Three copies of the above documentation must be submitted to program staff of the DNR for review before approval of the exemption can be granted.

Construction of Public Facilities:

1. Complete detailed plans for the proposed development, including:
   A. Description of the proposal including purpose of facility, potential, users, types of facilities and activities proposed (arts and crafts, reading areas, kitchen, gymnasium, multi-purpose room).
   B. Maps and/or drawings depicting the existing recreation facilities with respect to the proposed public facility including additional support necessitated by any new construction (parking areas, road access). Photographs are useful in depicting the area.
   C. Description of the proposed facility's size and design.
2. A site plan showing to scale the park property, improvements to the property, and the proposed development.
3. A description of how the proposed facility will increase public outdoor recreation use (positive net impact). A narrative must be included which describes how existing recreation opportunities will be enhanced or augmented by construction of the public facility.
4. A statement describing the proposed construction schedule, and any foreseeable interruptions in usage of the park.
5. A statement outlining public support of and involvement in the planning of the project.
6. An analysis of the impact on existing outdoor recreational facilities and its integration into the recreation purpose of the surrounding property. Will any existing recreation facilities be destroyed or relocated either on or off the site? Is the existing facility being used to capacity? Will the facility be constructed on the only area of its type in the community?
7. A complete environmental assessment using the information that follows:

   An assessment of the effect the project will have on the immediate and surrounding environment must be done. The environmental assessment should be a reporting of the effect this project will have on the environment. The assessment should cover the three points listed below in sufficient detail to resolve the test of "major" and "significant." Prepare your assessment in the format shown below, with headings and subheadings and not in the flowing narrative style.

   A. The Proposed Action. Include a description of the proposed action, a statement regarding the need for it, a description of what the action is designed to accomplish, location of the project, its scope, the level of impact-causing activities associated with the project, when the action is to take place, and, if applicable, its relation to other federal, state, or local projects and proposals.

   B. Alternative to the Proposed Action. This section will include a brief description of alternatives as required by NEPA Section 102(2)(E).

      The environmental impacts of the proposal and the alternatives should be presented in comparative form and should define the issues, pros and cons of a reasonable range of alternatives, and provide a clear basis for choice between them by program staff and the public.

   C. Environmental Impacts of Proposed Action. Succinctly describe those environmental elements which would be affected. Discuss anticipated impacts on the following elements and any means to mitigate adverse environmental impacts:

      - Land Use (project site and surrounding area)
      - Fish and Wildlife
      - Geology and Soils
      - Mineral Resources
      - Air and Water Quality

STATE HISTORICAL SOCIETY OF IOWA
REVIEW AND COMPLIANCE QUESTIONNAIRE

Carefully read the following questionnaire. Attach all necessary documentation, and send to the address below.

I. GENERAL INFORMATION

DATE SUBMITTED: _____

Project Name: _____ Project Cost $: _____

Project Address: _____ City: _____ County: _____ Zip: _____

Federal Agency (from which funds will be requested) _____

Other Federal/State Agencies Involved _____

Contact Person: _____ Address: _____ Phone #: _____

Name & Title of Authorized Official (print) _____

Address of Official _____

II. PROJECT DESCRIPTION AND LOCATION

A. Attach a map that clearly marks the precise location of the project and shows its relationship to the surrounding area. Rural projects should use United States Geological Survey (USGS) maps (these can be purchased through the Iowa Geological Survey Bureau in Iowa City 319-335-1575) and city projects should use city maps or other maps which show clear layout of streets.

B. Indicate the number of acres in the project area. _____ Acres (1 acre = 43,560 square feet)

C. Attach a legal description of the project. (Township, range, section, 1/4 section for rural projects; subdivision, block number, and lot number for city projects.

D. Has a professional archeological, architectural or historical resource survey been made of the area? Yes ____ No ____ Don't Know ____ If yes, list the author, title and date of the report. If you are unsure, check with city hall, a local library, or local historical organization.

_____

E. Describe the project. Summarize what the project is and what will happen during the project. Describe the existing land use within the project area, (i.e. plowed, residential, commercial, pasture, etc.) and previously modified areas within the project area (plowed, graded, cut, filled). Ground disturbances, excavating, digging, grading or erosion control.

REHABILITATION, ALTERATION, REMOVAL, OR DEMOLITION

If the project involves the rehabilitation, alteration, removal, or demolition of any structure, building, object, designed site, (park, cemetery), or district that is fifty years or older, contact the State Historical Society of Iowa for the appropriate IOWA SITE INVENTORY form (phone number below). If not, complete the following checklist and mail the above information to the address below.

____	The date for submission is provided (top of this form).
____	All lines in Section I are completed.
____	There is a contact name and telephone number.
____	A map clearly marking the project location is attached.
____	A legal description of the property is attached.

State Historical Society of Iowa
R&C Coordinator
600 E. Locust
Des Moines, Iowa 50319-0290
515-281-8743

- Water Resources/Hydrology
- Historic/Archaeological Resources
- Transportation/Access
- Consumption of Energy Resources
- Socio-economic Effects
- Discuss any existing easement, rights-of-way, etc., and their effect on the proposed site.

"Impacts" are defined as causing direct or indirect changes in the existing environment, whether beneficial or adverse which are anticipated as a result of the proposed action or related future actions. To the extent appropriate, the document will discuss impacts of the action, including environmental damage which could be caused by sewers, upon the physical and biological environment as well as upon cultural, aesthetic, and socio-economic conditions.

Elements of impacts which are unknown or only partially understood should be indicated. Any off-site impacts, such as increased traffic on neighborhood roads or increased noise levels in surrounding areas, should be described.

D. A listing of agencies and persons consulted.

8. A statement of assurance that no rights or interests in the property will be granted in the property by the project sponsor.
9. A statement of assurance that the intended present and future use of the project will not be impaired.
10. A statement of assurance that the property will be restored to its original condition after construction is completed.

Three copies of the above documentation must be submitted to program staff of the DNR for review before approval of the exception can be granted.

CONVERSION

When an area acquired or developed with LWCF assistance will be used for other than public outdoor recreation use, this use constitutes a conversion under Section 6(F)(3) of the LWCF Act. Properties acquired or developed with LWCF assistance are prohibited by Section 6(F)(3) of the LWCF Act, from conversion to other than public outdoor recreation use. As stated earlier, conversions are remedies to otherwise unresolvable situations, not vested rights in the program.

Conversions generally occur in the following four situations:

1. Property interests are conveyed for nonpublic recreation uses.
2. Nonoutdoor recreation uses (public and private) are made of the area, or a portion thereof.
3. Noneligible indoor recreation facilities are developed within the project area.
4. Public outdoor recreation use of property acquired or developed with LWCF assistance is terminated.

Examples of conversions are construction of through-roads, construction of residential, industrial and commercial developments, water or sewer lines, community centers, gymnasiums, senior centers, offices, residences, electrical easements, private circus showing, and other uses not permitted under the LWCF program.

CONVERSION PROCESS

In the event the activity and/or facility is not allowable, or does not qualify as an exception, program staff should determine if it can be discontinued and/or removed from the park voluntarily by the project sponsor. If not, the following procedure shall be followed:

A. Program staff of the DNR shall inform the project sponsor of the conversion determination, and request the following information as a prerequisite to approval (can also be done in a phone conversation):

1. A written description of all practical alternatives to the conversion.
2. A statement as to their evaluation and why they were rejected on a sound basis.

B. If a viable alternative to the conversion is available, the program sponsor must use it, either voluntarily or due to the contractual obligations as specified under the funding agreement, and Section 6(F)(3) of the LWCF Act.

If the conversion is necessary, several additional prerequisites are required to be met before approval. In order to convert property that was either acquired and/or developed with LWCF assistance, new property must be substituted for that being converted to other than public outdoor recreation use. To determine if the property qualified as replacement property, the program sponsor must submit the following:

A. Two appraisals establishing the fair market value of the property to be converted, and the property proposed for substitution showing the property proposed for substitution to be at least equal in fair market value to that being converted. This appraisal must be conducted by a state-approved appraiser.

1. The appraisals must be prepared in accord with the current Uniform Appraisal Standards for Federal Land Acquisition.

2. Property improvements will be excluded from all fair market value consideration for properties to be substituted. Exceptions are allowable only in those cases where property proposed for substitution contains improvements which directly enhance its outdoor recreation utility.

B. A statement that the property proposed for replacement is of reasonably equivalent usefulness and locations as that being converted. Dependent upon the situation and the desecration of program staff, the replacement property needn't provide identical recreation experiences or be located at the same site, provided it is in a reasonably equivalent location. It must, however, be administered by the same political jurisdiction as the converted property.

C. A statement of assurance that the property proposed for substitution meets the eligibility requirements for LWCF assisted acquisition as follows: NOTE: The replacement property must constitute or be part of a viable recreation area.

1. The project sponsor will obtain title or adequate control and tenure of the proposed substitute property in order to provide reasonable assurance that a conversion under Section 6(F)(3) of the LWCF Act will not occur without approval.

2. The land was not originally acquired by the seller for recreation, if seller is a public agency.

3. The land has not been managed for recreational purposes while in public ownership.

4. No federal assistance was provided in the original acquisition by the other agency to facilitate the basic project being funded by LWCF assistance, unless the federal assistance was provided by the supplemental programs allowed by the Act. (See Manual Section 670.1.5)

5. The selling agency is required by law to receive payment for land transferred to another public agency. Examples would be public school land that can be used for non-school purposes only through payment to the school agency, or excess state prison lands that can be transferred to local government use only on a purchase basis.

6. The requirement of appraisal, history of conveyances, and the evidence of title are the same as normal purchases.

7. If the selling agency is federal, fair market value is paid.

D. A statement that the project sponsor is aware of and complies with the requirements of P.L. 91-646 Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970.

E. A complete environmental assessment for the substitute property.

Two copies of the aforementioned documentation are required for review of the proposal. After review, DNR Land Acquisition Bureau will provide a recommendation to the DNR LWCF Program staff regarding approval or rejection of the proposal. If the state concurs with the proposal, it will be sent to the National Park Service for final review and approval. If the state does not concur with the proposal, the project sponsor must submit a new proposal for the replacement property until the conversion is resolved. NOTE: Repayment of the LWCF Grant monies is not an option in resolving a conversion.

The DNR stands ready to assist local governments with their outdoor recreation needs. It is the intent of the LWCF to provide the means for you and future generations to enjoy outdoor recreation opportunities in your community. Remember the requirements of the contractual obligations in the agreements with the state and the National Park Service when considering changes in you LWCF assisted facilities.

F. Additional information as outlined in the Conversion Checklist included with this packet.

LAND AND WATER CONSERVATION FUND

PROJECT PROPOSAL

REQUIRED PROJECT MAPS

Project maps are one of the most important components of the Project Proposal. The maps will be used for inspection years after the project has been completed. For this reason, accuracy is crucial. If possible, send a legal description of the boundary with your maps. The State will submit the signed and dated project boundary map to the National Park Service for approval.

REQUIRED MAPS - SEND TWO SIGNED ORIGINAL COPIES OF EACH:

1. Dated Project Boundary Map
2. Tract Map (acquisition projects only)*
3. Site Development Map (development projects only)*
4. County Map with project location
5. City Map with project location

Both the Tract Map and Site Development Map can be incorporated into the Dated Project Boundary map as long as detail will not be lost.

THE FOLLOWING INFORMATION IS REQUIRED FOR THE DATED PROJECT BOUNDARY MAPS:

1. title of the project;
2. date of map preparation, certified by the grantee signature;
3. maps must be to scale, project boundary outlined, showing feet, acres, section numbers and a directional arrow
4. show planned development for project site, color code existing and planned development;
5. show all tracts to be purchased (acquisition projects only);
6. show existing roads, overhead utility lines or other environmental intrusions;
7. show existing land use of land adjoining project site;
8. show area(s) under lease(s) and term remaining on the lease(s);
9. show known outstanding rights and interests in the area held by others such as easements, deed/lease restrictions, reversionary interest, etc.;
10. show and identify adjoining bodies of water or other natural landmarks.

At a minimum, the project area must be a viable public outdoor recreation area which is capable of being self-sustaining without reliance upon adjoining or additional areas not identified in the scope of the project. This area will be the park, open space or recreation area being developed, acquired, or added to. In no case would the areas covered by Section 6(f)(3) be less than that acquired with the LWCF assistance.

LAND AND WATER CONSERVATION FUND

SECTION 6(F)(3) CONVERSION CHECKLIST

DNR Responsibilities	City/Sponsor Responsibilities	
All Projects	Converted Property	Replacement Property
___ Cover Letter ___ Amendment - two: ___ Form 424 - one: ___ DNF - one, changes only: ___ General Conditions: ___ EO 12372 Intergvtl Review - State IDED (McCann 2-4719) ___ Appraisal Review ___ Categorical Exclusion	___ Cover Letter ___ Justification (*see list below) ___ Appraisal ___ 6(f)(3) Maps (see attachment) ___ ___ EO 12372 Intergvtl Approval - Regional COG (**see list below)	___ Justification (*see list below) ___ Appraisal ___ 6(f)(3) Maps (see attachment) ___ SHPO Review (see attachment) ___ EO 12372 Intergvtl Approval - Regional COG (**see list below) ___ SCORP Reference***

* **CONVERSION JUSTIFICATION** *(Narrative)*

1. Reason for Conversion
2. Alternatives Considered
3. Fair Market Value, (Appraisal)
   - Converted Property
   - Replacement Property
4. Public Utility Considerations/Problems
5. Proximity Impacts
6. Environmental Assessment of Conversion

** **EO 12372 REVIEW** *Request for Review and Approval from your Regional Council of Government(Consists of letter requesting any concerns)*

1. Reason for Conversion
2. Location Map
3. Property Plat Map for Converted & Replacement Properties

*** **STATEWIDE COMPREHENSIVE OUTDOOR RECREATION PLAN**

U.S. Department of Transportation
Federal Highway Administration

Memorandum

Sent Via Electronic Mail

Subject: **INFORMATION:** Interim Guidance: Questions and Answers Regarding Indirect and Cumulative Impact Considerations in the NEPA Process

Date: January 31, 2003

Original Signed by:

From: Frederick Skaer, Director
Office of NEPA Facilitation

Reply to
Attn. of: HEPE

To: Resource Center Mangers
Division Administrators
Federal Lands Highway Division Engineers

Federal indirect and cumulative impact requirements of the National Environmental Policy Act (NEPA) process were established in 1978 with the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (40 CFR §§ 1500 -1508). The Federal Highway Administration and State Departments of Transportation continue to make progress in incorporating indirect and cumulative impact considerations in NEPA and project decisionmaking, as we enhance our understanding of these issues and the complexities involved.

The purpose of this interim guidance is to focus attention on the existing NEPA requirements specific to indirect and cumulative impacts. The attached *Questions and Answers Regarding the Consideration of Indirect and Cumulative Impacts in the NEPA Process* is essentially a review of existing NEPA requirements regarding consideration, analysis, documentation, and mitigation of direct, indirect, and cumulative impacts. References to indirect impact and cumulative impact guidance, State DOT procedures, and training opportunities are provided for your information.

This interim guidance represents an initial step in our overall strategy to address the indirect and cumulative impacts policy, guidance, and training needs of the agency. Recognizing the frequent challenges you face regarding the analysis of indirect and cumulative impacts and the appropriateness of mitigation, we are planning additional activities, such as the development of supplemental policy and guidance, the possible revision of the FHWA's 1992 Position Paper, development of training, and the collection/dissemination of examples and best practices. With the issuance of this interim guidance, we are inviting FHWA field offices and interested State DOTs to participate in the effort. We welcome your comments on the attached *Questions and Answers* and are interested in knowing what the States are doing or planning to do regarding guidance and training. We are also looking for good examples and best practices of indirect impacts and cumulative impacts analysis at either the planning or project level, including examples of documentation.

BUCKLE UP AMERICA

If you are not already familiar with FHWA's NEPA "community of practice" website called Re:NEPA (http://nepa.fhwa.dot.gov), we invite you to take advantage of the information exchange opportunities available at the site to engage other practitioners regarding the state of the practice in the indirect and cumulative effects area. For more information concerning this interim guidance, please contact Lamar Smith, Training, Technology, and Technical Assistance Team Leader in the Office of Project Development and Environmental Review at lamar.smith@fhwa.dot.gov or (202) 366-8994.

COMMITMENTS IN THE
NEPA ENVIRONMENTAL DOCUMENT

County:_____ **Route:** _____
Location: _____ **Project No:** _____
NEPA Document Manager: _____

The completed environmental document used to select the location of the subject improvement requires IDOT to fulfill the following environmental commitments regarding the location, design, and construction and/or maintenance of the transportation facility. This information is being provided to assist project designers, construction staff, maintenance staff and preliminary studies environmental and cultural staff in their efforts regarding the transportation facility and to assure knowledge of the environmental commitments that need to be fulfilled or re-examined during project development and construction.

Natural Sciences Commitments:

Topic:
Commitment:
Environmental Contact:

Topic:
Commitment:
Environmental Contact:

Topic:
Commitment:
Environmental Contact:

Social Sciences Commitments:

Topic:
Commitment:
Environmental Contact:

Topic:
Commitment:
Environmental Contact:

Topic:
Commitment:
Environmental Contact:

COMMITMENTS IN THE NEPA ENVIRONMENTAL DOCUMENT

Cultural Resources Commitments:

Topic:
Commitment:
Environmental Contact:

Topic:
Commitment:
Environmental Contact:

Topic:
Commitment:
Environmental Contact:

Disposition:

These commitments were **compiled and reviewed** by the following persons:

NEPA Document Manager: _____ Date: _____
Cultural Resource Manager: _____ Date: _____
Wetland Resource Manager: _____ Date: _____
OLE Director: _____ Date: _____
Location Engineer: _____ Date: _____

These commitments were **transferred** to the following offices:

Road Design Section Engineer: _____ Date: _____
District Engineer: _____ Date: _____
District Construction Engineer: _____ Date: _____
Resident Construction Engineer: _____ Date: _____
Consultant Coordination Section: _____ Date: _____
Bridges and Structure: _____ Date: _____
ROW: _____ Date: _____
Construction: _____ Date: _____
Local Systems: _____ Date: _____
FHWA: _____ Date: _____
Contracts: _____ Date: _____
Specifications: _____ Date: _____

Additional Comments:

Public Notice Template

County: _____
DOT Project(s): _____
Letting: _____

Date Sent: **(Office of Construction will fill in.)**

Send To: Jaime Zweibohmer **e-mail:** jzweibohmer@cnaads.com
CNA (Customized Newspaper Advertising)
Phone: (800) 227-7636 Ext. 123 **Fax:** (515) 244-4855

For newspapers:

1. **(Office of Construction will fill in.)**
2. **(Office of Construction will fill in.)**

Please publish the following text as a legal notice in the next issue and run for one day only. (If the newspaper does not publish a legal section, please print as a public notice in the classified section.)

****

PUBLIC NOTICE OF STORM WATER DISCHARGE

The Iowa Department of Transportation plans to submit a Notice of Intent to the Iowa Department of Natural Resources to be covered under National Pollutant Discharge Elimination System (NPDES) General Permit No.2 "Storm Water Discharge Associated with Industrial Activity for Construction Activities."

The storm water discharge will be from highway construction activity located in _____ County on _____ Highway _____. The project is _____
_____.

(Choose One) The Public Lands Survey location is Township ___, Range ___, Section(s) _____. **(Or)** The Public Lands Survey location is from Township ___, Range ___, Section(s) _____ to Township ___, Range ___, Section(s) _____.

Storm water will be discharged from ____ point sources and will be discharged to the following streams: _____
_____.

Comments may be submitted to the Storm Water Discharge Coordinator, IOWA DEPARTMENT OF NATURAL RESOURCES, Environmental Protection Division, 502 East 9th Street, Des Moines, IA 50319-0034. The public may review the Notice of Intent from 8:00 a.m. to 4:30 p.m. Monday through Friday at the above address after it has been received by the Department.

****

Example Pollution Prevention Plan

POLLUTION PREVENTION PLAN

110-12A
02-23-93

All contractors/subcontractors shall conduct their operations in a manner that minimizes erosion and prevents sediments from leaving the highway right-of-way. The prime contractor shall be responsible for compliance and implementation of the Pollution Prevention Plan (PPP) for their entire contract. This responsibility shall be further shared with subcontractors whose work is a source of potential pollution as defined in this PPP.

1. SITE DESCRIPTION

This Pollution Prevention Plan (PPP) is for the construction of a four-lane facility on Ia 163 in Marion County around the south side of Pella.

This PPP covers approximately 350 acres with an estimated 325 acres being disturbed. The portion of the PPP covered by this contract has 325 acres disturbed.

The PPP is located in an area of two soil associations (Clinton-Keswick-Lindley and Otley-Mahaska-Taintor). The estimated average SCS runoff curve number for this PPP sfter completion will be 76.

Refer to the grading plan (Marion County NHS-163-3(7)--19-63) for locations of typical slopes, ditchgrades, and major structural and non-structural controls. A copy of this plan will be on file at the project engineer's office. Runoff from this work will flow into various unnamed ditches and waterways which flow into Muchakinock Creek and the Des Moines River. Muchakinock Creek is a tributary of the Des Moines River.

POTENTIAL SOURCES OF POLLUTION:
Site sources of pollution generated as a result of this work relate to silts and sediment which may be transported as a result of a storm event. However, this PPP provides conveyance for other (non-project related) operations. These other operations have storm water runoff, the regulation of which is beyond the control of this PPP. Potentially this runoff can contain various pollutants related to site-specific land uses. Examples are:

Rural Agricultural Activities:
Runoff from agricultural land use can potentially contain chemicals including herbicides, pesticides, fungicides and fertilizers.

Commercial and Industrial Activities:
Runoff from commercial, industrial, and commerce land use may contain constituents associated with the specific operation. Such operations are subject to potential leaks and spills which could be commingled with run-off from the facility. Pollutants associated with commercial and industrial activities are not readily available since they are typically proprietary.

2. CONTROLS

At locations where runoff can move offsite, silt fence shall be placed along the perimeter of the areas to be disturbed prior to beginning grading, excavation or clearing and grubbing operations. Vegetation in areas not needed for construction shall be preserved. As areas reach their final grade, additional silt fences, silt basins, intercepting ditches, sod flumes, letdowns, bridge end drains, and earth dikes shall be installed as specified in the plans and/or as required by the project engineer. This will include using silt fence as ditch checks and to protect intakes. Temporary stabilizing seeding shall be completed as the disturbed areas are constructed. If construction activity is not planned to occur in a disturbed area for at least 21 days, the area shall be stabilized by temporary seeding or mulching within 14 days. No more than 750,000 square feet of exposed erodible area is allowed in any one grading spread without permission of the project engineer. Other stabilizing methods shall be used outside the seeding time period.

This work shall be done in accordance with Section 2602 of the Standard Specification. If the work involved is not applicable to any contract items, the work shall be paid for according to Article 1109.03 paragraph B.

As the work progresses, additional erosion control items may be required as determined by the engineer after field investigation. These may be items such as letdown structures, soil stabilization mats, and other appropriate measures to be installed by the paving or erosion control contractor as directed by the engineer. The erosion control contractor will complete the construction with the establishment of permanent perennial vegetation of all disturbed areas.

3. OTHER CONTROLS

Contractor disposal of unused construction materials and construction material wastes shall comply with applicable state and local waste disposal, sanitary sewer, or septic system regulations. In the event of a conflict with other governmental laws, rules and regulations, the more restrictive laws, rules or regulations shall apply.

APPROVED STATE OR LOCAL PLANS:
During the course of this construction, it is possible that situations will arise where unknown materials will be encountered. When such situations are encountered, they will be handled according to all federal, state, and local regulations in effect at the time.

4. MAINTENANCE

The contractor is required to maintain all temporary erosion control measures in proper working order, including cleaning, repairing, or replacing them throughout the contract period. Cleaning of silt control devices shall begin when the features have lost 50% of their capacity.

5. INSPECTIONS

Inspections shall be made jointly by the contractor and the contracting authority every seven calendar days and after each rain event that is ½" or greater. The contractor shall immediately begin corrective action on all deficiencies found. The findings of this inspection shall be recorded in the project diary. This PPP may be revised based on the findings of the inspection. The contractor shall implement all revisions. All corrective actions shall be completed within 3 calendar days of the inspection.

6. NON-STORM DISCHARGES

This includes subsurface drains (i.e. longitudinal and standard subdrains), slope drains and bridge end drains. The velocity of the discharge from these features may be controlled by the use of patio blocks, Class A stone or erosion stone.

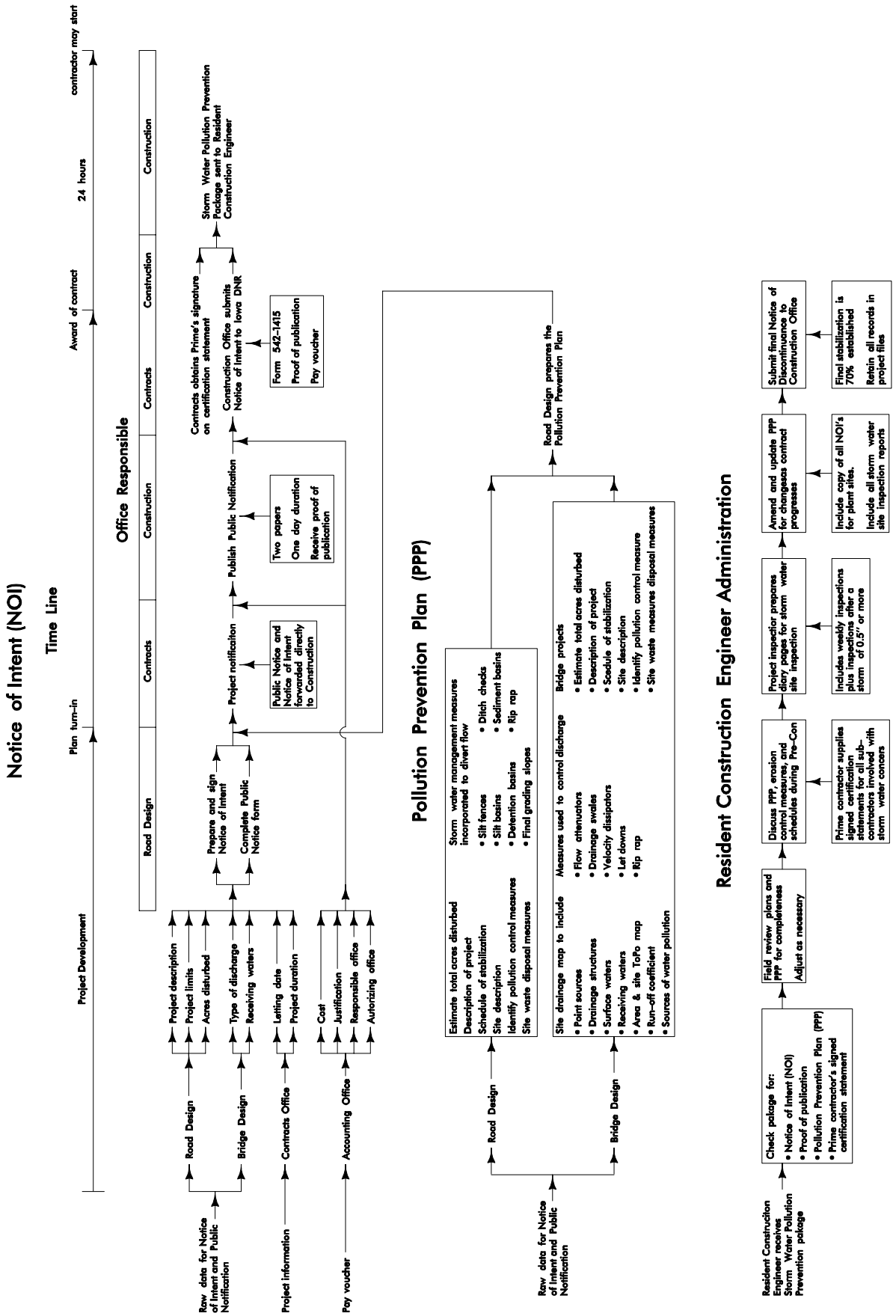

Figure 1: Storm water discharge permit flowchart.

IOWA DEPARTMENT OF TRANSPORTATION
Requirements for Section 404 Permits
Procedure Guide
UPDATED: August, 2007

1. Discharges of dredged or fill material into waters of the United States are regulated under the Clean Water Act by the U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, and the Iowa DNR.
2. "Waters of the United States" are all waters, impoundments of waters, or tributaries of waters such as lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, or natural ponds. Wetlands are one type of "waters of the United States".
3. The term "discharge of dredged or fill material" means the addition of fill material into waters of the United States. The term generally includes, but is not limited to, placement of dredge or fill that is necessary for the construction of any structure or infrastructure (including formed or pre-cast culverts and aprons); the building of any structure, infrastructure, or impoundment requiring rock, sand, dirt, concrete, flowable mortar, or other material for its construction; causeways or road fills; dams and dikes; artificial islands; riprap, groins, weirs, spur-dikes, breakwaters, and revetments; levees;
4. **Section 404 permits are required prior to placing dredged or fill material into any waters of the United States.** The Office of Location and Environment must submit a permit application to the Corps of Engineers and Iowa DNR prior to the work being performed. OLE typically applies for permits 8 months in advance of letting for minor projects and 13 months in advance for major projects.
5. The 404 permit authorizes construction activities in waters of the United States based on the plans and specifications submitted by DOT. Only activities reviewed and approved by the regulatory agencies are authorized. Construction activities NOT reviewed and approved by the regulatory agencies are NOT approved. Performing unapproved activities in waters of the United States constitutes violation of the law.
6. If the construction work involves only excavation and no placement of dredge or fill into any waters of the United States, then a Section 404 permit MAY NOT be required prior to performing the work. The Corps of Engineers should be consulted. All excavated material must be removed to an upland, non-wetland location.
7. If the placement of fill into wetlands exceeds 0.1 acres, then wetland mitigation will be required by the Corps of Engineers. Iowa DOT performs mitigation at a 1.5:1 ratio.
8. Iowa DOT **Standard Note 281-1** should be included in plans of proposed construction projects requiring Section 404 permits. This does not pertain to maintenance activities in which no contract, contractor, or plans are involved.
9. Upon issuance of a Section 404 permit, the Water Resources Section will forward a cover memo and the 404 permit to the District Construction Engineer or, for maintenance projects, to the District Maintenance Manager. Copies of the permit should be kept at the project site at all times until completion of the project. The memo and permit can also be found in the Electronic Records Management System.
10. OLE investigates potential wetland or stream impacts in the field and should be contacted for questions related to wetlands or streams.

Types of 404 Permits For DOT/ Local System Highway and Bridge Projects

Individual Permit (IP) – typically for major projects only

- ✓ More detailed permit application
- ✓ 30 day public notice process including public agency review
- ✓ Must respond to any comments from public
- ✓ More detailed mitigation plan
- ✓ Permit may contain special conditions which must be implemented as part of the project
- ✓ Typical processing time is 4 to 6 months
- ✓ Approval good for 5 years

Nation Wide Permit (NWP) - typical for smaller projects requiring a 404 permit

- ✓ New alignments limited to 500 ft either side of centerline
- ✓ Bank stabilization limited to < 500 ft in length
- ✓ Bank material not to exceed average of one cubic yard per running foot
- ✓ Wetland impacts limited to < ½ acre
- ✓ Wetland impacts > 1/10 acre must have mitigation
- ✓ No channelizations allowed; only channel "shaping" i.e. old/new channels must overlap
- ✓ Approval good for 2 years

Region 7 Permit (RP7) – possible intermediate for road and bridge projects

- ✓ Limited to wetland impacts 1 acre or less
- ✓ All wetland impacts must be mitigated at a 1.5:1 ratio
- ✓ Stream realigning and shaping must be < 500 ft in total length, including up to 300 ft on one side of the stream crossing
- ✓ Banks must be stabilized with vegetation or rock, no greater than 2H:1V in slope
- ✓ Approval good for 3 years

Clean Water Act Section 404 Permit Application Checklist

To be used for Nationwide Pen-nit (NWP) Pre Construction Notices (PCN) and Individual Permit (IP) Applications

Version date: February 28, 2001

This list was developed by the Wetlands and 404 Permits Section of the Iowa Department of Transportation based on coordination with Rock Island District of the U.S.. Army Corps of Engineers, Iowa Department of Natural Resources, and other Iowa resource agencies. The list is intended to be a guide for requesting Section 404 authorization for transportation projects in Iowa. Actual PCN's and I P applications should be developed at the applicant's discretion and coordinated directly with the regulatory agencies.

1. Cover letter

A. Write letter based upon info compiled In application supplement
B. Identify target authorization date, anticipated letting date
C. Identify funding source (local, county, state or federal)
D. List project numbers
E. Identify project manager/contact

2. Joint Application Form (Eng. Form 4345)

A. Complete form based upon info compiled in application supplement
B. Signature by applicant

3. Supplemental Information

A. Applicant
B. Identify project, limits, and project manager
C. Project Location
    I. LSS sections, township, & range
    II. Generally describe the waters of the U.S. (WUS) affected by project
    III. Figure 1 -Project Location (8.5x11 quad map or county map)
        a. Beginning and end of project
        b. Borrow(s)
        c. Mitigation site(s)
D. Project Description
    I. Describe project type: reference NEPA documents; describe typical cross section; refer reader to typical X-sect. in plans (Appendix
    II. Project purpose
        a. Project description from NEPA documents, Project Statement, files
    III. Alternatives Analysis
        a. Documentation from NEPA documents
        b. What other alternatives were considered (including no action)
    IV. Avoidance & Minimization (temporary and pemanent impacts)

a. Info on multiple alignments from NEPA documents & files; discuss special precautions related to minimization
b. Techniques to minimize water quality impacts during construction
c. Techniques to reduce adverse affects such as flooding or erosion upstream and downstream of project site
d. Documentation that discharges comply with FEMA or FEMA- approved local floodplain construction requirements

V. Existing Land Use description (amount of wetland, woodland, ag lands)
a. National Wetlands Inventory maps
b. Soils maps
i. include all soil types
ii. highlight hydric soils

E. Wetland Determinations & Delineations
I. Generally describe techniques, summarize impacts & locations of wetlands, WUS; summarize impacts related to channel work (lost channel length. how length was figured, fate of old channel); Summaries to be used in Public Notice (PN)
II. Table -Summary of Wetland and WUS Impacts & Proposed Mitigation
a. Acreage for wetlands and ponds, linear feet for channels
b. Cowardin and/or HGM classifications
c. Stationing locations
d. UTM coordinates for each crossing (for both NWP's and IP's); Use a central coordinate for large wetland areas; UTM coordinate not required for mitigation sites
III. Figure -Location of all jurisdictional waters

F. Proposed Mitigation
I. Generally describe impacted wetlands quality & functions; generally describe wetland mitigation concept as restoration, preservation, enhancement or combination; Include no net loss statement; Summary to be used in PN

G. Federal/State Threatened & Endangered Species Summary Statement
I. Generally describe field surveys & results for federal & state species of concern; Refer to coordination letters in Attachment A
II. Plant inventory results/summary for sensitive areas
a. fens
b. plant communities that have retained some natural character
c. not necessary for significantly degraded areas
III. Indiana bat habitat fonT1 (for counties affected) h)

H. Historical Resources
I. Generally describe field surveys & results; list R&C numbers
II. Include State Historic Preservation Office (SHPO) verified clearance for all project features (project, borrows, mitigation).

I. Additional Approvals & Certifications (if required)
I. Floodplain permits
II. Statement regarding FEMA floodplains
III. Others (local permits)

J. Attachment A -Project Plans
I. Project plans including all design features

a. Typical cross sections
b. Main line, side roads, cross sections at jurisdictional crossings only
c. All borrows
d. Bridge and culvert plans, Type Size & Locations
e. Transfer Jurisdictional Waters to plan sheets,

K. Attachment B -Site-specific Wetland/Jurisdictional Waters Information
I. Depict Wetland/Jurisdictional Waters impacted by the project (direct & indirect) on aerial photography at jurisdictional crossings and borrows
II. Delineation/DeterrT1ination forms
a. Description of how boundary was identified
b. One fon'T1 for center of wetland is not useful
c. No need to include non-wetland samples
d. Data sheet not required for jurisdictional areas less than 1/10 acre
III. Ground-level photographs of Wetland/Jurisdictional Waters impacted by the project (direct & indirect) (Optional, little use for agencies)

L. Attachment C -Mitigation Concept
I. Mitigation goals, no net loss statement
II. Mitigation site search summary (cities, county conservation boards, NRCS, other agencies contacted)
III. Information on location, site specific objective, existing conditions relating to soils, hydrology & vegetation, proposed manipulation of soils, hydrology, vegetation, landscape. water control structures
IV. Delineations of existing conditions (Certified Determination from NRCS on ag land)
V. Historic resource survey status, clearance
VI. Management plans, acquisition plan, site ownership, agreements, excess, disposal
VII. Timing of construction (estimate of start, completion, relation to road construction)
VIII. Plat/Legal description for filing deed restriction i) Monitoring proposal
a. DOT Mitigation Monitoring Protocol
b. Variations
c. Timing, Intervals
IX. Design plans if available
X. Figures: Mitigation area/site locations and detailed figures of each site showing proposed manipulations, expected limits of mitigation wetlands, property lines.

M. Attachment D -Correspondence . Relevant project correspondence (e.g" SHPO summary letter w/concurrence; FWS clearance letters; DNR floodplain/channel change authorization letters)
N. Attachment E -Adjacent landowners and addresses (IP only)

4. Peer Review/Revisions/Editing

5. Compile multiple copies of items 1). 2), & 3)

A. Corps of Engineers (1 copy; all lP's and NWP PCN's)
B. DNR (2 copies to Water Quality Section, 1 to field wildlife biologists; IP’s only)
C. EPA (1 copy; omit Attachments A, D, and E; IP’s onlyl)

D. FWS (1 copy; IP's only)
E. File

6. Mail Application

7. Provide electronic copies if useful

8. Provide additional information/assistance as requested

9. Coordinate application discussion meeting/teleconference if necessary

PROCEDURE GUIDE

NPDES (Storm Water Discharge) Permits

Wetlands and 404 Permits Section

August 10, 2001

1. Guidance for NPDES Permits can be found in DNR publications "Storm Water Management for Construction Activities – Summary Guidance" and NPDES General Permit No. 2. " Kevin has copies. Additional guidance my be found in DOT Design Manual, Chapter 10D-1
2. All mitigation project should be evaluated for NPDES needs. The following general thresholds apply to projects that require a separate permit.
    a. Disturbed area is greater than 5.0 acres (DOT uses 4.5 acres to be conservative).
    b. Mitigation project is not covered in a NPDES Permit for grading project due to timing, location, or other factor.
3. If a NPDES Permit is required, the mitigation design consultant should prepare a Public Notice of Storm Water Discharge, a Notice of Intent for NPDES Coverage Under General Permit, as well as the Pollution Prevention Plan (PPP) to be included with the contract documents.
4. The PPP should include site-specific data such as acreage, soils, watershed, points of discharge, etc. Bid items should be included for erosion control measures that may be needed during construction.
5. Kevin will sign the Notice of Intent and forward to Office of Construction (Dave Heer) with the Public Notice and a set of the mitigation plans.
6. Construction will arrange to publish the Public Notice, pay the permit fee, and file the permit.
7. Following completion of the project, Construction will file a Notice of Discontinuation with DNR.
8. All mitigation design work orders should include NPDES documentation preparation.
9. Note that NPDES Phase II rules, which are effective March 2003, lower the threshold to 1.0 acre.

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Memorandum of Agreement

Between
Iowa Department of Natural Resources
And
Iowa Department of Transportation

Regarding Transportation Land Use Within the Loess Hills

WHEREAS, The Loess Hills of western Iowa represent a resource of significance to the citizens of Iowa and are a recognized land feature of national importance;

WHEREAS, The Loess Hills warrant the highest level of protection and stewardship by state agencies in carrying out their respective legislative mandates;

WHEREAS, The Loess Hills comprise an extensive land form in western Iowa that makes it difficult for the Iowa Department of Transportation (IDOT) to avoid direct encroachment when carrying out the department's mandate to construct and maintain safe and efficient surface transportation facilities for the citizens of Iowa;

WHEREAS, the Iowa Department of Natural Resources (IDNR) and IDOT desire to arrive at a mutually acceptable understanding regarding unavoidable transportation land use within the Loess Hills;

WHEREAS, both IDNR and IDOT concur that a framework for negotiating unavoidable land uses within the Loess Hills would be mutually beneficial in carrying out respective agency responsibilities;

NOW THEREFORE, BE IT RESOLVED, that IDNR and IDOT agree to the following stipulations and conditions regarding encroachment on the Loess Hills, for purposes of maintaining or enhancing Iowa's transportation investments:

Stipulations and consensus points:

1. Definition of Loess Hills land form, soil types, and boundaries:

For purposes of this agreement, the Loess Hills landform will be defined using data provided in the Loess Hills of Western Iowa Special Resource Study and Environmental study prepared by the National Park Service in 2002 (2002 NPS report.) Page seven of this study defines the Loess Hills as a distinctive topographic region encompassing over 640,000 acres and extending nearly 200 miles in a narrow band adjacent to the Missouri River. Loess material is described as a widespread geologic deposit, but accumulating to depths of 150 feet in places within the Loess Hills landform. Topographic features include distinctive shapes, such as steep, narrow ridge crests, peaks, saddles, and

numerous steep side slopes, branching spurs, and precipitous bluffs. Figure 1, attached, shows the Loess Hills landform in relation to the seven principal landform regions of Iowa. Figure 2, attached, shows more specific boundaries of the Loess Hills landform within seven counties of western Iowa.

With the exception of the eastern slope of the Loess Hills, the boundaries shown in Figure 2, will be relied upon to define the Loess Hills landform for purposes of this agreement. Because soils types on the eastern boundary of the Loess Hills tend to be gradational, soil borings will be used to define Loess soils material, using a 50-foot or greater measure to further refine boundaries. Less than 50-foot Loess soils depths would not be considered Loess Hills.

2. Definition of areas of natural cover/vegetation within the Loess Hills:

Areas exhibiting natural vegetation cover shall be afforded a higher level of protection than those areas where natural vegetation has been significantly disturbed or removed. For purposes of this MOA, "natural vegetation" shall include herbaceous or woody vegetation that is unmodified by human activities, vegetation that has been altered in varying degrees by humans but has retained or regained characteristics of an undisturbed community, or vegetation that has been planted by humans but is not actively maintained for agricultural/commercial purposes. Natural vegetation shall include both native as well as introduced species, although a higher level of protection will be afforded those areas exhibiting a predominance of native species. Areas that have been cultivated and planted to non-native grasses, legumes, or grass-legume mixtures for purposes of livestock grazing, seed production, or hay crops shall not be given consideration as natural vegetation, except in cases where threatened or endangered species are present or otherwise very high quality habitat is present.

3. Incorporation by reference of the 2002 NPS report for purposes of defining special landscape areas and other areas of significance (13 areas of significance) which are to be afforded the highest level of protection. This reference will be supplemented by IDNR supplied electronic mapping that provides detailed definition of the 12 special landscape areas plus the Glenwood locality. A general location map of the 12 special landscape areas is shown on Figures 3A. Figure 3B shows the location of the site described as the Glenwood locality (refer to Section 11 of this agreement.)

4. IDOT will adopt an avoid or minimize approach to encroachment or land use within the designated Loess Hills boundary. Specifically, this stipulation means IDOT will not convert Loess Hills lands unless there is no practicable alternative to such land use, in IDOT's judgment. In addition, IDOT will afford special protection measures for areas within the Loess Hills mapped feature that exhibit native vegetation, previously undisturbed areas, or unique habitat.

5. IDOT will implement a total avoidance policy regarding use of borrow materials within the 12 special landscape areas and the Glenwood locality as defined in the 2002 NPS report. This stipulation will also apply to the west face of the Loess Hills boundary,

as defined in point 1 above. When borrow sites are necessary within the Loess Hills, IDOT agrees, to the greatest extent possible, to shape borrows so that they blend into the natural surroundings. In instances where use of land within the 12 special landscape areas or the Glenwood locality may be necessary and unavoidable, such as maintenance or safety and capacity improvements to existing highways, IDOT will confer with IDNR, as discussed in paragraph 7 below, prior to any formal decision. This consultative aspect will include a clear statement of why encroachment is necessary, what avoidance options were examined, and what, if any, opportunities exist for remedial action. Any remedial actions agreed to will be in writing and approved by both agencies.

6. When land use from the Loess Hills is unavoidable, IDOT and IDNR agree that cultivated land and previously disturbed areas within the Loess Hills can receive less consideration for avoidance and minimization than priority avoidance areas noted in paragraph 3, above. Similarly, land from the east side of the Loess Hills can be used for transportation needs, if other reasonable alternatives have been eliminated.

7. MOA Implementing Processes:

A. IDOT, in consultation with IDNR, will develop an implementing process that provides for early input/consultation with IDNR prior to a decision to encroach upon Loess Hills lands. This consultation process will follow the protocols established by this MOA, and will include a standardized data transmittal plan agreed to by both agencies.

B. By means of the process established in paragraph 7A, above, IDNR will be afforded the opportunity to provide early input into borrow site selection when borrows are proposed within the Loess Hills mapped feature established by the 2002 NPS report.

C. On a case by case basis, IDNR will be asked to provide input regarding establishing mitigative buffer zones adjacent to areas of natural cover. IDOT's Office of Location and Environment will provide IDNR a formal evaluation of both natural cover areas and potential buffer zones as part of this effort.

D. Should there be an instance where IDOT cannot avoid a natural area, or one of the 12 special areas or Glenwood locality described in the 2002 NPS report, IDOT will advise IDNR of the circumstances involved, and will include a discussion of IDOT's efforts to avoid or minimize the effects of proposed construction. This activity could include mutually agreed upon mitigation or other remedial actions appropriate to the scale of impacts.

E. The consultation process described in this MOA will be carried out for each incursion into the Loess Hill mapped feature. Results of this consultation will then be documented within the National Environmental Policy Act (NEPA) compliance report prepared for each project, and also retained with the NEPA administrative record, as evidence of compliance with MOA stipulations.

F. The consultative process described by this MOA will be carried forward in each instance where encroachment into the Loess Hills land form may be necessary. In the interests of efficiency, it is agreed that the consultative process described herein will be completed within 30 days, except under extraordinary circumstances.

9. Periodic Review or Modification of the MOA:

This MOA may be periodically reviewed when either signatory party determines a review or update to these provisions may be necessary. If modifications to the MOA result, they may be incorporated by addendum signed by both agencies, or by revising/updating the original MOA, followed by signature.

10. Stipulations Regarding Development of Local Systems Projects:

Transportation improvements sponsored by city and county governments (local systems initiatives) routinely are outside of IDOT's jurisdictional control. As such, IDOT's oversight role is limited to assuring that project development is completed in compliance with specific federal guidance, as appropriate. In these cases, IDOT will strongly encourage city and county project sponsors to follow the stipulations and consensus points established by this memorandum of agreement. Additionally, IDOT will make copies of this MOA available to city and county governments and metropolitan and regional planning associations for their use in planning future local systems transportation initiatives.

11. Scope of MOA Provisions:

Agreement with the provisions of this MOA, along with applicable state and federal laws, defines the complete guidance for IDOT land use within the Loess Hills land feature. With respect to the Glenwood locale in Mills County (13th special landform feature) IDOT's avoidance commitment will be based on the provisions of Section 106 of the National Historic Preservation Act of 1966, 36 CFR Part 800, as amended, and Iowa Code section 314.24 of the Iowa Code when applicable.

12. Agency Concurrence: Signature below indicates acceptance of the stipulations and consensus points detailed in this memorandum of agreement. These points will not be changed or modified without mutual agreement by the agencies involved.

Ken Herring — 11-12-08

For Iowa Department of Natural Resources — Date

James Rost — 11/06/08

James P. Rost, Director — Date

Office of Location and Environment

Iowa Department of Transportation

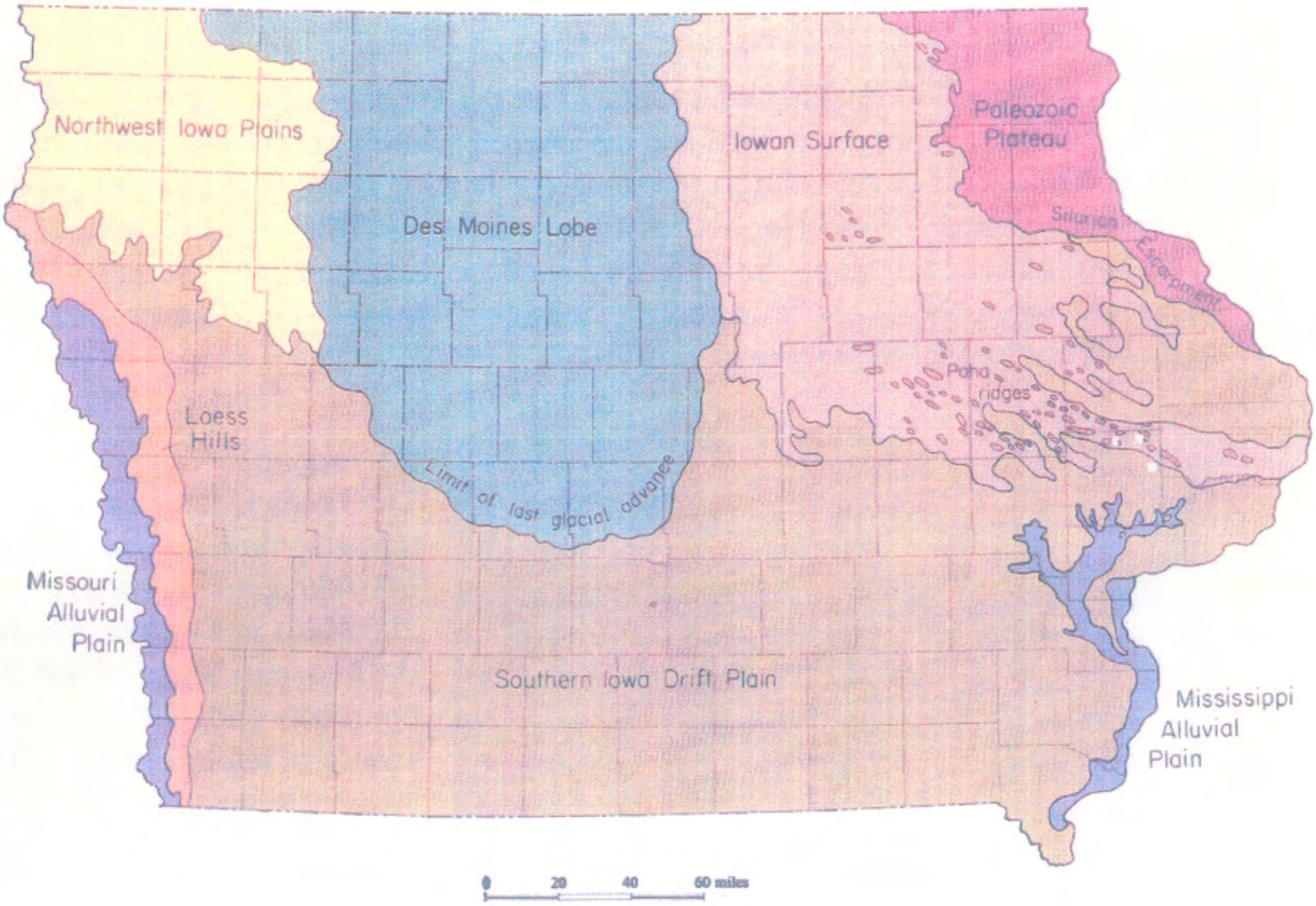
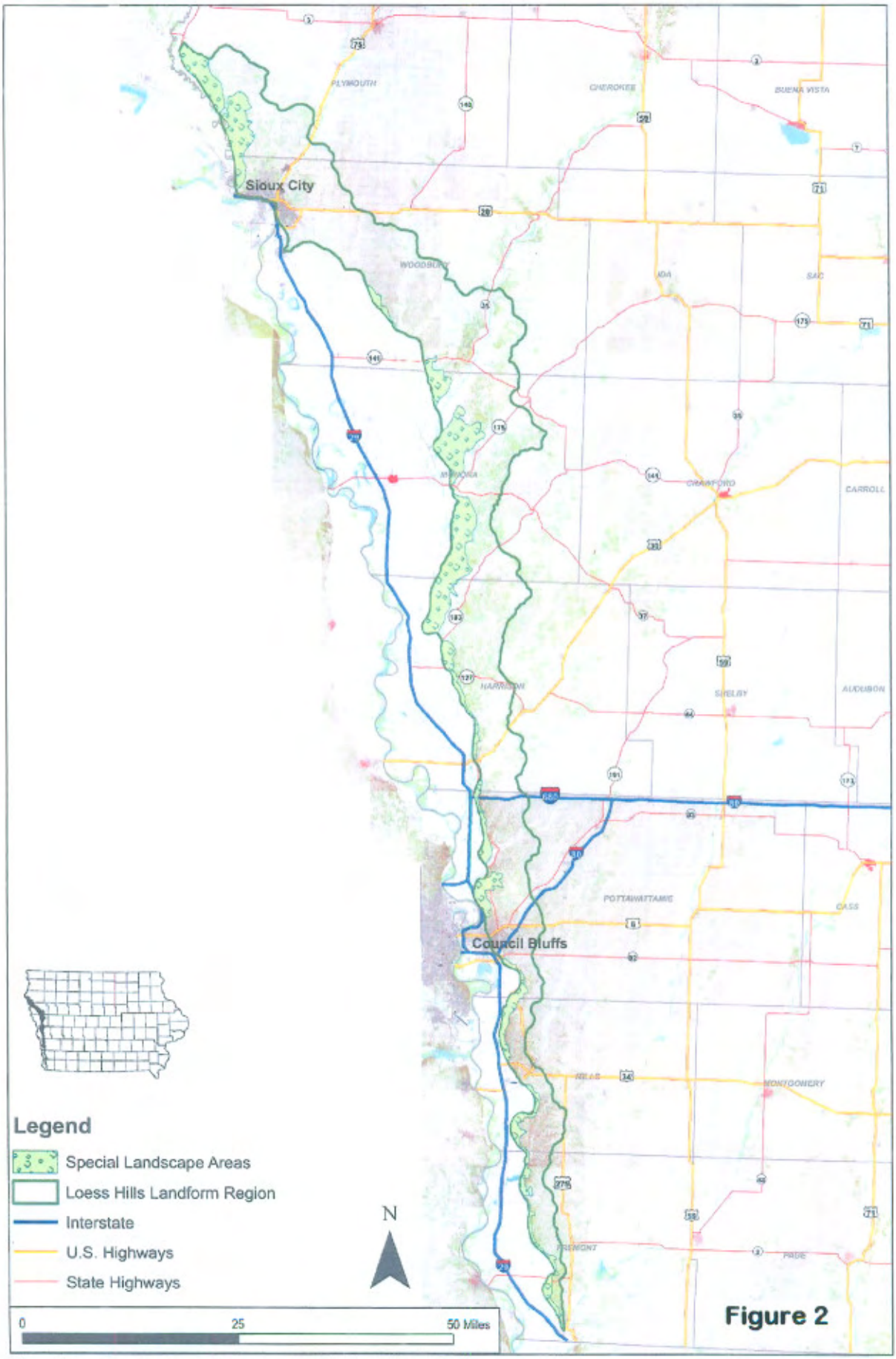

Northwest Iowa Plains
Des Moines Lobe
Iowan Surface
Paleozoic Plateau
Silurian Escarpment
Loess Hills
Limit of last glacial advance
Missouri Alluvial Plain
Southern Iowa Drift Plain
Mississippi Alluvial Plain
0 20 40 60 miles

Figure 1



Special Landscape Areas in the Loess Hills Landform Region

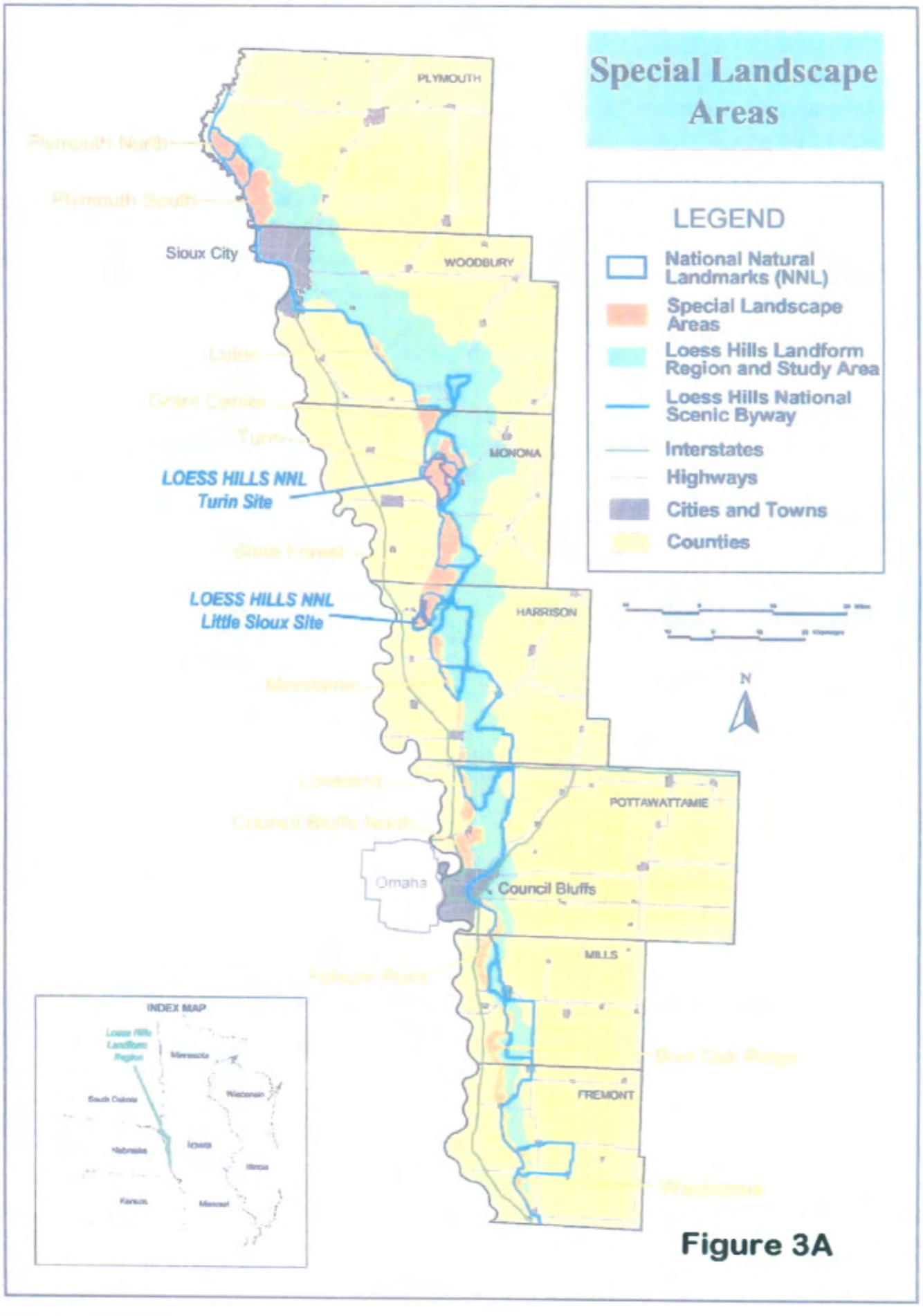

Special Landscape Areas
LEGEND
National Natural Landmarks (NNL)
Special Landscape Areas
Loess Hills Landform Region and Study Area
Loess Hills National Scenic Byway
Interstates
Highways
Cities and Towns
Counties
PLYMOUTH
Sioux City
WOODBURY
MONONA
LOESS HILLS NNL
Turin Site
LOESS HILLS NNL
Little Sioux Site
HARRISON
POTTAWATTAMIE
Omaha
Council Bluffs
MILLS
FREMONT
N
INDEX MAP

Figure 3A

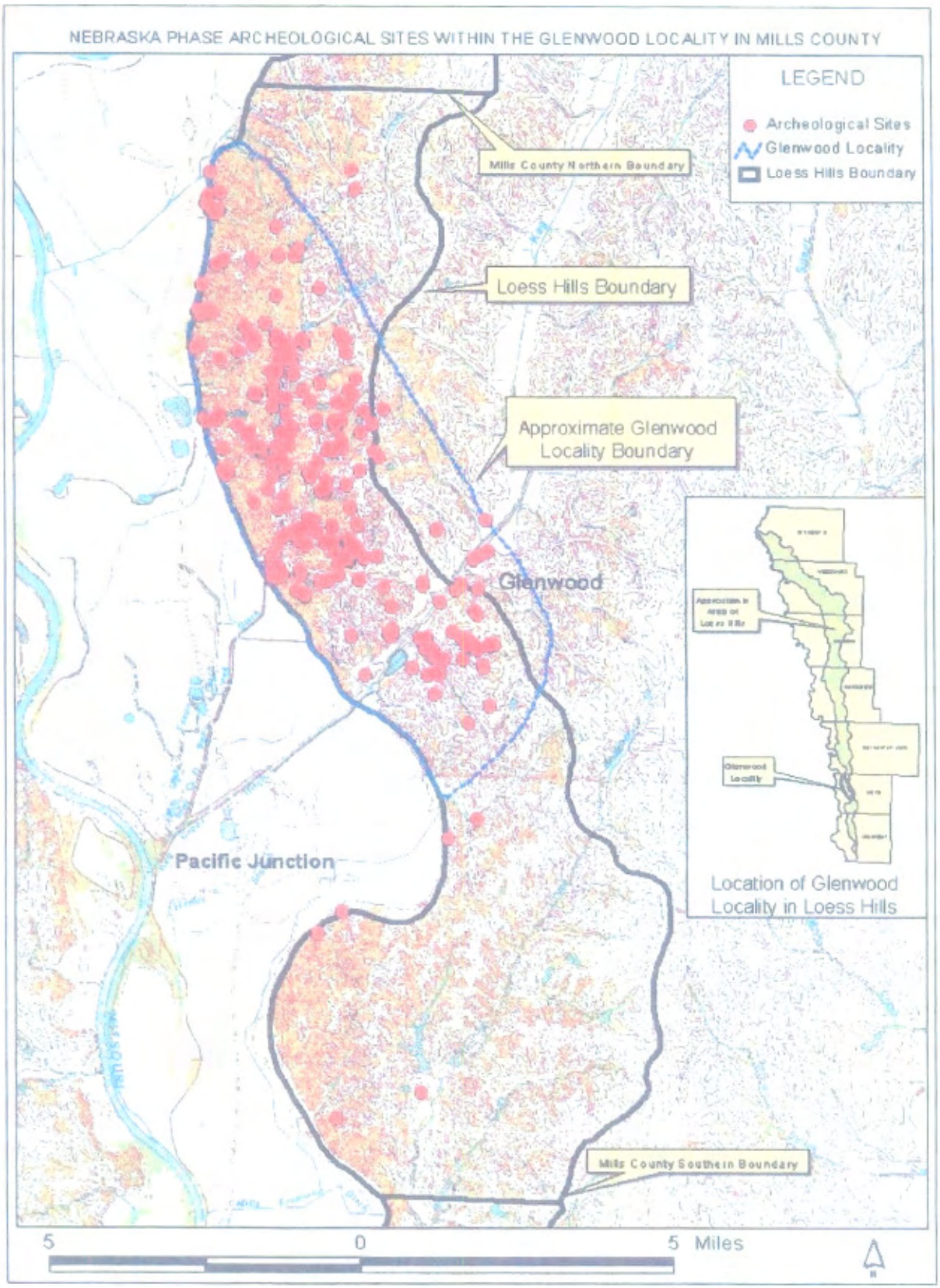


Figure 5: Glenwood Locality (map based on data compiled by the Office of the State Archaeologist, University of Iowa, under the direction of Dr. Joe Alan Artiz).

Figure 3B

U.S. Department
of Transportation

Federal Highway Administration

Memorandum

SENT BY ELECTRONIC MAIL

Subject: **INFORMATION: Management of the Endangered Species Act (ESA) Environmental Analysis and Consultation Process**

Date: February 20, 2002

(Original signed by)

From: James M. Shrouds
Director, Office of Natural Environment

Attn. of: HEPN-30

To: Division Administrators
Federal Lands Highway Division Engineers

The following guidance is intended to address issues related to implementation of the ESA in the Federal-aid highway program. These issues are:

1. The interaction of the National Environmental Policy Act (NEPA) environmental analysis and ESA Section 7 consultation process,
2. The authority of FHWA divisions to delegate and manage the ESA Section 7 process, and
3. Environmental analysis of candidate species for ESA listing.

Interaction Between NEPA and ESA

The NEPA and the ESA Section 7 processes interact in the early phases of the environmental analysis of a project. The NEPA drives the evaluation of biological resources in the project area concurrent and interdependent with the ESA Section 7 consultation process. Evaluation of impacts to species federally-listed as endangered is required for all levels of NEPA documentation, and the detail of analysis is potentially the same, dependant on the scope of the project, ecological importance and distribution of the affected species, and intensity of potential impacts of the project. A CE determination through NEPA does not exempt any project from sufficient environmental analysis to determine the likely presence and potential impacts of the project on listed species, unless a programmatic determination to that effect has been made at the local level with the concurrence of the Fish and Wildlife Service/National Marine Fisheries Service (Services). A potential impact on species or habitat protected by the ESA does not automatically require elevation of the NEPA documentation (CE, EA, EIS). This depends on the importance of the resources and the scope of the impacts.

The minimal biological evaluation (BE) under Section 7 for any Federal-aid project not addressed programmatically, is a request to the Services for information on the presence of listed or proposed species or critical habitat in the project vicinity. If the Services respond that protected species or habitat are known not to occur in the action area, the

environmental analysis with respect to the ESA is complete and the FHWA concurs in writing with a no effect determination by the State DOT. The determination of no effect should be included in the NEPA documentation, including CEs. A "likely to effect determination" is appropriate when the action area of the proposed project includes areas known to be inhabited, or known to be potentially inhabited, by one or more listed species, or the action area includes designated critical habitat.

If the Services respond that protected species or habitat are known or likely to occur in the project action area, the State DOT has the option of entering informal consultation or directly requesting formal consultation. The process of informal consultation is optional and is described in 50 CFR § 402, Interagency Cooperation-Endangered Species Act of 1973, as Amended, Subpart B, Consultation Procedures. The endangered species analysis should be appropriate to the scope of the project. It may be prepared as a BE or a BA in the case of an EIS. A distinction is made between the process for submitting a BA (which occurs in accordance with Part 50 CFR § 402.12 for EIS projects) and the preparation of a BE (which is developed during informal consultation and may be used to initiate formal consultation for EAs and CEs).

In a BE the groundwork is established for a determination of "may affect, not likely to adversely affect" or "may affect, likely to adversely affect", which is initially made by the State DOT. An analysis of the action area, determination of distribution and occurrence of contributing habitat elements, biological characteristics of the species, and potential impacts of the project (including noise, disturbance, and other factors which could affect the behavior, reproduction, and general ecological functions of the species) should be discussed. The BE should include an "affect" determination for listed species or habitat. These conclusions should be supported by the information in the BE, including a discussion of potential mechanisms of impact on the species or habitat.

Sufficient information must be provided to the Services to make a "not likely to adversely effect" or "likely to adversely effect" determination in informal consultation, or a jeopardy/adverse modification or non-jeopardy/no adverse modification determination in formal consultation. Because the FHWA does not require elevation of NEPA documentation when a project is determined as "likely to adversely affect" a listed or proposed species, the preparation of a BE and formal consultation can be required for CEs and EAs. BEs submitted for formal consultation should contain the same biological information as a BA.

When a programmatic determination on classes of actions which are considered "not likely to adversely affect" listed or proposed species or critical habitat has been concurred in by the FHWA and the Services in writing, no further evaluation is required on these projects. Actions of this nature might include signing, striping, overlays, minor reconstruction, and similar activities which experience has shown to have insignificant, discountable, or beneficial effects on listed species.

Consultation on Species or Critical Habitat Listed Under the Endangered Species Act – Delegation Authority

50 CFR Section 402.08, Designation of Non-Federal Representative, allows Federal agencies to delegate informal consultation and preparation of BEs and BAs to a non-Federal

representative. The FHWA (by letter to the Services dated August 7, 1986) did this, delegating informal consultation and preparation of BEs and biological assessments in the Federal-aid highway program to State DOTs. The ESA and 50 CFR § 402.08 require that the FHWA furnish guidance and supervision of the consultation process, concur in no effect determinations, and independently review and evaluate the scope and content of BAs. BEs, species lists, habitat descriptions, and other documentation prepared to assess the effects of both major and non-major Federal actions on listed and proposed species and habitats, both programmatic or individual, may be submitted by the State DOT directly to the Services' field office under the delegation authority, at the discretion of the FHWA division office. The FHWA division offices retain discretionary authority to review and participate in any stage of the ESA consultation process on a Federal-aid highway project, from NEPA evaluation of resources through formal consultation.

The FHWA policy encourages the State DOTs to be proactive in informal consultation, including modification of the proposed project where necessary to avoid adverse effects. If, during informal consultation, the State DOT obtains written concurrence from the Services that the action as proposed or modified is not likely to adversely affect listed or proposed species, or listed or proposed habitat, Section 7 requirements have been met. The authority of the FHWA to delegate informal consultation and preparation of BEs and BAs to the State DOTs is not discretionary on the part of the Services.

The ultimate responsibility for compliance with all Section 7 requirements in regard to federally-funded highway projects remains with the FHWA. 50 CFR § 402 does not provide for delegation of formal consultation to a non-Federal representative. All formal consultation procedures with the Services must be carried out by the FHWA division office.

BAs include information concerning all species listed and proposed for listing under the ESA, designated and proposed critical habitat that may be present in the action area of the project, and the evaluation of potential effects of the project on such species and habitat. This information is described in detail in 50 CFR 402.12(f). BAs are prepared for major construction activities, typically EIS projects, and shall be independently reviewed by the FHWA division office, before being submitted to the Services' field office. This review must be carried out in a timely way to facilitate completion of the consultation requirements.

Re-initiation of consultation may be requested by the State DOT, the FWHA, or the Services after initial consultation is completed as made necessary by changes in the scope or design of the project, discovery of the presence of previously unknown listed species or critical habitat, or the listing of new species. Re-initiation of informal consultation can be done by the FHWA or delegated to the State DOT, at the discretion of the FHWA division. Formal consultation must be re-initiated by the FWHA.

Conference Process for Proposed Species

Species and critical habitats proposed in the *Federal Register* for listing are subject to the conferencing process established in 50 CFR § 402.10, Conference on Proposed Species or Proposed Critical Habitat. Conference is a process of early interagency coordination, similar to consultation, involving informal or formal discussions between a Federal agency and the Services pursuant to Section 7(a)(4) of the ESA regarding the potential impact of a project or

action on proposed species or proposed critical habitat. The conference procedure is designed to help Federal agencies identify and resolve potential conflicts between Federal projects and species conservation by developing recommendations to minimize or avoid adverse effects on proposed species or proposed critical habitat.

Informal conference on proposed species or critical habitat may be carried out by the State DOTs. If a determination is made that a proposed Federal-aid highway project is likely to jeopardize a species or destroy, or adversely affect, critical habitat proposed for listing under the ESA authorities, a formal conference is required and must be initiated by the FHWA. During the conference process, the Services will make advisory recommendations on ways to avoid or minimize adverse effects. If agreed to by the FHWA division office and the Services' field office, the conference can be carried out under § 402.14, Formal Consultation. If those procedures are followed, and the species or critical habitat is listed prior to completion of the project, the Services have the option (in the absence of significant changes in the project or significant, new information on the species) of adopting the conference opinion as the biological opinion for the project. An incidental take statement issued with a conference opinion does not become effective unless the Services adopts the conference opinion as the biological opinion.

Candidate Species

Candidate species are those species for which the Services have on file sufficient information on biological vulnerability and threat(s) to support issuance of a proposed rule to list, but for which issuance of the proposed rule is currently precluded by one or more of several conditions. These species were formerly called Category 1 candidates. They are now referred to simply as candidate species. The Services emphasize that these candidate taxa are not proposed for listing, but that development and publication of proposed rules for listing of candidate species is anticipated. Species formerly classified as Category 2 and Category 3 candidate species are no longer classified as candidates. The Services maintain data on these species when feasible.

Categorization of a species as a candidate is strong evidence that the species is of special concern, and subject to the full protection of the listing process, if not at present, probably in the future. There are no absolute guidelines on how long it will take a species to go from the candidate list, to being proposed, to a final rule on listing. Impacts on candidate species should be addressed in Federal-aid highway project environmental documents. NEPA documents should identify candidate species as such, and describe any planned conservation measures. The Services encourage Federal agencies to consider implementing conservation measures for candidate species, as these measures may avoid the future necessity of listing. Proactive partnering with the Services to conserve candidate species might reduce future delays on Section 7 processes and/or result in future cost savings if listing can be avoided. However, candidate status does not provide species protection under the listing process, and neither consultation nor conference, formal or informal, is required on Federal-aid highway projects for candidate species under the ESA Section 7 requirements. Any interagency coordination on these species with respect to Section 7 of the ESA by the FHWA or the State DOT is discretionary. However, they have the same status as any other non-regulated resource issue under NEPA.

Emergency Listing

The Services have the option, when they believe it is warranted, of initiating emergency listing procedures, which can result in a species being listed in less than 90 days. Emergency listing lasts 240 days, during which time the Services can usually complete final listing.

cc: Directors of Field Services

DATA FORM FOR IOWA DOT PROJECTS WITHIN THE LOESS HILLS

Date _____ DOT Contact Name _____

DOT Project # _____ DOT Contact Number (___) ___ - _____

County & Route _____ DOT Contact Email _____

Township Range Section _____ Map Attached ☐

Project Description _____

The following questions relate to the November 12, 2008 Memorandum of Agreement between the Iowa DOT and Iowa DNR Regarding Transportation Land Use Within the Loess Hills

1) Does the proposed project lie within the boundaries of the Loess Hills? ☐ Yes ☐ No

1a) If yes to 1, does the proposed project lie along the eastern boundary? ☐ Yes ☐ No

1b) If yes to 1a, did soil borings determine more than 50 feet of loess soil is present? ☐ Yes ☐ No

2) Does the proposed project lie within the boundaries of the 12 Special Landscape Areas? ☐ Yes ☐ No

3) Does the proposed project lie within the boundaries of the Glenwood locality? ☐ Yes ☐ No

4) Does the proposed project site exhibit areas of natural vegetation cover? ☐ Yes ☐ No

5) Has the proposed project site been disturbed? ☐ Yes ☐ No

6) Describe the ground cover and topographic characteristics of the proposed project site. Provide information regarding avoidance and minimization strategies and why this site was chosen over alternative sites. _____

_____

_____

_____

_____

_____

7) Does the proposed project site contain the presence of:

threatened or endangered species or critical habitat? ☐ Yes ☐ No **OR** very high quality habitat? ☐ Yes ☐ No

If yes to either, provide details. _____

_____

_____

_____

IOWA DNR REVIEW

The Iowa DNR has reviewed this Data Form in regard to an Iowa DOT project within the Loess Hills.

The Iowa DNR: ☐ Has no concerns with the project proceeding as described above.

☐ Has concerns, detailed on back.

Iowa DNR personnel: _____ Date reviewed: _____

Iowa DNR personnel phone #: (___) ___ - _____ Email: _____

Continued from front.

IOWA DNR COMMENTS

Environmental Justice Workshop

Ames, Iowa
June 28, 2001

Applying Environmental Justice and Title VI in Transportation Planning

Overview: Title VI and Environmental Justice

- Title VI Legislation and Regulations
- Current Transportation Laws
- Environmental Justice: Executive Order 12898, USDOT Order and FHWA Order

Title VI, 1964 Civil Rights Act

No person in the United States shall, on the basis of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance.

Environmental Justice

Executive Order 12898, February 11, 1994:

- Consistent with Title VI of the Civil Rights Act of 1964
- Adds low-income to race, color, & nat'l origin
- Must identify and address disproportionately high and adverse impacts
- Applies to all programs, policies, & activities

Environmental Justice

Executive Order 12898:

- No exclusion from participation
- No denial of benefits
- No discrimination
- Must ensure greater Public Involvement

Environmental Justice

- Avoid, minimize or mitigate disproportionately high and adverse ... effects on minority populations and low income populations
- Ensure the full and fair participation ...
- Prevent the denial of ... benefits by minority populations and low income populations

U.S. DOT Title VI Regulations

"A recipient [of Federal funds] ...may not, directly or through contractual or other arrangements, utilize criteria or methods of administration which have the effect of subjecting persons to discrimination because of their race, color or national origin..."

(49 CFR 21.5(b) (2))

U.S. DOT Title VI Regulations

"... a recipient or applicant may not make [site] selections with the purpose or effect of excluding persons from, denying them the benefits of, or subjecting them to discrimination ... on the grounds of race, color, or national origin..."

(49 CFR 21.5(b)(3))

Environmental Justice

- **Principles**
  - **Consider**
    - the composition of the region or affected area
    - potential for multiple or cumulative exposure
    - interrelated cultural, social, occupational, historical, and economic factors
  - **Develop** effective public participation
  - **Assure** meaningful community representation

Definition of Effect

- **Adverse effect:** Totality of significant individual or cumulative human health or environmental effects.
- **Disproportionately high:** An effect that:
  1) is predominately borne by a minority or low-income population; or
  2) will be suffered by the minority or low-income population . . . appreciably more severe or greater in magnitude than the adverse effect . . . suffered by the non minority or non low-income population.

Adverse Effects Include:

"Interrelated social and economic effects, which may include, but are not limited to: bodily impairment, infirmity, illness or death; air, noise, and water pollution and soil contamination; destruction or disruption of man-made or natural resources; destruction or diminution of aesthetic values; destruction or disruption of community cohesion or a community's economic vitality; destruction or disruption of the availability of public and private facilities and services; vibration;. . .

1 of 2

As well as:

. . . adverse employment effects; displacement of persons, businesses, farms, or nonprofit organizations; increased traffic congestion, isolation, exclusion or separation of minority or low-income individuals within a given community or from the broader community; and the denial of, reduction in, or significant delay in the receipt of, benefits of DOT programs, policies, or activities."

(Appendix of U.S. DOT Order) 2 of 2

Population Definitions

- Low Income:
  - **Household income at or below the Department of Health and Human Services poverty guidelines of $17, 650 for a family of four (2001).**
- Minority:
  - **Black or African American**
  - **Hispanic**
  - **Asian American**
  - **American Indian/Native American or Alaskan Native**

2001 HHS Poverty Guidelines

Size of Family Unit	48 Contiguous States and D.C.	Alaska	Hawaii
1	$ 8,590	$10,730	$ 9,890
2	11,610	14,510	13,360
3	14,630	18,290	16,830
4	17,650	22,070	20,300
5	20,670	25,850	23,770
6	23,690	29,630	27,240
7	26,710	33,410	30,710
8	29,730	37,190	34,180
For each additional person, add:	3,020	3,780	3,470

What Does the U.S. Census Bureau Include to Determine Poverty?

$ **Includes money income before taxes**

o **Does not include:**

- **Capital gains and non-cash benefits (such as public housing, Medicaid, and food stamps)**

Note: Poverty is not defined for people in military barracks, institutional group quarters, or for unrelated individuals under age 15 (such as foster children). They are excluded from the poverty universe--that is, they are considered neither as "poor" nor as "non-poor."

Who is Low Income?

- **Black/African American 23.6%**
- **Hispanic 22.8%**
- **Asian & Pacific Islanders 10.7%**

Census Bureau Report Sept. 2000

Who is Low Income?

- **Most are White**
- **Many are children**
- **Many are rural**
- **Some are farmers**
- **Some are "seniors"**
- **Some are disabled**

"E J " is also called =

Transportation Equity or Service Equity

How To Implement Service Equity:

1. Demonstrated Commitment
   - How is it demonstrated?
   - At top levels of the organization?
   - Should be reflected in the planning process
   - Should be reflected in work products (i.e., plan, TIP, STIP, UPWP)
2. Demonstrated Outcomes
   - Measures, Benchmarks, & Criteria

Effective E.J. Methods

- Public Involvement Plan and Program (not just a Policy statement)
- Agency commitment
- Timing is important
- "Visible" inclusion of community needs, goals, and concerns in the decision-making process

Effective E.J. Methods

- "Outreach" = Go where the people are
- Staff: The right staff for the right activity
  - Necessary skills/experience
  - Diverse experience/understanding
  - Outreach coordinators
  - Translators (as appropriate)
  - Consultants (maybe)

The Importance -- and How To -- of Public Involvement

Priority on the Natural Environment: 1970-1994

Increased Priority on Humans & the Human Environment

Now doing what we should have done better before. . .

Benefits of Public Involvement

- **Reach better decisions**
- **Broaden information base: Gain information not available elsewhere**
- **Understand and respond to the needs, values, and concerns of the public**
- **Inform the public of plans, activities, and decisions**
- **Encourage public understanding**

Public Involvement: What Works?

- ✓ Develop a public involvement process
- ✓ Use techniques that respond to the needs of different populations
- ✓ Identify potential barriers
- ✓ Develop partnerships
- ✓ Evaluate the process, plan (strategy) and techniques

Develop Partnerships

- ❖ Seek organizations and leaders that can assist
- ❖ Understand cultural and language dynamics
- ❖ Understand communication styles

Goals and Strategies

- Integrate public involvement as part of the planning process--let public help define solutions
- Begin as early as possible -- before ideas and plans are fixed
- Provide full and timely information
- Identify publics affected/facilitate involvement
- Respond in a visible manner
- Document and describe how input was used

Communicating Information

- How do agencies display information about benefits & burdens?
  - GIS
  - Tables
  - Maps and photos
  - Literature (variety of types)
  - Visualization processes

Transportation Planning and Environmental Requirements

Planning Regulations

- Both the States and the MPO's shall annually certify that the metropolitan transportation planning process complies with Title VI. 450.316(b)(2) and 450.334(a)(3).
- States shall certify that the statewide transportation planning process complies with 450.220(a)(2), at least biennially.

Planning Regulations

- "...the planning process shall seek out & consider the needs of those 'traditionally underserved' such as low-income & minority households." 450.212(a)(6) & 450.316(b)(1)(vi)

Planning Regulations

- the transportation plan shall "reflect, to the extent that they exist, the area's comprehensive long-range land use plan and metropolitan development objectives... and national goals and objectives, such as linking low-income households with employment opportunities..." 450.322(b)(9).

Planning Factors

- *TEA-21, Section 1204:*
  - Changed the number of Planning factors to 7 for both Statewide and Metropolitan
  - Increased the accessibility and mobility options available to people (and freight)
  - Protect and enhance the environment, promote energy conservation, and improve quality of life

Environmental Regulations

- It is the policy of the administration that:
  - No person, because of handicap, age, race, color, sex, or national origin be excluded from participating in, or denied benefits of, or subject to discrimination...(23 CFR 771)

Role of Division and FTA

FHWA Divisions and FTA Region Offices have the responsibility for ensuring that Title VI and EJ are addressed in the planning process.

Division and FTA Role

- Long Range Plan Updates
  - Review goals, policies, strategies
- Review/Approval of NEPA documents
- UPWP/SPR
  - EJ data and collection activities
  - Update of Public Involvement Plan
  - Travel Demand Model enhancements

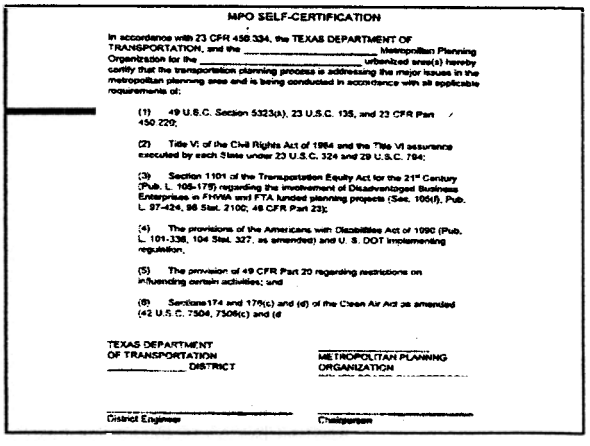
FHWA / FTA Actions in TMA Certification Reviews

Look for evidence showing:

- ✓ **Identification of:**
  - ✓ **Low income and minority populations**
  - ✓ **Community needs and priorities**
- ✓ **Good faith effort and results of EJ analysis, including analysis of benefits & burdens**
- ✓ **Effective public involvement**
- ✓ **Public involvement during the certification review (per TEA-21)**
- ✓ **Public comments considered in decisions**
- ✓ **October 7, 1999 memo as guidance**

FHWA and FTA Findings:

- Assure that each metropolitan TIP is based on the 3-C planning process in accordance with 23 USC 134 and 49 USC
- Assure that projects in the STIP are based on a planning process consistent with Section 1204 of TEA-21, 23 USC 134, and the Federal Transit Act (every 2 years)
- Are based on State and MPO self certifications and other reviews as appropriate



MPO SELF-CERTIFICATION

In accordance with 23 CFR 450.334, the TEXAS DEPARTMENT OF TRANSPORTATION, and the _____ Metropolitan Planning Organization for the _____ urbanized area(s) hereby certify that the transportation planning process is addressing the major issues in the metropolitan planning area and is being conducted in accordance with all applicable requirements of:

(1) 49 U.S.C. Section 5323(k), 23 U.S.C. 135, and 23 CFR Part 450.220;

(2) Title VI of the Civil Rights Act of 1964 and the Title VI assurance executed by each State under 23 U.S.C. 324 and 29 U.S.C. 794;

(3) Section 1101 of the Transportation Equity Act for the 21st Century (Pub. L. 105-178) regarding the involvement of Disadvantaged Business Enterprises in FHWA and FTA funded planning projects (Sec. 105(f), Pub. L. 97-424, 96 Stat. 2100; 49 CFR Part 23);

(4) The provisions of the Americans with Disabilities Act of 1990 (Pub. L. 101-336, 104 Stat. 327, as amended) and U. S. DOT implementing regulation.

(5) The provision of 49 CFR Part 20 regarding restrictions on influencing certain activities; and

(6) Sections174 and 176(c) and (d) of the Clean Air Act as amended (42 U.S.C. 7504, 7506(c) and (d

TEXAS DEPARTMENT OF TRANSPORTATION
_____ DISTRICT

_____
District Engineer

_____
METROPOLITAN PLANNING ORGANIZATION

_____
Chairperson

State Role and Responsibilities

State Responsibility

- State must identify and address EJ issues at the system level (LRP, STIP) and project level
- Involve low income & minority people in planning process (public involvement/outreach)

Role of State DOT

- State must be actively involved in the metropolitan planning process
- EJ issues should be reconciled at the STIP level for the state system
- State should identify & address EJ issues for non-urbanized areas

Statewide Plans and Programs

- Mobility issues
- Access to jobs & services (by mode)
- Safety and security of the system
- Level of Service
- Level of maintenance
- Disproportionate impacts or benefits
- Consistency of policies and standards across the system (landscaping, lighting, upkeep, maintenance)

System Level Analysis

- Transportation Plan Goals, Strategies, Policies
- Analyze Investments in past and proposed STIP/TIP Programs
- Public Involvement Plan and Outreach
- Document

Statewide/EJ Issues

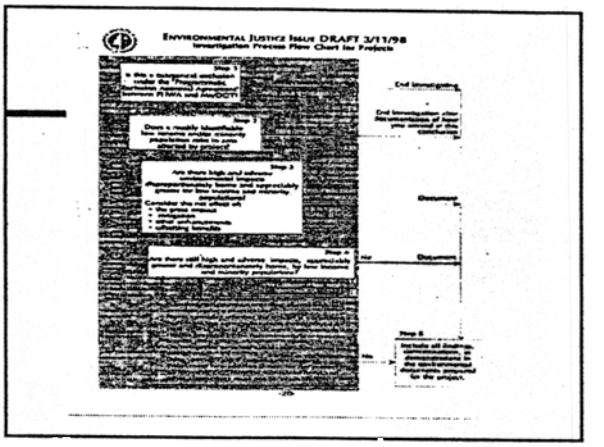
- Transportation Policy Plan
- Public Involvement/Outreach
- Modeling
- Demographics
  - High % of low income but low numbers/density in many counties
  - Many States have not done demographic analysis

Project Level/NEPA Analysis

- Determine if a minority or low income population is present within the project area
- What impacts or types of impacts are likely to affect these populations?
- Is the proposed improvement a benefit &/or a burden to the population(s)?
- Avoid, minimize, mitigate
- Document (CE's, EA's, EIS's/ROD's)

Project Development (NEPA)

- Considering EJ in Specific Phases of the NEPA Process:
  - Purpose and Need
  - Scoping
  - Public Participation
  - Determining the Affected Environment
  - Analysis
  - Alternatives
  - Mitigation
  - Final Decision



OPERATIONS & MAINTENANCE

- Transit Operations
- Highway Maintenance
- Landscaping
- Safety

State DOT Web Sites

- Ohio: www.dot.state.oh.us/planning
- Colorado: www.dot.state.co.us/DevelopProjects/PublicInvolvement/
- Minnesota: www.dot.state.mn.us/pubinvolve/partner.html

MPO Roles And Responsibilities

MPO Role

- MPO must identify and address EJ issues at the plan and program level
- MPO and transit operator should actively include minority & low-income groups in EJ analysis

MPO Role/Responsibility

- Explore needs within low-income & minority communities
- Involve low-income & minority people in the planning process
- Use different consultants
- Include low-income and minority people on boards and committees in leadership roles
- Document Title VI efforts (+ or -)

MPO Role/Responsibility

- Hold meetings at convenient times & places for members of these populations
- Advertise public meetings in places where low-income and minority people are/go
- Communicate in languages other than English (orally & written)
- Consider special needs in public accommodations
- Follow-up (1) after public meetings, (2) when decisions are made, and (3) after project implementation

Plans and Programs Should Examine:

- Mobility issues
- Access to jobs & services (by mode)
- Safety and security of the system
- Level of Service
- Level of maintenance
- Disproportionate impacts or benefits
- Consistency of standards across the system (landscaping, lighting, upkeep, maintenance)

Effect of Transportation Plans On:

- Land use/development patterns
- Job growth patterns
- Commuting patterns
- Mode choice
- Levels of congestion/travel times
- Pollution levels
- Safety of commuters

Transportation Improvement Program

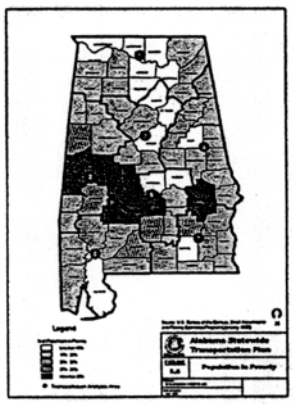
- Similar analysis as done on Plan
- Look at all projects (highway, transit, pedestrian)
- Inner city vs. suburb
- Are some projects or some communities always low priorities?
- Maintenance vs. new facilities

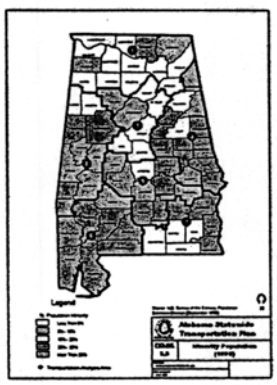
Coordination

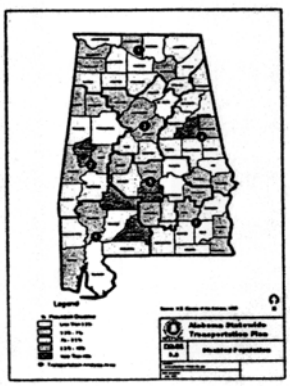
- State DOT, MPO, transit operators, and stakeholders should work together & share resources
- Health & Human Services, State DOL, and others
- Federal Agencies

DATA ANALYSIS EXAMPLES

ALABAMA



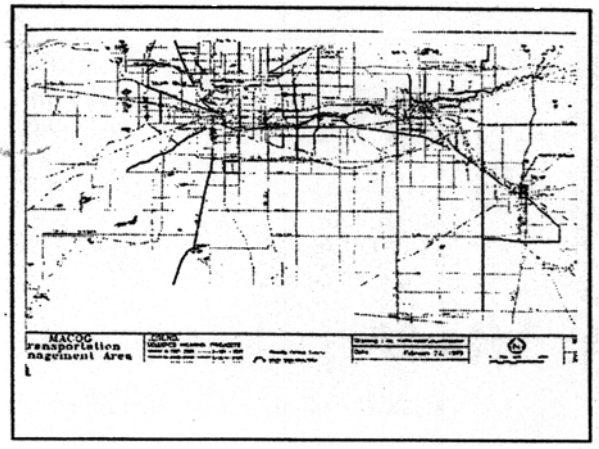


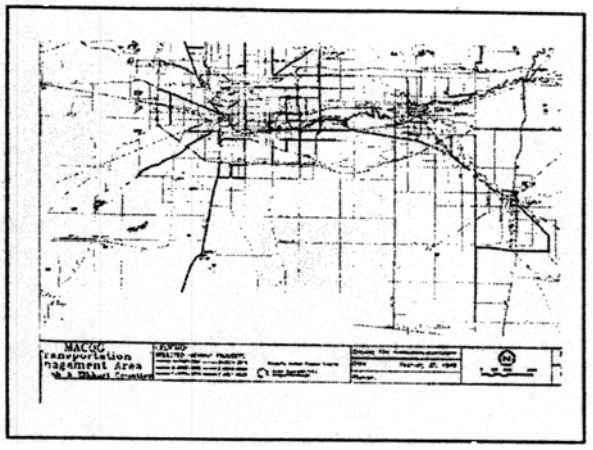


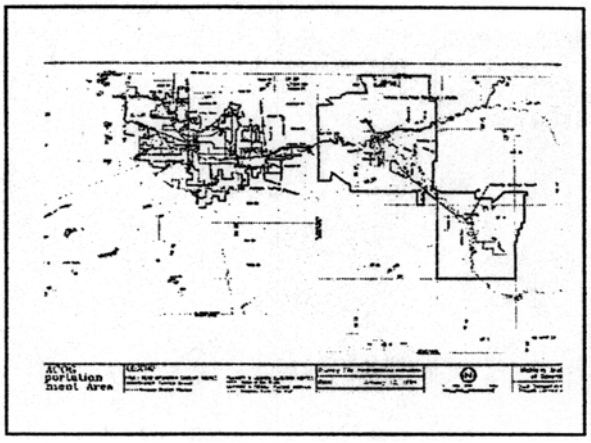
MACOG

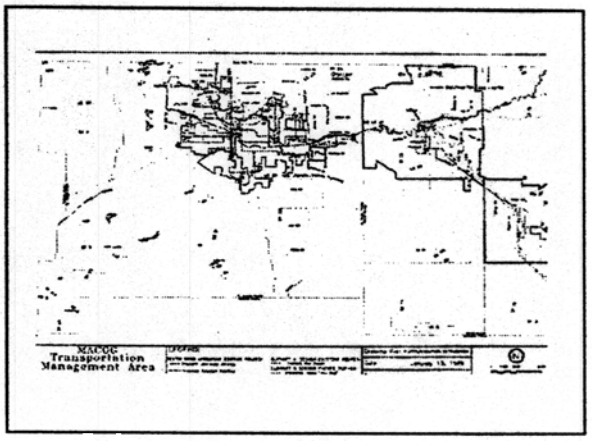
(Michiana Area Council of Governments)

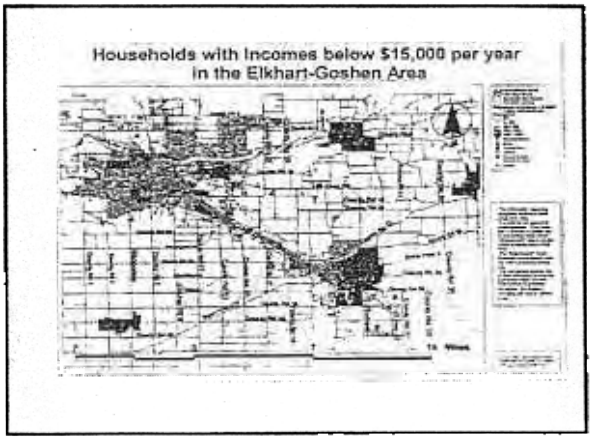
SOUTH BEND, IN





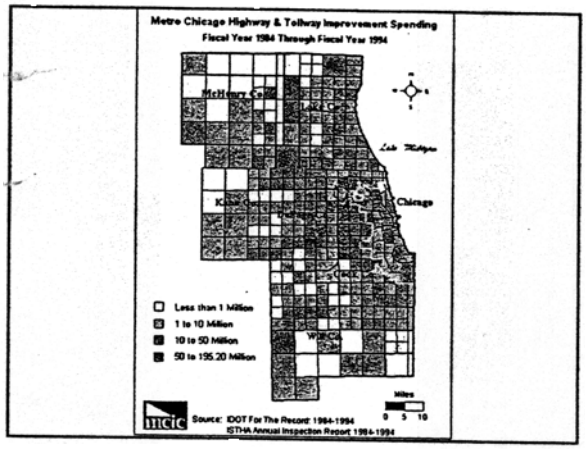


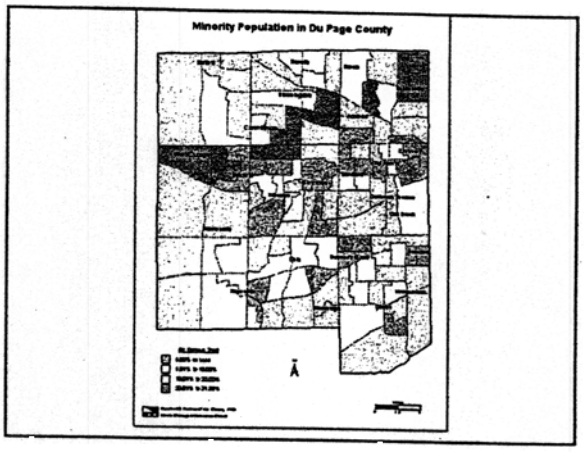




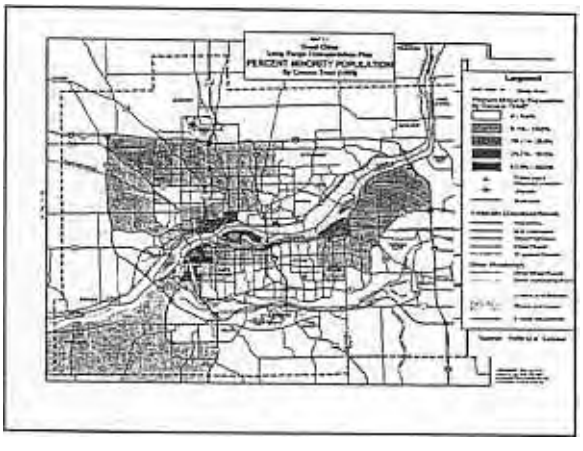
Illinois Examples

(Metro Chicago Info Center)





Iowa Example – Quad Cities



From Planning to Project Development

(and Beyond)

What Should Planning Provide to Project Development?

- A real Purpose and Need
- Assessment of Potential Impacts
- Preliminary E.J. Evaluation
- Documentation of analyses
- Results of public involvement

❖ Opportunities to make good decisions

Community Impact Assessment

- Define Study/Project Area
- Develop a Community Profile
- Collect Data
- Select Analysis Tools
- Analyze Impacts
- Identify Solutions
- Use Public Involvement
- Document Findings

(See CIA booklet)

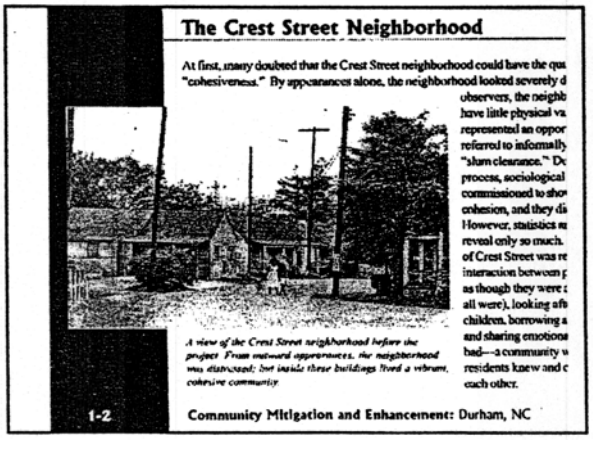
Potential Issues During Project Development

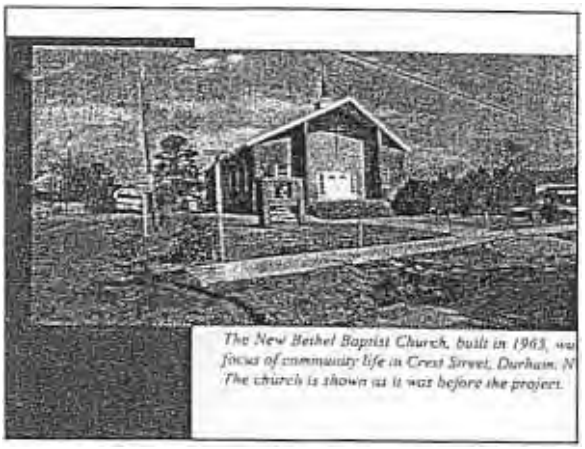
- Historic treatment of a Community
- Previous relocation, community division or other impacts
- Local economy (+ or -)
- Mobility/access to jobs
- Significance of places of worship, parks, community meeting places

Other Potential Issues During Project Development

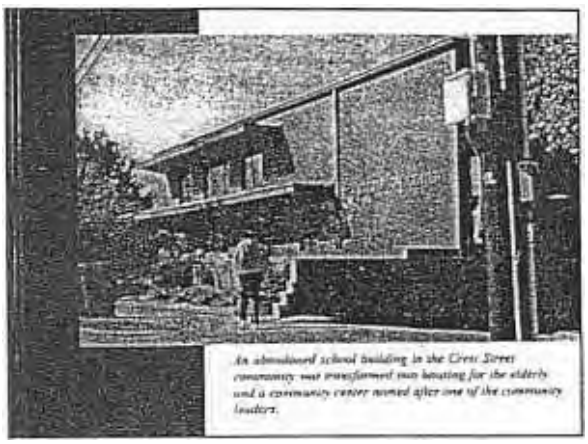
- Tax base and property values
- Emergency services, schools, libraries
- Direct and indirect impacts
- Relocation or displacement of public facilities or community centers
- Possible isolation as a community
- Fair share of transportation benefits
- Avoid, minimize, mitigate, enhance

Durham, North Carolina



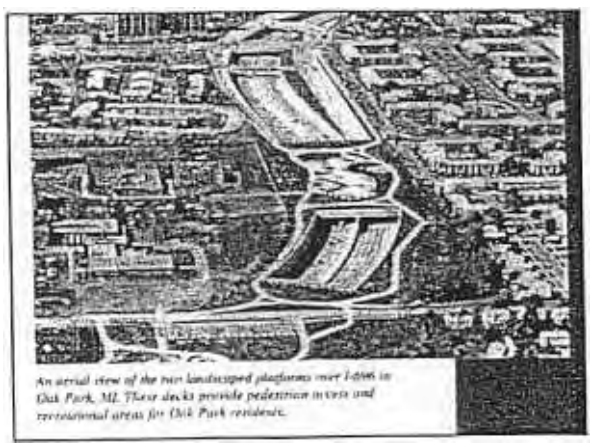


The New Bethel Baptist Church, built in 1963, wa focus of community life in Crest Street, Durham, N The church is shown as it was before the project.



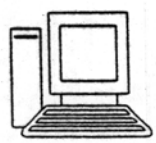
An abandoned school building in the Crest Street community was transformed into housing for the elderly and a community center named after one of the community leaders.

Oak Park, Michigan



An aerial view of the two landscaped platforms over I-696 in Oak Park, MI. These decks provide pedestrian access and recreational areas for Oak Park residents.

Tools and Resources



Collection and Use of Data

- No prescribed format for analysis
- Integrate analysis in appropriate manner: Logical/"reasonable" analysis
- Understandable by the general public
- Avoid unnecessary duplication. Use existing data systems and cooperative arrangements with other agencies

Data Sources

- Where is the existing data?
- What data is being used?
- How old is the data
- How accurate is it?
- Who is effective at using it?

Data Sources

- U.S. Census Products
  - **1990 and 2000 U.S. Census Data**
    - **Minority, Poverty, Poor Pre-school Children, Median Household Income**
  - **Census Transportation Planning Package**
  - **Regional Economic Information System and County Business Patterns**
  - **Public Use Microdata Sample of Census Data (PUMS)**
  - **TIGER Files**

Non-Census Data Sources

- **U.S. Department of Labor**
  - **ES-202 (local area employment)**
- **Family and Children Services**
  - **Medicaid, Food Stamp, and Income Assistance**
- **Economic Development Agencies**
- **State and local tax collecting agencies**
- **Schools, School Districts race and low-income lunch program**
- **Workforce Investment Boards**
- **Health and Human Services**

Private Data Sources

* Claritas, Inc.
* Dunn and Bradstreet
* Other sources: More will be available as the "industry" grows

(See hand-out for other data sources)

Additional Case Studies

- www.fhwa.dot.gov/environment/ejustice/case
  - 10 Case Studies
    - 7 project level
    - 3 MPO regional Level
- www.fhwa.dot.gov/planning/toolbox
  - Toolbox for Regional Policy Analysis

Office of Location and Environment
Limited English Proficiency Plan
May 2008

Legislation, Regulations and Guidance.

1) Title VI of the Civil Rights Act of 1964 – National Origin Discrimination Against Persons with Limited English Proficiency (as promulgated in the Department of Justice Federal Register Notice of August 16, 2000, policy guidance document.)
2) Executive Order 13166 of August 11, 2000.
3) Office of the Secretary, US DOT, Federal Register Notice of December 14, 2005 – Policy guidance concerning Recipients' Responsibilities to Limited English Proficiency Persons.
4) 42 U.S.C 2000d.

Definitions.

1) Who is a Limited English Proficient Person: Individuals who do not speak English as their primary language and who have a limited ability to read, write, speak, or understand English (US DOT policy guidance for LEP Persons, FR Vol. 70, No 239, December 12, 2005.

Purpose.

The Office of Location and Environment (OLE) LEP plan is intended to identify and engage persons of limited English proficiency so that they can meaningfully access services the Iowa DOT provides to the citizens of Iowa. This plan includes those activities of OLE, as they relate to compliance with Title VI of the Civil rights Act of 1964, in carrying out National Environmental Policy Act (NEPA) requirements, and is not intended to serve as a comprehensive LEP plan for all Iowa DOT activities and programs.

Implementation Plan.

In general, analysis methodology for LEP persons will follow guidelines established in the OLE Environmental Procedures manual, as referenced in Chapter 32, Environmental Justice. This chapter provides the analytical basis for conducting environmental justice reviews, and includes project level analysis using the following procedures:

- Determine characteristics of the general study area population.
  As part of the environmental justice analysis, OLE staff will examine census data and confer with resource agencies, local officials, community groups, other stakeholders, and the general public, as necessary, to assure that study area population

characteristics are refined to a level where LEP populations can accurately be determined.

- Determine project area's likely zone of influence.

  Zone of influence analysis will focus on interrelationships of the communities/region affected, or potentially affected by the proposed action, so that a reasoned judgment can be made regarding project impacts to environmental justice and LEP populations. This effort will include both direct and indirect impact analysis.

- Determine impacted population's characteristics.

  This activity includes defining specific characteristics of affected populations to determine applicability of environmental justice or LEP using US DOT/FHWA guidelines. Results of this activity will be noted in a separate section of the NEPA compliance product prepared for qualifying projects, along with recommendations for avoidance, minimization, or remedial actions, as may be appropriate.

- Comparison of impacted populations to determine if a disproportionate impact exists.

  This determination represents a formal response to the requirement to define whether project impacts fall disproportionately upon classes of individuals defined in environmental justice guidance. As part of this effort, a notation will also be made in qualifying NEPA documents regarding project affects to LEP populations when necessary. Although not specifically required by environmental justice guidance, the information will be included in the spirit of full disclosure, so that decision makers receive detailed analysis of project impacts prior to the decision making process.

Using the basic environmental justice methodology described above, OLE staff will expand the project evaluation to indentify and engage, as may be appropriate, persons of limited English proficiency. To accomplish this, OLE staff will apply US DOT guidance (see FR Vol. 70, No. 239, of December 14, 2005) that provides a four-step process to the various kinds of contacts staff has with resource agencies, local governments, community groups, other stakeholders and the general public, as necessary, to assess language needs and decide what reasonable steps should be taken to reduce the effects of language barriers, and provide meaningful access for LEP persons. This four-step process is described as follows:

1.) OLE staff will identify the number or proportion of LEP persons eligible to be served or likely to be encountered by a program, activity, or service of the Iowa DOT.
2.) A determination will be made regarding the frequency with which LEP individuals come in contact with the program.

3.) A determination will be made regarding the nature and importance of the program, activity, or service provided by the Iowa DOT to LEP individual's daily lives.
4.) OLE staff will identify resources available to the recipient and costs.

Examples of specific applications would include assessing on a project basis, the number or proportion from a particular language group served, or encountered in the eligible service population, as an indication of the language services that may be needed. The threshold for this application would be consistent with US DOT guidelines (Policy Guidance Concerning Recipient's Responsibilities to Limited English Proficient (LEP) Persons, published in the Federal Register, Vol. 70, No. 239, December 14, 2005) defined as 5 % or 1000 individuals, whichever is less, of the population of persons eligible to be served or likely to be affected or encountered. If there are fewer than 50 persons in a language group that reaches the 5% trigger above, OLE will not routinely provide language services, but will instead provide written notice in the primary language of the LEP language group, of the right under federal law, and Iowa DOT's obligation as a recipient of federal funds, to receive competent oral or written interpretation of materials associated with the project initiative, free of cost, if requested. This action is contingent upon a determination that competent interpretation services are available, and if such a response can be accomplished in a timely and cost effective manner.

In cases where eligible populations exceed LEP application triggers described above, or when a determination is made that the frequency of program contacts, nature and importance of the program, activity or service warrants, or when a direct request is received from an LEP group, OLE will respond with some, or all, of the following activities to assure meaningful access for LEP persons:

- LEP persons/populations will be notified via public notice or direct outreach, of services the Department will provide, free of charge.
- Services provided by the Department may include:

1.) Posting of signs at initial points of contact so that LEP persons can learn how to access language services.
2.) Stating in outreach documents that language services are, or may be available, from the agency.
3.) Working with community based organizations and stakeholders to inform LEP individuals of the availability of language assistance services, if available.
4.) Including notices in local newspapers in languages other than English.
5.) Providing notices on non-English radio and television stations about the available language assistance services, and how to obtain them.
6.) Providing presentations and/or notices at schools, religious and social organizations.

These actions may be implemented as part of the NEPA compliance process through early coordination and scoping activities, by employing census data followed by specific outreach actions if needed, by conferring with area resource/community groups and local officials, and as part of OLE's public participation process. The focus of this effort

will be to use a comprehensive approach to identify and engage LEP populations to assure their participation in initiatives advanced by OLE.

When it has been determined that language assistance services are necessary to assure meaningful access for LEP persons to OLE programs or activities, OLE staff will assess and implement, as may be deemed reasonable by Iowa DOT, language assistance services to the affected LEP populations. Language assistance may include oral interpretation on-site, or written translation, or both. Determinations to provide language assistance will be based on importance of the activity, information, service or program, level of resources available to provide language assistance, and costs imposed.

Consistent with the Office of Location and Environment Procedures manual, project specific determinations of appropriate responses for LEP persons will be carried out as described above, and documented via technical memos. The technical memos will be the basis for conclusions presented in the NEPA compliance products prepared for qualifying projects, and will be retained in the project administrative record as evidence of compliance.

On-Going LEP Compliance and Staff Training Activities.

OLE staff will be briefed, on an annual basis, of Iowa DOT's obligations regarding compliance with Title VI of the Civil Rights Act of 1964. This briefing will include a discussion of OLE's efforts to provide meaningful access to information and services for LEP persons, related Iowa DOT policy and procedures, and federal guidance, laws and executive orders, as may be appropriate.

In addition, a Title VI folder will be retained and maintained with information regarding compliance activities by the Director of the Office of Location and Environment, or his designee. The OLE Environmental Procedures manual will be amended to include the procedures discussed above, and this manual will be made available to staff in OLE, and made a part of new employee orientation/training activities.

U.S. Department of Transportation, Federal Highway Administration

Measurement of Highway-Related Noise

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Measurement of Highway-Related Noise

1. Introduction

The U.S. Department of Transportation, Research and Special Programs Administration, John A. Volpe National Transportation Systems Center (Volpe Center), Acoustics Facility, in support of the Federal Highway Administration (FHWA), Office of Environment and Planning, has developed the "Measurement of Highway-Related Noise." This document reflects substantial improvements and changes in noise measurement technologies that have evolved since the 1981 FHWA publication, Sound Procedures for Measuring Highway Noise.

Section 1 presents a general overview, as well as an historical perspective. Section 2 presents definitions of terminology used throughout the document. Section 3 presents field measurement instrumentation generalized to subsequent sections of the document. Section 4 describes the recommended practice for performing existing-noise measurements in the vicinity of a highway. Section 5 describes the recommended practice for the measurement of vehicle noise emissions for use with highway noise prediction models. Section 6 describes the procedures for the measurement of highway barrier insertion loss. Section 7 describes the procedures for the measurement of construction equipment noise for highway-related projects. Section 8 describes the procedures for the measurement of the noise reduction performance of buildings in the vicinity of a highway. Section 9 describes the measurement of highway-related occupational noise exposure. Section 10 details the recommended information for properly documenting final reports prepared in support of a highway project.

1.1 Background

Noise is an important environmental consideration for highway planners and designers. Transportation agencies measure different aspects of highway noise to determine or predict community impacts during urban planning. However, measurement instrumentation and procedures have varied from program to program and agency to agency.[(1)] Precise, uniform, field measurement practice allows for valid comparison of results from similar studies performed by a variety of transportation practitioners and researchers.

Sound Procedures for Measuring Highway Noise was written over a decade ago. Since then, substantial advancements have been made in the methodology and technology of noise measurement, barrier analysis and design, and noise measurement instrumentation. In addition, highway noise modeling software has recently improved. The Federal Highway Administration has replaced the **STA**ndard **M**ethod **I**n **N**oise **A**nalysis (STAMINA, Version 2.0)[(2)] with the FHWA Traffic Noise Model (FHWA TNM®), Version 1.0.[(3)] The FHWA TNM uses a Microsoft Windows-based interface and includes a 1994/1995 **R**eference **E**nergy **M**ean **E**mission **L**evel (REMEL) data base,[(4)] as well as state-of-the-art acoustic algorithms. Consequently, the FHWA identified the need to develop and document a new highway-traffic noise measurement document which reflects these recent advancements.

1.2 Objective

The objective of this document is to provide a uniform, state-of-the-art reference for highway noise practitioners and researchers, which addresses measurement and analysis instrumentation, site selection, measurement procedures, and data reduction and analysis techniques. Each of these topics is addressed separately for each of the following areas of concern:

1. Existing-noise in the vicinity of a highway (Section 4);
2. Vehicle noise emissions for use with highway noise prediction models (Section 5);
3. Highway barrier insertion loss (Section 6);
4. Construction equipment noise for highway-related projects Section 7);
5. Noise reduction due to buildings in the vicinity of a highway (Section 8); and

6. Highway-related occupational noise exposure (Section 9).

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FHWA

United States Department of Transportation - **Federal Highway Administration**

Measurement of Highway-Related Noise

2. Terminology

This section presents pertinent terminology used throughout the document. These terms are highlighted with boldface type when they first appear in subsequent sections. Note: Definitions are generally consistent with those of the American National Standards Institute (ANSI) and References 5 through 8.

A-WEIGHTING: A frequency weighting network used to account for changes in sensitivity as a function of frequency (See Section 3.1.3.4.2).

ABSORPTION COEFFICIENT: See Sound absorption coefficient.

ACOUSTIC ENERGY: Commonly referred to as sound energy, or just plain energy, acoustic energy is arithmetically equivalent to $10^{[\text{Sound Pressure level (SPL)}/10]}$, where SPL is expressed in decibels re 20 µPa.

AMBIENT NOISE: All-encompassing sound that is associated with a given environment, excluding the analysis system's electrical noise and the sound source of interest.

ARTIFICIAL NOISE SOURCE: An acoustical source that is controlled in position and calibrated as to output power, spectral content, and directivity.

AUDIOMETRY: The measurement of human hearing acuity.

ANTI-ALIAS FILTER: A low-pass filter applied to the input signal of a digital system prior to the digitization process. This filter, unique to digital systems, ensures that spurious signals (alias signals) resulting from the digitization process are not contributing components of the sampled signal. An anti-alias filter must be included in all digital systems, prior to the analog-to-digital conversion.

BACKGROUND NOISE: All-encompassing sound of a given environment that includes ambient, as well as analysis system noise, excluding the sound source of interest.

COMMUNITY-NOISE EXPOSURE LEVEL (CNEL, denoted by the symbol L_{den}): A 24-hour time-averaged L_{AE} (see definition), adjusted for average-day sound source operations. In the case of highway noise, a single operation is equivalent to a single vehicle pass-by. The adjustment includes a 5-dB penalty for vehicle pass-bys occurring between 1900 and 2200 hours, local time, and a 10-dB penalty for those occurring between 2200 and 0700 hours, local time. The L_{den} noise descriptor is used primarily in the state of California. L_{den} is computed as follows:

$$L_{den} = L_{AE} + 10 \times \log_{10}(N_{day} + 3 \times N_{eve} + 10 \times N_{night}) - 49.4 \qquad \text{(dB)}$$

where:

L_{AE} = Sound exposure level in dB (See definition);

N_{day} = Number of vehicle pass-bys between 0700 and 1900 hours, local time;

N_{eve} = Number of vehicle pass-bys between 1900 and 2200 hours, local time;

N_{night} = Number of vehicle pass-bys between 2200 and 0700 hours, local time; and

49.4 = A normalization constant which spreads the acoustic energy associated with highway vehicle pass-bys over a 24-hour period, i.e., 10 x $\log_{10}$(86,400 seconds per day) = 49.4 dB.

CONTAMINATION: (See Noise Contamination).

DAY-NIGHT AVERAGE SOUND LEVEL (DNL, denoted by the symbol L_{dn}): A 24-hour time-averaged L_{AE} (See definition), adjusted for average-day sound source operations. In the case of highway noise, a single operation is equivalent to a single vehicle pass-by. The adjustment includes a 10-dB penalty for vehicle pass-bys occurring between 2200 and 0700 hours, local time. L_{dn} is computed as follows:

$$L_{dn} = L_{AE} + 10 \times \log_{10}(N_{day} + N_{eve} + 10 \times N_{night}) - 49.4 \qquad \text{(dB)}$$

where:

L_{AE} = Sound exposure level in dB (See definition);

N_{day} = Number of vehicle pass-bys between 0700 and 1900 hours, local time;

N_{eve} = Number of vehicle pass-bys between 1900 and 2200 hours, local time;

N_{night} = Number of vehicle pass-bys between 2200 and 0700 hours, local time; and

49.4 = A normalization constant which spreads the acoustic energy associated with highway vehicle pass-bys over a 24-hour period, i.e., 10 x $\log_{10}$(86,400 seconds per day) = 49.4 dB.

DECIBEL (dB): A unit of level which denotes the ratio between two quantities that are proportional to power; the number of decibels is 10 times the base 10 logarithm of this ratio. For the purpose of this document, the reference level is 20 µPa, or the threshold of human hearing.

DIFFRACTED WAVE: A sound wave whose front has been changed in direction by an obstacle in the propagation medium, typically air for the purposes of this document.

DIVERGENCE: The spreading of sound waves from a source in a free field environment. In the case of highway noise, two types of divergence are common, spherical and cylindrical. Spherical divergence is that which would occur for sound emanating from a point source, e.g., a single vehicle pass-by. It is independent of frequency, and is computed using a 20 x $\log_{10}$(d1/d2) relationship. For example, if the sound level from a point source at 15 m was 90 dB, at 30 m it would be 84 dB due to divergence, i.e., 90 + 20 x $\log_{10}$(15/30). Cylindrical divergence is that which would occur for sound emanating from a line source, e.g., a single vehicle pass-by. It is independent of frequency, and is computed using a 10 x $\log_{10}$(d1/d2) relationship. For example, if the sound level from a point source at 15 m was 90 dB, at 30 m it would be 87 dB due to divergence, i.e., 90 + 10 x $\log_{10}$(15/30).

DOPPLER EFFECT: The change in the observed frequency of a wave in a transmission system caused by a time rate of change in the effective length of the path of travel between the source and the point of observation.

DYNAMIC RANGE: The difference between the highest input sound pressure level achievable without exceeding a specified non-linearity or distortion of the output signal, for a specified frequency range, and the lowest input sound pressure level for which the level linearity is within specified tolerances.

EQUIVALENT SOUND LEVEL (TEQ, denoted by the symbol L_{AeqT}): Ten times the base-10 logarithm of the ratio

of time-mean-squared instantaneous A-weighted sound pressure, during a stated time interval, T (where $t=t_2-t_1$), to the square of the standard reference sound pressure. For the purpose of this document, the reference sound pressure is 20μPa, or the threshold of human hearing. L_{AeqT} is related to L_{AE} by the following equation:

$$L_{AeqT} = L_{AE} - 10 \times \log_{10}(t_2-t_1) \qquad \text{(dB)}$$

where:

L_{AE} = Sound exposure level in dB (See definition).

EXCHANGE RATE: The amount a sound level is increased or decreased to preserve a certain noise exposure when the exposure duration is doubled or halved. Typically, for transportation-related noise, an exchange rate of 3 dB is used; for occupational noise exposure, 5 dB is used.

FAR-FIELD: That portion of a point source's sound field in which the sound pressure level (due to this sound source) decreases by 6 dB per doubling of distance from the source, i.e., spherical divergence; or if the sound source is linear, then the far-field is the portion of the sound field in which the sound pressure level decreases by 3 dB per doubling of distance.

FREE FIELD: A sound field whose boundaries exert a negligible influence on the sound waves. In a free-field environment, sound Spreads spherically from a source and decreases in level at a rate of 6 dB per doubling of distance from a point source, and at a rate of 3 dB per doubling of distance from a line source.

GROUND ATTENUATION: The change in sound level, either positive or negative, due to intervening ground between source and receiver. Ground attenuation is a relatively complex acoustic phenomenon, which is a function of ground characteristics, source-to-receiver geometry, and the spectral characteristics of the source. A commonly used rule-of-thumb for propagation over soft ground (i.e., grass, terrain) is that ground effects will account for about 1.5 db per doubling of distance. However, this relationship is quite empirical and tends to break down for distances greater than about 30 to 61 m (100 to 200 ft).

GROUND IMPEDANCE: A complex function of frequency relating the sound transmission characteristics of a ground surface type. Measurements to determine ground impedance must be made in accordance with the ANSI Standard for measuring ground impedance scheduled for publication in the second half of 1996.[50]

HARD GROUND: Any highly reflective surface in which the phase of the sound energy is essentially preserved upon reflection; examples includes water, asphalt and concrete.

INSERTION LOSS (IL): The difference in levels before and after installation of a barrier, where the source, terrain, ground, and atmospheric conditions have been judged as equivalent.

L_{AE}: See Sound exposure level.

L_{Aeq}: See Equivalent sound level.

L_{AFmx} and L_{ASmx}: See Maximum sound level.

L_{den}: See Community-noise exposure level.

L_{dn}: See Day-night average sound level.

L_{90}: A statistical descriptor describing the sound level exceeded 90 percent of a measurement period.

LINE SOURCE: Multiple point sources moving in one direction radiating sound cylindrically. Note: Sound levels measured from a line source decrease at a rate of 3 dB per doubling of distance.

LOWER BOUND TO INSERTION LOSS: The value reported for insertion loss when background levels are not measured or are too high to determine the full attenuation potential of the barrier.

MAXIMUM SOUND LEVEL (MXFA or MXSA, denoted by the symbol L_{AFmx} or L_{ASmx}, respectively): The maximum, A-weighted sound level associated with a given event (See Figure 1). Fast-scale response (L_{AFmx}) and slow-scale response ($L_{ASmx,}$) characteristics effectively damp a signal as if it were to pass through a low-pass filter with a time constant of 125 and 1000 milliseconds, respectively. See Section 3.1.3.4.4 for a more detailed discussion of exponential time-averaging.

NEAR FIELD: The sound field (between the source and the far field). The near field exists under optimal conditions at distances less than four times the largest sound source dimension.

NOISE: Any unwanted sound.

NOISE BARRIER: The structure, or structure together with other material, that potentially alters the noise at a site from a BEFORE condition to an AFTER condition.

NOISE CONTAMINATION: Any noise event, other than that which is intended for measurement. Contamination typically occurs when the background noise is within 10 dB of the noise produced by the source intended for measurement.*

NOISE DOSE: A measure of the noise exposure to which a person is subjected in the workplace. For the purposes of this document, the workplace is any highway-related environment.

NOISE REDUCTION COEFFICIENT (NRC): A single-number rating of the sound absorption properties of a material; it is the arithmetic mean of the Sabine absorption coefficients (See below) at 250, 500, 1000, and 2000 Hz, rounded to the nearest multiple of 0.05.

PINK NOISE: A random signal for which the spectrum density, i.e., narrow-band signal, varies as the inverse of frequency. In other words, one-third octave-band spectral analysis of pink noise yields a flat response across all frequency bands.

POINT SOURCE: Source that radiates sound spherically. Note: Sound levels measured from a point source decrease at a rate of 6 dB per doubling of distance.

SABINE ABSORPTION COEFFICIENT (α_{Sab}): Absorption coefficient obtained in a reverberation room by measuring the time rate of decay of the sound energy density with and without a patch of the sound-absorbing material under test laid on the floor. These measurements are performed in accordance with the American Society of Testing and Materials (ASTM) Standard C 423-90a.

SOFT GROUND: Any highly absorptive surface in which the phase of the sound energy is changed upon reflection; examples include terrain covered with dense vegetation or freshly fallen snow. (Note: at grazing angles greater than 20 degrees, which can commonly occur at short ranges, or in the case of elevated sources, soft ground becomes a good reflector and can be considered hard ground).*

SOUND ABSORPTION COEFFICIENT (α): (See also Sabine Absorption Coefficient) The ratio of the sound energy, as a function of frequency, absorbed by a surface, to the sound energy incident upon that surface.

SOUND EXPOSURE LEVEL (SEL, denoted by the symbol L_{AE}): Ten times the logarithm to the base 10 of the ratio of a given time integral of squared instantaneous A-weighted sound pressure to the squared reference sound pressure of 20 μPa, the threshold of human hearing. The time interval must be long enough to include a majority of the sound source's acoustic energy. As a minimum, this interval should encompass the 10 dB down points (See

Figure 1).

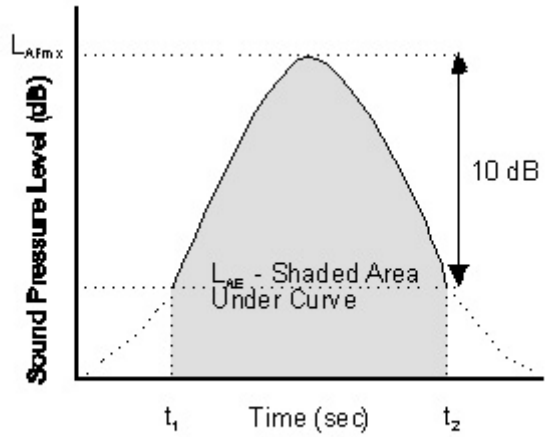

Figure 1. Graphical representation of L_{AE} and L_{AFmx} noise descriptors.

In addition, L_{AE} is related to L_{AeqT} by the following equation:

$$L_{AE} = L_{AeqT} + 10 \times \log_{10}(t_2-t_1) \qquad \text{(dB)}$$

where L_{AeqT} = Equivalent sound level in db (See definition).

SOUND PRESSURE LEVEL (SPL): Ten times the logarithm to the base 10 of the ratio of the time-mean-squared pressure of a sound, in a stated frequency band, to the square of the reference sound pressure of 20 µPa, the threshold of human hearing.

SOUND TRANSMISSION CLASS (STC): A single-number rating used to compare the sound insulation properties of barriers.

SPECTRUM: A signal's resolution expressed in component frequencies or fractional octave bands.

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*Rule of thumb

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FHWA

United States Department of Transportation - **Federal Highway Administration**

Measurement of Highway-Related Noise

3. Instrumentation

This section describes field measurement instrumentation, acoustic and otherwise. It also includes a list of instrumentation manufacturers.

3.1 Acoustic Instrumentation

Figure 2 presents a generic, acoustic-measurement-instrumentation setup. Subsequent subsections address individual components of this generic setup.

All acoustic instrumentation should be calibrated annually by its manufacturer, or other certified laboratory to verify accuracy. Where applicable, all calibrations shall be traceable to the National Institute of Standards and Technology (NIST).

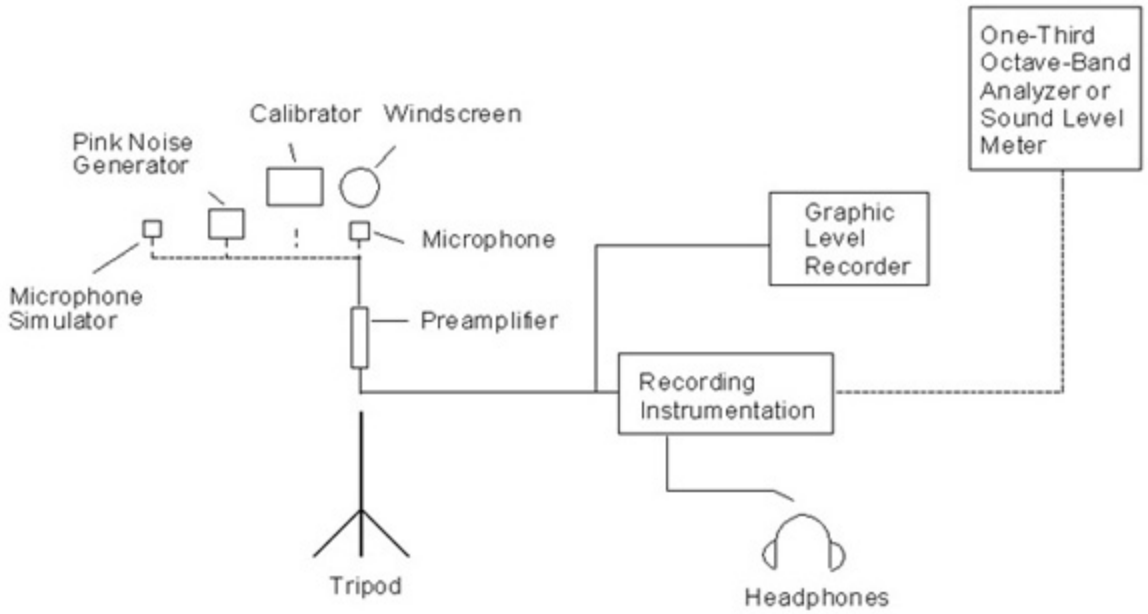

Figure 2. Generic measurement instrumentation setup.

3.1.1 Microphone System (Microphone and Preamplifier)

A microphone transforms sound-pressure variations into electrical signals, that are in turn measured by instrumentation such as a sound level meter, a one-third octave-band spectrum analyzer, or a graphic level recorder. These electrical signals are also often recorded on tape for later off-line analysis. Microphone characteristics are further addressed in ANSI S1.4-1983.(9)

A compatible preamplifier, if not engineered as part of the microphone system, should also always be used. A preamplifier provides high-input impedance and constant, low-**noise*** amplification over a wide frequency range.(10) Also, depending upon the type of microphone being used (See Section 3.1.1.1), a preamplifier may also provide a polarization voltage to the microphone.

The microphone system (microphone and preamplifier) should be supported using a tripod or similar device, such as an anchored conduit. Care should be taken to isolate the microphone system from the support, especially if the support is made up of a metal composite. In certain environments, the support can act as an antenna, picking up errant radio frequency interference which can potentially contaminate data. Common isolation methods include encapsulating the microphone system in nonconductive material (e.g., nylon) prior to fastening it to the support.

In addition, it is important to ensure that the microphone system is positioned relative to the support device, such that contamination due to sound reflections from the support is minimized. Research has shown that a position directly behind the support device provides for minimum interference (See Figure 3).(11)

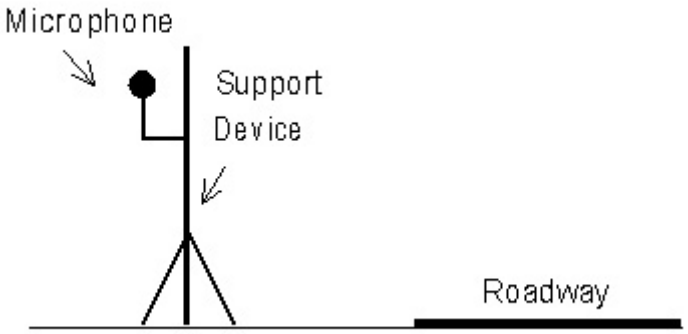

Figure 3. Recommended microphone position relative to support device.

Once supported appropriately, the microphone should be positioned as discussed in Section 3.1.1.3. The microphone system should then be connected to the measuring/recording instrumentation via an extension cable. At least 15 m (50 ft) of cable is recommended. Thus, any potential contamination of the measured data due to operator activity can be minimized.

3.1.1.1 Microphone Type

Condenser (or electrostatic or capacitor) microphones are recommended for a wide range of measurement purposes because of their high stability, reasonably high sensitivity, excellent response at high frequencies, and very low electrical noise characteristics. There are two types of condenser microphones: conventional and electret.

Conventional condenser microphones characterize magnitude changes in sound pressure in terms of variations in electrical capacitance. Sound pressure changes incident upon the diaphragm of a microphone change the spacing between the diaphragm and the microphone backplate. This dynamic change in the gap between the diaphragm and backplate translates to a change in electrical capacitance.

In the case of a conventional condenser microphone, a polarization voltage must be applied to the backplate. Typically, a polarization voltage of between 50 and 200 V is applied to the microphone backplate by the preamplifier. Due to the requirement that a polarization voltage be supplied from a source external to the microphone, i.e., the microphone is not a "closed" system, measurements made with a conventional condenser microphone are often adversely effected by atmospheric conditions, especially high humidity. High humidity can result in condensation between the microphone diaphragm and backplate. Condensation can cause arcing of the polarization voltage, rendering the measured data essentially useless.(8,12) To minimize condensation effects, the use of dehumidifying chambers, desiccants, and nonconductive back coating, such as quartz, can be used. Several manufacturers provide devices to minimize this often-overlooked potential problem.

Electret condenser microphones, on the other hand, use a thin plastic sheet with a conductive coating on one side as a backplate. This design allows the microphone to maintain its own polarization, i.e., often referred to as a "pre-polarized" design.(10) "Pre-polarization" allows the electret microphone to be essentially a "closed" system, eliminating the potential for condensation in high-humidity environments.

One drawback to electret microphones is they are often less sensitive at high frequencies. In addition, there are currently no electret microphones known to the authors which provide nearly flat response characteristics at grazing incidence, which is the incidence of choice for transportation-related noise measurements (See Section 3.1.1.3).

3.1.1.2 Microphone Size

The diameter of a microphone diaphragm directly affects its useable frequency range, **dynamic range** (or level sensitivity), and directivity. For example, as the microphone diameter becomes smaller, the useable frequency range increases; however, sensitivity decreases.(8,13) Thus, the selection of a microphone size often involves a compromise of these elements. Unless measurements at extremely low **sound pressure levels** (SPL) are required (e.g., below 20 dB SPL) a ½-in (1.27 cm) diameter microphone, or 3/8;-in (0.95 cm) microphone as characterized by some manufacturers, is suitable for most situations. For low-SPL measurements, a 1-in diameter microphone may be necessary.

3.1.1.3 Microphone Incidence

The sensitivity of a microphone varies with the angle of incidence between the sound waves and the microphone diaphragm. Two microphone system orientations and their specific applications are discussed below: normal and grazing incidence.

Normal incidence, also referred to as 0-degrees incidence, occurs when sound waves impinge at an angle perpendicular, or normal, to the microphone diaphragm (See Figure 4). It is best used for situations involving point-source measurements, in which the sound being measured is coming from a stationary, single, known direction (e.g., an idling automobile or a power generator).

Grazing incidence, also referred to as 90-degrees incidence, occurs when sound waves impinge at an angle that is parallel to, or grazing, the plane of the microphone diaphragm (See Figure 4). This orientation is preferred for moving, or line-source, measurements, since the microphone presents a constant incidence angle to any source located within the plane of the microphone diaphragm.(8)

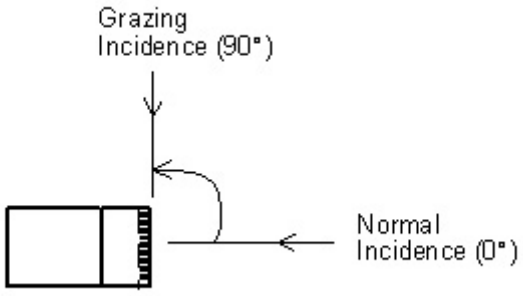

Figure 4. Microphone incidence.

Grazing incidence is commonly used for the measurement of highway, aircraft, and guided-transit noise. If other than grazing incidence is used for the measurement of moving noise sources, correction of the measured data in accordance with manufacturer-published response curves is required. This process can be quite complex because the incidence angle is continually changing, thus requiring continuously varying corrections. It is perfectly acceptable to position a microphone for grazing incidence even if it has its flattest frequency response characteristics in a normal incidence configuration, as long as the appropriate manufacturer-published corrections are applied, and as long as the required corrections do not exceed certain limits.(14) If the manufacturer does not

provide the appropriate incidence corrections, testing must be performed in accordance with ANSI S1.10-1986.(15)

For the unique situation of measuring randomly occurring sounds, such as the case with **ambient noise** measurements, or existing-noise measurements where the location of the sound source can be arbitrary, microphone corrections should be based on random-incidence response curves.

3.1.2 Recording System

Components of the measurement system are discussed separately in Section 3.1.3, so as to make a distinction between the actual recorded data, as would be heard by the human ear, and the actual sound level data computed as a result of some form of electrical/ arithmetic process.

There are two basic types of tape recorders: analog and digital. Analog recorders store signals as continuous variations in the magnetic state of the particles on the tape. Digital recorders store signals as a combination of binary "1s" and "0s." Most digital recorders represent a continually varying analog level using many discrete 16-bit words, i.e., a unique combination of 16 "1s" and "0s." The number of 16-bit words depends upon the sampling rate of the particular recorder.

The sampling rate must be at least twice the highest frequency of interest, which is often 20 kHz for transportation-related measurements. In theory, this means that one second of continuously varying analog data is represented by at least 40,000 discrete 16-bit combinations of "1s" and "0s." However, practically, due to the design limitations on **anti-alias filters** (anti-alias filters are described later in this section), a sampling rate of 44,000 to 48,000 is common, i.e., 44,000 to 48,000 discrete 16-bit combinations of "1s" and "0s."

Not all field measurement systems will include a tape recorder. A recorder offers the unique capability of repeated playback of the measured noise source, thus allowing for more detailed analyses. The electrical characteristics of a tape recorder shall conform to the guidelines set in IEc 1265 and ANSI S1.13-1971 for frequency response and signal-to-noise ratio.(14,16)

The advantages of modern digital over analog recorders are numerous. Digital recorders typically have much wider frequency response characteristics, as well as a much larger dynamic range. About the only advantage analog recorders have is that they typically are less expensive, although the cost difference is decreasing.

When selecting a specific model of tape recorder, there are three important issues and/or differences associated with the use of digital versus analog recorders that require consideration. They are as follows:

- **Anti-Alias Filters:** An anti-alias filter is a low-pass filter applied to the input signal of a digital system prior to the digitization process. This filter, unique to digital systems, ensures that spurious signals (alias signals) resulting from the digitization process are not contributing components of the sampled signal. An anti-alias filter must have attenuation characteristics which ensure the contribution of aliased frequency components in the output are reduced to a negligible level.(17,18)
- **System Overloads:** The overload point in a digital system is a well-defined point controlled by the maximum size of the bit-register used in the digitization process. When the size of the bit-register is exceeded, "hard" limiting occurs, followed by instantaneous distortion. In most cases, the dynamic range of a digital recorder is specified from this "hard" limiting point, and the overload and full-scale indicators are referenced to it.

  In contrast, analog recorders have no clearly defined overload point and generally "soft" limiting (a gradual process) begins around 6 dB above the full scale (0 dB) on a volume unit (VU) meter, with the subsequent gradual increase in distortion.

  A safety margin of at least 10 dB, and preferably 20 dB, between the overload point and the expected maximum level of the data to be digitally recorded, including calibration data, should be maintained.

- **Dynamic Range:** A substantial advantage of digital recorders is that they offer an extended dynamic range, resulting in an extended operating range available. Dynamic range is typically specified from the "hard" overload point, and to guard against overload, a 10- to 20-db safety margin is recommended, thus reducing the effective operating range by 10 to 20 dB. Additionally, the amplitude linearity error of a digital recorder increases as signal levels decrease, thus, reducing the effective operating range of the recorder. This is also

true of analog recorders.

3.1.3 Measurement System

There are three general acoustic measurement systems discussed in this section: graphic level recorders (GLRs), sound level meters (SLMs), and one-third octave-band analyzers.

3.1.3.1 Graphic Level Recorder

A graphic level recorder (GLR) connected to the analog output of the measuring or recording instrumentation is typically used in the field to provide a visual, real-time history of the measured noise level. a GLR plot varies in level at a known, constant pen-speed rate and response time that may be adjusted to approximate exponential time-averaging, i.e., fast-scale and slow-scale response characteristics (See Section 3.1.3.4.4).[(10)] It is valuable in visually judging ambient levels and verifying the acoustic integrity of individual events.

3.1.3.2 Sound Level Meter

For the purposes of all measurements discussed herein, sound level meters (SLMs) should perform true numeric integration and averaging in accordance with ANSI S1.4-1983.[(9)] Components of an SLM include (See Figure 5): a microphone with preamplifier, an amplifier, frequency weighting (See Section 3.1.3.4.2), input gain control (See Section 3.1.3.4.3), time-averaging (See Section 3.1.3.4.4), and an output indicator or display.[(8)] Selection of a specific model of sound level meter should be based upon cost and the level of accuracy desired.

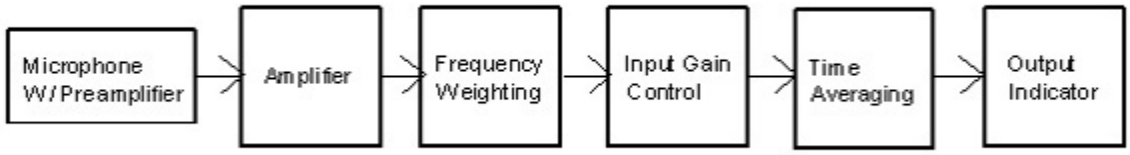

Figure 5. Components of a sound level meter.

The accuracy of an SLM is characterized by its "type." There are three types of sound level meters available: Types 0, 1, and 2. Type 0 sound level meters are used for laboratory reference purposes, where the highest precision is required. Type 1 sound level meters are designed for precision field measurements and research.[(9)] Either Type 1 or Type 2 sound level meters are acceptable for use in traffic noise analyses for Federal-aid highway projects.

3.1.3.3 One-Third Octave-Band Analyzer

When the frequency characteristics of the sound source being measured are of concern, a one-third octave-band analyzer should be employed. In most cases, such a unit would not be employed directly in the field, but would be used subsequent to field measurements in tandem with tape-recorded data (See Section 3.1.2). Such units can be employed to determine noise spectra, as well as compute various noise descriptors, such as L_{AeqT} and L_{AE}. If consistency with previously measured data is desired, one-third octave-band filters must be shown to comply with a Type 1-D Butterworth filter, as defined in ANSI S1.11-1986.[(19)] The Type 1-D Butterworth filter design has existed in analyzers for decades. However, manufacturers are now providing filter-shape algorithms which depart from the traditional Butter worth design, and more closely resemble "ideal" filters, which allow essentially no energy outside of the pass-band.

Use of octave-band analyzers is not precluded; however, one-third octave-band analysis is preferred.

3.1.3.4 Characteristics of the Measurement System

3.1.3.4.1 Bandwidth

The bandwidth of a measurement instrument refers to its frequency range of operation. Most measurement instrumentation of interest for readers of this document will accurately measure levels in the frequency range 20 Hz to 20 kHz, the audible range for humans. Typically, measurement of one-third octave-band data between 50 Hz and 10 kHz will satisfy the objectives of highway-related studies.

3.1.3.4.2 Frequency Weighting

Frequency weighting is used to account for changes in sensitivity of the human ear as a function of frequency. Three standard weighting networks, A, B, and C, are used to account for different responses to sound pressure levels (See Table 1 and Figure 6).[8,20] Note: The absence of frequency weighting is referred to as "flat" response.

C-weighting is essentially linear. B-weighting reflects the ear's response to sounds of moderate pressure level. **A-weighting** reflects the ear's response to sounds of lower pressure level.[20] A-weighting is the most widely used system for assessing transportation-related noise. In fact, unless otherwise stated, noise descriptors for transportation-related activity are assumed to be A-weighted. Most SLMs and one-third octave-band analyzers offer A- and C-weighting options. B-weighting has essentially become obsolete. Note: It is also important to note that the response for the A-, B-, and C-weighting curves are all referenced to a frequency of 1 kHz. In other words, the weighting at 1 kHz for all three curves is zero.

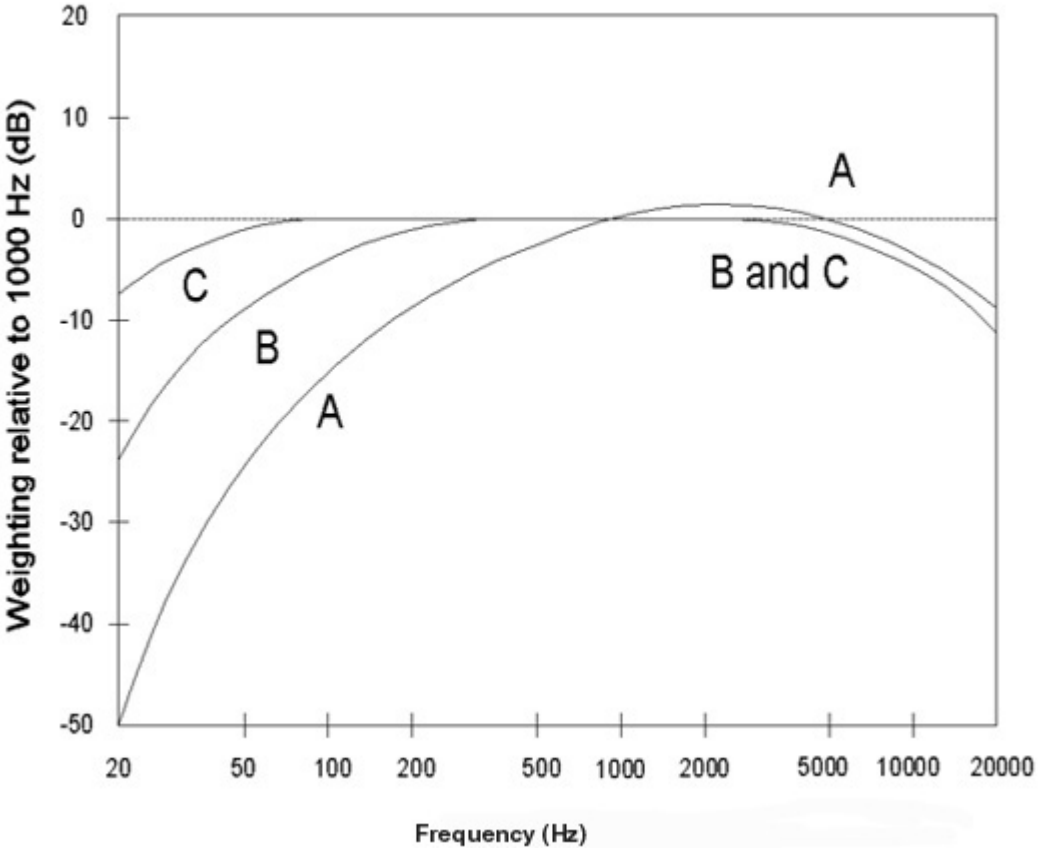

Figure 6. Frequency weighting.

Table 1. Frequency Weighting.

One Third Octave-Band Center Frequency	A	B	C

20	-50.4	-24.2	-6.2
25	-44.8	-20.5	-4.4
31.5	-39.5	-17.1	-3.0
40	-34.5	-17.1	-2.0
50	-30.3	-11.6	-1.3
63	-26.2	-9.4	-0.8
80	-22.4	-7.3	-0.5
100	-19.1	-5.6	-0.3
125	-16.2	-4.2	-0.2
160	-13.2	-2.9	-0.1
200	-10.8	-2.0	0
250	-8.7	-1.4	0
315	-6.6	-0.9	0
400	-4.8	-0.5	0
500	-3.2	-0.3	0
630	-1.9	-0.1	0
800	-0.8	0	0
1000	0	0	0
1250	0.6	0	0
1600	1.0	0	-0.1
2000	1.2	-0.1	-0.2
2500	1.3	-0.2	-0.3
3150	1.2	-0.4	-0.5
4000	1.0	-0.7	-0.8
5000	0.6	-1.2	-1.3
6300	-0.1	-1.9	-2.0
8000	-1.1	-2.9	-3.0
10000	-2.5	-4.3	-4.4
12500	-4.3	-6.1	-6.2
16000	-6.7	-8.5	-8.6
20000	-9.3	-11.2	-11.3

3.1.3.4.3 Input Gain Control

The input gain of a measurement system should be adjusted to provide for maximum dynamic range while preserving a modest safety factor to avoid overload. Dynamic range is the difference in **decibels** between the maximum and minimum levels that can be accurately measured. To avoid system overload, it is recommended that the gain be set such that the expected maximum level of the source being measured is between 10 and 20 decibels

below overload. In the absence of a standard that addresses linear operating ranges for general field measurement studies, it is recommended that the linear operating range of the measurement system is in accordance with tolerances specified in IEc 1265, a standard specific to aircraft noise measurement.(14)

3.1.3.4.4 Exponential Time-Averaging

Exponential time-averaging is a method of stabilizing instrumentation response to signals with changing amplitudes over time using a low-pass filter with a known, electrical time constant. The time constant is defined as the time required for the output level to reach 67 percent of the input, assuming a step-function input. Also, the output level will typically reach 100 percent of an input-step-function after approximately five time constants.

The exponential time-averaged output produced by the low-pass filter is a running average dominated by the most recent value but smoothed out by the contribution of the preceding values. Two exponential time-averaging, response settings are applicable for this document: fast and slow, with time constants (T) of 0.125 and 1 second, respectively (See Figure 7).

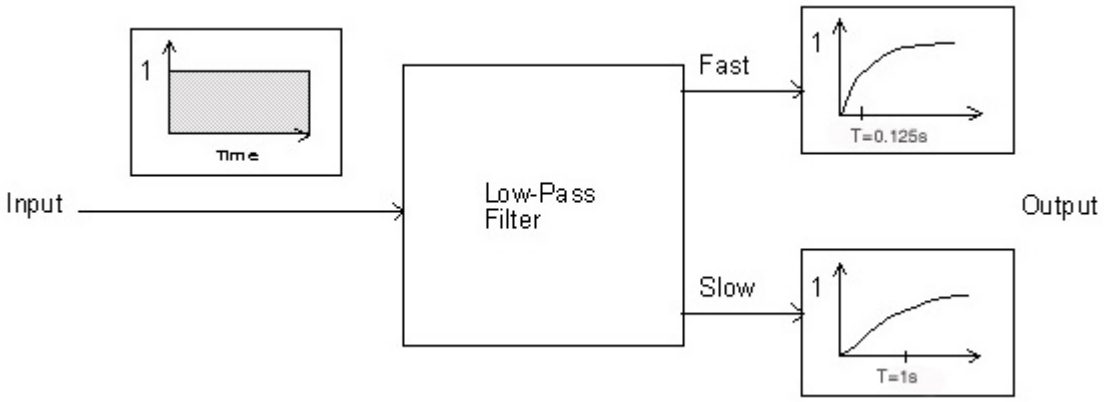

Figure 7. Exponential time-averaging.

Slow response is typically used for measurements of sound source levels which vary slowly as a function of time, such as aircraft. Fast response is typically used for measuring individual highway vehicle pass-bys (See Section 5). Slow response is recommended for the measurement of long-term impact due to highway noise, where impulsive noises are not dominant.

3.1.3.4.5 Temperature and Humidity Effects

Temperature and humidity can affect the sensitivity of many types of instrumentation, including microphones and spectrum analyzers. For example, most current-generation digital audio tape (DAT) recorders have a built-in dew sensor which monitors condensation, and will prevent operation under high-humidity situations. As discussed in Section 3.1.1.1, non-electret condenser microphones are subject to arcing under high-humidity conditions. Also, battery life is substantially shortened when subject to prolonged low temperatures. Manufacturers' recommendations for acceptable temperature and humidity ranges for equipment operation should be followed. Typically, these range from -10 C to 50 C (14 F to 122 F) and from 5 to 90 percent relative humidity.

3.1.4 Calibrator

An acoustic calibrator provides a means of checking the entire acoustic instrumentation system's (i.e., microphone, cables, and recording instrumentation) sensitivity by producing a known sound pressure level (referred to as the calibrator's reference level) at a known frequency, typically 94 or 114 dB at 1 kHz, or 124 dB at 250 Hz. The calibrator used for measurements described herein shall meet the Type 1L performance requirements of IEC 942. (21)

Calibration of acoustic instrumentation must be performed at least at the beginning and end of each measurement session, and before and after any changes are made to system configuration or components. In addition, it is strongly recommended that calibration be performed at hourly intervals throughout the session.

The following procedure should be used to determine calibration (CAL) adjustments prior to data analysis:

- If the final calibration of the acoustic instrumentation differs from the initial calibration by 1 dB or less, all data measured with that system during the time between calibrations should be adjusted by arithmetically Adding to the data the following CAL adjustment:
  CAL adjustment = reference level - [($CAL_{INITIAL}$ + CAL_{FINAL}) / 2]
  For example:
  - reference level = 114.0 db
  - initial calibration level = 114.1 db
  - final calibration level = 114.3 db

  Therefore:

  CAL adjustment = 114.0-[(114.1+114.3)/2] = -0.2 dB

- If the final calibration of the acoustic instrumentation differs from the initial calibration by greater than 1 dB, all data measured with that system during the time between calibrations should be discarded and repeated; and the instrumentation should be thoroughly checked.

3.1.5 Microphone Simulator

In accordance with ANSI S1.13-1971,[(16)] the electronic noise floor of the entire acoustic instrumentation system should be established on a daily basis by substituting the measurement microphone with a passive microphone simulator (dummy microphone) and recording the noise floor for a period of at least 30 seconds.

A dummy microphone electrically simulates the actual microphone by providing a known fixed (i.e., passive) capacitance which is equivalent to the minimum capacitance the microphone is capable of providing. This allows for valid measurement of the system's electronic noise floor.

With the microphone removed and the simulator inserted in its place, all input channels of the instrumentation system should be monitored using headphones. Extraneous signals, such as radio interference or hum, can result when the system is located near antennae, power lines, transformers, or power generators. The system can be especially susceptible to such interference when using long cables which essentially act as antennae for such signals. Extraneous signals detected must be eliminated or reduced to a negligible level, i.e., at least 40 dB below the expected maximum level of the noise source being measured. This can usually be accomplished by re-orienting the instrumentation and/or cables, using shorter cable, checking and cleaning grounding contacts, or in a worst-case scenario, moving the instrumentation system away from the source of the interference, if the position of the source is known.

3.1.6 Pink Noise Generator

The frequency response characteristics of the entire acoustic instrumentation system should be established on a daily basis by measuring and storing 30 seconds of **pink noise.** Pink noise is a random signal for which the spectrum density, i.e., narrow-band signal, varies as the inverse of frequency. In other words, one-third octave-band spectral analysis of pink noise yields a flat response across all frequency bands.

3.1.7 Windscreen

Windscreens should be placed atop all microphones used in outdoor measurements. A windscreen is a porous sphere placed atop a microphone to reduce the effects of wind-generated noise on the microphone diaphragm. The windscreen should be clean, dry, and in good condition. A new windscreen is preferred.

Typically, the effect on the measured sound level due to the insertion of a windscreen into an acoustic

instrumentation system can be neglected. As an example, Table 2 shows typical response corrections to be applied to the measured data to account for the insertion of a Brüel & Kjær Model 0237 windscreen, the most commonly used windscreen for transportation-related noise measurements, into an acoustic instrumentation system. These corrections should not be considered typical for other model windscreens. If a manufacturer does not provide corrections and high precision measurements are desired, tests in an anechoic chamber would be required.

Table2. B & K Model 0237 windscreen typical response corrections.

Incidence Angle(°)	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6130	8000	10000
0	-0.1	-0.2	-0.2	-0.3	-0.3	-0.5	-0.6	-0.6	-0.5	0	0	0.1	0.2	0.5
30	-0.2	-0.3	-0.3	-0.4	-0.4	-0.5	-0.5	-0.8	-0.6	0	0.2	0.1	0.5	0.6
60	0	-0.1	-0.2	-0.3	-0.3	-0.4	-0.6	-0.9	-0.8	-0.2	0.4	0.1	0.4	0.6
90	-0.1	-0.2	-0.3	-0.4	-0.5	-0.6	-0.7	-0.8	-0.8	-0.3	0.5	0.6	0.5	1
120	0	0	-0.1	-0.2	-0.3	-0.3	-0.5	-0.7	-0.6	0	0.7	0.5	0.9	1.2
150	0	0	0	0	-0.1	-0.2	-0.3	-0.4	-0.3	0	0.8	0.7	0.6	1.3
180	0	0	-0.1	-0.2	-0.3	-0.4	-0.5	-0.5	-0.4	0	0.5	0.9	0.8	1.4

3.2 Meteorological Instrumentation

When performing any transportation-related noise study, proper documentation of meteorological conditions is essential. This section provides guidance in selecting instrumentation for measuring meteorological conditions.

3.2.1 Anemometer

Recent research has shown that wind speed and direction may affect measured noise levels in the vicinity of a highway.[22,23] These effects typically increase with increasing distance from the noise source.

An anemometer is an instrument used to measure wind Speed. Anemometers shall meet the requirements of ANSI S12.18-1994.[7]

For general-purpose measurements at relatively close distances to a noise source, i.e., within 30 m (100 ft), a hand-held, wind-cup anemometer and an empirically observed estimation of wind direction are sufficient to document wind conditions. For research purposes or for measurements where the receiver(s) will be positioned at distances greater than 30 m (100 ft) from the noise source, a high-precision anemometer, capable of measuring wind conditions in three dimensions, integrated into an automated, data-logging weather station, should be used. For all types of measurements, the anemometer should be located at a relatively exposed position and at an elevation approximately equal to that of the highest receiver position.[6]

Except for research purposes, where the study of wind effects on measured data is an integral objective, measurements should not be made when wind speeds exceed 19 km/h (12 mi/h), regardless of direction. A previous study, in which wind data were carefully recorded and analyzed, concluded that wind speeds below 19 km/h have no apparent effect on measurements performed at a distance within 30 m of the noise source.[24]

Wind conditions are also important in judging equivalency for BEFORE and AFTER acoustical measurements -- e.g., during existing-noise measurements (See Section 4)-- and **barrier** insertion loss measurements (See Section 6). It is recommended that BEFORE and AFTER measurements be compared only if the wind class (See Table 3) remains unchanged and the vector components of the average wind velocity (vector wind speed, VWS) from the source to receiver do not differ by more than a certain limit. This limit depends on the accuracy desired and the distance from source to receiver.[6] VWS is computed as follows (Note: A negative VWS indicates the wind is blowing from receiver to source): VWS = COS(Wind Direction) x Wind Speed.

Table 3. Classes of wind conditions

Wind Class	Vector Component of Wind Velocity (m/s)
upwind	-1 to -5
calm	-1 to +1
downwind	+1 to +5

*Note: 1m/s = 2.2 mi/h

Specifically, to keep the error due to wind conditions to less than ±1 dB and distances less than 70 m (230 ft), this limit should be 1.0 m/s (2.2 mi/h). If it is desired to keep the acoustical error within ±0.5 dB and distances less than 70 m, at least four BEFORE and four AFTER measurements should be made within the limit of 1.0 m/s (2.2 mi/h). However, these 1.0 m/s (2.2 mi/h) limits are not applicable for a calm wind class when strong winds with a small vector component in the direction of propagation exist. In other words, BEFORE/AFTER measurements in such instances should be avoided.(25)

3.2.2 Thermometer, Hygrometer, and Psychrometer

A thermometer for measuring ambient temperature and a hygrometer for measuring relative humidity should be used in conjunction with all noise measurement studies. An alternative is to use a psychrometer which is capable of measuring both dry and wet bulb temperature. Dry and wet bulb temperatures can then be used to compute relative humidity (See Appendix A).

For general purpose measurements, use of a sling psychrometer is recommended. For research purposes, a high-precision system may be needed, such as an automated, fast-response, data-logging weather station.

The thermometer or other temperature sensor should have an accuracy of ±5 percent or better at full scale. All temperature sensors should be shielded from direct solar radiation. In addition, a variable-height support-device may be necessary for the measurement of temperature profiles.(6)

Temperature and humidity can affect measured sound levels, typically to a much lesser degree than wind. In the case where the noise source is on pavement, such as vehicle emissions (See Section 5), measurements should not be made unless the pavement is dry; emission levels may be influenced by up to 2 dB by moisture on road surfaces.(26)

In addition, atmospheric absorption can substantially reduce measured sound levels, especially at high frequencies in a low temperature, low-humidity environment. As such, it is important to use caution comparing measured data taken under substantially different temperature and humidity conditions, especially when the distance from source to receiver is quite large, or when the sound source is dominated primarily by higher frequencies. It is very difficult to provide general rules-of-thumb, or guidance for quantifying atmospheric absorption because of the many parameters involved; however, there are several standards which provide algorithms for computing such effects. (27,28,29)

3.3 Vehicle-Speed Detection Unit

Measured sound levels of transportation-related vehicles are a direct function of vehicle speed. This section discusses various instruments for measuring vehicle speed.

3.3.1 Doppler-Radar Gun

A **Doppler**-radar gun may be used to measure vehicle speed. When using a radar gun, it should be placed at least 120 m (400 ft) upstream of traffic flow, relative to the noise measurement microphone, and directed toward the vehicles as they approach the microphone. This placement has been shown to minimize effects on traffic flow resulting from driver curiosity.(4)

The radar gun should be positioned at a distance of no greater than 10 m (31 ft) from the centerline of the path of the vehicle being measured. This will ensure that the angle subtended by the axis of the radar antenna and the

direction of travel of the vehicle will be less than 5 degrees, when the vehicle is at the microphone pass-by point, assuming the 120 m offset distance mentioned above is maintained. The resulting uncertainty in vehicle speed readings, due to angular effects on Doppler accuracy, will not exceed 0.5 km/h (0.28 mi/h) over a speed range from 15 to 110 km/h (10 to 70 mi/h).[(30)]

Some manufacturers now offer speed guns which are based on laser technology. Such units would also be appropriate for determining vehicle speed.

3.3.2 Stopwatch

A stopwatch may be used to determine vehicle speed. Cones or observers at known distances from one another should be positioned along the roadway. A separation distance of at least 15 m (50 ft) should be maintained. Start/stop the stopwatch at the instants the vehicle reaches the pass-by points. The vehicle's speed is simply determined by dividing the distance by the measured time period. A similar method for determining vehicle speed could also be used in conjunction with a video camera processing a time-synchronized display.

3.3.3 Light Sensor

Light sensors may also be used to determine vehicle speed. Position the light sensors at known distances from one another along the roadway. A separation distance of at least 15 m (50 ft) should be maintained. The light sensors are triggered at the instants the vehicle reaches the pass-by points. The triggering of the sensors typically results in a signal being sent to some type of electronic detector, which in turn is programmed to read and Store time of day, or compute elapsed time between pulses from a computer or other time base. Light sensor systems are commercially available at most electronic stores. The signal detector system may also by used to trigger the start and Stop of acoustic data collection.

3.3.4 Pneumatic Line

Pneumatic lines may also be positioned at known locations from one another along the roadway to determine vehicle speed. The pressure in the pneumatic line increases when a vehicle passes over it, causing a mechanical switch to close. The vehicle's speed is determined by dividing the known distance by the measured time period. The mechanical switches may also be used to trigger the start and stop of acoustic data collection.

3.4 Traffic-Counting Device

For many transportation-related measurements, the collection of traffic data, including the logging of vehicle types, as defined in Section 5.1.3, vehicle-type volumes, and average vehicle speed may be required for: (1) determination of site equivalence (See Existing-Noise Measurements in Section 4 and Barrier Insertion Loss Measurements in Section 6); or (2) input into a highway traffic noise prediction model. This section discusses various instruments for the counting and classification of roadway traffic, including the use of a video camera, counting board, or pneumatic line. If none of these instruments is available, meticulous pencil/paper tabulation should be used.

3.4.1 Video Camera

A video camera can be used to record traffic in the field and perform counts off-line at a later time. This approach, however, would require strict time synchronization between the acoustic instrumentation and the camera.

3.4.2 Counting Board

A counting board is simply a board with three or more incrementing devices, depending on the number of vehicle types. Each device is manually triggered to increment for a given type of vehicle pass-by.

3.4.3 Pneumatic Line

A pneumatic line may also be used to determine traffic counts. The pressure in the line increases when a vehicle passes over it, causing a mechanical switch to close. The mechanical switch triggers an internal counting

mechanism to increment. The disadvantage of using a pneumatic line is that the specific vehicle mix, i.e., automobiles versus trucks, as well as other vehicle types, is not preserved.

3.5 Special Purpose Instrumentation

3.5.1 Tachometer

A tachometer indicates or measures the revolutions per minute of a revolving shaft. A tachometer may be used to more completely characterize noise sources, primarily for the purpose of research. A tachometer may also be used for the measurement of special equipment, e.g., power generators.

3.5.2 Artificial Noise Source

A fixed, **artificial noise source,** such as a loudspeaker, may be used in place of the actual noise source, usually when the actual source is not available, such as might be the case for building noise-reduction measurements (See Section 8). Where measurements using a loudspeaker source are to be directly compared with measurements made using the actual noise source, a high-powered omnidirectional loudspeaker system is recommended to properly simulate the direct and reflected sounds of the source.(31)

The loudspeaker should produce signals of random noise filtered in one-third octave-bands. Loudspeaker directional characteristics shall be such that at 2000 Hz, the free-field radiated signal out to an angle of 45 degrees shall drop no more than 6 dB relative to the on-axis signal. In addition, the loudspeaker must supply sufficient output for measurements within the band range of 100 to 4000 Hz.(32)

3.5.3 Noise Dosimeter

In accordance with ANSI S1.25-1991(33) and the U.S. Occupational Safety and Health Administration (OSHA), a noise dosimeter is a small device that integrates sound pressure over time to determine a subject's noise dose, as a percentage of a manually set maximum criterion determined by OSHA.(8)

Similar to a sound level meter (See Figure 5 in Section 3.1.3.2), components of a noise dosimeter include: a microphone with preamplifier, an amplifier, A-weighting (See Section 3.1.3.4.2), a squaring device, slow exponential time-averaging (See Section 3.1.3.4.4), an **exchange rate** of 5 dB, and an output indicator or display.

3.6 Support Instrumentation

Care should be taken to ensure that all support instrumentation is compatible with the acoustic instrumentation. For example, headphones should have an input impedance suitable for the recording instrumentation's output impedance. In addition, for maximum power transfer and minimum distortion, cables used with this equipment should have a matching impedance. Finally, sufficient back-up equipment, such as batteries, chargers, data sheets, floppy diskettes, etc., should always be available.

3.7 Manufacturers and Vendors

The following is a suggested list of sources for the instrumentation discussed in Section 3.(34) It is not an endorsement by the FHWA, nor is it meant to be complete, but is intended solely as a guide for readers.

3.7.1 Acoustic Instrumentation

3.7.1.1 Microphone System

- ACO Pacific, Inc., 2604 Read Avenue, Belmont, Ca 94002, (415) 595-8588.
- Brüel & Kjær Instruments, Inc., 2364 Park Central Blvd., Decatur, GA 30035, (800) 332-2040.
- Cirrus Research p/c, Acoustic House, Bridlington Road, Hunmanby, Y014 OPH UK, 44-1723-891655.
- Hewlett-Packard Company, P.O. Box 95052-8059, Santa Clara, CA 95052, (800) 333-1917.

- Ivie Technologies, Inc., 1366 West Center Street, Orem, UT 84043, (801) 224-1800.
- Larson Davis Laboratories, 1681 West 820 North, Provo, UT 84601, (801) 375-0177.
- Lucas CEL Instruments, 1 Westchester Drive, Milford, NH 03055, (800) 366-2966.
- Metrosonics, Inc., P.O. Box 23075, Rochester, Ny 14692, (716) 334-7300.
- Ono Sokki Technology, Inc., 2171 Executive Drive, Suite 400, Addison, IL 60101, (708) 627-9700.
- Quest Technologies, 510 South Worthington Street, Oconomowoc, WI 53066, (414) 567-9157.
- Scantek, Inc., 916 Gist Avenue, Silver Spring, Md 20910, (301) 495-7738.
- Zonic Corporation, 50 West Technecenter Drive, Milford, OH 45150, (513) 248-1911.

3.7.1.2 Recording System

- Brüel & Kjær Instruments, Inc., 2364 Park Central Blvd., Decatur, GA 30035, (800) 332-2040.
- Hewlett-Packard Company, P.O. Box 95052-8059, Santa Clara, CA 95052, (800) 333-1917.
- JVC Company of America, 41 Slater Drive, Elmwood Park, NJ 07407, (201) 794-3900.
- Larson Davis Laboratories, 1681 West 820 North, Provo, UT 84601, (801) 375-0177.
- Lucas CEL Instruments, 1 Westchester Drive, Milford, NH 03055, (800) 366-2966.
- Metrosonics, Inc., P.O. Box 23075, Rochester, Ny 14692, (716) 334-7300.
- Quest Technologies, 510 South Worthington Street, Oconomowoc, WI 53066, (800) 245-0779.
- Racal Recorders, Inc., 15375 Barranca Parkway, Suite H-101, Irvine, CA 92718, (714) 727-3444.
- Scantek, Inc., 916 Gist Avenue, Silver Spring, Md 20910, (301) 495-7738.
- Sony Electronics Inc., 3300 Zanker Road, San Jose, CA 95134, (408) 432-1600.
- TEAC, 7733 Telegraph Road, Montebello, CA 90640, (213) 726-0303.
- Technics, Panasonic East, 50 Meadowlands Parkway, Secaucus, NJ 07094, (201) 348-7250.
- Tritek, Inc., 155 Middlesex Turnpike, Burlington, MA 01803, (617) 272-4550.
- Zonic Corporation, 50 West Technecenter Drive, Milford, OH 45150, (513) 248-1911.

3.7.1.3 Measurement System

3.7.1.3.1 Graphic Level Recorder

- Brüel & Kjær Instruments, Inc., 2364 Park Central Blvd., Decatur, GA 30035, (800) 332-2040.
- Hewlett-Packard Company, P.O. Box 95052-8059, Santa Clara, CA 95052, (800) 333-1917.

3.7.1.3.2 Sound Level Meter

- ACO Pacific, Inc., 2604 Read Avenue, Belmont, Ca 94002, (415) 595-8588.
- Brüel & Kjær Instruments, Inc., 2364 Park Central Blvd., Decatur, GA 30035, (800) 332-2040.
- Cirrus Research p/c, Acoustic House, Bridlington Road, Hunmanby, Y014 OPH UK, 44-1723-891655.
- Hewlett-Packard Company, P.O. Box 95052-8059, Santa Clara, CA 95052, (800) 333-1917.
- Ivie Technologies, Inc., 1366 West Center Street, Orem, UT 84043, (801) 224-1800.
- Larson Davis Laboratories, 1681 West 820 North, Provo, UT 84601, (801) 375-0177.
- Lucas CEL Instruments, 1 Westchester Drive, Milford, NH 03055, (800) 366-2966.
- Metrosonics, Inc., P.O. Box 23075, Rochester, Ny 14692, (716) 334-7300.
- Ono Sokki Technology, Inc., 2171 Executive Drive, Suite 400, Addison, IL 60101, (708) 627-9700.
- Quest Technologies, 510 South Worthington Street, Oconomowoc, WI 53066, (800) 245-0779.
- Scantek, Inc., 916 Gist Avenue, Silver Spring, Md 20910, (301) 495-7738.
- Tritek, Inc., 155 Middlesex Turnpike, Burlington, MA 01803, (617) 272-4550.
- Zonic Corporation, 50 West Technecenter Drive, Milford, OH 45150, (513) 248-1911.

3.7.1.3.3 One-Third Octave-Band Analyzer

- ACO Pacific, Inc., 2604 Read Avenue, Belmont, Ca 94002, (415) 595-8588.
- Brüel & Kjær Instruments, Inc., 2364 Park Central Blvd., Decatur, GA 30035, (800) 332-2040.
- Cirrus Research p/c, Acoustic House, Bridlington Road, Hunmanby, Y014 OPH UK, 44-1723-891655.
- Computational Systems, Inc., 835 Innovation Drive, Knoxville, TN 37932, (423) 675-2400.
- GW Instruments, 35 Medford Street, Somerville, Ma 02143, (617) 625-4096.
- Hewlett-Packard Company, P.O. Box 95052-8059, Santa Clara, CA 95052, (800) 333-1917.
- Ivie Technologies, Inc., 1366 West Center Street, Orem, UT 84043, (801) 224-1800.
- Larson Davis Laboratories, 1681 West 820 North, Provo, UT 84601, (801) 375-0177.

- Lucas CEL Instruments, 1 Westchester Drive, Milford, NH 03055, (800) 366-2966.
- Metrosonics, Inc., P.O. Box 23075, Rochester, Ny 14692, (716) 334-7300.
- Ono Sokki Technology, Inc., 2171 Executive Drive, Suite 400, Addison, IL 60101, (708) 627-9700.
- Quest Technologies, 510 South Worthington Street, Oconomowoc, WI 53066, (800) 245-0779.
- Scantek, Inc., 916 Gist Avenue, Silver Spring, Md 20910, (301) 495-7738.
- Tektronix, Inc., P.O. Box 500, Beaverton, OR 97077, (503) 627-7111.
- Tritek, Inc., 155 Middlesex Turnpike, Burlington, MA 01803, (617) 272-4550.
- Zonic Corporation, 50 West Technecenter Drive, Milford, OH 45150, (513) 248-1911.

3.7.1.4 Calibrator

- Brüel & Kjær Instruments, Inc., 2364 Park Central Blvd., Decatur, GA 30035, (800) 332-2040.
- Cirrus Research p/c, Acoustic House, Bridlington Road, Hunmanby, Y014 OPH UK, 44-1723-891655.
- Larson Davis Laboratories, 1681 West 820 North, Provo, UT 84601, (801) 375-0177.
- Metrosonics, Inc., P.O. Box 23075, Rochester, Ny 14692, (716) 334-7300.
- Scantek, Inc., 916 Gist Avenue, Silver Spring, Md 20910, (301) 495-7738.

3.7.1.5 Microphone Simulator

- Brüel & Kjær Instruments, Inc., 2364 Park Central Blvd., Decatur, GA 30035, (800) 332-2040.
- Larson Davis Laboratories, 1681 West 820 North, Provo, UT 84601, (801) 375-0177.

3.7.1.6 Pink Noise Generator

- Brüel & Kjær Instruments, Inc., 2364 Park Central Blvd., Decatur, GA 30035, (800) 332-2040.
- Ivie Technologies, Inc., 1366 West Center Street, Orem, UT 84043, (801) 224-1800.

3.7.1.7 Windscreen

- Brüel & Kjær Instruments, Inc., 2364 Park Central Blvd., Decatur, GA 30035, (800) 332-2040.
- Larson Davis Laboratories, 1681 West 820 North, Provo, UT 84601, (801) 375-0177.

3.7.2 Meteorological Instrumentation

- Climatronics Corp., 1324 Motor Parkway, Hauppauge, NY 11787, (516) 567-7300.
- Edmund Scientific, Order Dept., Edscorp Bldg., Barrington, NJ 08007-1380, (609) 573-6250.
- Industrial Instruments & Supplies, P.O. Box 416, County Line Industrial Park, Southampton, PA 18966, (215) 396-0822.
- Larson Davis Laboratories, 1681 West 820 North, Provo, UT 84601, (801) 375-0177.
- R.M Young Company, 2801 Aero-Park Drive, Traverse City, MI 49686, (616) 946-3980.
- Robert E. White Instruments, 34 Commercial Wharf, Boston, MA 02110, (617) 742-3045.
- Viking Instruments, 525 Main Street, S. Weymouth, MA 02190, (800) 325-0360.

3.7.3 Vehicle-Speed Detection Unit

- Applied Concepts, 717 Sherman, Suite 300, Richardson, TX 75081, (214) 578-5100.
- CMI Inc., 316 East Ninth Street, Owensboro, KY 42301, (502) 685-6545.
- Decatur Electronics, Inc., 715 Bright Street, Decatur, IL 62522, (217) 428-4315.
- Kustom Signals, Inc., 9325 Pflumm, Lenexa, KS 66215, (913) 492-1400.
- Laser Technology, Inc., 7399 South Tucson Way, Garden Level B, Inglewood, CO 80112, (303) 649-9707.
- Tribar Inc., 1655 Flint Road, Downsview, Ontario, Canada M3J2W8, (416) 736-9600.

3.7.4 Traffic-Counting Device

3.7.4.1 Video Camera

- HB Communications Inc., 15 Corporate Drive, P.O. Box 689, North Haven, CT 06473-0689, (203) 234-9246.

- JVC, 14 Slater Drive, Elmwood Park, NJ 07407, (201) 794-3900.
- Panasonic, One Panasonic Way, Secaucus, NJ 07094, (201) 348-7000.
- Sony, One Sony Drive, Park Ridge, NJ 07656, (941) 768-7669.

3.7.5 Special Purpose Instrumentation

3.7.5.1 Tachometer

- Brüel & Kjær Instruments, Inc., 2364 Park Central Blvd., Decatur, GA 30035, (800) 332-2040.
- Larson Davis Laboratories, 1681 West 820 North, Provo, UT 84601, (801) 375-0177.

3.7.5.2 Artificial Noise Source

- CTS of Brownsville Inc., 3555 East 14th Street, Brownsville, TX 78521, (210) 546-5184.
- ESS, 9613 Oates Drive, Sacramento, CA 95827.
- HB Communications Inc., 15 Corporate Drive, P.O. Box 689, North Haven, CT 06473-0689, (203) 234-9246.
- Infinity, 9409 Owensmouth Avenue, Chatsworth, Ca 91311, (818) 407-0228.
- Jamo, 425 Huehl Road, Bldg 8, Northbrook, IL 60062, (847) 498-4648.
- JBL, 240 Crossways Park W., WoodBury, NY 11797, (516) 496-3400.
- Motorola, Sheumburg, IL, (312) 397-1000.
- OHM Acoustics, 241 Taaffe Place, Brooklyn, NY 11205, (718) 783-1111.
- Panasonic, One Panasonic Way, Secaucus, NJ 07094, (201) 348-7000.
- Phase Technology, 6400 Yougerman Circle, Jacksonville, FL 32244, (904) 777-0700.
- Pioneer, 737 Fargo Avenue, Elk Grove Village, Il 60007, (312) 593-2960.
- Shure Brothers Inc., 222 Hartrey Avenue, Evanston, IL 60204.
- Sonance, 961 Calle Negocio, San Clemente, CA 92672, (800) 582-7777.
- VMPS, Itone, 3429 Morningside Drive, El Sobrante, CA 94803, (415) 222-4276.

3.7.5.3 Noise Dosimeter

- Brüel & Kjær Instruments, Inc., 2364 Park Central Blvd., Decatur, GA 30035, (800) 332-2040.
- Cirrus Research p/c, Acoustic House, Bridlington Road, Hunmanby, Y014 OPH UK, 44-1723-891655.
- Larson Davis Laboratories, 1681 West 820 North, Provo, UT 84601, (801) 375-0177.
- Scantek, Inc., 916 Gist Avenue, Silver Spring, Md 20910, (301) 495-7738.

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*As Previously noted, all terms defined in the Terminology section are highlighted when they first appear in the main body of the text of this document.

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United States Department of Transportation - **Federal Highway Administration**

Measurement of Highway-Related Noise

4. Existing-Noise Measurements in the Vicinity of Highways

This section describes recommended procedures for performing existing-noise measurements in the vicinity of highways. Existing-noise measurements include measurements made either prior to a highway project, including the construction of a new highway or the expansion of an existing one (BEFORE), measurements made subsequent to project completion (AFTER), or measurements of both the BEFORE-project and AFTER-project condition. This section does not address the assessment of highway **noise barrier** performance, which is covered separately in Section 6. The difference in sound levels BEFORE a highway project is started and AFTEr it is completed, combined with the overall level associated with the completed project, gives an indication of the expected noise impact.(35)

4.1 Site Selection

Site selection should be guided by the location of noise-sensitive receivers.

4.1.1 Site Characteristics

Site characteristics depend on the purpose of the existing-noise measurements: (1) establishing an overall sound level for the purpose of assessing noise impact of a nearby highway; and (2) establishing a change in sound level prior to a highway project relative to the sound level upon project completion.

4.1.1.1 Overall Sound Level Measurements

Land-use maps and field reconnaissance should be used to identify potential noise-sensitive areas. Schools, hospitals, and churches are especially sensitive to noise impacts since they require very low levels to facilitate activity. Noise-sensitive residential areas should also be included in a noise-impact assessment. When selecting potential representative sites for overall sound level measurements, keep in mind, that the site should exhibit typical conditions (e.g., ambient, roadway, and meteorological) for the entire community. It is recommended that good engineering judgment be used to select sites, keeping in mind the objectives of the study.

4.1.1.2 Change in Sound Level Measurements

For valid comparison of BEFORE and AFTER sound levels, equivalence in site geometry, meteorological, and traffic conditions must be established.

Equivalence in site geometry entails similar terrain characteristics and **ground impedance** within an angular sector of 120 degrees from all receivers looking towards the noise source. For research purposes, equivalence in ground impedance may be determined by performing measurements in accordance with the ANSI Standard for measuring ground impedance, scheduled for publication in the second half of 1996.(37) For more empirical studies, or if measurements are not feasible, then the ground for BEFORE and aFTER measurements may be judged equivalent if general ground surface type and conditions, e.g., surface water content, are similar.

Equivalence in meteorological conditions includes wind, temperature, humidity, and cloud cover. Wind conditions may be judged equivalent for BEFORE and AFTER measurements if the wind class (See Table 3 in Section 3.2.1) remains unchanged and the vector components of the average wind velocity from source to receiver do not differ by more than a certain limit, which is defined as follows: (1) for an acoustical error within ±1.0 dB and distances less than 70 m (230 ft), this limit is 1.0 m/s (2 mi/h); (2) for an acoustical error within ±0.5 dB and distances less than 70 m (230 ft), at least four BEFORe and AFTER measurements should be made within the limit of 1.0 m/s (2 mi/h). However, these 1.0 m/s limits are not applicable for a calm wind class when strong winds with a small vector

component in the direction of propagation exist. In other words, BEFORE/AFTER measurements in such instances should be avoided.(25)

Average temperatures during BEFORE and AFTER measurements may be judged equivalent if they are within 14 ° C of each other. In certain conditions, dry air produces substantial changes in sound attenuation at high frequencies. Therefore, for a predominantly high-frequency source (most sound energy over 3000 Hz), the absolute humidity for BEFORE and AFTER measurements should be similar.

The BEFORE and AFTER acoustical measurements should be made under the same class of cloud cover, as determined from Table 4.

Table 4. Classes of cloud cover.(6)

Class	Description
1	Heavily overcast
2	Lightly overcast (either with continuous sun or the sun obscured intermittently by clouds 20 to 80% of the time
3	Sunny (sun essentially unobscured by clouds at least 80% of the time)
4	Clear night (less than 50% cloud cover)
5	Overcast night (50% or more cloud cover)

Equivalence in traffic conditions includes the volume and mix of roadway traffic, as well as spectral content, directivity, and spatial and temporal patterns of the individual vehicles. To a certain degree, non-equivalence in traffic conditions can be factored out through the use of a reference microphone (See Section 4.1.2.1).

4.1.2 Microphone Location

When performing measurements to establish the change in sound level, it is important to remember that microphone locations relative to the sound source in the BEFORE and AFTER cases should be as close to identical as possible.

4.1.2.1 Reference Microphone

The use of a reference microphone is strongly recommended for all existing-noise measurements. Use of a reference microphone allows for a calibration of measured levels, which accounts for variations in the characteristics of the noise source, e.g., traffic speeds, volumes, and mixes.

Typically, the reference microphone is positioned at a height of 1.5 m (5 ft), and located within 30 m (100 ft) of the centerline of the near travel lane at a position which is minimally influenced by **ground attenuation** and atmospheric effects (See Section 3.2). However, the specific location of the reference microphone may be defined by the location(s) of any noise-sensitive receiver(s) (See Section 4.1.2.2).

4.1.2.2 Receiver

In most situations, study objectives will dictate specific microphone locations. As such, this section presents a generic discussion of microphone locations, and assumes no specific study objectives have been identified.

Sometimes a single, typical residential area near the existing or proposed highway route can be used to represent other similar areas. If traffic conditions or topography vary greatly from one residential area to the next, receivers at

many locations may be required.

In terms of microphone height, 1.5 m (5 ft) is the preferred position. However, microphone height(s) should be chosen to represent all noise-sensitive receivers of interest, i.e., if multistory structures are of interest, including microphones at heights of 4.5 m and 7.5 m (15 ft and 25 ft) may be helpful.

Note: For receiver distances greater than 100 m (300 ft) from the source, atmospheric effects have a much greater influence on measured Sound levels.(8,38) In such instances, precise meteorological data will be needed to ensure BEFORE and AFTER equivalence of meteorological conditions (See Section 3.2).

4.2 Noise Descriptors

The **equivalent sound level (L_{Aeq})** should be used to describe continuous sounds, such as relatively dense highway traffic. The **sound exposure level (L_{AE}),** or the **maximum A-weighted Sound level** with fast time response characteristics (L_{AFmx}) should be used to describe the sound of single events, such as individual vehicle pass-bys. The **day-night average sound level (L_{dn})** and the **community-noise exposure level (L_{den})** may be used to describe long-term noise environments (typically greater than 24 hours), particularly for land-use planning. Note: Once the L_{Aeq} and L_{AE} noise descriptors are established, other descriptors can be computed using the mathematical relationships presented in Section 2.

4.3 Instrumentation (See Section 3)

- Microphone system (microphone and preamplifier)
- Graphic level recorder (optional)
- Measurement/recording instrumentation
- Calibrator
- Microphone simulator
- Pink noise generator
- Windscreen
- Tripod
- Cabling
- Meteorological instrumentation
- Vehicle-speed detection unit
- Traffic-counting device

4.4 Sampling Period

Different sound sources require different sampling periods. For multiple-source conditions, a longer sampling period is needed to obtain a representative sample, averaged over all conditions. Typical sampling periods range from 2 to 30 minutes. In special instances where the temporal nature is expected to vary substantially, longer sampling periods, such as 1 hr or 24 hr, may be necessary. Measurement repetitions at all receiver positions are required to ensure statistical reliability of measurement results. A minimum of 3 repetitions for like conditions is recommended, with 6 repetitions being preferred. Table 5 presents suggested measurement sampling periods based on the temporal nature and the range in sound level fluctuations of the noise source. Guidance on judgment of the temporal nature of the source may also be found in ANSI S1.13-1971 and aNSI S12.9-1988.(16,47)

Table 5. Sampling periods.

Temporal nature[16]	Greatest anticipated range		
	10dB	10 - 30dB	>30dB
Steady*	2 minutes	N/A	N/A
Nonsteady fluctuating	5 minutes	15 minutes	30 minutes
Nonsteady intermittent	For at least 10 events	For at least 10 events	For at least 10 events

Nonsteady, impulsive isolated bursts	For at least 10 events	For at least 10 events	For at least 10 events
Nonsteady, impulsive-quasisteady	3 cycles of on/off	3 cycles of on/off	3 cycles of on/off

* A minimum of three repetitions is recommended, with 6 repetitions being preferred.

4.5 Measurement Procedures

1. Prior to initial data collection, at hourly intervals thereafter, and at the end of the measurement day, the entire acoustic instrumentation system should be calibrated. Meteorological conditions (wind speed and direction, temperature, humidity, and cloud cover) should be documented prior to data collection, at a minimum of 15-minute intervals, and whenever substantial changes in conditions are noted.
2. The electronic noise floor of the acoustic instrumentation system should be established daily by substituting the measurement microphone with a dummy microphone (See Section 3.1.5). The frequency response characteristics of the system should also be determined on a daily basis by measuring and Storing 30 seconds of pink noise from a random-noise generator (See Section 3.1.6).
3. Ambient levels should be measured and/or recorded by sampling the sound level at each receiver and at the reference microphone, with the sound source quieted or removed from the site. A minimum of 10 seconds should be sampled. Note: If the study sound source cannot be quieted or removed, an upper limit to the ambient level using a statistical descriptor, such as $\mathbf{L_{90}}$, may be used. Such upper limit ambient levels should be reported as "assumed." Note: Most sound level meters have the built-in capability to determine this descriptor.
4. Sound levels should be measured and/or recorded simultaneously with the collection of traffic data, including the logging of vehicle types, as defined in Section 5.1.3, vehicle-type volumes, and the average vehicle speed. It is often easier to videotape traffic in the field and perform counts at a later time. This approach, of course, requires strict time synchronization between the acoustic instrumentation and the video camera.

4.6 Data Analysis

4.6.1 Overall Sound Level Measurement Analysis

1. Adjust measured levels for calibration drift (See Section 3.1.4).
2. Adjust measured levels for ambient (See Section 4.6.3).
3. Compute the mean sound level for each receiver by arithmetically Averaging the levels from individual sampling periods.
4. Perform an assessment of the averaged sound levels based on study objectives.

4.6.2 Change in Sound Level Measurement Analysis

1. Adjust measured levels for calibration drift (See Section 3.1.4).
2. Adjust measured levels for ambient (See Section 4.6.3).
3. For each measurement repetition of each BEFORE-AFTER receiver pair, the noise level difference should be determined by subtracting the difference in adjusted reference and receiver levels for the BEFORE case from the difference in adjusted reference and receiver levels for the AFTER case:

$$\text{Difference}_i = (L_{Aref} - L_{Arec}) - (L_{Bref} - L_{Brec}) \qquad \text{(dB)}$$

where:

   - Difference_i is the noise level difference at the *i*th receiver;
   - L_{Brec} and L_{Arec} are, respectively, the BEFORE and AFTER adjusted source levels at the *i*the receiver; and
   - L_{Bref} and L_{Aref} are, respectively, the BEFORE and aFTER adjusted reference levels.
4. Compute the mean sound level for each receiver by arithmetically Averaging the levels from individual sampling periods.
5. Perform an assessment of the averaged sound levels based on study objectives.

4.6.3 Ambient Adjustments

If measured levels do not exceed ambient levels by 4 dB or more, i.e., they are masked, or if the levels at the reference microphone do not exceed those at the receivers, then those data should be omitted from data analysis.

If measured levels exceed the ambient levels by between 4 and 10 dB, and if the levels at the reference microphone exceed those at the receivers, then correct the measured levels for ambient as follows (Note: For source levels which exceed ambient levels by greater than 10 dB, ambient contribution becomes essentially negligible and no correction is necessary):

$$L_{adj} = 10 \times \log_{10} (10^{\{0.1L_c\}} - 10^{\{0.1L_a\}}) \qquad \text{(dB)}$$

where:

1. L_{adj} is the ambient-adjusted measured level;
2. L_c is the measured level with source and ambient combined; and
3. L_a is the ambient level alone.

For example:

- Lc = 55.0 db
- La = 47.0 db

Therefore:

$L_{adj} = 10 \times \log_{10}(10^{(0.1 \times 55.0)} - 10^{(0.1 \times 47.0)}) = 54.3$ dB

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FHWA

United States Department of Transportation - **Federal Highway Administration**

Measurement of Highway-Related Noise

5. Vehicle Noise Emission Level Measurements for Highway Noise Prediction Models

This section describes recommended procedures for the measurement of vehicle noise emission levels. Among other purposes, emission levels are required to input user-defined vehicles in the FHWA Traffic Noise model (FHWA TNM®).[3] The TNM is used to predict sound levels in the vicinity of highways and to design highway noise barriers. The procedures described below are consistent with the methodology used during the development of the **R**eference **E**nergy **M**ean **E**mission **L**evel (REMEL) Data Base for the FHWA TNM.[4,36]

5.1 Site Selection

5.1.1 Site Characteristics

To minimize site specific effects associated with vehicle-noise emission level measurements, it is recommended that between five and ten unique sites be selected. These sites should possess the following geometric characteristics:

- A flat open space free of large reflecting surfaces, such as parked vehicles, signboards, buildings, or hillsides, located within 30 m (100 ft) of either the vehicle path or the microphone(s) (See Figure 8).

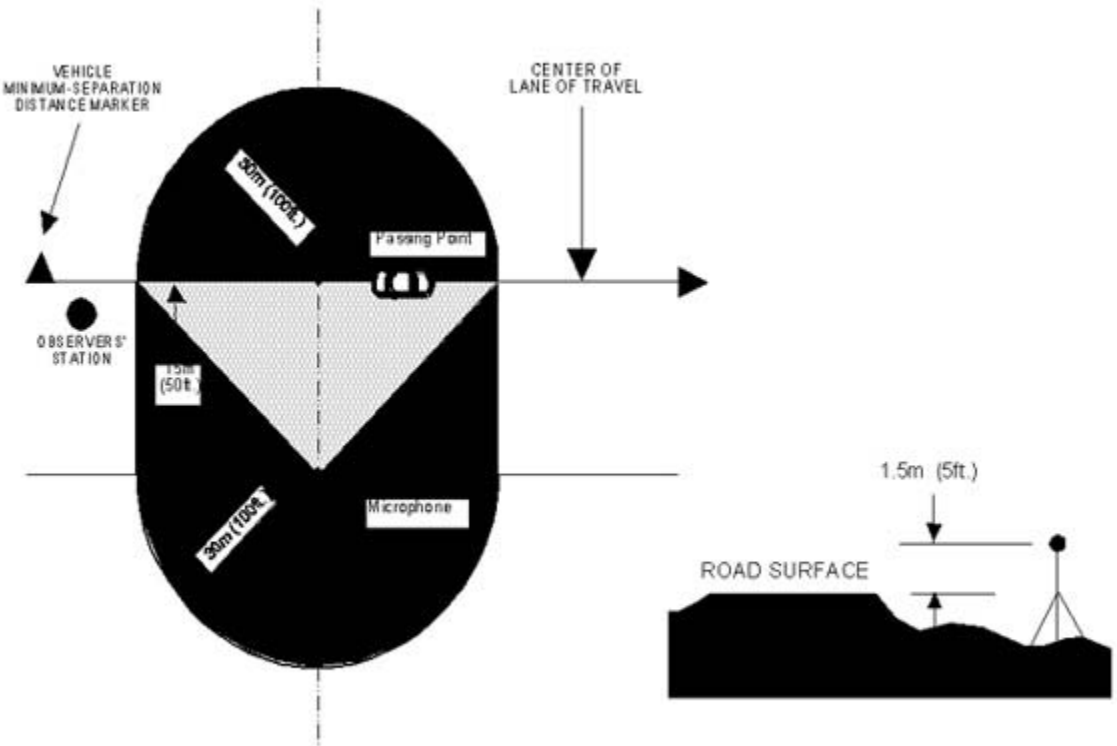

Figure 8. Site geometry.

- Ground surface within the measurement area is free of snow and representative of acoustically hard, e.g., pavement, or acoustically soft, e.g., grass, terrain.
- Line-of-sight from the microphone(s) to the roadway is unobscured within an arc of 150 degrees.
- Vehicle path, i.e., roadway lane, is smooth, dry concrete, dense-graded asphalt, or open-graded asphalt, and free of extraneous material, such as gravel or road debris.
- A predominant, ambient level at the measurement site is low enough to enable the measurement of uncontaminated vehicle pass-by sound levels. Specifically, the difference between the lowest-anticipated, vehicle pass-by, maximum A-weighted sound-pressure level (L_{AFmx}) and the A-weighted ambient level, as measured at the 15-m (50-ft) microphone, should be at least 10 dB.
- Site is to be located away from known noise sources, such as airports, construction sites, rail yards, or other heavily traveled roadways.
- Site is to exhibit constant-speed roadway traffic operating under cruise conditions at speeds between 15 and 110 km/h (10 to 70 mi/h) and located away from intersections, lane merges or any other features that would cause traffic to accelerate or decelerate, unless, of course, noise emission levels are being measured for vehicles subject to interrupted-flow traffic or roadway grade conditions.

The above characteristics and parameters are presented for vehicle noise emission level measurements in general; Section 5.6.1 presents specific requirements and measurement parameters associated with inputting user-defined vehicles in the TNM.

5.1.2 Microphone Location

The microphone system should be placed 15 m (50 ft) om the center of the near travel lane, with the microphone diaphragm positioned for grazing incidence, 1.5 m (5 ft) above the plane of the pavement (See Figure 8). Additionally, systems may be optimally positioned at other offset distances, e.g., 7.5 and 30 m (25 and 100 ft), for the purpose of characterizing measurement-site drop-off rate.

5.1.3 Vehicle Types

Roadway vehicles are typically grouped into five acoustically significant types, i.e., vehicles within each type exhibit statistically similar acoustical characteristics. These vehicle types are consistent with the FHWa TNM, and are defined as follows:

- **Automobiles (A):** All vehicles having two axles and four tires and designated primarily for transportation of nine or fewer passengers, i.e., automobiles, or for transportation of cargo, i.e., light trucks. Generally, the gross vehicle weight is less than 4500 kg (9900 lb).
- **Medium Trucks (MT):** All cargo vehicles having two axles and six tires. Generally, the gross vehicle weight is greater than 4500 kg (9900 lb) but less than 12,000 kg (26,400 lb).
- **Heavy Trucks (HT):** All cargo vehicles having three or more axles. Generally, the gross vehicle weight is greater than 12,000 kg (26,400 lb).
- **Buses (B):** All vehicles having two or three axles and designated for transportation of nine or more passengers.
- **Motorcycles (MC):** All vehicles having two or three tires with an open-air driver and/or passenger compartment.

One of the primary purposes for performing REMEL measurements is for the purpose of characterizing user-defined vehicle types (See Section 5.6.1). Such types may include motor homes or electric cars.

5.2 Noise Descriptors

The maximum, A-weighted sound-pressure level with fast exponential time-averaging (L_{AFmx}) should be used for the development of vehicle noise emission level relationships. Additionally, spectral data, although not required, may be useful during analysis. Specifically, since TNm computations are performed in one-third octave-bands, it may be helpful to verify consistency with the spectral data currently in the model.[(4)]

5.3 Instrumentation (See Section 3)

- Microphone system (microphone and preamplifier)
- Graphic level recorder (optional)
- Measurement/recording instrumentation
- Calibrator
- Microphone simulator
- Pink noise generator
- Windscreen
- Tripod
- Cabling
- Meteorological instrumentation
- Vehicle-speed detection unit

5.4 Sampling Period

The sampling period for each vehicle pass-by will vary, but should be chosen to encompass a time period such that a minimum rise and fall in the noise-level time-history trace of 6 dB is achieved, with 10 dB being preferred (See Section 5.4.1). Rise and fall are defined, respectively, as the difference between L_{AFmx} and the minimum measured level associated with either the start or end of a given pass-by (whichever difference is smaller). This criterion ensures acoustic quality of the pass-by event, and may be determined by (1) observing the display of the sound level meter; or (2) examining the time-history chart produced by a Graphic Level Recorder (GLR). A GLR is the preferred instrument for establishing event quality.

5.4.1 Event Quality

The event quality for each pass-by should be determined during data measurement and prior to data analysis. Event quality is characterized by three type designations (Type 2, 1, or 0).

Events with a rise and fall of the optimum 10 dB or greater are designated as Type 2, the highest quality event. Events with a rise and fall of between 6 and 10 dB are designated as Type 1. Events with a rise and fall of between 3 and 6 dB are designated as Type 0, and in most cases should not be used. Events with less than a 3 dB rise and fall should be discarded.

In special situations, events in which the ambient is less than 10 dB below the L_{AFmx} and events designated as Type 0 may be used in the analysis. More specifically, it may be necessary to relax the 10-dB ambient requirement, discussed in Section 5.1.1, to 6-dB. This situation may occur, for example, during the measurement of low-speed automobiles or during the measurement of hard-to-find vehicle types, e.g., buses. The L_{AFmx} for these events may be corrected for ambient via energy-subtraction before data analysis as follows:

$$L_{adj} = 10 \times \log_{10} (10^{\{0.1L_c\}} - 10^{\{0.1L_a\}}) \qquad \text{(dB)}$$

where:

- L_{adj} is the ambient-adjusted measured level;
- L_c is the measured level with vehicle and ambient combined; and
- L_a is the ambient level alone.

For example:

- L_c = 55.0 db
- L_a = 47.0 db

Therefore:

$$L_{adj} = 10 \times \log_{10}(10^{(0.1 \times 55.0)} - 10^{(0.1 \times 47.0)}) = 54.3 \text{ B}$$

Furthermore, it may be necessary to use events designated as Type 0. These events may be corrected only if the 10 dB-ambient requirement is maintained, and as such, the rise and fall of these events can be attributed entirely to nearby vehicles. This correction is to be performed by subtracting from the measured L_{AFmx}, the sound energy due to "contaminating" vehicle(s) as follows:

$$L_{adj} = 10 \times \log_{10}(10^{\{0.1L_c\}} - 10^{\{0.1L_a\}}) \qquad \text{(dB)}$$

where:

- L_{adj} is the adjusted measured level;
- L_c is the measured level with vehicle and contaminating vehicle(s) combined; and
- L_a is the level due to contaminating vehicle(s) alone.

This method is only viable if a time-history trace is available. In such instances, the sound due entirely to a contaminating vehicle can be estimated through linear extrapolation (See Figure 9).

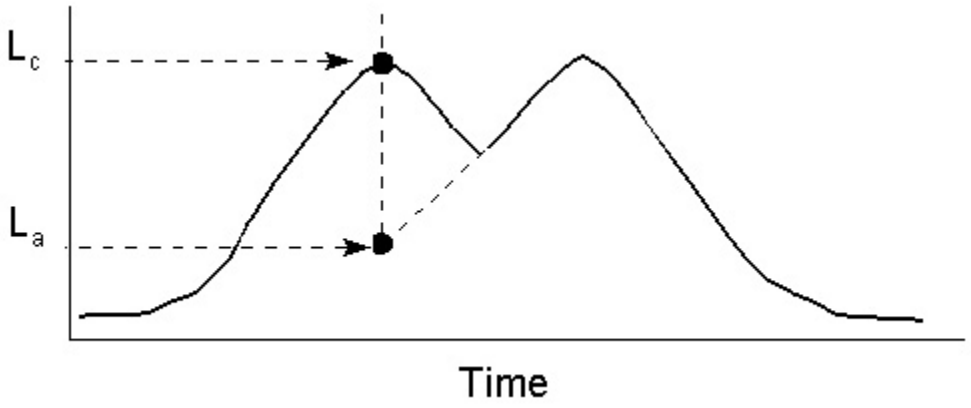

Figure 9. Correction for contaminating vehicles.

5.4.2 Minimum Separation-Distance

To ensure negligible contamination from vehicles other than the subject vehicle, a minimum separation-distance between vehicles should be used during the process of event selection in the field. A previous study[(35)] has shown that a minimum of 120 m (400 ft) between similar vehicles is required to insure that the contamination from nearby vehicles is less than 0.5 dB. In the case of sequential pass-bys of unlike vehicles, such as an automobile followed by a heavy truck, a minimum of 300 m (985 ft) is required (See Appendix C for further details).

5.4.3 Recommended Number of Samples

While, the number of samples is somewhat arbitrary and often a function of budgetary constraints, a larger number of samples will result in higher precision and a greater degree of statistical confidence in the final emission levels. Table 6 provides, as a function of speed, the recommended minimum number of samples. These numbers should be considered an absolute minimum for characterizing automobiles, medium trucks, and heavy trucks. However, for more obscure vehicle types, such as buses, motorcycles, or motor homes, it may not be practical to obtain such a significant number of samples. As a point of relative comparison, 2825 autos, 765 medium trucks, 2986 heavy trucks, 355 buses, and 39 motorcycles were sampled for the development of the TNM.

Table 6. Recommended minimum number of samples.

Speed	Minimum Number of

	Samples
0-10	10
11-20	10
21-30	20
31-40	30
41-50	100
51-60	200
61-70	100

5.5 Measurement Procedures

1. The instrumentation should be deployed as shown in Figure 10.

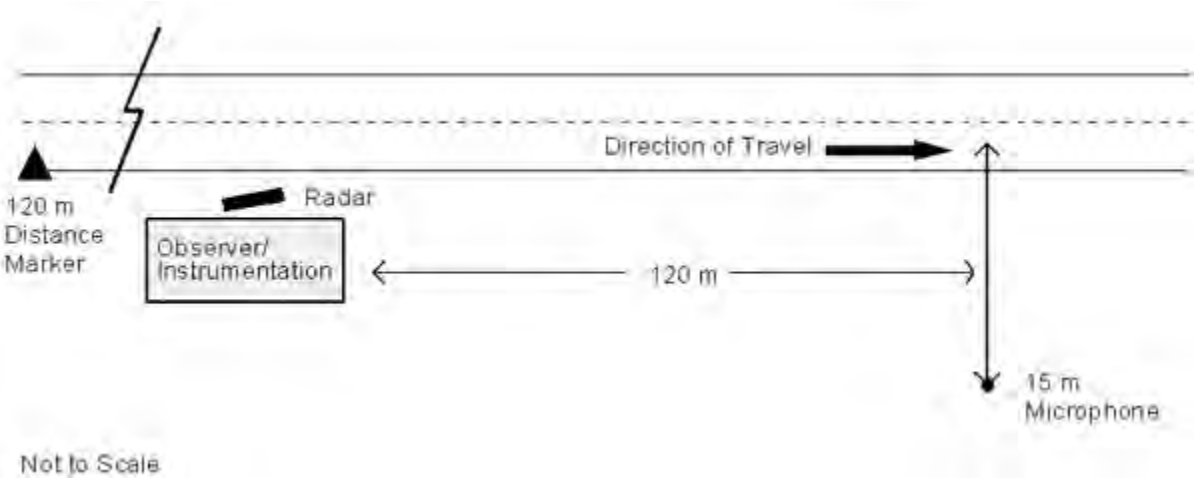

Figure 10. Vehicle emissions measurement plan view.

2. Prior to initial data collection, at hourly intervals thereafter, and at the end of the measurement day, the entire acoustic instrumentation system should be calibrated. Meteorological conditions (wind speed and direction, temperature, humidity, and cloud cover) should be documented prior to data collection, at a minimum of 15-minute intervals, and whenever substantial changes in conditions are noted.

3. The electronic noise floor of the acoustic instrumentation system should be established daily by substituting the measurement microphone with a dummy microphone (See Section 3.1.5). The frequency response characteristics of the system (if applicable) should also be determined on a daily basis by measuring and storing 30 seconds of pink noise from a random-noise generator (See Section 3.1.6).

4. If applicable, calibration of the Doppler radar should be periodically checked in the field for accuracy and functionality, using a calibrated tuning fork, and the unit's "internal circuit test" capability, if available.

5. Ambient levels should be measured and/or recorded by sampling the sound level at each receiver with the sound source quieted or removed from the site. A minimum of 10 seconds should be sampled. Note: If the study sound source cannot be quieted or removed, an upper limit to the ambient level using a statistical descriptor, such as L_{90}, may be used. Such upper limit ambient levels should be reported as "assumed." Note: Most sound level meters have the built-in capability to determine this descriptor.

6. A minimum of two operators are necessary for logging all field data: a vehicle observer and an acoustic observer. For each pass-by event the following data should be logged: site number, event number, vehicle class, vehicle speed, maximum A-weighted sound level (L_{AFmx}), spectral data (if desired), meteorological conditions, and any observed anomalies or extraneous sounds.

A potential pass-by event is identified when the vehicle observer confirms that the minimum separation-distance criterion is met. Note: Orange highway cones may be positioned 120 m (394 ft) upstream from the observers' station to aid in identifying potentially acceptable events.

7. After the vehicle passes the observers' station, the acoustic observer should begin data capture.
8. After the vehicle passes the microphones and before subsequent vehicles approach, the acoustic observer should end data capture. Note: If the subject vehicle's speed varied by more than ±3 km/h (2 mi/h) and/or acoustic contamination was observed, the pass-by event should be omitted from later data analysis.

(Note: Appendix B provides example field-data log sheets.)

5.6 Data Analysis

1. Adjust L_{AFmx} for calibration drift (See Section 3.1.4).
2. Merge L_{AFmx} data and corresponding vehicle information, including speed data, into a single file for subsequent analysis, and development of REMEL regression equations. A spreadsheet-compatible file is recommended. Note: It is extremely important not to exclude samples which appear to be outliers (e.g., samples measured for extremely loud vehicles) in the data set. Due to the nature of the field measurement procedures, specifically the use of the minimum separation-distance criteria, the data collected are truly representative of a random sample.

5.6.1 Development of REMEL Regression Equations

The FHWA's Traffic Noise Model (FHWA TNM®) used for noise prediction and barrier analysis and design allows the user to input user-defined vehicles. However, it is anticipated that the capability to input user-defined vehicles in the FHWA TNM will not be used for entering state-specific emission levels. Based on work performed by the Volpe Center,[(40)] there is no indication of a need or justification for developing state-specific REMELs at this time. Until the design of highway vehicles change incrementally, or regulatory requirements warrant lower noise emission levels, development of state-specific REMELs is unnecessary.

However, the user-defined-vehicle capability in the FHWA TNM is intended for describing vehicles which differ significantly from automobiles, medium trucks, heavy trucks, buses, or motorcycles (e.g., motor homes or electric cars). Unique vehicles should be measured under the following reference conditions: constant-flow roadway traffic; level grade; and dense-graded asphaltic concrete or Portland-cement concrete.

The first step in defining a user-defined vehicle is to develop the level-mean emission level equation. To develop the equation, the measured L_{AFmx} data should be regressed as a function of vehicle speed for each vehicle type. This can be done with any commercially available statistical analysis program. The functional form of the regression equation is as follows:

$$L(s) = C + [A \times \log_{10} s + B] =$$

$$10 \times \log_{10}[10^{C/10} + 10^{(A \times \log s + B)/10}] =$$

$$10 \times \log_{10}[10^{C/10} + s^{A/10} 10^{B/10}] \qquad \text{(dB)}$$

For example:

- C = 50.128316
- s = 65 km/h
- A = 41.740807
- B = 1.148546

Therefore:

$$L(65 \text{ km/h}) = 10 \times \log_{10}(10^{(50.128/10)} + 65^{(41.741/10)} \times 10^{(1.149/10)}) = 76.8 \text{ dB}$$

In the above equation, L(s) is expressed in terms of the logarithm to the base 10 of the coefficient, C, (the engine/ exhaust coefficient, which is independent of vehicle speed); and, A x $\log_{10}$(s) + B (the tire/pavement-term, which increases with increasing speed, s). The graphical form on a logarithmic plot of L(s) is illustrated in Figure 11 below.

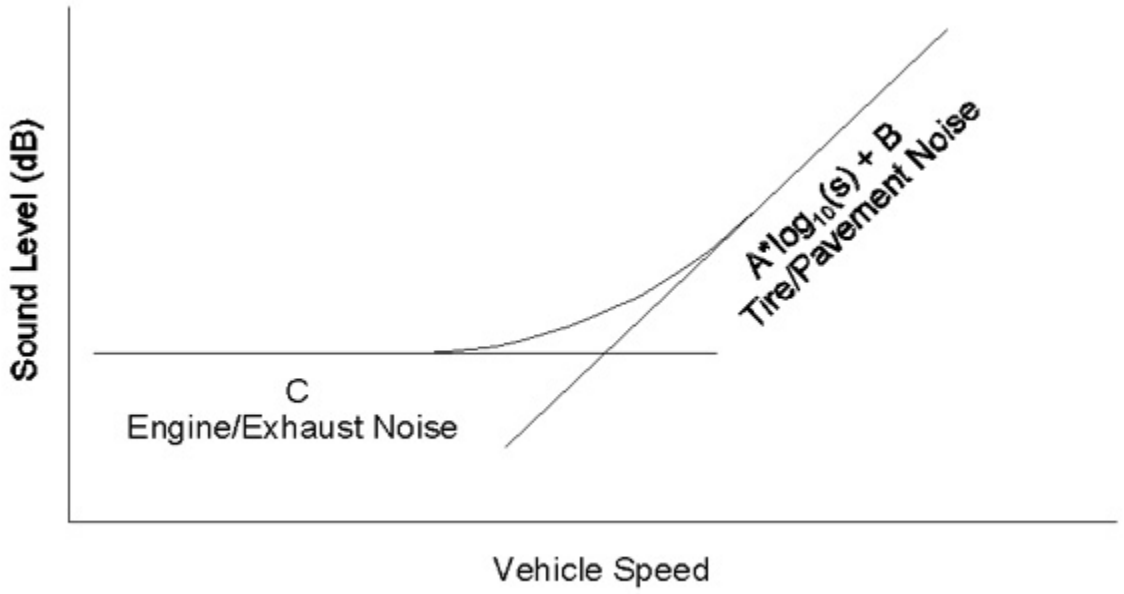

Figure 11. Graphical form of the FHWa TNM regression equation.

The level-mean emission level equation is then adjusted upward by a fixed value, which is a function of the relationship between the level-mean regression and the individual L_{AFmx} values, to develop the energy-mean emission level equation. In previous REMEL studies, the adjustment from level-mean to energy-mean was computed using 0.115 2, where is the standard error of the regression. However, due to the potentially non-Gaussian distribution of the level-mean data about its level-mean regression (the 0.115 2 adjustment assumes a Gaussian distribution), the following equation is used to compute the level-mean to energy-mean adjustment factor:

$$\Delta E = 10 \times \log_{10}[(1/n)\Sigma RE_i] - (1/n)\Sigma RL_i \qquad (dB)$$

For example:

- n = 327
- ΣRE_i (i=1 to n) = $RE_1 + RE_2 + ... + RE_{327}$ = 378.768351
- ΣRL_i (i=1 to n) = $RL_1 + RL_2 + ... + RL_{327}$ = -3.761481

Therefore:

$\Delta E = 10 \times \log_{10}[(1/n)\ \Sigma RE] - (1/n)\ \Sigma RL = 0.649762$

In the above, the RL_i values represent the level residuals, which are equivalent to the value of each data point, i, at its corresponding speed, s, minus the value of regression at s; RE_i values represent the energy residuals, which are equivalent to $10^{(RL_i/10)}$; and n represents the total number of data samples.

This ΔE adjustment is then added to both the engine/exhaust term and the tire/pavement term of the L(s) equation, i.e., the C and B coefficients, as follows:

$$L_E(s) = 10 \times \log_{10}[10^{(C+\Delta E)/10} + s^{A/10}10^{(B+\Delta E)/10}] \quad \text{(dB)}$$

From the above energy-mean emission-level regression equation, four input parameters are required to specify a user-defined vehicle type in the FHWA TNM: (1) a minimum level (the C coefficient plus ΔE); (2) a reference level (the emission level at 80 km/h or 50 mi/h); (3) the slope (the A coefficient); and (4) a like vehicle type. A like vehicle type is the FHWa TNM vehicle type to which the user-defined type is most similar. In determining a like vehicle type, the factors to be considered are listed in order of importance as follows: estimated subsource heights; estimated acceleration characteristics; and estimated, one-third octave-band frequency spectrum.[3,4]

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Measurement of Highway-Related Noise

6. Highway Barrier Insertion Loss Measurements

This section describes recommended procedures for the measurement of highway noise barrier insertion loss. Insertion loss is defined as the difference in sound level at a receiver location with and without the presence of a noise barrier, assuming no change in the sound level of the source.

The procedures described in this section are in accordance with ANSI S12.8-1987,(6) which provides three methods to determine the field insertion loss of noise barriers: (1) "direct" BEFORE/AFTER measurement; (2) "indirect" BEFORE measurement at an equivalent site; and (3) "indirect" predictions of BEFORE levels.

The "direct" BEFORE/AFTER method requires performing measurements at a site before the barrier has been constructed to determine "BEFORE" levels, and another set of measurements at the same site after construction to determine "AFTER" levels. The advantage of using this method is that it insures identical site geometric characteristics. However, the disadvantages are that equivalent meteorological and traffic conditions may not be reproducible.

The "indirect" BEFORE method requires performing measurements at a site with a barrier to determine "AFTER" levels, and another set of measurements at an "equivalent" site without a barrier to determine equivalent "BEFORE" levels.

A site may be judged equivalent if geometric, atmospheric, and traffic conditions are determined to be essentially identical for the BEFORE case as compared with the AFTER case. Geometric equivalence refers to the terrain characteristics and ground impedance at the site. Atmospheric equivalence refers to temperature, humidity, and wind speed and direction (See Section 6.1.1). Traffic equivalence refers to vehicle type and mix.

The BEFORE and AFTER cases for the "indirect" BEFORe method should be studied simultaneously, if possible. In other words, the ideal situation is to make BEFORE and AFTER measurements simultaneously at adjacent locations. The primary advantage to using this method is that it insures essentially the same meteorological and traffic conditions. The difficulty is that an adjacent equivalent site may not always be available. If an adjacent equivalent site is available, then this method is preferred.

The "indirect" prediction method requires performing measurements at a site with a barrier to determine AFTER levels, and using a highway-traffic, noise-prediction model, such as the Federal Highway Administration's Traffic Noise Model (FHWA TNM®), to predict sound levels at an equivalent site without a barrier. This method is inherently the least accurate of the three methods presented herein.

6.1 Site Selection

Site selection for all three measurement methods is guided by site geometry, and the location of noise-sensitive receivers.

6.1.1 Site Characteristics

For valid comparison of BEFORE and AFTER sound levels, equivalence in site geometry, meteorological, and traffic conditions must be established.

Equivalence in site geometry entails similar terrain characteristics and ground impedance within an angular sector of 120 degrees from all receivers looking towards the noise source. For research purposes, equivalence in ground impedance may be determined by performing measurements in accordance with the ANSI Standard for measuring

ground impedance scheduled for publication in the second half of 1996.[37] For more empirical studies, or if measurements are not feasible, then the ground for BEFORE and AFTER measurements may be judged equivalent if general ground surface type and conditions, e.g., surface water content, are similar.

Equivalence in meteorological conditions includes wind, temperature, humidity, and cloud cover. Wind conditions may be judged equivalent for BEFORE and AFTER measurements if the wind class (See Table 3 in Section 3.2.1) remains unchanged and the vector components of the average wind velocity from source to receiver do not differ by more than a certain limit, which is defined as follows: (1) for an acoustical error within ±1.0 dB and distances less than 70 m (230 ft), this limit is 1.0 m/s (2 mi/h); (2) for an acoustical error within ±0.5 dB and distances less than 70 m (230 ft), at least four BEFORe and AFTER measurements should be made within the limit of 1.0 m/s (2 mi/h). However, these 1.0 m/s limits is not applicable for a calm wind class when strong winds with a small vector component in the direction of propagation exist. In other words, BEFORE/AFTER measurements in such instances should be avoided.[25]

Average temperatures during BEFORE and AFTER measurements may be judged equivalent if they are within 14 ° C of each other. Also, in certain conditions, dry air produces substantial changes in sound attenuation at high frequencies. Therefore, for a predominantly high-frequency source (most sound energy over 3000 Hz), the absolute humidity for BEFORE and AFTER measurements should be similar.

The BEFORE and AFTER acoustical measurements should be made under the same class of cloud cover (See Table 4 in Section 4.1.1.2).

Equivalence in traffic conditions includes the number and mix of roadway traffic, as well as spectral content, directivity, and spatial and temporal patterns of the individual vehicles. To a certain degree, non-equivalence in traffic conditions can be factored out through the use of a reference microphone (See Section 6.1.2.1).

6.1.2 Microphone Location

6.1.2.1 Reference Microphone

The use of a reference microphone is strongly recommended for all barrier insertion loss measurements. Use of a reference microphone allows for a calibration of measured levels, which accounts for variations in the characteristics of the noise source, e.g., traffic speeds, volumes, and mixes. In most cases, a reference microphone is placed between the noise source and other measurement microphones at a height of 1.5 m (5 ft) directly above the barrier (See Figure 12), and at a distance from the sound source sufficient to minimize near-field effects. Typically, a minimum, standard distance of 15 m (50 ft) from the noise source is used. If the barrier is located less than 15 m from the source, the reference microphone should be placed at a distance of 15 m from the noise source, but at a height such that the line of sight between the microphone and the ground plane beneath the source is at least 10 (See Figure 13). This location should remain the same for all measurements, including measurements at the equivalent site, where the barrier is not present.

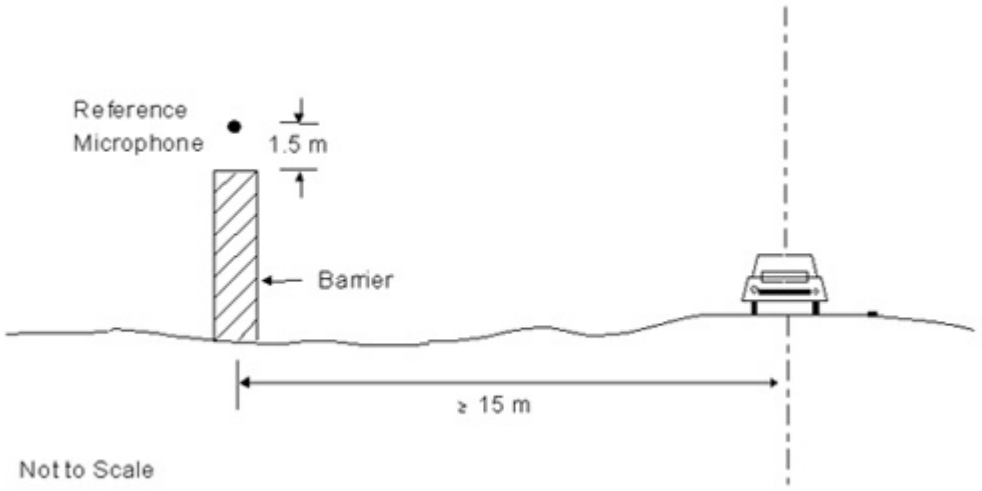

Figure 12. Reference microphone-position 1.

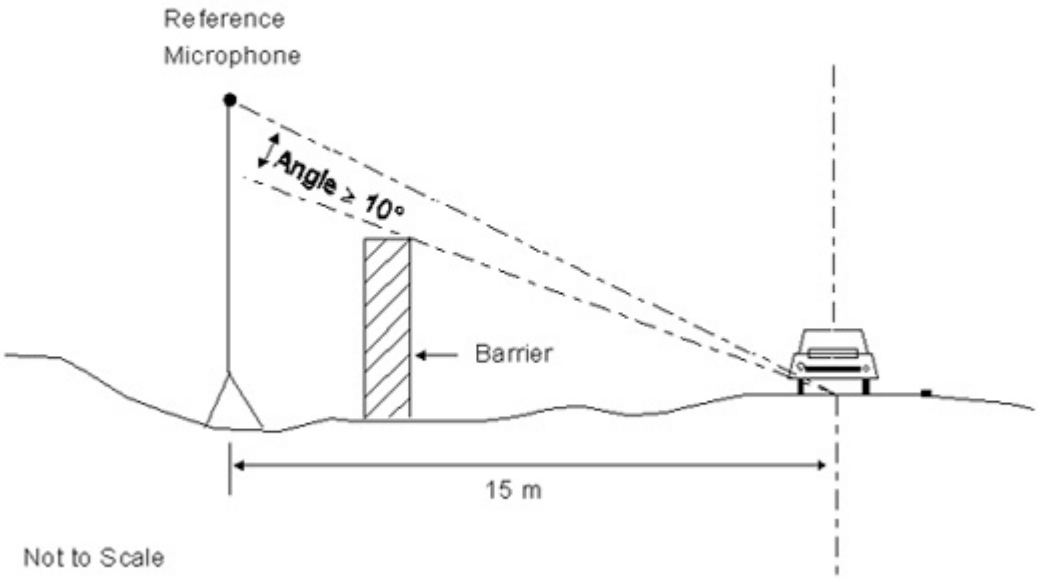

Figure 13. Reference microphone-position 2

6.1.2.2 Receiver

In most situations, study objectives will dictate specific microphone locations. As such, this section presents a very generic discussion of microphone locations, and assumes no specific study objectives have been identified.

Generally, it is useful to position microphones at offset distances from the barrier which corresponds to incremental doublings of distances (e.g., 15, 30, and 60 m [50, 100, and 200 ft]). Often times measurement sites are characterized by drop-off rates as a function of distance doubling.

In terms of microphone height, 1.5 m (5 ft) is the preferred position. If multi-story structures are of interest, including microphones at heights of 3 m and 6 m (10 ft and 20 ft) may be helpful. Microphone heights should be chosen to encompass all noise-sensitive receivers of interest (See Figure 14).

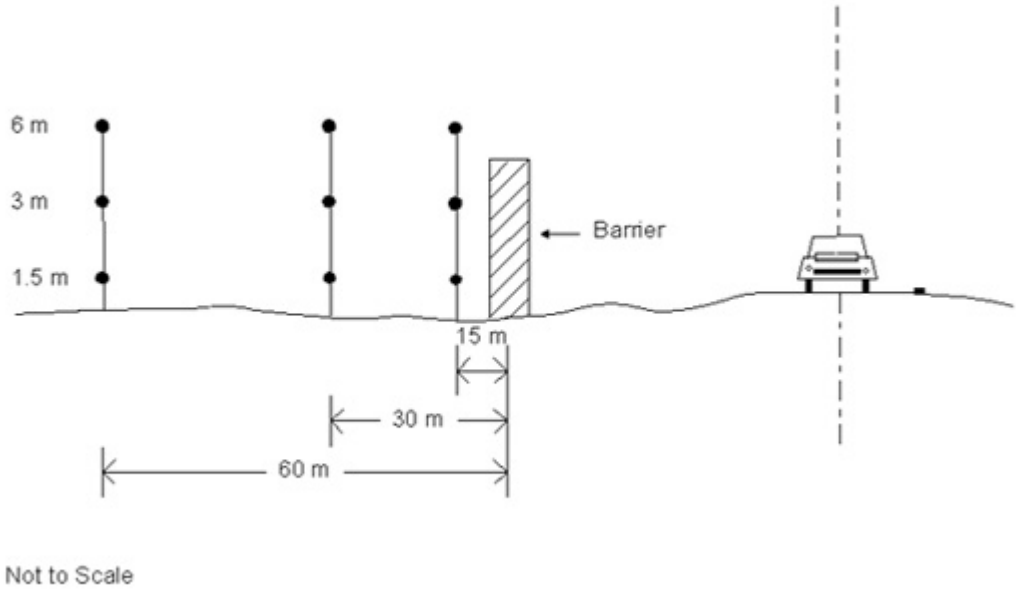

Figure 14. Receiver positions.

For the purpose of determining barrier insertion loss, it is important to remember that microphone locations relative to the sound Source in the BEFORE and AFTER cases must be identical. There may be instances when receivers are placed on the lawns of homes within the community adjacent to a noise barrier.

Note: For receiver distances greater than 100 m (300 ft) from the source, atmospheric effects have a much greater influence on measured Sound levels.[8,38] In such instances, precise meteorological data will be needed to ensure BEFORE and AFTER equivalence of the meteorological conditions (See Section 3.2).

6.2 Noise Descriptors

The equivalent sound level (L_{Aeq}) should be used to describe continuous sounds, such as relatively dense highway traffic. The sound exposure level (L_{AE}), or the maximum A-weighted sound level with fast time response characteristics (L_{AFmx}), should be used to describe the sound of single events, such as individual vehicle pass-bys. The day-night average sound level (L_{dn}) and the community-noise exposure level (L_{den}) may be used to describe long-term noise environments (typically greater than 24 hours), particularly for land-use planning. Note: Once the L_{Aeq} and L_{AE} noise descriptors are established, other descriptors can be computed using the mathematical relationships presented in Section 2.

6.3 Instrumentation (See Section 3)

- Microphone system (microphone and preamplifier)
- Graphic level recorder (optional)
- Measurement/recording instrumentation
- Calibrator
- Microphone simulator
- Pink noise generator
- Windscreen
- Tripod

- Cabling
- Meteorological instrumentation
- Vehicle-speed detection unit
- Traffic-counting device

6.4 Sampling Periods

Different sound sources require different sampling periods. For multiple-source conditions, a longer sampling period is needed to obtain a representative sample, averaged over all conditions. Typical sampling periods are 15 minutes, 1 hr and 24 hr. Measurement repetitions at all receiver positions are required to ensure statistical reliability of measurement results. A minimum of three repetitions for like conditions is recommended, with six repetitions being preferred. Table 5 in Section 4.4 presents suggested measurement sampling periods based on the temporal nature and the range in sound level fluctuations of the noise source. Guidance on judgment of the temporal nature of the source may also be found in ANSI S1.13-1971 and ANSI S12.9-1988.[16,47]

6.5 Measurement Procedures

The following steps apply for all methods except the BEFORE predictions for the "indirect predicted" method, which is discussed separately in Section 6.5.1.

1. Prior to initial data collection, at hourly intervals thereafter, and at the end of the measurement day, the entire acoustic instrumentation system should be calibrated. Meteorological conditions (wind speed and direction, temperature, humidity, and cloud cover) should be documented prior to data collection, at a minimum of 15-minute intervals, and whenever substantial changes in conditions are noted.
2. The electronic noise floor of the acoustic instrumentation system should be established daily by substituting the measurement microphone with a dummy microphone (See Section 3.1.5). The frequency response characteristics of the system should also be determined on a daily basis by measuring and Storing 30 seconds of pink noise from a random-noise generator (See Section 3.1.6)
3. Ambient levels should be measured and/or recorded by sampling the sound level at each receiver and at the reference microphone with the sound source quieted or removed from the site. A minimum of 10 seconds should be sampled. Note: If the study sound source cannot be quieted or removed, an upper limit to the ambient level using a statistical descriptor, such as L90,may be used. Such upper limit ambient levels should be reported as "assumed." Note: Most sound level meters have the built-in capability to determine this descriptor.
4. Sound levels should be measured and/or recorded simultaneously with the collection of traffic data, including the logging of vehicle types, as defined in Section 5.1.3, vehicle-type volumes, and the average vehicle speed. It is often easier to videotape traffic in the field and perform counts at a later time. This approach, of course, requires strict time synchronization between the acoustic instrumentation and the video camera.

(Note: Appendix B provides example field-data log sheets.)

6.5.1 Predicted BEFORE levels for the "Indirect Predicted" Method

1. Perform the data collection for the AFTER case according to Section 6.5.
2. Using the measured traffic data and the observed site data, input the necessary information into a highway-noise prediction model, such as the FHWA TNM, to compute BEFORE levels at the reference position and at each receiver position. It is possible that modeled levels at the reference position may differ substantially in the BEFORE case, as compared with the measured AFTER case. In such instances, the difference observed at the reference microphone shall be used as a calibration factor for all other measurement positions (See Section 6.6).

6.6 Data Analysis

1. For valid comparisons of BEFORE and AFTER measured levels, the equivalence of meteorological conditions, i.e., wind, temperature, humidity, and cloud cover, should be established (See Section 6.1.1). It is assumed that equivalence of site parameters, such as terrain characteristics and ground impedance, were established prior to performing measurements. Sampling periods in which equivalence cannot be established should be excluded from subsequent analysis.

2. Adjust measured levels for calibration drift (See Section 3.1.4).
3. Adjust measured levels for ambient (See Section 6.6.1).
4. Adjust measured levels for the reflection and/or edge-**diffraction** bias adjustment (See Section 6.6.2).
5. Compute the barrier insertion loss or lower-bound to insertion loss for each source-receiver pair (See Section 6.6.3).
6. Compute the mean barrier insertion loss by arithmetically Averaging the insertion loss values from individual sampling periods.
7. Perform an assessment of mean insertion loss values based on study objectives.

6.6.1 Ambient Adjustments

If measured levels do not exceed ambient levels by 4 dB or more, or if the levels at the reference microphone do not exceed those at the receivers, then the barrier insertion loss cannot be determined.

If measured levels exceed the ambient levels by between 4 and 10 dB, and if the levels at the reference microphone exceed those at the receivers, then measured levels must be corrected for ambient as follows (Note: For sound levels which exceed ambient levels by greater than 10 dB, ambient contribution becomes essentially negligible and no correction is necessary):

$$L_{adj} = 10 \times \log_{10} (10^{0.1L_c} - 10^{0.1L_a}) \qquad \text{(dB)}$$

where:

- L_{adj} is the ambient-adjusted measured level;
- L_c is the measured level with source and ambient combined; and
- L_a is the ambient level alone.

For example:

- L_c = 55.0 db
- L_a = 47.0 db

Therefore:

$L_{adj} = 10 \times \log_{10}(10^{(0.1 \times 55.0)}-10^{(0.1 \times 47.0)}) = 54.3$ dB

6.6.2 Reflections and/or Edge-Diffraction Bias Adjustment

Due to multiple reflections between source and barrier and/or edge diffraction at the top of a barrier, a 0.5 dB correction factor to reference microphone sound levels in the AFTER case may be applied. Good engineering judgment, based on repeatability through measurements, should be used to determine the magnitude and necessity of this correction. For example, if for several runs (i.e., greater than six), a consistent repeatable difference at the reference microphone position in the BEFORE and AFTER case occurs, and it can be proven that the traffic during both cases were equivalent, then the difference can be attributed to edge diffraction effects. The edge diffraction correction factor will be a negative value which is added directly to the sound level measured at the reference microphone in the AFTER case (See Section 6.6.3).[22,31] Note: Larger corrections due to parallel barriers may be necessary.

6.6.3 Insertion Loss

For each measurement repetition and BEFORE/AFTER pair, the insertion loss, or its **lower bound**, should be determined by subtracting difference in adjusted reference receiver levels for case from case:

$$IL_i = (L_{Aref} + L_{edge} - L_{Arec}) - (L_{Bref} - L_{Brec}) \qquad \text{(dB)}$$

where:

- IL_i is the insertion loss at the ith receiver;
- L_{Bref} and L_{Aref} are, respectively, the BEFORE and AFTER adjusted reference levels;
- L_{edge} is the edge diffraction correction factor (See Section 6.6.2);
- L_{Brec} and L_{Arec} are, respectively, the BEFORE and AFTER adjusted source levels at the ith receiver.

For example:

- L_{Aref} = 78.2 db
- L_{edge} = -0.5 db
- L_{Arec} at receiver 1 = 56.3 db
- L_{Bref} = 77.7 db
- L_{Brec} at receiver 1 = 65.0 db

Therefore:

IL_1 = (78.2 - 0.5 - 56.2) - (77.7 - 65.0) = 21.5 - (12.7) = 8.8 dB

The lower bound to barrier insertion loss is the value reported when ambient levels are not directly measured without the sound source, i.e., "assumed" ambient.

*Note: There are several useful rules-of-thumb for estimating noise barrier insertion loss. If the line-of-sight is broken by the barrier between the source and the receiver, barrier insertion loss is typically 5 dB. For each additional 1 m (3 ft) of barrier height beyond the line-of-sight blockage, an increase in barrier insertion loss of 1.5 dB can be considered typical. Noise barriers are usually designed with an insertion loss goal of 10 dB in mind. Actual barrier insertion losses of between 6 and 8 dB are quite common.

*In addition, insertion loss due to buildings is dependent on the amount of gap, or opening, between buildings in the same row. Typically, 4.5 dB attenuation is attainable for the first row of buildings, and an additional 1.5 dB for each subsequent row, up to a maximum of about 10 dB.

Also, to achieve any substantial amount of attenuation due to foliage, such as trees and bushes, foliage must be at least 30 m (100 ft) deep and dense enough to block the line-of-sight. Typically, as much as 5 dB attenuation is attainable.[26,39]

6.7 Parallel Noise Barriers

One of the consequences of noise barrier construction on one side of a roadway, is the possibility of noise reflecting to the opposite side of the roadway. Increases in sound level due to a single reflection can practically range from 0.5 to 1.5 dB, with a theoretical increase of 3 dB when 100 percent of the sound energy is reflected. A 3 dB increase is generally just slightly perceptible to the human ear.

Although the overall sound level increase due to reflections off a single barrier may not be readily perceptible, the frequency of the reflected Sound may alter the signature of the source as perceived by residents on the opposite side of the road. This change in the general character of the sound may be perceptible, although no conclusive research has been done in this area.

However, construction of barriers on both sides of the highway may not solve this potential problem. Sound reflected between both barriers may cause degradations in each barrier's performance anywhere from 2 to as much as 6 dB, i.e., a single reflective barrier with an insertion loss of 10 dB may only realize an effective reduction of 4 to 8 dB if another reflective barrier is placed parallel to it on the opposite side of the highway.

There are several methods used to minimize the reflections from single barriers and reflections between parallel

barriers:

- For parallel barriers, ensure that the distance (width) between the two barriers is at least 10 times their average height relative to the roadway elevation (width-to-height ratio or w/h ratio).

  In recent studies,[22,25] it was determined that as the w/h ratio increases, the insertion loss degradation tends to decrease. This decrease was attributed to: (1) the decrease in the number of reflections between the barriers; and (2) the weakening of the reflections due to geometrical spreading and atmospheric absorption. Table 7 provides a guideline of three, general w/h ratio ranges and the corresponding barrier insertion-loss degradation (IL) that can be expected.

Table 7. Guideline for categorizing parallel barrier sites based on the width-to-height ratio.

w/h Ratio	Maximum Δ_{IL} in dB (A)	Recommendation
Less than 0.1	3 or greater	Action required to minimize degradation
10:1 to 20:1	0 to 3	Degradation acceptable in most instances
Greater than 20:1	No measurable degradation	No action required

- Apply acoustically absorptive material on either one or both barrier facades. Absorptive treatment may be categorized by the amount of incident sound that a barrier absorbs. Currently, the **Noise Reduction Coefficient** (NRC) is the measure of choice. NRC is defined as the arithmetic average of the **Sabine absorption coefficients**, A Sab, at 250 Hz, 500 Hz, 1000 Hz, and 2000 Hz. Measurements to determine the Sab of a facade should be made in accordance with the American Society of Testing and Materials (ASTM) Recommended Practice C 423-90a (Reverberation Room Method).[40] An alternative method for computing the NRC is to determine the absorption coefficients using ASTM Recommended Practice C384-95a (Impedance Tube Method).[41] The Reverberation Room method provides a measure of material absorption for randomly incident sound while the Impedance Tube method provides a measure of absorption for normal incident sound. Typically, the reverberation room method is used for determining NRC.

  NRC values theoretically range from 0 to 1, where 0 indicates that the barrier will reflect all the incident sound, and 1 indicates that the barrier will absorb all the incident sound. However, very often when a material is tested in a reverberation room (ASTM C423-90a), NRC values higher than 1 may be computed. This is the result of an anomaly in the test procedure. To correct for this anomaly, and, in turn, obtain a meaningful NRC, the four absorption coefficients should first be normalized such that the highest one is equivalent to 1.0, and the factor that was applied to the highest one should then, in turn, be applied to the remaining three coefficients. Typical NRC values for an absorptive barrier range from 0.6 to 0.9.

- Tilt one of the barriers outward away from the road. Previous research has shown that an angle as small as 7 degrees is quite effective at minimizing degradations.(31) Note: This method must consider structures higher than the opposite barrier. High structures may be adversely affected by the reflected sound.

6.8 Noise Barrier Sound Transmission Class

A barrier may be described by the amount of noise it transmits, i.e., its **Sound Transmission Class** (STC). Measurements to determine the STC of a section of a barrier should be made in accordance with ASTM Recommended Practice E 413-87.[42]

Usually it is assumed that the sound transmitted through a barrier is negligible relative to that which is diffracted over the top, i.e., the sound transmitted is at least 20 dB below that diffracted. Most state transportation agencies specify a minimum STC for barriers constructed within their state.

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* Rule of thumb

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FHWA

United States Department of Transportation - **Federal Highway Administration**

Measurement of Highway-Related Noise

7. Construction Equipment Noise Measurements for Highway-Related Projects

This section describes recommended procedures for the measurement of highway construction equipment noise. The results of these measurements Can be used to assess the potential noise impact of a construction site associated with a highway-related project.

Highway construction site activity consists of several generic phases, including mobilization, clearing and grading, earthwork, foundations, bridge construction, base preparation, paving, and cleanup. Thus, any noise impact due to a construction site is actually composed of contributions from each of these phases.[(43)]

The noise level associated with a particular construction phase is determined by first measuring the levels of individual equipment, then summing the individual contributions over a particular time period. The types and numbers of construction equipment, and the amount of time specific equipment operate in different modes are a direct function of the construction phase.

For the procedures described herein, each type of construction equipment will be characterized by up to four modes of operation as appropriate:

1. the equipment is stationary in a passive operation mode (STATIONARY-PASSIVE, e.g., a bulldozer at idle);
2. the equipment is stationary in an active operation mode (STATIONARY-ACTIVE, e.g., a bulldozer lifting earth, debris, etc.);
3. the equipment is moving to another area within a site but is not actively performing project-related activities (MOBILE-PASSIVE); and
4. the equipment is mobile in an active operation mode (MOBILE-ACTIVE, e.g., a bulldozer moving while pushing earth, debris, etc).

7.1 Site Selection

7.1.1 Site Characteristics

In determining overall noise levels associated with a particular construction site, the first step is to establish reference noise emission levels for each type of construction equipment operating in each of the above four modes. As such, the general site characteristics for determining reference noise emission levels for construction equipment are somewhat similar to those presented in Section 5.1.1 for determining noise emissions for highway vehicles. These characteristics are as follows:

- A flat open space free of large reflecting surfaces, such as parked vehicles, signboards, buildings, or hillsides, located within 30 m (100 ft) of either the construction equipment's path (if measurements of mobile operations are being performed), its stationary position (if appropriate), or the microphone(s).
- The ground surface within the measurement area is free of snow and representative of acoustically hard, e.g., pavement, or acoustically soft, e.g., grass, terrain.
- The line-of-sight from the microphone(s) to the construction equipment being measured unobscured within an arc of 150 degrees.
- A predominant, ambient level at the measurement site low enough to enable the measurement of uncontaminated vehicle pass-by sound levels. Specifically, the difference between the lowest-anticipated, vehicle pass-by, maximum A-weighted sound-pressure level (L_{AFmx}) and the A-weighted ambient level, as measured at the 15-m (50-ft) microphone, should be at least 10 dB.
- The site to be located away from known noise sources, such as airports, construction sites, rail yards, or heavily traveled roadways, if possible.

7.1.2 Microphone Location

Microphones should be positioned at a height of 1.5 m (5 ft) above ground level (AGL), and placed at a distance of 15 m (50 ft) perpendicular to the equipment's typical operating location (for STATIONARY-PASSIVe and STATIONARY-ACTIVE operating modes), and typical operating path (for MOBILE-PASSIVe and MOBILE-ACTIVE operating modes). For stationary noise sources, measurements should be made at each of 4 positions around each piece of construction equipment, each position representing azimuth angles separated by 90 degrees (See Figure 15).[44] For mobile noise sources, measurements should be made with each piece of equipment passing by in a left-to-right and a right-to-left direction (See Figure 15).[44,45] For all measurements, a minimum of three measurement repetitions, and preferably six, should be made.

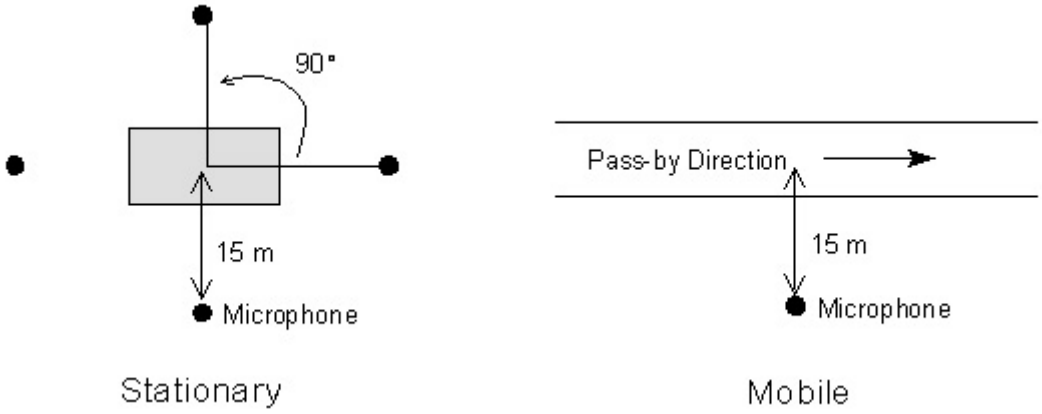

Figure 15. Microphone positions for construction equipment noise measurements.

7.2 Noise Descriptors

For stationary noise sources, a 30-second L_{Aeq} should be measured at each of the four azimuth angles. If a 30-second measurement is not possible, shorter durations can be used if the sound level is relatively steady as a function of time. For mobile noise sources, the L_{AFmx} should be measured. The individual reference levels and the number and type of each piece of construction equipment are then, ultimately, used to compute the total equivalent sound level, $L_{Aeq,total}$, for a typical work day during a particular construction phase. Note: Once the L_{Aeq} descriptor has been established for a typical work day and construction phase, other descriptors Can be computed using the mathematical relationships presented in Section 2. The L_{Aeq} descriptor may be more useful in assessing potential noise impact due to construction-related activity.

7.3 Instrumentation (See Section 3)

- Microphone system (microphone and preamplifier)
- Graphic level recorder (optional)
- Measurement/recording instrumentation
- Calibrator
- Microphone simulator
- Pink noise generator
- Windscreen
- Tripod
- Cabling
- Meteorological instrumentation
- Tachometer (optional)

7.4 Sampling Period

For each type of construction equipment, the sampling period will vary depending upon the operating mode (STATIONARY-PASSIVE, STATIONARY-ACTIVE, MOBILE-PASSIVE, and MOBILE-ACTIVE). For each mode, the construction equipment should be operated in a manner which is considered typical for the work period associated with a particular mode. Due to the expected abundance of activity At a construction site, the sampling period may be based entirely on good engineering judgment; and it will be up to the person performing the measurements to ensure that representative high-quality data are obtained.

7.5 Measurement Procedure

1. The instrumentation should be deployed as shown in Figure 15.
2. Prior to initial data collection, at hourly intervals thereafter, and at the end of the measurement day, the entire acoustic instrumentation system should be calibrated. Meteorological conditions (wind speed and direction, temperature, humidity, and cloud cover) should be documented prior to data collection, at a minimum of 15-minute intervals, and whenever substantial changes in conditions are noted.
3. The electronic noise floor of the acoustic instrumentation system should be established daily by substituting the measurement microphone with a dummy microphone (See Section 3.1.5). The frequency response characteristics of the system should also be determined on a daily basis by measuring and Storing 30 seconds of pink noise from a random-noise generator (See Section 3.1.6).
4. Ambient levels should be measured and/or recorded by sampling the sound level at each receiver with the sound source quieted or removed from the site. A minimum of 10 seconds should be sampled. Note: If the study sound source cannot be quieted or removed, an upper limit to the ambient level using a statistical descriptor, such as L90, may be used. Such upper limit ambient levels should be reported as "assumed." Note: Most sound level meters have the built-in capability to determine this descriptor.
5. For each mode, the construction equipment should be operated in a manner which is considered typical for the work period and the particular mode.
6. For each equipment type and operating mode, record the L_{AFmx} or L_{Aeq30s}, as appropriate.

(Note: Appendix B provides example field-data log sheets.)

7.6 Data Analysis

1. Adjust measured levels for calibration drift (See Section 3.1.4).
2. Adjust measured levels for ambient (See Section 7.6.1).
3. Calculate an energy-averaged level ($L_{AVG,j}$) of the L_{Aeq30s} values obtained for each azimuth angle and each measurement repetition of each equipment type in each stationary mode of operation, j (See Section 7.4).
4. Calculate an energy-averaged level ($L_{AVG,j}$) of the L_{AFmx} values obtained for each measurement repetition of each equipment type in each mobile mode of operation, j (See Section 7.4).
5. Calculate the $L_{Aeq,i}$ for each equipment type, i (See Section 7.6.2).
6. When all equipment measurements used for a particular phase are complete, compute the $L_{Aeq,total}$ for a typical workday during that phase (See Section 7.6.3).
7. Perform an assessment of noise impact due to construction equipment activity based on study objectives. In most instances, the $L_{Aeq,total}$ computed above will be used in Environmental Analyses to compare the potential impact of different construction phases. If a particular noise-sensitive receiver is a primary concern in the study, it is suggested that long-term existing-noise measurements be made at that location, in accordance with the recommendations in Section 4.

7.6.1 Ambient Adjustments

If measured levels do not exceed ambient levels by 4 dB or more, i.e., they are masked, then those data should be omitted from data analysis.

If measured levels exceed the ambient levels by between 4 and 10 dB, then correct the measured levels for ambient as follows (Note: For source levels which exceed ambient levels by greater than 10 dB, ambient contribution becomes essentially negligible and no correction is necessary):

$$L_{adj} = 10 \times \log_{10}(10^{0.1L_c} - 10^{0.1L_a}) \qquad \text{(dB)}$$

where:

- L_{adj} is the ambient-adjusted measured level;
- L_c is the measured level with source and ambient combined; and
- L_a is the ambient level alone.

For example:

- Lc = 55.0 db
- La = 47.0 db

Therefore:

$$L_{adj} = 10 \times \log_{10}(10^{(0.1 \times 55.0)} - 10^{(0.1 \times 47.0)}) = 54.3 \qquad \text{(dB)}$$

7.6.2 Determination of the Equivalent Sound Level for Each Type of Construction Equipment

The equivalent sound level for a particular type, i, of construction equipment is computed as follows:

$$L_{Aeq,i} = 10 \times \log_{10} {}^{4}\Sigma_{j=1} \left[10^{(L_{AVG,j} / 10 \times T_j)} \times (T_j / T_{total}) \times N_j \right] \qquad \text{(dB)}$$

where:

- $L_{Aeq,i}$ is the equivalent sound level for equipment type i;
- j is the operating mode, where up to four modes are applicable for each type of equipment;
- $L_{AVG,j}$ is energy-averaged level obtained in operating mode j;
- T is the operating mode duration, in seconds; and
- N is the number of pieces of equipment type i operating in mode j.

For example:

- $L_{AVG,1}$ = 65.5 dB for T1 = 600 seconds and N = 3 pieces
- $L_{AVG,2}$ = 86.7 dB for T2 = 5500 seconds and N = 2 pieces
- $L_{AVG,3}$ = 71.0 dB for T3 = 350 seconds and N = 2 pieces
- $L_{AVG,4}$ = Not applicable

Therefore:

$L_{Aeq,1} = 10\log_{10} [(10^{65.5/10} \times (600/6450) \times 3) + (10^{86.7/10} \times (5500/6450) \times 2) + (10^{71.0/10} \times (350/6450) \times 2) = 89.0$ dB

7.6.3 Determination of the Total Equivalent Sound Level

The total equivalent sound level for a typical work day during a particular construction phase is computed as follows:

$$L_{Aeq,\,total} = 10 \times \log_{10} {}^{k}\Sigma_{i\,=\,1} \left[10^{(L_{Aeq,\,i} / 10)} \right] \qquad \text{(dB)}$$

where:

- $L_{Aeq,total}$ is the total equivalent sound level for a typical work day during a particular construction period;
- k is the number of different types of equipment; and

- $L_{Aeq,i}$ is the equivalent sound level for equipment type i.

For example:

- $L_{Aeq,1}$ = 89.0 db
- $L_{Aeq,2}$ = 81.7 db
- $L_{Aeq,3}$ = 79.0 db
- $L_{Aeq,4}$ = 80.5 db

Therefore:

$L_{Aeq,total} = 10\log_{10} [10^{89.0/10} + 10^{81.7/10} + 10^{79.0/10} + 10^{80.5/10}] = 90.6$ dB

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Measurement of Highway-Related Noise

8. Building Noise Reduction Measurements in the Vicinity of a Highway

This section describes recommended procedures for the measurement of building noise reduction, i.e., the effectiveness of a building structure in insulating residents from outside noise sources, in this case, highways. In contrast, these procedures may also be used to determine how effectively A structure contains internal noise, especially where the external environment is quieter than the noise environment within the building.(20) The following procedures are in accordance with the American Society of Testing and Materials (ASTM) Standard E966-84.(32)

Two sets of measurements are recommended: (1) exterior measurements of the roadway noise. (Note: If a traffic noise source is not available, a fixed, artificial noise source, such as a loudspeaker, may be used); and (2) interior measurements of the roadway noise within the building itself. The difference between the exterior and interior measured sound levels is the resulting noise reduction performance for that building, or commonly referred to as the "outdoor-indoor noise reduction."

8.1 Site Selection

8.1.1 Site Characteristics

8.1.1.1 Interior Measurements

The interior location should be a completely enclosed Space with, preferably, its largest dimension no greater than twice its smallest. During measurements, all other noise-generating activities in the room should be quieted. In addition, the interior ambient level should be at least 10 db below the lowest-anticipated, vehicle pass-by, maximum A-weighted sound-pressure level (L_{AFmx}).

8.1.1.2 Exterior Measurements

Exterior measurement sites should have the following geometric characteristics:

- A flat open space relatively free of large reflecting surfaces, such as parked vehicles, signboards, hillsides, or buildings other than the subject building, located within 30 m (100 ft) of either the vehicle path or the microphones.
- A predominant, ambient level at the measurement site low enough to enable the measurement of vehicle pass-by sound levels. Specifically, the difference between the lowest-anticipated, vehicle pass-by, maximum A-weighted Sound-pressure level (L_{AFmx}) and the A-weighted ambient level, as measured at the exterior microphone, should be at least 10 dB.
- The line-of-sight from microphone positions to the roadway unobscured within an arc of 150 degrees.
- The site to be located away from known noise sources, such as airports, construction sites, or rail yards.

8.1.2 Microphone Location

8.1.2.1 Interior Measurements

Microphones are placed at 1.5 m (5 ft) above the floor of the interior location and at least 1 m (3 ft) from any walls (See Figure 16). Measurements at several different heights and locations in the room are strongly recommended to achieve statistical precision.

8.1.2.2 Exterior Measurements

There are two potential locations for the placement of the exterior microphone as shown in Figure 16:

Position 1: At least 3 m (10 ft) from the side of the building, at the same distance from the road as the front wall, at a height of 1.5 m (5 ft) AGL. This position must be carefully selected such that the microphone is not shielded from the road by the building, or influenced by noise sources behind the building. This positioning essentially eliminates influences on the measured levels due to reflections. As such, this is the preferred position.

Position 2: Not greater than 2 m (6.6 ft) from the facade, located on the roadway side of the building, at a point opposite the middle of the facade, at a height of 1.5 m (5 ft) AGL. This setup is not recommended if the roadway facade of the building is within 7.5 m (25 ft) of the centerline of the near lane of traffic.

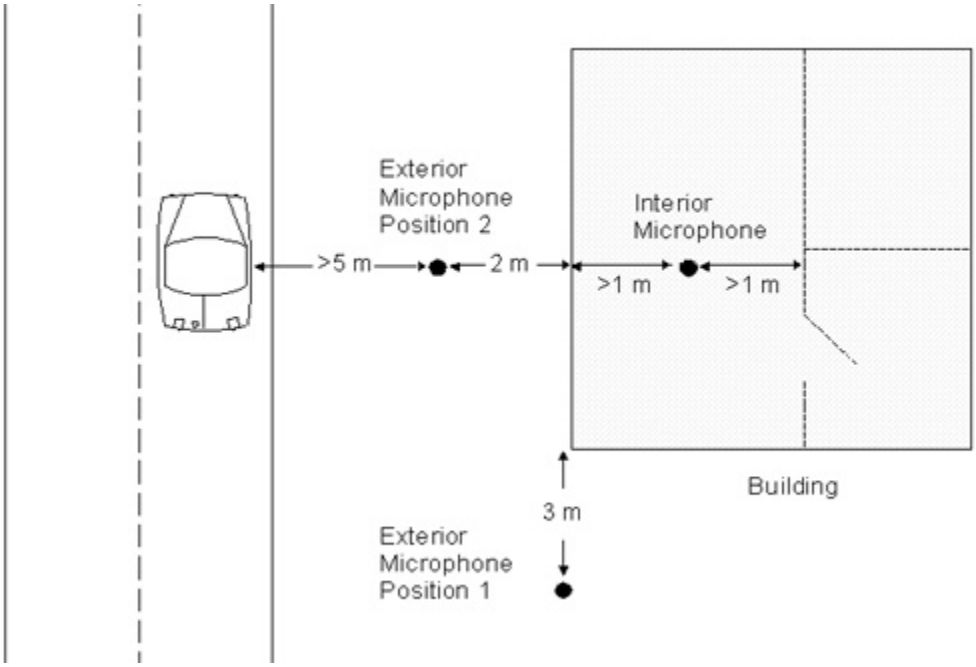

Figure 16. Microphone positions for building noise reduction measurements.

8.1.3 Artificial Noise Source Position

If a loudspeaker is used, it should be located at a distance from the building facade such that the ratio of the distances from the loudspeaker to the farthest (D1) and nearest (D2) edges of the facade is no greater than two, i.e., D1/D2 ≤ 2. The loudspeaker should be angled at an incidence within the range of 15 and 60 degrees, preferably at an angle of 45 degrees (See Figure 17). This angle, θ, is determined by the perpendicular to the facade midpoint and the line joining the loudspeaker to the midpoint.

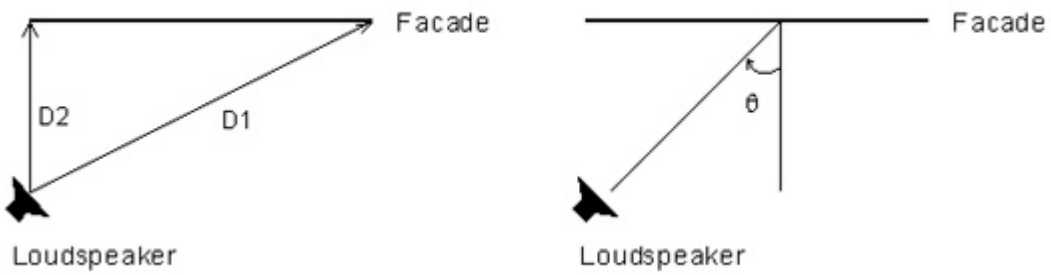

Figure 17. Loudspeaker position.

8.2 Noise Descriptors

The equivalent sound level (L_{Aeq}) should be used to describe continuous sounds, such as relatively dense highway traffic. The sound exposure level (L_{AE}), or the maximum A-weighted sound level with fast time response characteristics (L_{AFmx}), should be used to describe the sound of single events, such as individual vehicle pass-bys. The day-night average sound level (L_{dn}) and the community-noise exposure level (L_{den}) may be used to describe long-term noise environments (typically greater than 24 hours), particularly for land-use planning. Note: Once the L_{Aeq} and L_{AE} noise descriptors are established, other descriptors can be computed using the mathematical relationships presented in Section 2. Ultimately, the particular descriptor chosen is of little importance since the objective of these measurements is to obtain a change in sound level.

8.3 Instrumentation (See Section 3)

- Microphone system (microphone and preamplifier)
- Graphic level recorder (optional)
- Measurement/recording instrumentation
- Calibrator
- Microphone simulator
- Pink noise generator
- Windscreen
- Tripod
- Cabling
- Meteorological instrumentation
- Vehicle-speed detection unit
- Traffic-counting device
- Artificial noise source (if applicable)

8.4 Sampling Period

Different sources may require different measurement periods. For multiple-source conditions, a longer sampling period is needed to obtain a representative sample averaged over all conditions. Typical sampling periods are 15 minutes, 1 hr and 24 hr. Measurement repetitions at all receiver positions are required to ensure statistical reliability of measurement results. A minimum of 3 repetitions for like conditions is recommended, with 6 repetitions being preferred. Table 5 in Section 4.4 presents suggested measurement sampling periods based on the temporal nature and the range in sound level fluctuations of the noise source. Guidance on judgment of the temporal nature of the source may be found in ANSI S1.13-1971.[(16)]

8.5 Measurement Procedure

1. Prior to initial data collection, at hourly intervals thereafter, and at the end of the measurement day, the entire acoustic instrumentation system should be calibrated. Meteorological conditions (wind speed and direction, temperature, humidity, and cloud cover) should be documented prior to data collection, at a minimum of 15-minute intervals, and whenever substantial changes in conditions are noted.
2. The electronic noise floor of the acoustic instrumentation system should be established daily by substituting the measurement microphone with a dummy microphone (See Section 3.1.5). The frequency response characteristics of the system should also be determined on a daily basis by measuring and Storing 30 seconds of pink noise from a random-noise generator (See Section 3.1.6)
3. Ambient levels should be measured and/or recorded by sampling the sound level at each receiver and at the reference microphone with the sound source quieted or removed from the site. A minimum of 10 seconds should be sampled. Note: If the study sound source cannot be quieted or removed, an upper limit to the ambient level using a statistical descriptor, such as L_{90}, may be used. Such upper limit ambient levels should be reported as "assumed." Note: Most sound level meters have the built-in capability to determine this descriptor.
4. The interior and exterior measurements should then be performed Simultaneously; and the characteristics of

the source should be carefully documented (e.g., if actual highway traffic is being used, the volume, speed, and mix should be recorded).

(Note: Appendix B provides example field-data log sheets.)

8.6 Data Analysis

1. Adjust measured levels for calibration drift (See Section 3.1.4).

2. Adjust measured levels for ambient (See Section 8.6.1).

3. Compute the building noise reduction

   (NR) as follows:
   For exterior microphone at Position 1:

$$NR = L_{exterior} - L_{interior} \qquad (dB)$$

   For exterior microphone at Position 2:*

$$NR = L_{exterior} - L_{interior} - 3 \qquad (dB)$$

   For example:

   - $L_{exterior}$ = 77.0 dB for microphone-position 2
   - $L_{interior}$ = 65.0 db

   Therefore:
   NR = 77-65-3 = 9 dB

8.6.1 Ambient Adjustments

If measured levels do not exceed ambient levels by 4 dB or more, i.e., they are masked, then those data should be omitted from data analysis.

If measured levels exceed the ambient levels by between 4 and 10 dB, then correct the measured levels for ambient as follows (Note: For source levels which exceed ambient levels by greater than 10 dB, ambient contribution becomes essentially negligible and no correction is necessary):

$$L_{adj} = 10 \times \log_{10} \left(10^{\{0.1L_c\}} - 10^{\{0.1L_a\}}\right) \qquad (dB)$$

where: L_{adj} is the ambient-adjusted measured level;
L_c is the measured level with source and ambient combined; and
L_a is the ambient level alone.

For example:

- Lc = 55.0 db
- La = 47.0 db

Therefore:

$L_{adj} = 10 \times \log_{10}(10^{(0.1 \times 55.0)}-10^{(0.1 \times 47.0)}) = 54.3$ dB

---

* At distances greater than ¼ -wavelength from the facade of the building, the incident and reflected waves result in a level 3 dB higher than would be measured due to the incident wave alone. Thus the 3 - dB correction for the 2 - m exterior microphone position is acceptable down to about 50 Hz.

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9. Highway-Related Occupational Noise Exposure Measurements

This section describes recommended procedures for the measurement of highway-related occupational noise exposure. Highway toll plaza and tunnel employees, highway maintenance and repair crews, and highway inspectors may be exposed to sound levels hazardous to hearing. Occupational noise exposure was developed to rate a person's susceptibility to hearing loss and to study noise environments that may be hazardous to hearing.(8) The following procedures are in accordance with ANSI S12.19-1996.(47)

For occupational noise exposures greater than 90 dB(A) in an 8-hour workday, the Occupational Safety and Health Administration (OSHA) requires mandatory hearing-conservation measures, such as audiometric testing or hearing protectors. OSHA defines a 90-dB(A) noise exposure as the criterion sound level, denoted herein by the symbol, LC; OSHA defines an 8-hour workday As the criterion duration, denoted herein by the symbol, TC.(48) A continuous criterion sound level over an entire criterion duration would result in 100 percent of an employee's allowable noise exposure. In addition, for exposures greater than 90 dB(A), some type of noise abatement action, such as machinery noise reduction via redesign or replacement, source/receiver isolation/enclosure, or employee exposure time limits, must be initiated.

For varying exposure durations, OSHA limits may be adjusted accordingly by the use of an exchange rate. For occupational noise exposure studies, OSHA requires the use of a 5-dB(A) exchange rate. In other words, for each additional 5 dB(A) of noise exposure up to 115 dB(A), the permitted duration is halved; for each reduction of 5 dB (A), the permitted duration is doubled. For example, if the noise exposure is 95 dB(A), a duration of 4 hours is permissible according to OSHA.

In addition, OSHA states that "exposure to impulsive or impact noise level should not exceed 140 dB." However, the regulations do not define what constitutes an impulsive or impact sound, nor do they address frequency weighting (See Section 3.1.3.4.2) of the measuring instrument, or whether the measurement uses one or none of the standard exponential time-averagings (See Section 3.1.3.4.4).(8) For the purposes of this document, it is recommended that the maximum A-weighted sound level, L_{AFmx}, be used to ensure the 140 dB criterion is met.

9.1 Site Selection

For the purposes of noise exposure measurements, a noise dosimeter or a sound level meter can be used. To a certain degree, the particular instrument chosen will dictate the site-selection process.

9.1.1 Noise Dosimeter

The noise dosimeter should be worn by the employee during his/ her daily work routine. Its accompanying microphone should, preferably, be located on the employee's shoulder. If the employee is consistently exposed to noise from one particular side, the microphone should be placed on the associated Side. The microphone cable, which connects to the dosimeter, should be routed and fastened such that it does not interfere with the employee's safety or performance. The main body of the dosimeter may be located/attached to the employee's clothing at any convenient location. If the employee works at only one particular station, or if the employee will not be present during measurements, the dosimeter may be placed on a tripod at a representative position within the area.

9.1.2 Sound Level Meter

Because of their larger size as compared with noise dosimeters, and due to the fact that they often do not have readily detachable microphones, sound level meters are often not logistically feasible to be worn directly by an employee. Consequently, they are typically positioned on a tripod within the work area. Specifically, the microphone

should be positioned at a height approximately equal to that of the employee's head and as close as possible to the his/her ear. ANSI 12.19-1996 recommends a distance of 0.1 m (4 in) from the employee's ear, if feasible. In addition, the microphone should be placed Such that shielding by the employee or other objects is avoided. If the employee works at only one particular station, or if the employee will not be present during measurements, the microphone and sound level meter may be placed on a tripod at a representative position within the area.

9.2 Noise Descriptors

The equivalent sound level, L_{Aeq}, and the duration of each measurement period should be recorded. The L_{Aeq} and the duration are then used to compute noise dose, which is, in turn, used to compute the time-weighted average sound level ($L_{TWA(TC)}$), i.e., the employee's "noise exposure." As stated earlier, TC is the OSHA criterion duration of 8 hours. In addition, the maximum A-weighted sound level, L_{AFmx}, should be recorded to ensure that the employee is not subjected to impulsive or impact noise levels greater than 140 dB(A).

9.3 Instrumentation (See Section 3)

- Microphone system (microphone and preamplifier)
- Graphic level recorder (optional)
- Noise dosimeter or sound level meter
- Calibrator
- Microphone simulator
- Windscreen (if the employee's primary work area is outdoors)
- Tripod
- Cabling
- Meteorological instrumentation (if the employee's primary work area is outdoors)

9.4 Sampling Period

The measurement duration should be sufficiently long, such that the resulting noise exposure is representative of the noise exposure associated with each task/location. For continually varying sound environments (sound level fluctuations greater ± 2.5 dB(A)), a longer sampling period is recommended. In most cases, noise exposure measurements are performed over a typical 8-hour work day.

9.5 Measurement Procedures

1. Prior to initial data collection, after data collection is complete, and at convenient times throughout the measurement day, calibrate the noise dosimeter or sound level meter.
2. Record the L_{Aeq} and the associated duration in addition to the L_{AFmx} for each measurement period. Note: For a measurement to be considered valid:

    a. The microphone should not be moved from its original position during the measurement period.
    b. The employee should not speak directly into the microphone.
    c. The unit should be periodically checked for proper use.

(Note: Appendix B provides example field-data log sheets.)

9.6 Data Analysis

1. Adjust measured levels for calibration drift (See Section 3.1.4).
2. Calculate the noise dose for a typical workday (See Section 9.6.1).
3. Calculate the noise exposure for a typical workday (See Section 9.6.2).
4. Perform an assessment of noise impact based on the calculated noise exposure. The maximum recorded sound levels for each task/location should also be considered in the assessment. The overall objective of any Assessment should be to determine the necessity to implement hearing-conservation measures, or some type of noise abatement action.

9.6.1 Determination of Noise Dose

The total noise dose for a typical workday is a summation of the individual task/location noise doses and is computed as follows:

$$D = 100\ [{}^{n}\Sigma_{i=1}\ (C_i / T_i)] = 100[(C_1 / T_1) + (C_2 / T_2) + \ldots (C_n / T_n)] \qquad \%$$

$$\text{where: } T_i = TC/2^{(L_{Aeq,\,i} - LC)/Q}$$

The variables in the above equations are defined as follows:

D	=Noise dose, expressed as a percentage;
Ci	=Measurement duration at task/location i;
Ti	=Permissible duration at task/location i;
$L_{Aeq,i}$	=Equivalent sound level measured during task/ location, i (Note: If the $L_{Aeq,i}$ for a specific measurement period is below the OSHA-defined threshold level of 80 dB(A), it is not considered in the noise dose computation);
LC	=OSHA criterion level of 90 dB(A);
Q	=OSHA exchange rate of 5 dB(A); and
TC	=OSHA criterion duration of 8 hours;

For example:

- $L_{Aeq,1}$ = 88.0 dB, C1 = 0.33 hours, T_1 = 10.6
- $L_{Aeq,2}$ = 73.0 dB, C1 = 0.33 hours, T_1 =
- $L_{Aeq,3}$ = 90.0 dB, C1 = 2.6 hours, T_1 = 8.00
- $L_{Aeq,4}$= 105.0 dB, C1 = 3.5 hours, T_1 = 1.00
- $L_{Aeq,5}$= 108.0 dB, C1 = 1.24 hours, T_1 = 0.66
- $L_{Aeq,6}$ = 95.0 dB, C1 = 2.00 hours, T_1 = 4.00

Therefore:

$$D = 100\ [\ (0.33/10.6) + (0.33/\infty) + (2.6/8.0) + (3.5/1.0) + (1.24/0.66) + (2.0/4.0)] = 623.5\%$$

9.6.2 Determination of Noise Exposure

The total noise exposure for a typical workday is computed as follows:

$$L_{TWA\ (TC)} = [Q/\log_{10}(2)][\log_{10}(D/100)] + LC \qquad (dB)$$

The variables in the above equation are defined as follows:

$L_{TWA(TC)}$ =	Noise exposure (time-weighted average sound level);
Q =	OSHA exchange rate of 5 dB(A);
D =	Noise dose, expressed as a percentage; and
LC =	OSHA criterion level of 90 dB(A).

For example:

- D = 623.5%

Therefore:

$$L_{TWA\ (8)} = [5/\log_{10}(2)][\log_{10}(623.5/100)] + 90 = 103.2 \quad (dB)$$

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10. Report Documentation

This section details the information to be documented in the field measurement report. It is general enough to be applicable to all sections discussed herein. Report documentation shall include all procedures in sufficient detail such that the measurement results can be repeated. It shall include clearly stated measurement objectives, field measurement equipment and detailed field measurement procedures, a description of the noise source, the descriptors used, and detailed data analyses and results, including detailed meteorological conditions.[6,8,49] A sample computation of experimental error is also recommended. Note: A sample report has been provided in Appendix D.

10.1 Site Sketches

10.1.1 Plan View

A plan view illustrates the site as if looking down upon it from above. The plan view should include the location of the source(s), receiver(s), and any notable geographical objects, such as trees, bodies of water, hills, buildings, and signs. Relative distances of all objects should also be indicated (See Figure 18).

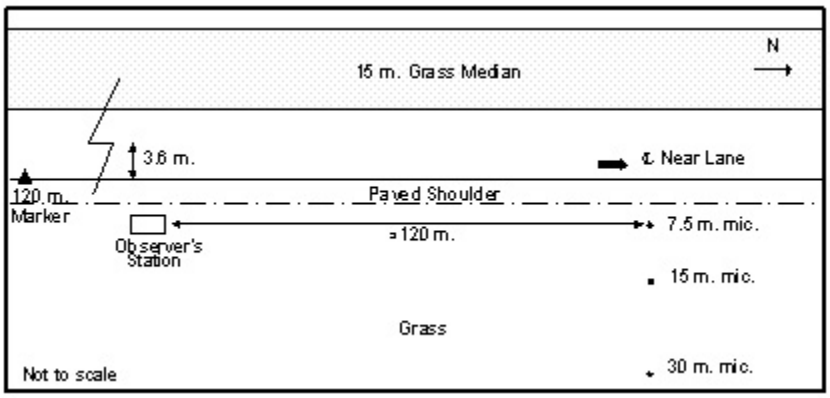

Figure 18. Sample plan view.

10.1.2 Elevation View

An elevation view illustrates the site from a viewpoint normal to the ground plane, cutting across or slicing the cross-section. It should include the relative slopes and elevations of the source, receiver, terrain, buildings, and other objects at that site for a given source-receiver pair (See Figure 19).

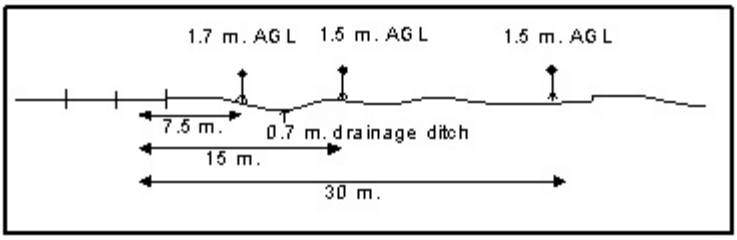

Figure 19. Sample elevation view.

10.2 Source Description

A detailed description of the source should be provided. If applicable, this may include information regarding make, model, type, speed, etc., if an individual noise source; or volume and speed, if a fleet of vehicles.

10.3 Instrumentation Description

The manufacturer, model number, serial number, and parameter settings, including gain settings, for all instrumentation should be documented. A block diagram of the measurement and analysis systems should also be included. Calibration, frequency response, and noise floor data should all be provided.

10.4 Meteorological Data

Weather conditions should be documented at a minimum of 15-minute intervals, and whenever substantial changes in conditions are noted. These conditions include wind speed, wind direction, temperature, humidity, cloud cover, and time-of-day when these data were measured.

10.5 Ground Surface Characterization

The ground characteristics for both the sources and receivers should also be documented, e.g., **hard** or **soft ground**.

10.6 Barrier Characteristics

For barrier insertion loss measurements, the following barrier characteristics need to be documented: barrier height, length, location, material, Noise Reduction Coefficient, Sound Transmission Class, and tilt angle (if applicable).

10.7 Measurement Procedures

All field measurement procedures should be documented. These procedures should be detailed such that the measurement results are able to be repeated by other individuals.

10.8 Acoustical Data

Data acquired from field measurements and analyses, as well as the procedures used, should be documented fully. Also to be recorded are all adjustments applied to the data due to calibration drift, ambient influences, and instrumentation non-linearities.

10.9 Incidental Observations and Conclusions

A discussion of any unforeseen events during the measurements should be included. Any situations that suggest modifications to the experiment for improved results should be documented. Any relevant subjective judgments or interpretations may appear in this section of the measurement report.

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Appendix A
Relative Humidity Computation

This appendix presents the procedures for converting measured dry and wet bulb temperatures into relative humidity expressed in percent.

1. Convert Dry Bulb temperature from °F to °C:

$$\text{Dry, °C} = [(\text{Dry,°F}) - 32] / 1.8$$

2. Convert Dry Bulb temperature from °C to °K:

$$\text{Dry, °K} = (\text{Dry, °C}) + 273.15$$

3. Repeat steps 1 and 2 to convert Wet Bulb temperature (Wet) to °K.

4. Compute the Saturation Pressure, assuming standard-day ambient atmosphere pressure, for the Dry Bulb temperature (DrySatPres):

$$\text{DrySatPres} = e^{19.163 - (4063.2 + 184089.0/\text{Dry})/\text{Dry}}$$

5. Repeat step 4 to compute the Saturation Pressure for the Wet Bulb temperature (WetSatPres).

6. Compute the Relative Humidity (RH) in percent:

$$\text{RH, \%} = 100 \times [\text{WetSatPres}/\text{DrySatPres}]$$

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Appendix B
Sample Data Log Sheets

This appendix contains sample field-data log sheets for use with the measurement procedures described within the main body of the document.

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Table 8. Sample instrumentation log.

Site #: 1	Date: 5/1/96	Location: I-95 S	
Item #:	**Quantity:**	**Instrument Type:**	**Serial #:**
1	1	Brüel & Kjær 4155 Microphone	43515
2	1	Brüel & Kjær 4155 Microphone	43516
3	1	Larson Davis 820 Sound Level Meter	33768
4	1	Larson Davis 820 Sound Level Meter	33769
5	1	Cetec Ivie Random Noise Generator	501
6	2	Microphone Simulators	N/A
7	3	Brüel & Kjær 0237 Windscreens	N/A
8	1	Wind-Cup Anemometer	N/A
9	1	Sling Psychrometer	N/A
10	1	100-Ft Tape Measure	N/A
11	10	9-Volt Batteries	N/A
12	1	Flashlight	N/A
13	10	D-Cell Batteries	N/A

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Table 9. Blank instrumentation log.

Site #:	Date:	Location	
Item #:	**Quantity:**	**Instrument Type:**	**Serial #:**

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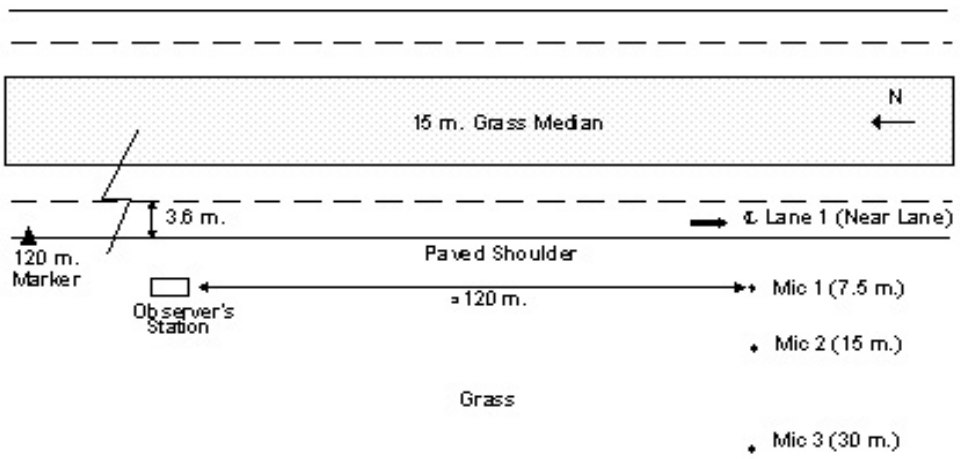
Table 10. Sample site data log.

Site #: 1	Date: 5/1/96	Location: I-95 S	Observer: Joe
Lane Dir: South	Site Surface: Soft	Nearby Landmark: I-495 Junction	
Grade: 0%	Pavement Type: Concrete	Distance to Landmark: 0.25 km	

Plan View:



Elevation View:

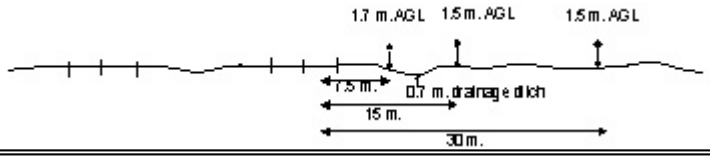


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Table 11. Blank site data log.

Site #:	Date:	Location:	Observer:
Lane Dir:	Site Surface:	Nearby Landmark:	
Grade:	Pavement Type:	Distance to Landmark:	
Plan View:			
Elevation View:			

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Table 12. Sample meteorological data log.

Site #: 1	Date: 5/1/96	Location: I-95 S		Observer: Joe		
Time:	**Temperature, °C (dry bulb):**	**Temperature, °C (wet bulb):***	**Relative Humidity (%):**	**Wind Speed (km/h):**	**Wind Dir**	**Cloud Cover Class**
8:00	15	13	89.8	5	W-E	2
8:15	16	13	86.6	5	W-E	2
8:30	16	14	86.7	5-7	W-E	2
8:45	16	14	86.7	5-7	W-E	2
9:00	16	14	86.7	5	W-E	3
9:15	16	15	91.5	5	W-E	3
9:30	17	15	89.9	0	N/A	3
9:45	17	16	89.9	0	N/A	3
10:00	18	16	83.9	0-5	W-E	3
10:15	19	16	83.3	0-5	W-E	3
10:30	19	16	83.3	0-5	W-E	3
10:45	19	16	83.3	4	W-E	3
11:00	20	16	79.7	4	W-E	3
11:15	20	16	79.7	4	W-E	3

* See Appendix A to convert Dry-Wet bulb temperature readings to Relative Humidity.

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Table 13. Blank meteorological data log.

Site #:	Date:	Location:		Observer:		
Time:	**Temperature, C (dry bulb):**	**Temperature, C (wet bulb):***	**Relative Humidity (%):**	**Wind Speed (km/h):**	**Wind Dir**	**Cloud Cover**

						Class

* See Appendix A to convert Dry-Wet bulb temperature readings to Relative Humidity.

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Table 14. Existing-noise measurements
Sample acoustic data log.

Site #: 1	Date: 5/1/96	Location: I-95 S					Observer: Joe	
Site Type (Check one):	Overall Sound Level	Change in Sound Level		Mic Type (Check one):	Reference	Receiver	Mic #: 1	Mic Location: 7.5 m. offset
		BEFORE	AFTER					
Event #:	**Time:**	**Duration (sec):**	**Sound Level (dB):**	**Gain Setting:**	**Comments:**			
PreCal	8:00:31	25.0	N/A	0				
Cal	8:05:24	20.125	N/A	↓	Reset SLM			
Dummy	8:09:01	30.125	N/A	↓				
Pink	8:15:00	31.625	N/A	↓				

PreCal	8:45:23	22.0	N/A	↓	
Cal	8:55:15	20.25	N/A	↓	
1	9:05:00	300.0	56.4	+20	
2	9:10:00	300.0	65.7		

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Table 15. Existing-noise measurements
Blank acoustic data log.

Site #:	Date:	Location:					Observer:	
Site Type (Check one):	Overall Sound Level	Change in Sound Level		Mic Type (Check one):	Reference	Receiver	Mic #:	Mic Location:
		BEFORE	AFTER					
Event #:	**Time:**	**Duration (sec):**	**Sound Level (dB):**	**Gain Setting:**	**Comments:**			

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Table 16. Existing-noise measurements
Sample vehicle data log.

Site #: 1	Date: 5/1/96	Location (Traffic Direction/Lane, etc.): I-95 (Southbound on Lane 1)						Observer: Joe	
Event #:	**Time:**	**Predominant Vehicle Speed (km/h):**	**Auto:**	**Medium Truck:**	**Heavy Truck:**	**Bus:**	**Motorcycle:**	**Other:**	**Comments:**
1	9:05:00	80	25	10	24	4			
2	9:10:00	85	22	8	20	2	1		

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Table 17. Existing-noise measurements
Blank vehicle data log.

Site #:	Date:	Location (Traffic Direction/Lane, etc.):						Observer:	
Event #:	**Time:**	**Predominant Vehicle Speed (km/h):**	**Auto:**	**Medium Truck:**	**Heavy Truck:**	**Bus:**	**Motorcycle:**	**Other:**	**Comments:**

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Table 18. Vehicle emission level measurements
Sample acoustic data log.

Site #: 1	Date: 5/1/96	Location: I-95 S				Observer: Joe
Mic #: 1	Mic Location: 7.5 m. offset					
Event #:	**Time:**	**Duration (sec):**	**L_{AFmx}:**	**Event Quality:**	**Gain Setting:**	**Comments:**
PreCal	8:00:31	25.0	N/A	N/A	0	
Cal	8:05:24	20.125	N/A	N/A		Reset SLM
Dummy	8:09:01	30.125	N/A	N/A		
Pink	8:15:00	31.625	N/A	N/A		
PreCal	8:45:23	22.0	N/A	N/A		

Cal	8:55:15	20.25	N/A	N/A		
1	9:05:12	8.0	56.4	1		
2	9:09:15	10.875	65.7	2		
3	9:15:09	18.9	79.0	2		
4	9:21:54	4.375	58.9	NG		No good - jet overhead
5	9:34:56	7.25	65.0	1		

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Table 19. Vehicle emission level measurements
Blank acoustic data log.

Site #:		Location:				Observer:
Mic #:	Mic Location:					
Event #:	**Time:**	**Duration (sec):**	**L_{AFmx}:**	**Event Quality:**	**Gain Setting:**	**Comments:**

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Table 20. Vehicle emission level measurements
Sample vehicle data log.

Site #: 1	Date: 5/1/96	Location (Traffic Direction/Lane, etc.): I-95 (Southbound on Lane 1)						Observer: Joe	
Event #:	**Time:**	**Vehicle Speed (km/h):**	**Auto:**	**Medium Truck:**	**Heavy Truck:**	**Bus:**	**Motorcycle:**	**Other:**	**Comments:**
1	9:05:12	80			x				5 axle
2	9:09:15	85		x					
3	9:15:09	75			x				3 axle
4	9:21:54	88	x						
5	9:34:56	90	x						

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Table 21. Vehicle emission level measurements
Blank vehicle data log.

Site #:	Date:	Location (Traffic Direction/Lane, etc.):						Observer:	
Event #:	**Time:**	**Vehicle Speed (km/h):**	**Auto:**	**Medium Truck:**	**Heavy Truck:**	**Bus:**	**Motorcycle:**	**Other:**	**Comments:**

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Table 22. Barrier insertion loss measurements
Sample acoustic data log.

Site #: 1	Date: 5/1/96	Location: I - 95 S					Observer: Joe	
Site Type (Check one)	BEFORE	Equiv. BEFORE	AFTER	Mic Type (Check one)	Reference	Receiver	Mic #: 1	Mic Location: 7.5 m. offset
	√					√		
Event #	**Time:**	**Duration**	**Sound Level (dB):**	**Event Quality (if applicable):**	**Gain Setting:**	**Comments:**		
PreCal	8:00:31	25.0	N/A	N/A	0			
Cal	8:05:24	20.125	N/A	N/A	↓	Reset SLM		
Dummy	8:09:01	30.125	N/A	N/A	↓			
Pink	8:15:00	31.625	N/A	N/A	↓			
PreCal	8:45:23	22.0	N/A	N/A	↓			
Cal	8:55:15	20.25	N/A	N/A	↓			
1	9:15:00	300.0	56.4	N/A	+20			
2	9:20:00	300.0	65.7	N/A				

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Table 23. Barrier insertion loss measurements
Blank acoustic data log.

Site #:	Date:	Location:					Observer:	
Site Type (Check one)	BEFORE	Equiv. BEFORE	AFTER	Mic Type (Check one)	Reference	Receiver	Mic #:	Mic Location:
	√					√		
Event #	**Time:**	**Duration**	**Sound Level**	**Event Quality (if**	**Gain**	**Comments:**		

			(dB):	applicable):	Setting:	

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Table 24. Barrier insertion loss measurements
Sample vehicle data log.

Site #: 1	Date: 5/1/96	Location (Traffic Direction/Lane, etc.): I-95 (Southbound on Lane 1)						Observer: Joe	
Event #:	**Time:**	**Predominant Vehicle Speed (km/h):**	**Auto:**	**Medium Truck:**	**Heavy Truck:**	**Bus:**	**Motorcycle:**	**Other:**	**Comments:**
1	9:15:00	80							
2	9:20:00	85							

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Table 25. Barrier insertion loss measurements
Blank vehicle data log.

Site #:	Date:	Location (Traffic Direction/Lane, etc.):						Observer:	
Event #:	**Time:**	**Predominant Vehicle Speed (km/h):**	**Auto:**	**Medium Truck:**	**Heavy Truck:**	**Bus:**	**Motorcycle:**	**Other:**	**Comments:**

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Table 26. Construction equipment noise measurements
Sample acoustic data log.

Site #: 1	Date: 5/1/96	Location/Construction Phase: I-95 S /Earthwork				Observer: Joe	
Operating Mode (Check one):	Stationary-Passive	Stationary-Active	Mobile-Passive	Mobile-Active	Equipment Type: Bulldozer	Mic #: 1	Mic Location: 15 m. offset
Event #:	**Time:**	**Duration (sec):**	**Sound Level (dB):**	**Equipment Speed (km/h):**	**Gain Setting:**	**Comments:**	
PreCal	8:00:31	25.0	N/A	N/A	0		
Cal	8:05:24	20.125	N/A	N/A	↓	Reset SLM	
Dummy	8:09:01	30.125	N/A	N/A	↓		
Pink	8:15:00	31.625	N/A	N/A	↓		
PreCal	9:15:23	22.0	N/A	N/A	↓		
Cal	9:20:15	20.25	N/A	N/A	↓		
1	10:00:07	8.0	56.4	5	+20		
2	10:05:15	10.875	65.7	6			
3	10:09:56	18.9	79.0	5			
4	10:14:37	4.375	58.9	7		No good - dogs barking	
5	10:21:21	7.25	65.0	5			

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Table 27. Construction equipment noise measurements
Blank acoustic data log.

Site #:	Date:	Location/Construction Phase:				Observer:	
Operating Mode (Check one):	Stationary-Passive	Stationary-Active	Mobile-Passive	Mobile-Active	Equipment Type: Bulldozer	Mic #:	Mic Location:

Event #:	Time:	Duration (sec):	Sound Level (dB):	Equipment Speed (km/h):	Gain Setting:	Comments:

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Table 28. Building noise reduction measurements
Sample acoustic data log.

Site#: 1	Date: 5/1/96	Location: 55 Broadway Street off I-95 S				Observer: Joe
Site Type (Check one)	Interior	Exterior				
		√				
Event #:	**Time:**	**Duration (sec):**	**Sound Level (dB):**	**Event Quality (if applicable):**	**Gain Setting:**	**Comments:**
PreCal	8:00:31	25.0	N/A	N/A	0	
Cal	8:05:24	20.125	N/A	N/A	↓	Reset SLM
Dummy	8:09:01	30.125	N/A	N/A	↓	
Pink	8:15:00	31.625	N/A	N/A	↓	
PreCal	8:45:23	22.0	N/A	N/A	↓	
Cal	8:55:15	20.25	N/A	N/A	↓	
1	9:30:01	8.0	56.4	1	+20	
2	9:36:15	10.875	65.7	2		

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Table 29. Building noise reduction measurements
Blank acoustic data log.

Site#:	Date:	Location:				Observer:
Site Type (Check one)	Interior	Exterior				
Event #:	**Time:**	**Duration (sec):**	**Sound Level (dB):**	**Event Quality (if applicable)**	**Gail Setting**	**Comments:**

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Table 30. Building noise reduction measurements
Sample vehicle data log.

Site #: 1	Date: 5/1/96	Location (Traffic Direction/Lane, etc.): I-95 (Southbound on Lane 1)						Observer: Joe	
Event #:	**Time:**	**Predominant Vehicle Speed (km/h):**	**Auto:**	**Medium Truck:**	**Heavy Truck:**	**Bus:**	**Motorcycle:**	**Other:**	**Comments:**
1	9:30:01	80							
2	9:36:15	85							

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Table 31. Building noise reduction measurements
Blank vehicle data log.

Site #:	Date:	Location (Traffic Direction/Lane, etc.):						Observer:	
Event #:	**Time:**	**Predominant Vehicle Speed (km/h):**	**Auto:**	**Medium Truck:**	**Heavy Truck:**	**Bus:**	**Motorcycle:**	**Other:**	**Comments:**

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Table 32. Sample occupational noise exposure data log

Site #: 1	Date: 5/1/96	Task/Location: I-95 S Toll booth at Exit 19				Employee/Observer: Joe/Fred
Instrumentation (Check one):	Noise Dosimeter	Sound Level Meter				Mic Location: Shoulder
	√					
Event #:	**Time:**	**Duration (hour):**	**L_{Aeq} (dB):**	**L_{AFmx} (dB):**	**Gain Setting:**	**Comments:**
PreCal	7:00:31	25.0 sec	N/A		0	
Cal	7:05:24	20.125 sec	N/A		↓	Reset SLM
Dummy	7:09:01	30.125 sec	N/A		↓	
Pink	7:15:00	31.625 sec	N/A		↓	
PreCal	7:45:23	22.0 sec	N/A		↓	
Cal	7:55:15	20.25 sec	N/A		↓	
1	8:07:12	0.33	88.0	90.1	+20	
2	8:30:15	0.33	73.0	77.9		
3	8:52:09	2.60	90.0	90.9		
4	11:15:12	3.50	105.0	105.1		
5	15:08:15	1.24	108.0	109.0		
6	16:25:09	2.00	95.0	96.9		

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Table 33. Blank occupational noise exposure data log

Site #:	Date:	Task/Location:				Employee/Observer:
Instrumentation (Check one):	Noise Dosimeter	Sound Level Meter				Mic Location:
Event #:	**Time:**	**Duration (hour):**	**L_{Aeq} (dB):**	**L_{AFmx} (dB):**	**Gain Setting:**	**Comments:**

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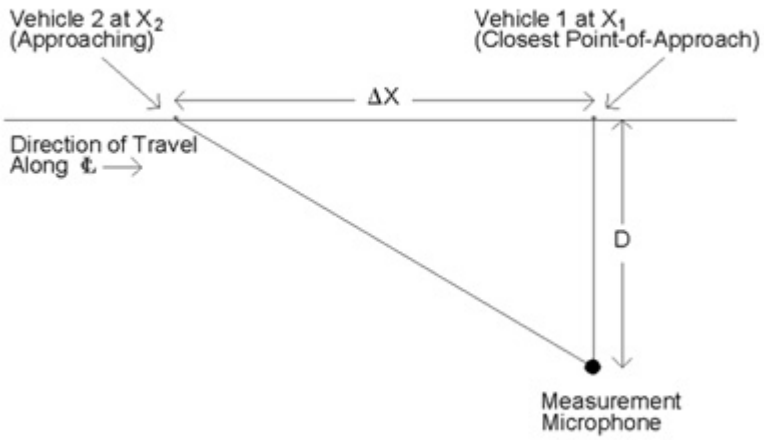
Appendix C
Minimum Separation-Distance Criteria for Noise Emission Level Measurements

The minimum separation-distance criteria were based on Caltrans' California REMEL study.[(24)]

In the Caltrans study, the following assumptions were made: (1) the vehicle behaves as a **point source**, i.e., spherical **divergence** is assumed; and (2) there is no ground attenuation of the emission level. In addition, the ambient level was at least 10 dB less than the L_{AFmx} of the observed vehicle.

In general, when a vehicle approaches a measurement microphone at a constant speed, the observed sound level at the microphone is related to the vehicle position as follows:

$$L_2 = L_1 - 20 \times \text{Log}_{10} \sqrt{(\Delta X^2 + D^2)} / D$$



where: L_2 is the contribution to the measured emission level of the subject vehicle, Vehicle 1 at X_1, due to a subsequent vehicle, Vehicle 2, at X_2;

L1 is the contribution to the measured emission level of the subject vehicle, Vehicle 1, due entirely to Vehicle 1 at X1;

Δ X is the distance between X1 and X2, or the minimum separation distance to be determined; and

D is the distance from the microphone to X1, or 15 m in this Case.

If other vehicles are in proximity of the subject vehicle to be measured, the measured sound level at the microphone for the subject vehicle may increase due to contamination. A maximum of 0.5 dB contamination is considered allowable.

Based on the 0.5-dB criterion, the next step is to determine the associated separation-distance criteria. Potential sources of contamination include contamination due to ambient noise, as well as contamination due to other vehicles in proximity of the subject vehicle (See Figure 20).

The maximum contamination due to ambient noise was determined to be 0.4 dB, assuming the ambient level is 10 dB less than the L_{AFmx} of observed vehicles. Consequently, a maximum 0.1-dB contamination due to subsequent vehicles, based on the 0.5-dB contamination criterion, is allowed.

To ensure no more than 0.1-dB contamination due to subsequent vehicles, it was determined that the emission level due to a subsequent vehicle, Vehicle 2 in the case of Figure 20, must be at least 15.9 dB below that of the subject vehicle, Vehicle 1. The next step was to determine the separation distance associated with the 15.9-dB requirement.

Using the above equation and substituting the following values:

L_2 = L_{AFmx} - 15.9
D = 15 m,

Δ X was solved for.

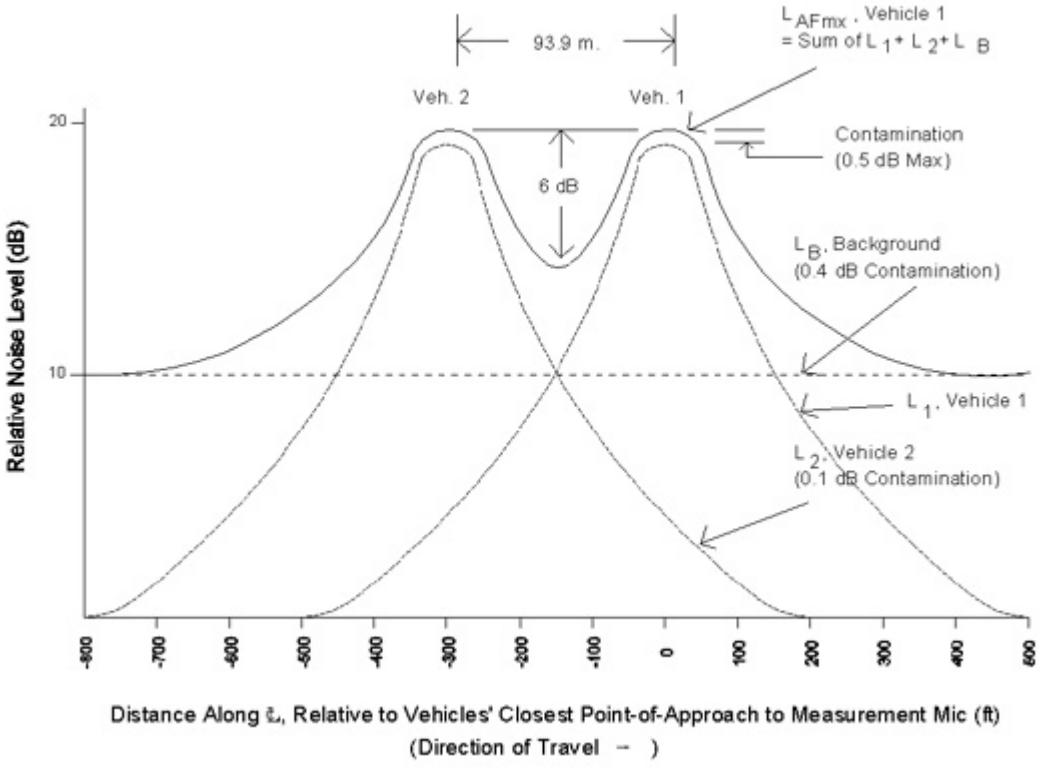


Figure 20. Minimum separation distance between two similar vehicles.

For REMELs measured at 15 m (50 ft), a minimum separation distance of 93.9 m (308 ft) between similar vehicles was required to ensure that the total contamination was not greater than 0.5 dB. For automobiles in the vicinity of heavy trucks, a minimum separation distance of 300.2 m (985 ft) between the automobile and heavy truck was required, assuming a heavy truck is 10 dB louder than an automobile at comparable speeds.

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Appendix D
Sample Report Documentation

The objective of this appendix is to exemplify the types of information to be documented in a field measurement report. For the purposes of this appendix, assume existing-noise measurements were performed (See Section 4).

D.1 Site Sketches

The measurement site was located on Route 95 (a 2-lane highway) 0.8 km past Exit 21. A reference microphone was attached to a mast, placed at a height of 1.5 m above the roadway pavement, and located at a 15 m offset position from the centerline of the near travel lane. Another portable mast was fitted with three microphones, placed at heights of 1.5 m (low), 4.5 m (middle), and 7.5 m (high), and located at a 30-m offset position. When referring to microphone heights, the high, middle, and low convention will be used for the remainder of this report. Figures D1 and D2 present the plan and elevation views, respectively.

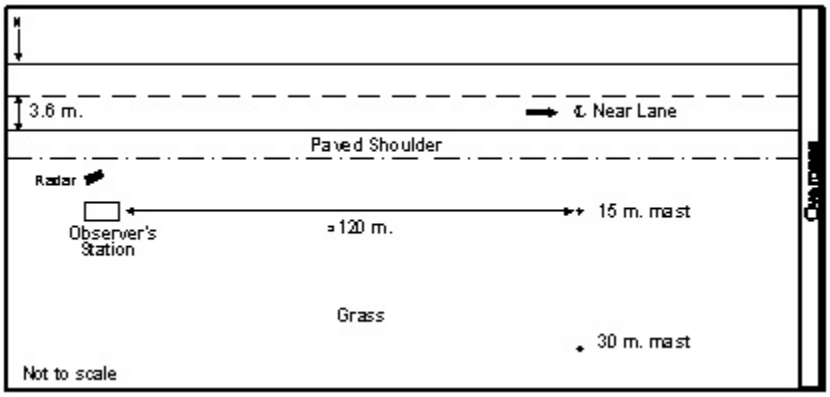

Figure D1. Measurement site plan view.

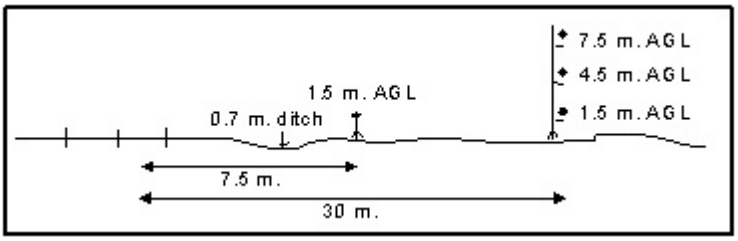

Figure D2. Measurement site elevation view.

D.2 Source Description

The source was constant free-flowing traffic traveling on Route 95. Traffic volume and mix were recorded on video cassette and used to obtain vehicle counts. Vehicles were counted and classified in three categories: automobiles (A); medium trucks (MT); and heavy trucks (HT). Vehicles were further grouped by direction (eastbound and westbound). Vehicle counts and average speed for each test run are presented in Table D1.

Table D1. 5-minute vehicle count and average speed data.

Test Run #	Start Time	Westbound			Eastbound			Avg Speed (km/h)	Std Deviation(Σ)
		A	MT	HT	A	MT	HT		
1	9:00	407	7	31	322	9	38	96.7	3.4
2	9:10	351	8	36	348	12	26	97.3	3.4
3	9:20	319	8	20	340	10	29	96.4	3.7
4	9:30	317	16	25	338	10	37	96.7	3.2
5	9:40	335	14	25	342	12	39	94.8	3.1
6	9:50	363	8	32	335	6	38	93.6	3.3
7	10:00	332	8	20	375	8	35	94.0	3.8
8	10:10	340	11	22	320	11	33	93.8	3.9
9	10:20	291	10	23	354	7	28	96.7	3.5
10	10:30	374	10	25	404	12	40	94.9	3.5
11	11:00	370	3	41	428	7	55	90.7	4.3
12	11:10	364	3	47	422	11	42	91.6	5.7
13	11:20	352	4	48	375	4	41	93.8	5.0
14	11:30	397	2	38	426	4	39	90.1	4.1
15	11:40	416	4	39	384	6	47	90.7	4.6
16	11:50	397	3	34	411	5	49	94.8	3.6
17	12:00	424	3	49	377	6	44	92.5	3.3
18	12:10	408	2	28	364	2	39	91.4	2.7
19	12:20	-	-	-	-	-	-	-	-
20	12:30	346	3	37	342	8	30	93.6	5.0
21	13:30	385	8	49	427	11	33	93.6	3.8
22	13:40	391	4	40	459	5	42	94.3	3.6
23	13:50	409	1	39	463	14	30	94.4	3.1
24	14:00	-	-	-	-	-	-	-	-
25	14:10	-	-	-	-	-	-	-	-
26	14:20	-	-	-	-	-	-	-	-
27	14:30	426	3	33	499	10	33	92.2	4.1
28	14:40	500	3	39	699	5	51	90.6	4.5
29	14:50	507	3	17	678	7	32	94.9	4.0
30	15:00	476	7	32	704	9	39	92.7	2.3

(-) Denotes test run was removed from the population of events to be analyzed (See Section D.7 for an explanation).

D.3 Instrumentation Description

Note: A list of instrumentation is presented in Table D2. Each noise measurement system consisted of a General Radio Model 1962-9610 random-incidence electret microphone, connected to a Larson Davis Model 827-0V preamplifier. The microphone/ preamplifier system was mounted in an insulated nylon holder and connected via cable to a Larson Davis Model 820 Type 1 Precision integrating Sound Level Meter/Environmental Noise Analyzer (LD820). The microphone/preamplifier combination was positioned 0.3 m from the mast and placed in its shadow as

viewed from the roadway. This position insured minimum errors due to reflections from the mast structure.(11) Brüel & Kjær Model UA0237 windscreens were placed atop each microphone to reduce the effects of wind-generated noise on the microphone diaphragm.

Pre-processing and storage of the measured noise level data were accomplished by the LD820. Each unit was programmed to continually measure, energy average, and store A-weighted noise levels with fast-exponential response characteristics at a rate of two data records each second (1/2-second averages).

A passive microphone simulator was used to establish the electronic noise floor of each system. In addition, the frequency response of each system was tested using pink noise generated by a Cetec Ivie Model IE-20b random noise generator.

Traffic speed was obtained with a CMI Doppler radar gun set up 6 m off the edge of the near travel lane, approximately 100 m west of the microphone centerline (See Figure D1). The Doppler radar was directed at the departing westbound traffic, thus minimizing the possibility of individual vehicles slowing down after detecting the radar signal. Readings were observed visually from the radar's digital display, and recorded continuously during each measurement period at a rate of approximately one reading every 10 seconds.

A Panasonic Model AG170 video camera was set up on a nearby overpass to record pass-by traffic at the measurement site. The camera was time-synchronized with the LD820's, so that the noise data could be correlated with the traffic data.

Table D2. Sample instrumentation log.

Item #:	Quantity:	Instrument Type:	Serial #:
1	1	General Radio 1962-9610 Microphone & Preamp	43515
2	1	General Radio 1962-9610 Microphone & Preamp	43516
3	1	General Radio 1962-9610 Microphone & Preamp	43517
4	1	General Radio 1962-9610 Microphone & Preamp	43518
5	1	Larson Davis 820 Sound Level Meter	33768
6	1	Larson Davis 820 Sound Level Meter	33769
7	1	Larson Davis 820 Sound Level Meter	33770
8	1	Larson Davis 820 Sound Level Meter	33771
9	2	Brüel & Kjær Type 4231 Calibrator	N/A
10	1	Cetec Ivie Random Noise Generator	501
11	2	Microphone Simulators	N/A
12	6	Brüel & Kjær 0237 Windscreens	N/A
13	1	Wind-Cup Anemometer	N/A
14	1	Sling Psychrometer	N/A
15	1	CMI Doppler Radar Gun	10331
16	1	Panasonic Model AF170 Video Camera	15095
17	1	Climatronics Model EWS Weatder Station	66881
18	20	9-Volt Batteries	N/A
19	1	100' Tape Measure	N/A

D.4 Meteorological Data

A Climatronics Model EWS weather station continually recorded temperature, humidity, wind speed, and wind direction data on a continuous strip-chart recorder with a paper speed of four inches per hour. Wind speed and direction were measured at a height of 7.5 m above the ground (height equivalent to the highest microphone position); temperature and humidity were measured at a height of 1.5 m above the ground. In addition, cloud cover was documented periodically, as well as significant changes in weather conditions.

Using the known recorder paper speed and the time marks produced on the strip-chart, a time scale was transposed on each chart and the 5-minute measurement period for each test was identified.

The average wind speed and average wind direction *re* magnetic north (degrees) were computed for each 5-minute test run. The 5-minute averaged wind speed (WS) and direction (WD) were then used to compute the vector component of wind speed in the x-y plane from the source to receiver (VWS) for each test run.

Meteorological data are presented in Table D3. Note: Cloud cover class 2 was observed for the duration of the measurement day.

Table D3. Meteorological data (5-minute average values).

Test Run #	Start Time	Wind Speed (km/h)	Wind Dir* (°)	Temp (°F)	Rel Hum (%)	VWS (km/h)
1	9:00	10.5	65	13	46	4.3
2	9:10	11.3	80	14	45	1.9
3	9:20	6.4	130	14	44	-4.2
4	9:30	12.1	100	14	43	-2.1
5	9:40	8.8	105	14	43	-2.3
6	9:50	9.3	150	14	42	-8.0
7	10:00	12.1	115	15	41	-5.1
8	10:10	14.5	65	16	40	6.1
9	10:20	4.0	195	16	40	-3.9
10	10:30	12.9	155	16	40	-11.7
11	11:00	7.2	195	19	38	-6.9
12	11:10	0.0	-	18	36	0.0
13	11:20	7.7	15	19	34	7.4
14	11:30	10.0	35	19	33	8.2
15	11:40	8.8	325	19	32	7.2
16	11:50	13.4	10	19	32	13.2
17	12:00	7.7	350	19	32	7.6
18	12:10	5.3	45	19	32	3.7
19	12:20	-	-	-	-	-
20	12:30	7.2	330	18	32	6.3
21	13:30	10.9	345	19	32	10.6
22	13:40	6.9	20	19	32	6.4
23	13:50	8.2	50	19	32	5.3
24	14:00	-	-	-	-	-
25	14:10	-	-	-	-	-
26	14:20	-	-	-	-	-

27	14:30	8.8	30	20	30	7.7
28	14:40	6.3	30	20	30	5.5
29	14:50	10.5	40	19	29	8.0
30	15:00	0.0	-	18	29	0.0

* Wind Direction *re* Magnetic North
(-) Denotes test run was removed from the population of events to be analyzed (See Section D.7 for an explanation).

D.5 Ground Surface Characterization

The roadway surface was composed of dense-graded asphaltic concrete. The roadside terrain between the road and the receivers was relatively flat and composed of packed clay with low-cut grass.

D.6 Measurement Procedures

At the beginning of the measurement day, a complete system check was performed on the entire measurement system. To establish the electronic noise floor of each system, a passive microphone simulator was substituted for each microphone. The frequency response of each system was tested by recording a 30-second sample of pink noise. In addition, 30 seconds of calibration data were recorded at the beginning and end of the measurement day.

Data were collected at a rate of two samples per second. After collecting data for ten consecutive 5-minute test runs (5-minute spacing between each run), approximately 30 seconds of calibration data were measured and stored for all microphones. Data collection then calibration were repeated until a total of thirty 5-minute test runs were measured and stored.

At the end of the measurement day, the 1/2-second noise data stored in each LD820 were downloaded to an AST Premium Exec Model 386SX/20 notebook computer and stored on floppy disk for later off-line processing.

D.7 Acoustical Data

Processing of the noise data files stored on floppy disk was accomplished off-line, using the LD820 support software in tandem with the Acoustics Facility-developed computer program, RFILE. The LD820 software was used to obtain a graphical history plot (noise level versus time) for the test runs identified in the field as potentially contaminated. These plots were examined and all questionable test runs were removed from the population of events to be processed.

The RFILE program, using the 1/2-second data stored in each file, was used to compute the equivalent A-weighted sound levels for each 5-minute test run ($L_{Aeq,5min}$). The $L_{Aeq,5min}$ values were adjusted for calibration drift. No ambient adjustments were necessary. The final $L_{Aeq,5min}$ values are presented in Table D4. Computation of experimental error is shown below.

Experimental Data Error Calculation

1. Compute Variance* for:
   - Background (Not computed if measured level background by 10 dB):

     Reference Microphone Position 0.0
     High Microphone Position 0.0

   - Difference (Corrected source levels at reference microphone position minus calibration corrected source levels at the

     High Microphone Position 0.012

- Bias:

Type	Amount	Amount/2	$(Amount/2)^2$	Variance
Calibrator	0.25	0.125	0.016	0.016
Cal. Drift	0.23	0.115	0.013	0.013

2. Sum of Variances (Sum of above items) 0.041
3. Standard Error (Square root of Sum of Variances) 0.202

* Note: Variance = $(\Sigma)^2 = [n \sum (X_i)^2 - (\sum X_i)^2] / [n (n-1)]$; where n is number of levels and X_i is value of i^{th} level.

Table D4. Calibration corrected $L_{Aeq,5min}$ data.

Test Run #	Start Time	REF	HIGH	MID	LOW
1	9:00	80.65	79.30	72.50	65.65
2	9:10	80.15	78.90	71.60	64.95
3	9:20	80.05	78.80	71.40	64.75
4	9:30	80.55	79.30	71.80	64.15
5	9:40	80.25	79.10	71.50	64.85
6	9:50	80.15	79.00	71.20	64.75
7	10:00	80.05	78.80	71.40	64.65
8	10:10	80.55	79.10	71.10	64.25
9	10:20	80.15	78.80	71.10	64.45
10	10:30	80.55	79.20	71.50	64.85
11	11:00	81.15	79.95	73.25	64.75
12	11:10	81.55	80.25	74.35	64.15
13	11:20	80.95	79.45	72.35	64.85
14	11:30	80.75	79.35	72.05	64.75
15	11:40	80.95	79.65	72.75	64.65
16	11:50	80.75	79.45	72.45	64.25
17	12:00	80.95	79.55	72.45	64.45
18	12:10	80.25	79.15	72.15	64.85
19	12:20	-	-	-	-
20	12:30	81.25	80.05	72.95	66.00
21	13:30	81.20	80.00	72.85	66.15
22	13:40	81.30	80.00	72.75	65.95
23	13:50	81.50	80.30	73.35	66.65
24	14:00	-	-	-	-
25	14:10	-	-	-	-
26	14:20	-	-	-	-
27	14:30	80.80	79.50	72.35	65.75
28	14:40	81.80	80.50	73.15	66.75

29	14:50	81.20	80.10	72.85	66.15
30	15:00	81.40	80.30	73.15	66.45

(-) Denotes test run was removed from the population of events to be analyzed (See Section D.7 for an explanation).

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FHWA

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FHWA

United States Department of Transportation - **Federal Highway Administration**

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SHORT FORMAT
NOISE STUDY REPORT

PROJECT_____ PREPARER_____
HIGHWAY _____ DATE_____
COUNTY _____ CITY_____

PROJECT DESCRIPTION:

EXISTING LAND USE:

PEAK TRUCK HOUR

EXISTING SOUND LEVELS
(Distances are from highway centerline)

TRAFFIC NOISE IMPACTS

TRAFFIC NOISE MITIGATION

CONSTRUCTION NOISE

IMPACTS:

MITIGATION: See attachment

LOCAL COORDINATION

A copy of this report will be sent to

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*	Date Of Land Evaluation Request
Name Of Project	Federal Agency Involved
Proposed Land Use	County And State
PART II *(To be completed by NRCS)*	Date Request Received By NRCS

Does the site contain prime, unique, statewide or local important farmland? *(If no, the FPPA does not apply -- do not complete additional parts of this form).* Yes ☐ No ☐	Acres Irrigated	Average Farm Size
Major Crop*(s)*	Farmable Land In Govt. Jurisdiction Acres: %	Amount Of Farmland As Defined in FPPA Acres: %
Name Of Land Evaluation System Used	Name Of Local Site Assessment System	Date Land Evaluation Returned By NRCS

PART III *(To be completed by Federal Agency)*	Alternative Site Rating			
	Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly				
B. Total Acres To Be Converted Indirectly				
C. Total Acres In Site	0.0	0.0	0.0	0.0
PART IV *(To be completed by NRCS)* Land Evaluation Information				
A. Total Acres Prime And Unique Farmland				
B. Total Acres Statewide And Local Important Farmland				
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted				
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value				
PART V *(To be completed by NRCS)* Land Evaluation Criterion Relative Value Of Farmland To Be Converted *(Scale of 0 to 100 Points)*	0	0	0	0

PART VI *(To be completed by Federal Agency)* Site Assessment Criteria *(These criteria are explained in 7 CFR 658.5(b)*	Maximum Points				
1. Area In Nonurban Use					
2. Perimeter In Nonurban Use					
3. Percent Of Site Being Farmed					
4. Protection Provided By State And Local Government					
5. Distance From Urban Builtup Area					
6. Distance To Urban Support Services					
7. Size Of Present Farm Unit Compared To Average					
8. Creation Of Nonfarmable Farmland					
9. Availability Of Farm Support Services					
10. On-Farm Investments					
11. Effects Of Conversion On Farm Support Services					
12. Compatibility With Existing Agricultural Use					
TOTAL SITE ASSESSMENT POINTS	160	0	0	0	0
PART VII *(To be completed by Federal Agency)*					
Relative Value Of Farmland *(From Part V)*	100	0	0	0	0
Total Site Assessment *(From Part VI above or a local site assessment)*	160	0	0	0	0
TOTAL POINTS *(Total of above 2 lines)*	260	0	0	0	0

Site Selected:	Date Of Selection	Was A Local Site Assessment Used? Yes ☐ No ☐

Reason For Selection:

(See Instructions on reverse side)

This form was electronically produced by National Production Services Staff

Clear Form

Form AD-1006 (10-83)

STEPS IN THE PROCESSING THE FARMLAND AND CONVERSION IMPACT RATING FORM

Step 1 – Federal agencies involved in proposed projects that may convert farmland, as defined in the Farmland Protection Policy Act (FPPA) to nonagricultural uses, will initially complete Parts I and III of the form.

Step 2 – Originator will send copies A, B and C together with maps indicating locations of site(s), to the Natural Resources Conservation Service (NRCS) local field office and retain copy D for their files. (Note: NRCS has a field office in most counties in the U.S. The field office is usually located in the county seat. A list of field office locations are available from the NRCS State Conservationist in each state).

Step 3 – NRCS will, within 45 calendar days after receipt of form, make a determination as to whether the site(s) of the proposed project contains prime, unique, statewide or local important farmland.

Step '4 – In cases where farmland covered by the FPPA will be converted by the proposed project, NRCS field offices will complete Parts II, IV and V of the form.

Step 5 – NRCS will return copy A and B of the form to the Federal agency involved in the project. (Copy C will be retained for NRCS records).

Step 6 – The Federal agency involved in the proposed project will complete Parts VI and VII of the form.

Step 7 – The Federal agency involved in the proposed project will make a determination as to whether the proposed conversion is consistent with the FPPA and the agency's internal policies.

INSTRUCTIONS FOR COMPLETING THE FARMLAND CONVERSION IMPACT RATING FORM

Part I: In completing the "County And State" questions list all the local governments that are responsible for local land controls where site(s) are to be evaluated.

Part III: In completing item B (Total Acres To Be Converted Indirectly), include the following:

1. Acres not being directly converted but that would no longer be capable of being farmed after the conversion, because the conversion would restrict access to them.

2. Acres planned to receive services from an infrastructure project as indicated in the project justification (e.g. highways, utilities) that will cause a direct conversion.

Part VI: Do not complete Part VI if a local site assessment is used.

Assign the maximum points for each site assessment criterion as shown in § 658.5 (b) of CFR. In cases of corridor-type projects such as transportation, powerline and flood control, criteria #5 and #6 will not apply and will, be weighed zero, however, criterion #8 will be weighed a maximum of 25 points, and criterion #11 a maximum of 25 points.

Individual Federal agencies at the national level, may assign relative weights among the 12 site assessment criteria other than those shown in the FPPA rule. In all cases where other weights are assigned relative adjustments must be made to maintain the maximum total weight points at l60.

In rating alternative sites, Federal agencies shall consider each of the criteria and assign points within the limits established in the FPPA rule. Sites most suitable for protection under these criteria will receive the highest total scores, and sites least suitable, the lowest scores.

Part VII: In computing the "Total Site Assessment Points" where a State or local site assessment is used and the total maximum number of points is other than 160, adjust the site assessment points to a base of 160. Example: if the Site Assessment maximum is 200 points, and alternative Site "A" is rated 180 points:

$$\frac{\text{Total points assigned Site A}}{\text{Maximum points possible}} = \frac{180}{200} \times 160 = 144 \text{ points for Site "A."}$$

CATEGORICAL "NO HISTORIC PROPERTIES AFFECTED" PROGRAMMATIC MEMORANDUM OF UNDERSTANDING

Between

the FEDERAL HIGHWAY ADMINISTRATION (FHWA),

Iowa Division,

the IOWA DEPARTMENT OF TRANSPORTATION (IA DOT),

and

the IOWA STATE HISTORIC PRESERVATION OFFICER (IA SHPO)

I. PREAMBLE:

WHEREAS: the IA DOT has received, and will continue to receive, federal aid to highways funding from the FHWA for the purposes of planning, designing, constructing and maintaining interstate, primary, and local systems highways and ancillary facilities throughout the State of Iowa; **and**

WHEREAS: Section 106 of the *National Historic Preservation Act of 1966, as amended,* **(Section 106)**, and the Council for Environmental Quality Regulations for implementing the procedural provisions of the *National Environmental Policy Act of 1969* **(NEPA)** require the federal agency (FHWA) having jurisdiction over a federal, federally-assisted, or federally-licensed undertaking (project) to take into account the effects of the agency's undertakings upon properties listed on, or considered eligible for listing on, the *National Register of Historic Places*; **and**

WHEREAS: it is the responsibility of the FHWA to determine that a proposed project, activity, or program constitutes an "undertaking," and also to establish a designated undertaking's area of potential effect upon historic resources; **and**

WHEREAS: in addition to the multitude of more 'traditional' federally-funded highway improvement projects contemplated and referenced above, Section 1108 (b) of the Transportation Equity Act of the 21st Century **(TEA 21)** also authorizes the expenditure of federal funds for the development and construction of "transportation enhancement activities;" **and**

WHEREAS: Section 1201, paragraph 35 of TEA 21 defines the phrase *"transportation enhancement activities"* to include a variety of 'non-traditional' project categories that can be directly beneficial to the preservation of historic (cultural) properties; **and**

WHEREAS: transportation enhancement projects are also federally-assisted undertakings for Section 106 purposes and have the potential to affect properties included on, or eligible for inclusion on, the *National Register of Historic Places*, and therefore require compliance with Section 106 provisions and its implementing regulations, as found in *36CFR Part 800* **(Part 800)**, in the same manner as traditional federally-funded highway projects; **and**

WHEREAS: the FHWA and the IA DOT have determined- in consultation with the IA SHPO- that certain types of undertakings, including transportation enhancement projects, normally do not result in significant alterations to, or otherwise adversely affect, adjacent cultural sites and resources, and that Part 800 consultation by the agencies with the IA SHPO for such undertakings is deemed to be unnecessary, if the undertakings meet all of the qualifying criteria appropriate to their specific category of projects as described in ***Exhibit A***; **and**

WHEREAS: On July 13, 1989, these same three parties executed a "Categorical No Effect Agreement" designed to eliminate from review certain kinds of undertakings which normally do not result in significant alterations to, or otherwise adversely affect, cultural resources; **and**

WHEREAS: the parties believe that the 1989 agreement has achieved those goals, has been of benefit to all of the parties and, with amendment, would offer potential for even greater future savings of time and effort through expansion to other undertakings, including transportation enhancement projects as defined by TEA 21; **and**

WHEREAS: in May 1997, the Chairman of the Advisory Council on Historic Preservation, the Acting Administrator of the Federal Highway Administration, and the President of the National Conference of State Historic Preservation Officers executed a Nationwide Programmatic Agreement pertaining to the implementation of Transportation Enhancement project activities, said agreement being designed to reduce the processing time required to review such projects with respect to possible impacts upon cultural resources; **and**

WHEREAS: on July 18, 1997, the IADOT notified the FHWA, the Advisory Council and the National Conference of SHPOs that it was officially adopting said Nationwide Programmatic Agreement for Iowa's transportation enhancement program, with the expectation that doing so would reduce the need for SHPO review of individual enhancement projects, thus reducing project development time; **and**

WHEREAS: the signatories to this agreement desire to reduce the time required for planning and development activities for all qualifying federally-funded Iowa transportation and related undertakings, including enhancement projects, by eliminating the requirement for a full Part 800 historic preservation consultation with the Iowa SHPO on individual projects which meet applicable qualifying criteria.

II. THE UNDERSTANDING:

NOW, THEREFORE, AND IN CONSIDERATION OF THE FOREGOING DECLARATIONS, IT IS AGREED BY THE PARTIES TO THIS "CATEGORICAL NO HISTORIC PROPERTIES AFFECTED " PROGRAMMATIC MEMORANDUM OF UNDERSTANDING -

THAT: the stipulations found in Section III and the qualifying criteria preceding, or contained in, each group of project categories, as found in Exhibit A, provide acceptable and adequate screening for federally-funded transportation projects, by which the parties may exclude from further Part 800 historic

preservation review processing, all projects which meet the stipulations and qualifying criteria; **and**

THAT: the undertakings listed in Exhibit A have each been determined to comply with the stipulations and meet qualifying criteria established for their respective categories, and are therefore declared by the signatories to be exempt from the need for Part 800 historic preservation consultation with the IA SHPO; **and**

THAT: adherence to this agreement by the IOWA DOT and the FHWA will satisfy the responsibilities of those agencies under Section 106/Part 800 and NEPA to consider the effects of these categories of undertakings on cultural resources through consultation with the IA SHPO; **and**

THAT: for other categories of federally-assisted undertakings *not* included in the attached list (Exhibit A), or included in the list but having been found as individual projects to not meet all of their applicable qualifying criteria, FHWA and the IA DOT shall, for those excepted undertakings, identify and evaluate historic properties which may be affected, assess the undertakings' effect upon those resources, consult with the IA SHPO, and afford the President's Advisory Council on Historic Preservation **(Council)** an opportunity to comment, when appropriate under Part 800; **and**

THAT: if, during implementation of any project, including actions included on the attached list, the work uncovers an historic object or other resource which may be of archeological, historical, or architectural significance, or if important new archeological, historical, or architectural data come to light in the project area, the agencies shall avoid or minimize harm to the resource(s), contact the IA SHPO (and the Iowa Office of the State Archeologist if prehistoric burial association is evident or suspected), evaluate the resource, and develop an appropriate course of action per the requirements of Part 800. Council will be notified of the discovery, and of any action taken; **and**

THAT: if any interested person objects to any determination made by the FHWA and the IA SHPO pursuant to this agreement, the FHWA shall ensure that the concerned public has a reasonable opportunity to comment, per Part 800. In addition, the FHWA will provide the Council with whatever documentation/additional information it may request in connection with notification by the public under Part 800.6(e); **and**

THAT: documentation of all projects processed under this agreement shall be retained by the FHWA and made available to the SHPO at any time during the life of the projects. The FHWA shall, by October 15th of each year, report to the SHPO the number of projects which have been processed under this agreement; **and**

THAT: the parties hereto will explore and develop suitable methodologies for tracking projects processed and advanced without SHPO review under this agreement such that the overall desirability, effectiveness and reliability of its procedures can be readily identified. Based upon the results of tracking information, the parties may establish a mutually agreeable interval for conducting a formal review of the process for revision, addition or deletion of individual project exclusions, or to specify procedural changes; **and**

THAT: in addition to the formal review contemplated above, these procedures also may be reviewed for possible modification at the request of any of the parties, and at any time. Any party may initiate any revision(s), including termination, to this agreement by submitting written notice to the other parties at least 30 days in advance of the desired action; **and**

FINALLY THAT: upon execution of this Categorical No Historic Properties Affected Memorandum of Understanding by the parties, the 1989 agreement shall be considered terminated, to be replaced in its entirety by this agreement.

III. STIPULATIONS

The parties to this agreement stipulate that all classes of actions described in the attached list (**Exhibit A**), ***"Undertakings Not NormallyRequiring Further Consultation with Iowa SHPO,"*** 1) are hereby considered to result in **"No Historic Properties Affected,"** and, 2) will require neither individual nor categorical Part 800 historic preservation review or consultation with the IA SHPO so long as they meet and satisfy all of the qualifying criteria set forth at the beginning of, or contained in, their respective sections of Exhibit A.

IV. EXECUTION OF THE AGREEMENT:

By their signatures below, the parties to this agreement indicate their concurrence with its provisions and their intent to fully abide by its provisions. Execution of this *Categorical No Historic Properties Affected Programmatic Memorandum of Underatanding* evidences that FHWA and the IA SHPO have reached agreement on the effects of specified categories of undertakings upon cultural resources.

FEDERAL HIGHWAY ADMINISTRATION, Iowa Division

BY: Bobby Blackmon **DATE:** 9/9/98

Bobby Blackmon, Division Administrator

IOWA STATE HISTORIC PRESERVATION OFFICER

BY: Patricia Ohlerking **DATE:** 9-4-98

Patricia Ohlerking, Deputy SHPO

IOWA DEPARTMENT OF TRANSPORTATION, Planning & Programming Division

BY: Harry S Budd **DATE:** 9/10/98

Harry S. Budd, Director
Office of Project Planning

EXHIBIT A

UNDERTAKINGS NOT NORMALLY REQUIRING FURTHER CONSULTATION WITH IOWA SHPO

I. ROAD AND STREET PROJECTS

A. QUALIFYING CRITERIA:

1. The project is entirely contained within an existing right of way; **or**

2. any additional right of way proposed, including permanent or temporary easements, is limited in its entirety to areas that can be documented as having been *previously disturbed-* and/or *surveyed for cultural resources and determined to contain none of significance*; **and**

3. the project does not involve exposed brick, stone, or wood block street surfaces, or will not disturb buried street surfaces of such make; **and**

4. although an activity may be excluded from Iowa SHPO review (as a result of being processed under this agreement), if the project involves or occurs at or near a *National Register*-eligible or listed property, the project will be developed and carried out in accord with the recommendations of *The Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings*, and *The Secretary of the Interior's Standards for the Treatment of Historic Propeties with Guidelines for the Treatment of Cultural Landscapes*; **and**

5. there are no *known and significant adjacent* sites, properties or other cultural resources that will be significantly altered or otherwise adversely affected by the project.

B. PROJECTS EXCLUDED FROM REVIEW:

1. Pavement repair, resurfacing, marking, and rehabilitation of roadway and parking where the area is within both existing horizontal and vertical alignment; **or**

2. pavement widening and/or shoulder construction and the addition of auxiliary lanes, such as turn lanes or climbing lanes; **or**

3. bicycle and pedestrian facilities; **or**

4. all median work on fully-controlled access facilities; **or**

5. noise wall installation or extension; **or**

6. highway rest areas and weigh station installations and improvements; **or**

7. ramp modifications within interchange control of access lines; **or**

8. signing, lighting, guardrails, subdrains, railroad warning devices, and traffic signals; **or**

9. culvert extensions or replacement; **or**

10. intersection modifications; **or**

11. slide repairs; **or**

12. surface grinding and grooving; **or**

13. landscaping and erosion control including treatment, maintenance, and replacement of all vegetative material, native or planted, where the work entails removal when required for traffic safety or because of disease infestation or pest control; **or**

14. planting of trees, shrubs, and herbaceous seedlings, except on earthen formations that could be prehistoric cultural alterations of the topography.

II. BRIDGE AND CULVERT PROJECTS

A. QUALIFYING CRITERIA:

1. The project is entirely contained within an existing right of way; **or**

2. any additional right of way proposed, including permanent or temporary easements, is limited in its entirety to areas that can be documented as having been *previously disturbed-* and/or *surveyed for cultural resources and determined to contain none of significance*; **and**

3. the project does not involve exposed brick, stone, or wood block street surfaces, or will not disturb buried street surfaces of such make; **and**

4. although an activity may be excluded from Iowa SHPO review (as a result of being processed under this agreement), if the project involves or occurs at or near a *National Register*-eligible or listed property, the project will be developed and carried out in accord with the recommendations of *The Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings*, and *The Secretary of the Interior's Standards for the Treatment of Historic Propeties with Guidelines for the Treatment of Cultural Landscapes*; **and**

5. there are no *known and significant adjacent* sites, properties or other cultural resources that will be significantly altered or otherwise adversely affected by the project.

B. PROJECTS EXCLUDED FROM REVIEW:

1. Replacement or reconstruction, on existing alignment, of bridges that have been previously evaluated as being *not eligible* for listing on the *NRHP*; **or**

2. bridge deck or other bridge structural repairs on bridges previously evaluated as being *not eligible* for listing on the *NRHP*, and not subsequently deemed eligible for listing on the *NRHP*; **or**

3. routine maintenance, stabilization, and protective activities on *NRHP* -listed or eligible bridges; work tasks falling into this category include:

   i. **Removing accumulated deposits-** this maintenance includes removal of harmful or otherwise undesirable deposits of dirt, stains, coatings, efflorescence (salts) and pollutants in a manner that does the least amount of harm to the surface being treated. Such housekeeping is repeated at short time intervals so that removal can be done with the gentlest and least radical methods;

   ii. **Routine maintenance-** usually consists of:

      a. service activities such as tightening, adjusting, etc.; **and/or**

      b. maintenance of historic construction material through treatments such as mending the material of a structure or object, rust removal, caulking, limited paint removal, and re-application of protective coatings.

   iii. **Stabilization-** this work includes acts or processes of applying measures designed to reestablish a weather resistant structure and restoring the structural stability of an unsafe or deteriorated bridge while maintaining the essential form as it exists at present. May include tasks such as:

      a. Reinforcement of load bearing members accomplished in such a manner so as to detract as little as possible from the property's original appearance; **and/or**

      b. arresting the deterioration of material that might otherwise be subject to structural failure.

   iv. **Protection-** this generally involves the least degree of intervention and, being preparatory to other work, includes such measures as:

a. Installation of temporary fencing, emergency utility repairs, security lighting, protective plywood, alarm systems and other short-term protective measures without causing damage to the historic materials; **and/or**

b. emergency stabilization work necessary to protect damaged historic fabric from additional damage, including seasonal debris removal (e.g. ice, trees, and tree branches) that have not caused damage requiring repair or replacement.

III. TRAIL PROJECTS

A. QUALIFYING CRITERIA:

1. The project does not involve *exposed* brick, stone, or wood block street surfaces, or will not disturb *buried* street surfaces of such make; **and**

2. although an activity may be excluded from Iowa SHPO review (as a result of being processed under this agreement), if the project involves or occurs at or near a *National Register*-eligible or listed property, the project will be developed and carried out in accord with the recommendations of *The Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings*, and *The Secretary of the Interior's Standards for the Treatment of Historic Propeties with Guidelines for the Treatment of Cultural Landscapes*; **and**

3. there are no *known and significant adjacent* sites, properties or other cultural resources that will be significantly altered or otherwise adversely affected by the project; **and**

4. for other qualifying criteria, refer to the restrictions as stated in the following individual categories of excluded projects.

B. PROJECTS EXCLUDED FROM REVIEW:

1. Rehabilitation and widening of existing trails, walks, paths and side-walks within previously disturbed areas; **or**

2. the construction of bicycle or pedestrian trails, and small parking lots less than one acre in size, located on row-cropped agricultural land- provided that any ground disturbance activities will be contained within the plowzone, which generally extends 10 to 12 inches below the surface; **or**

3. the construction of bicycle or pedestrian trails placed on top of existing road, street, or railroad right of way. This activity should involve very minimal surface alteration prior to construction; **or**

4. relocation of non *NRHP*-eligible bridges onto existing bridge abutments (where no bridge exists currently).

IV. NRHP-ELIGIBLE BUILDINGS, and OTHER NON-BRIDGE STRUCTURES

A. QUALIFYING CRITERIA:

1. The project does not involve *exposed* brick, stone, or wood block street surfaces, or will not disturb *buried* street surfaces of such make; **and**

2. although an activity may be excluded from Iowa SHPO review (as a result of being processed under this agreement), if the project involves or occurs at or near a *National Register*-eligible or listed property, the project will be developed and carried out in accord with the recommendations of *The Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings*, and *The Secretary of the Interior's Standards for the Treatment of Historic Propeties with Guidelines for the Treatment of Cultural Landscapes*; **and**

3. there are no *known and significant adjacent* sites, properties or other cultural resources that will be significantly altered or otherwise adversely affected by the project; **and**

4. for other qualifying criteria, refer to the restrictions as stated in the following individual categories of excluded projects.

B. PROJECTS EXCLUDED FROM REVIEW:

1. Electrical work- limited to upgrading or in-kind replacement and/or relocation of critical electrical and mechanical panels, switches, and control boards to a higher level; **or**

2. plumbing work- limited to upgrading or in-kind replacement, with the exception of historic fixtures which shall be repaired when possible; **or**

3. installation, repair, or elevation of mechanical equipment which does not affect the exterior of the building or require installation of new ducts throughout the interior; **or**

4. repainting of existing painted surfaces, provided that destructive surface preparation treatments including, but not limited to, water blasting, sandblasting and chemical cleaning are *not* used; **or**

5. repair or partial replacement of porches, cornices, exterior siding, doors, balustrades, stairs or other trim when the repair or replacement is done in-kind to closely match existing material and form; **or**

6. replacement of severely damaged doors or windows when the replacement is done in-kind to closely match the existing in all material and visual aspects, and the total number of doors or windows to be replaced is less than 25% of the total number of doors or windows; **or**

7. replacement of window panes, including skylights, in-kind or with double or triple glazing so long as glazing is clear and untinted and replacement does not alter the existing window material and form; **or**

8. caulking and weatherstripping with compatibly colored materials; **or**

9. roof repair or replacement of historic roofing with material which closely matches the existing material and form. Existing wood shingles may be replaced with `weathered wood-colored' asphalt- based shingles; **or**

10. replacement of insulation (with the exception of urea formaldehyde foam insulation or any other thermal insulation which contains *water* in its chemical composition) which is installed within wall cavities, provided that decorative interior plaster and woodwork, or exterior siding, *is not altered* by this work item and vapor barrier paint is applied to inside surfaces of exterior walls; **or**

11. replacement of fire or smoke detectors; **or**

12. replacement of damaged non-original security devices, including deadbolts, door locks, window latches, door peepholes, or intrusion detection devices installed in the same locations; **or**

13. repair or replacement of driveways and walkways when work is done in-kind to closely match existing materials and form; **or**

14. repair or replacement of deteriorated historically significant fencing when work is done in-kind to closely match existing material or form; or removal of fencing less than 50 years in age; **or**

15. floor refinishing; **or**

16. repair or replacement of floors when work is done in-kind to closely match existing material or form; **or**

17. repair or replacement of deteriorated historically significant signs or awnings when work is done in-kind to closely match existing material and form; **or**

18. repair or replacement of severely deteriorated interior stairs when work is done in-kind to closely match existing material and form; **or**

19. repair or replacement of interior walls including plaster and dry wall to closely match prior or

existing walls; this can include the repair of exterior and interior cracks up to one inch wide in masonry or plaster. [Any material used to repair such cracks, such as epoxy or mortar should not exceed the strength of the material being repaired, and should match the color and workmanship of the existing material. These materials must be restricted to the damaged area and care must be taken in this application to avoid staining adjacent materials.]; **or**

20. anchoring of masonry walls to floor systems so long as anchors are embedded and concealed from exterior view- such as those used in the "Hilti" systems; **or**

21. reconstruction or repair of parapets, chimneys, and cornices to closely match existing in all material and visual aspects; **or**

22. temporary bracing or shoring as part of stabilization or foundations; **or**

23. removal, replacement or repair of furniture and equipment; **or**

24. removal and replacement of books and book storage equipment; **or**

25. removal of suspended ceiling systems or replacement of suspended ceiling tiles; **or**

26. installation of temporary, reversible barriers, such as chin link fences and polyethylene sheeting or tarps; **or**

27. fees for architectural, engineering or other design services; **or**

28. miscellaneous labor costs.

V. OTHER UNDERTAKINGS

A. QUALIFYING CRITERIA:

1. The project is entirely contained within an existing right of way; **or**

2. any additional right of way proposed, including permanent or temporary easements, is limited in its entirety to areas that can be documented as having been *previously disturbed-* and/or *surveyed for cultural resources and determined to contain none of significance*; **and**

3. the project does not involve *exposed* brick, stone, or wood block street surfaces, or will not disturb *buried* street surfaces of such make; **and**

4. although an activity may be excluded from Iowa SHPO review (as a result of being processed under this agreement), if the project involves or occurs at or near a *National Register*-eligible or

listed property, the project will be developed and carried out in accord with the recommendations of *The Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings*, and *The Secretary of the Interior's Standards for the Treatment of Historic Propeties with Guidelines for the Treatment of Cultural Landscapes*; **and**

5. there are no *known and significant adjacent* sites, properties or other cultural resources that will be significantly altered or otherwise adversely affected by the project; **and**

6. for other qualifying criteria, refer to the restrictions as stated in the following individual categories of excluded projects.

B. *PROJECTS EXCLUDED FROM REVIEW:*

1. Landscaping and erosion control; treatment, maintenance, and replacement of all vegetative material, native or planted, including where the work entails removal when required for traffic safety or because of disease infestations or pest control, except when such removal would affect known archeological deposits or their associated historic landscapes; **or**

2. planting of trees, shrubs and herbaceous seedlings, except on earthen formations that could be prehistoric cultural alterations of the topography, or except where in the vicinity of *NRHP*-listed or eligible properties or their associated historic landscapes; **or**

3. mowing, burning, cutting and spraying of noxious weeks and other undesirable vegetation, except on earthen formations that could be prehistoric cultural alterations of the topography, or except where in the vicinity of *NRHP*-listed or eligible properties or their associated historic landscapes; **or**

4. construction of new facilities and structures entirely contained on and within dredge spoil sites; **or**

5. construction and removal of fences, signs, and boundary markers except where located upon earthen formations that could be prehistoric cultural alterations of the topography, or except where in the vicinity of *NRHP*-listed or eligible properties or their associated historic landscapes; **or**

6. health and safety activities such as radon mitigation, removal of buried oil tanks and the dust-free removal of asbestos and lead paint abatement or chemical spill cleanup where no historically significant materials are removed; **or**

7. repair, replacement or removal of existing underground drainage systems, pipelines, or utility lines on the existing alignment; or placement, maintenance or replacement of utility lines, transmission lines and fences using existing alignments, except where the activity is in the

vicinity of *NRHP*-listed or eligible properties or their associated historic landscapes; **or**

8. placement of signs, small wayside exhibits and memorial plaques; **or**

9. removal of borrow material from- and burial of trash and debris in- exposed glacial till (where the topsoil has eroded away) or post-settlement alluvium (aka "Camp Creek Member" or "historic alluvium"), not to exceed one (1) surface acre; **or**

10. obtaining additional fill materials from borrow areas which have been previously archeologically investigated **and** were found to contain either no historic properties, or historic properties evaluated as not being eligible for the *NRHP*; **or**

11. filling of abandoned ***drilled*** wells located on historic properties which have been evaluated as being not eligible for listing upon the *NRHP*, or are less than 50 years in age.

STATE OF IOWA

PROGRAMMATIC AGREEMENT

Among the

IOWA DEPARTMENT OF TRANSPORTATION,

IOWA DIVISION, FEDERAL HIGHWAY ADMINISTRATION,

and the

IOWA STATE HISTORIC PRESERVATION OFFICER

JULY 2002

Based Upon

36 CFR, PART 800, Sections 800.1 through 800.16
"Protection of Historic Properties"
Final Rule: January 2001

Iowa Department of Transportation
Highway Division
Office of Location and Environment
Ames, Iowa

PROGRAMMATIC AGREEMENT

AMONG THE
IOWA DIVISION, FEDERAL HIGHWAY ADMINISTRATION,
IOWA STATE HISTORIC PRESERVATION OFFICER,
AND THE
IOWA DEPARTMENT OF TRANSPORTATION

WHEREAS: the Iowa Division Administrator, Federal Highway Administration (**FHWA**), is the "Agency Official" responsible for compliance with Section 106 of the *National Historic Preservation Act of 1966* (**NHPA**), as amended *(16. U.S.C. 470 et seq.)* and implementing regulations *(36 CFR, Part 800)* for the Federal Aid Highway Program in Iowa; and

WHEREAS: the Iowa Department of Transportation (**DOT**), in consultation and partnership with the FHWA, administers federal-aid highway projects (undertakings) throughout the State of Iowa as authorized by Title 23, U.S.C.; and

WHEREAS: the Iowa State Historic Preservation Officer's (**SHPO**) responsibilities, under Section 106 of the NHPA and 36 CFR, Part 800, are to advise, assist, and consult with federal agencies as they carry out their historic preservation responsibilities and to respond to federal agencies' requests within a specified period of time; and

WHEREAS: the FHWA, SHPO, and DOT signed a Partnering Charter on May 6, 1977, that established a Cultural Interchange Team (CIT) that meets regularly to discuss policies, procedures and project related issues [see Attachment 1]; and

WHEREAS: the FHWA; **1)** has determined that certain transportation projects constitute "undertakings" which may have an effect upon properties included in, or eligible for inclusion in, the *National Register of Historic Places* (**NRHP**); **2)** has consulted with the SHPO, the Advisory Council on Historic Preservation (**Council**), and other consulting parties pursuant to 36 CFR, Part 800; **3)** wishes to ensure that the DOT will conduct its programs in a manner consistent with 36 CFR, Part 800; and **4)** intends to integrate its historic properties preservation planning and management decisions with other policy and program requirements (such as those of the *National Environmental Policy Act [**NEPA**]*) to the maximum extent possible, consistent with Section 110 NHPA; and

WHEREAS: the DOT, as a partner of the FHWA and formally designated by the FHWA to perform certain Section 106 duties on its behalf, and as an applicant for federal-aid highway funds, employs qualified professional staff and consultants capable of completing many of the steps of the Section 106 review and compliance process on behalf of the FHWA, and has established a significant track record of successful and conscientious compliance with Section 106 and 36 CFR, Part 800; and

WHEREAS: the DOT, in cooperation and consultation with the FHWA, staff of the SHPO, and the Council, has prepared and adopted a document dated July 2002, and titled *"Procedures for Implementation of Section 106 Requirements"* which describes the process the respective agencies will follow to fulfill the Section 106 responsibilities; said procedures are attached as Exhibit "A" to this programmatic agreement and, by this reference, are incorporated into and made a part of this agreement; and

WHEREAS: the procedures of Exhibit "A" and the stipulations of this agreement are intended to recognize and accommodate all existing agreements currently in effect in Iowa between the FHWA, the DOT, and the

SHPO. The agreements (Marsh Arch Historic Bridges Programmatic Agreement, a "Categorical `No Historic Properties Affected' Programmatic Memorandum of Understanding" of August 1998, and the Nationwide Enhancement Projects Programmatic Agreement [with Iowa Addendum]) will remain in effect; and

WHEREAS: with the exception of the preceding provision, the procedures of Exhibit "A" and the stipulations of this agreement are intended to document the agencies' commitment to adhere to the 'standard Section 106 procedures' as prescribed by 36 CFR, Part 800; they do not attempt to establish "Program Alternatives" [to the standard procedures] as allowed by Subpart - C of the revised Part 800 regulations; and

WHEREAS: the FHWA in partnership with DOT invited the tribes who may attach religious or cultural significance to historic properties in Iowa to a three-day Iowa Tribal Summit in May 2001, and a subsequent two-day Iowa Tribal Workshop in October 2001, to establish a continued working relationship and mutually acceptable consultation process; and

WHEREAS: the DOT has participated in the consultation process, leading to preparation of this agreement and the attached procedures, and has been invited to concur in this Programmatic Agreement (PA); and

WHEREAS: the definitions contained in 36 CFR, Part 800.16 are appropriate to define the terms used in this agreement and Exhibit "A".

NOW, THEREFORE: the FHWA, the SHPO and the DOT agree that the purpose of the Programmatic Agreement (PA) is to document the commitment of the FHWA, the DOT and the SHPO to the Iowa process for the benefit of the Iowa parties; it is also to provide documented assurance to other state and federal resource protection agencies having a stake in the protection of historic properties, and with whom the parties regularly interact in the highway project development process, that the process will be followed to a proper conclusion for every applicable federal-aid highway project.

1. This PA sets forth the process by which FHWA, with the assistance of the DOT, will meet its responsibilities under Section 106 of the NHPA and the Act's revised implementing regulations as set forth in 36 CFR, Part 800, effective on January 11, 2001. This PA shall apply to all FHWA undertakings administered under its federal-aid highway program in Iowa, except those otherwise exempted by existing agreements for historic bridges and minor scale/Transportation Enhancement type projects;

2. The review of FHWA undertakings in the State of Iowa will be administered according to the following stipulations and the procedures of Exhibit "A", hereto; the SHPO agrees that use of these procedures will satisfy the FHWA's Section 106 responsibilities for all applicable DOT-administered federal-aid projects:

I. PROCESS STIPULATIONS

The FHWA, with the cooperation and assistance of the DOT, will ensure that the following measures are carried out:

1. Section 106 and the Iowa Project Development Process: The parties hereto recognize, and agree, that:

a) it is highly desirable to avoid causing adverse effects to significant historic properties and that complete avoidance is always preferable to minimizing and/or mitigating effects; and

b) it is highly desirable, but sometimes not possible, to fully complete all applicable steps of the Section 106 process before any element of an undertaking is advanced to construction.

Regarding Item a), the parties hereto are fully committed to the concept of avoidance whenever possible. When adverse effects are identified, FHWA and the DOT will examine location and design elements of a project in an effort to make revisions that will allow the project to avoid the adverse effect. Accepting minimized impacts, or planning mitigation for impacts that cannot be avoided are considered less desirable courses of action. As required by 36 CFR 800, the parties will continue to make it their practice to consult with the consulting parties in an effort to identify feasible and prudent alternatives that will achieve the desired avoidance where significant historic properties will be subject to adverse effects.

Regarding Item b), the FHWA and the DOT are also committed to completing all applicable steps of the Section 106 process for every project subject to 106 review. Project reviews are performed for construction of a facility, the use of borrow sites to obtain needed fill material, and the construction of wetland or other resource mitigation sites in connection with the project itself. When Federal permits, such as those mandated by Section 404 of the Clean Water Act, are required for a project, and have SHPO review and comment as a prerequisite for their issuance, the agencies will make every reasonable effort to complete the Section 106 processing steps prior to applying for the permit.

There are times, however, when this is not possible. Borrow and mitigation site plans often must be developed after the highway project itself is designed and ready for construction. With this scenario, it is not feasible to complete the necessary surveys and obtain comments for these supplemental sites at the same time as for the roadway. The DOT occasionally finds itself in the position of needing to complete Section 106 steps for a mitigation area after it has already done so for the roadway. Yet, the necessary permit covering both elements must be obtained in time to allow construction of the roadway to begin on schedule. In these cases, Section 106 steps for the mitigation area- survey, evaluation, avoidance/mitigation planning, etc.- may need to be taken after an initial permit for a project has been issued.

2. Initial Processing: The DOT, in consultation with the SHPO staff, and using consultants meeting the Secretary of the Interior's Professional Qualifications Standards (C-36 CFR, Part 61), and in keeping with the procedures outlined in Exhibit "A," hereto, will perform the work and consultation described in 36 CFR, Parts 800.3 through 800.5 on behalf of the FHWA, as follows:

A. for 36 CFR, Part 800.3 "Initiation of the Section 106 Process"

1) establish the project as undertaking;
2) establish that project has no potential to cause effects on historic properties and that no further obligations exist under section 106; OR
3) identify potential to cause effects;
4) determine extent of tribal and other public participation warranted based upon scope of project and potential to affect historic properties;
5) identify other possible consulting parties.

B. for 36 CFR, Part 800.4 "Identification of Historic Properties"

1) assess information needs (scope of identification efforts);
2) determine and document the `Area of Potential Effect' (APE);
3) locate and identify historic properties;
4) evaluate identified properties for historic significance;
5) conclude Section 106 upon SHPO concurrence when no historical properties are found by issuing a finding of "No Historic Properties Affected"; and
6) assess effects per 800.5 when historic properties are found.

C. for 36 CFR, Part 800.5 "Assessment of Adverse Effects"

1) apply the 'Criteria of Effect';
2) prepare the finding of "No Adverse Effect"; and
3) consult and coordinate with the SHPO to obtain documented concurrence in the above findings.

3. No Adverse Effect, or Less: If consultation with the consulting parties results in a finding of 'No Adverse Effect' or less, the DOT will prepare documentation in support of that finding as described in 36CFR, Part 80011(e) and forward it to the SHPO and other consulting parties. SHPO concurrence in the finding will be sufficient to conclude Section 106 consultation for that project without further review by the Council.

4. Adverse Effect/Failure to Agree: If consultation results in a finding of 'Adverse Effect', or if agreement can not be reached concerning the effects, the work required to conclude the Section 106 consultation process will be completed by the DOT and FHWA as described in 36 CFR, Section 800.6, "Resolution of Adverse Effects." Written documentation required by 800.6 will normally be prepared by the DOT for use by the FHWA in contacting and involving the Council. Resolution of Adverse Effects includes the following:

a) notify the Council and determine Council participation;
b) involving the public as appropriate to the scale of the project, its potential to affect historic properties, and the likely interest of the public in resolving the issues;
c) continue the consultation with or without Council involvement;
d) prepare and execute a Memorandum of Agreement (**MOA**) to document measures to avoid, minimize and/or mitigate the adverse effects; and
e) refer the matter to the Council if the Iowa parties to the MOA can not agree on its terms.

5. Tribal Coordination: As a result of the Tribal Summit and Tribal Workshop, the participating parties agree the DOT will notify the tribes who have an interest in a project area at one or more of the four consultation points during the "Can-Do" project development process *[see Can Do/Section 106 Chart, Attachment 2]*.

Consultation Points are:

1) Identification of the project's "area of potential effect" (APE) when the project is initiated. Tribes are requested to notify the DOT if there are sensitive areas within the APE that need to be avoided.
2) Tribes are provided with prehistoric site information and maps.
3) Consultation regarding site treatment of National Register-eligible prehistoric sites affected by the project.
4) Tribes participating in an MOA regarding prehistoric sites receive a copy of the final data recovery report.

A Tribal Notification Form accompanies the project submittal to the tribes. The notification form indicates the type of project, type of coordination or consultation, the findings, and requests a response. The form is a self-mailer to facilitate a response *[see Tribal Notification Form, Attachment 3]*.

The DOT will be the contact point with the tribes until there has been a determination that the project will adversely affect a prehistoric site, or there is a conflict, at which time the FHWA will become actively involved in the consultation process.

The DOT and FHWA *will complete these steps* and ensure that final review and comments are obtained from the SHPO and other consulting parties. The FHWA, in partnership with the DOT- has the ultimate responsibility (as "Agency Official" under 36 CFR, Part 800 and Section 106 of the NHPA) to ensure these measures are completed. The signatures of the parties to this programmatic agreement attest to their commitment.

II. ADMINISTRATIVE STIPULATIONS

1 Emergency Situations

A. Immediate rescue and salvage operations conducted to preserve life or property are exempt from the provisions of Section 106 and this PA.

B. These emergency procedures apply only to undertakings that will be implemented within 30 days after the disaster or emergency has been formally declared by the appropriate authority. FHWA may request an extension of the period of applicability from the SHPO prior to the expiration of the 30 days.

In the event that FHWA proposes an emergency undertaking as an essential and immediate response to a disaster or emergency declared by the President or the Governor of Iowa, or to another immediate threat to life or property, FHWA will notify the appropriate SHPO and any Indian tribe that may attach religious and cultural significance to historic properties likely to be affected prior to the undertaking and afford them an opportunity to comment within seven (7) days of notification.

If FHWA determines that circumstances do not permit seven (7) days to comment, the agency official will notify the SHPO and the Indian tribe and invite comments within the time available. FHWA will take into account any comments received in reaching a decision on how to proceed with the emergency undertaking.

2. Dispute Resolution

Should any party to this agreement object at any time to any actions proposed or the manner in which the terms of this PA are implemented, FHWA will consult with the objecting party or parties to resolve the objection. If FHWA determines within 30 days that such objection(s) cannot be resolved, FHWA will:

A. Forward all documentation relevant to the dispute to the Council in accordance with 36 CFR, Part 800.2(b)(2). Upon receipt of adequate documentation, the Council will review and advise FHWA on the resolution of the objection within 30 days. Any comment provided by the Council and all comments from the parties of the PA will be taken into account by FHWA in reaching a final decision regarding the dispute.

If the Council does not provide comments regarding the dispute within 30 days after receipt of adequate documentation, FHWA may render a decision regarding the dispute. In reaching its decision, FHWA will take into account all comments regarding the dispute from the parties to the PA. FHWA will notify all parties of its decision in writing before implementing that portion of the undertaking that is subject to dispute under this stipulation. FHWA's decision will be final.

B. FHWA's responsibility to carry out all other actions subject to the terms of this PA that are not a subject of dispute remain unchanged.

3. Post Review Discovery

If historic properties are discovered, or unanticipated effects on historic properties are found after approval of the undertaking, and after construction has commenced, FHWA will:

a) make reasonable efforts to avoid, minimize, or mitigate adverse effects to such properties;

b) determine reasonable actions that it can take to resolve adverse effects; and

c) notify the SHPO and any Indian tribe that might attach religious and cultural significance to the affected property within 48 hours of the discovery.

A. The notification will describe FHWA's assessment of National Register eligibility of the property and proposed actions to resolve the adverse effects. The SHPO and Indian tribe(s) that have been notified will respond within 48 hours of the notification. The Agency official will provide the SHPO and the Indian tribe(s) a report of the actions when they are completed.

B. FHWA, in consultation with the SHPO, may assume a newly discovered property to be eligible for the National Register for purposes of Section 106

4. Duration
This executed agreement will be null and void if its terms have not been discussed by the established Cultural Interchange Team (CIT) within a five (5) year time period from the date of its execution. Documented consideration of the agreement will be the basis for it to remain in effect unless it is superceded or is terminated according to stipulation 8.

5. Monitoring and Reporting
Following the execution of this agreement by the CIT, until it may be terminated or superseded, all parties agree to monitoring through the on-going activities of the CIT. Any signatory to this PA may place on the agenda any problems or objections to actions or findings covered under this PA for discussion and resolution at regular or special CIT meetings.

6. Special Requirements for Protecting National Historic Landmarks
If FHWA (DOT) determines that an undertaking may adversely effect a National Historic Landmark, FHWA (DOT) will request the SHPO, Council, and the Secretary of the Interior to participate in consultation to resolve any adverse effects as outlined in 36 CFR, Part 800.10.

7. Amendments Any party to this agreement may request that it be amended, whereupon the parties shall consult to consider such an amendment.

8. Termination Any party to this agreement may terminate it by providing thirty (30) days written notice to the other parties, provided that the parties will consult during that period prior to actual termination to seek agreements on amendments or other actions that would avoid termination. In the event of termination, FHWA and DOT will comply with the provisions of 36 CFR, Part 800 with respect to the undertakings covered by this agreement.

9. Regulatory Revisions In the event that 36 CFR, Part 800 should again be revised by the Council after this agreement is executed, the parties hereto will consult to consider the need to amend this PA accordingly.

III. EXECUTION and IMPLEMENTATION

The execution and implementation of this Programmatic Agreement evidences that the FHWA has afforded, and is committed to providing the Council with a reasonable opportunity to comment on the undertakings covered by this agreement, and that the FHWA will take into account the effects to historic sites and properties of all applicable federal-aid undertakings in the State of Iowa.

Signatories:

FEDERAL HIGHWAY ADMINISTRATION

Bobby Blackmon — 8-13-02

Bobby Blackmon, Division Administrator — **Date**
Iowa Division

IOWA STATE HISTORIC PRESERVATION OFFICER

Lowell J. Soike — 8-13-02

Lowell J. Soike, PhD — **Date**
Deputy State Historic Preservation Officer

IOWA DEPARTMENT OF TRANSPORTATION

8-9-02

Mark F. Wandro — **Date**
Director of Transportation

Concurring Party

WINNEBAGO TRIBE OF NEBRASKA

8/21/02

John Blackhawk **Date**
Tribal Chairman

Iowa DOT'S Project Development

"CAN DO" PROCESS

"SECTION 106" REVIEW PROCESS

106 Consultations

PHASE 1

Send new project scope to regulatory/governmental agencies

Collect data about the project corridor

PHASE 2

Develop location alternatives

Recommend one alternative

Finalize design (implement Memorandum of Agreement in design)

Acquire right of way

PHASE 3

Begin construction

1

2 — 12–18 months

3 — 24–36 months

4 — 2–5 years

Can we avoid historic property?

Initiate project, notify tribes

"Identify historic property" (Does any historic property exist?)

- No historic property exists → **106 completed;** end of consultation (unless late findings)
- YES

"Evaluate property's historical significance" (Determine if property is potentially elgible for National Register of Historic Places)

- No NRHP-elgible property → **106 completed;** end of consultation (unless late findings)
- YES

"Assess adverse effects" (Is NRHP-eligible property likely to be adversely affected by project?)

- NO → **106 completed;** end of consultation (unless late findings)
- YES

"Resolve effects" (Develop Memorandum of Agreement to resolve/mitigate adverse effects)

Implement Memorandum of Agreement

Report Memorandum of Agreement implementation

106 completed; end of consultation (unless late findings)

Legend for Phases of Archaeological Investigation

PHASE 1 archaeological investigation: to determine if the site may contain historic property; includes visual survey, perhaps data collection and/or subsurface testing

PHASE 2 archaeological investigation: to determine if property qualifies for National Register of Historic Places; includes subsurfacing testing and research

PHASE 3 archaeological investigation: to determine methods by which Memorandum of Agreement will be implemented; may include archaeologicaal excavation, data recovery

Form 536002
10-01

Iowa Department of Transportation
TRIBAL NOTIFICATION

Date _____ IA DOT contact _____

IADOT project # _____ Phone # _____

Location _____ E-mail _____

Description _____

Type of Project *(see map)*

- ☐ VERY SMALL - Disturb less than 12 inch depth *(plow zone)*
- ☐ SMALL - Grading on existing road, shouldering, ditching, etc.
- ☐ SMALL - Bridge or culvert replacement
- ☐ LARGE - Improve existing road from 2-lanes to 4-lanes
- ☐ LARGE - New alignment
- ☐ OTHER

Type of Coordination/Consultation Points

- ☐ **1**--Early project notification *(project map and description)*
- ☐ **2**--Notification of survey findings *(Phase I)*
- ☐ **2a**--Notification of site evaluation *(Phase II)*
- ☐ **3**--Consultation regarding site treatment
- ☐ **4**--Final Data Recovery Report

Type of Findings

- ☐ No American Indian sites found
  --Section 106 Consultation Process ends *
- ☐ No significant American Indian sites eligible for National Register listing found--Section 106 Consultation Process ends *
- ☐ Avoided American Indian sites eligible for National Register listing *(see map and list of sites)*
  --Section 106 Consultation Process may or may not end

* *in the event of a late discovery consultation will be reopened*

- ☐ Potentially significant American Indian sites found
  Phase II evaluation conducted *(see map and list of sites)*
- ☐ American Indian sites eligible for National Register listing cannot be avoided *(see map)*
- ☐ Burial site found

_____ # of non-significant prehistoric sites
_____ # of potentially significant prehistoric sites
_____ # of National Register eligible prehistoric sites

Affected National Register Properties

- ☐ Investigating avoidance or minimizing harm options
- ☐ Avoided
- ☐ Protected
- ☐ Data Recovery/MOA

* Please Respond *

Who should we contact for site/project related discussions?

Name _____ Street Address _____ City, Zip Code _____

Phone _____ E-mail _____

Do you know of any sensitive areas within or near the project the FHWA/DOT should avoid *(please describe)*? _____

- ☐ Thank you for the information; however, we do not need to consult on this particular project.
- ☐ We do not have a comment at this time but request continued notification on this project.
- ☐ Please send a copy of the archaeology report.
- ☐ Thank you for the information. We are satisfied with the planned site treatment.
- ☐ We have concerns and wish to consult.
- ☐ We wish to participate in the Memorandum of Agreement for this project.

Comments _____

Name _____ Tribal Name _____ Date _____

(Comments continued on back)

ARCHAEOLOGICAL SURVEY SHORT REPORT FORM

State Historical Society of Iowa
The Historical Division of the Department of Cultural Affairs
600 E. Locust
Des Moines, Iowa 50319-0290

R & C#: _____
Reviewer: _____
Date: _____
ASSR Accepted: Yes (___) No (___)

Locational Information and Survey Conditions

County(ies): _____
Quadrangle(s): _____ Date(s): _____
Project type/title: _____

Responsible federal/state agencies: _____

Legal Location: _____1/4 _____1/4 _____1/4 Sec._____ T._____ R._____
(if needed) :_____1/4 _____1/4 _____1/4 Sec._____ T._____ R._____
(if needed) : _____1/4 _____1/4 _____1/4 Sec._____ T._____ R._____
UTM coordinates: N_____ to _____, E_____ to _____
(if needed) : N_____ to _____, E_____ to _____
Project description: _____

Topography

Soil associations: _____

_____ Reference: _____
Landform: _____

_____Reference: _____
Drainage Name: _____

Land use/ground cover/percent visibility: _____

Survey Limitations: _____

ARCHAEOLOGICAL SURVEY SHORT REPORT FORM
State Historical Society of Iowa
The Historical Division of the Department of Cultural Affairs
600 E. Locust
Des Moines, Iowa 50319-0290

R & C#: _____
Reviewer: _____
Date: _____
ASSR Accepted: Yes (___) No (___)

Archaeological and Historical Information

Previously reported sites: _____
Previous surveys: _____

_____ Citation(s): _____
Regional archaeologist contacted: _____ Phone number: _____
Investigation Techniques: _____

Historical sources consulted: _____

Time expended: _____ Person hours: _____
Area surveyed: _____ acres _____ square meters.

Contractor and Surveyor Information

Archaeological contractor: _____
Address: _____

Surveyor's Name(s): _____

Date(s) surveyed: _____
ASSR completed by: _____
ASSR submitted by: _____ (title) _____ Signature: _____
Address (if the address is not the same as the contractor address): _____

ARCHAEOLOGICAL SURVEY SHORT REPORT FORM

State Historical Society of Iowa
The Historical Division of the Department of Cultural Affairs
600 E. Locust
Des Moines, Iowa 50319-0290

R & C#: _____
Reviewer: _____
Date: _____
ASSR Accepted: Yes (___) No (___)

Attachments Checklist

_____ 1. Project location map depicting general project location, scale, and north arrow
_____ 2. U.S.G.S. topographic map depicting project limits, scale, north arrow, and date of map
_____ 3. Sketch map(s) depicting project limits, scale, north arrow, date of map, all subsurface tests, shovel probes, soil cores, and soil profiles
_____ 4. Copies of historical plat map(s) consulted
_____ 5. Relevant depiction(s) of soil profiles and soil descriptions
_____ 6. References cited section
_____ 7. Additional information sheets as necessary

Contractor and ASSR Assurance Control

I (We), the (Co-) Principal Investigator(s): _____

_____(sign here),

do hereby assure that the Phase I archaeological reconnaissance has located no archaeological materials or no historic properties (sites over 50 years of age from the date of this report); project clearance is recommended.

Address(es) of the agency or person to whom SHPO comments should be mailed: _____

Comments: _____

Reviewer's comments: _____

IOWA ARCHAEOLOGICAL SITE FORM

Office of the State Archaeologist
700 Clinton Street Building
University of Iowa
Iowa City, Iowa 52242-1030

State Site No._____
OSA Accession No._____
New Form_____ **Supplemental**____

I. SITE TYPE INFORMATION

County_____
Site Name_____**Field Site No.**_____
Location: Township_____Range_____Section_____

_____1/4_____1/4_____1/4_____1/4

_____1/4_____1/4_____1/4_____1/4

Reliability of Site Location _____Good _____Fair _____Poor

Quadrangle_____**Date of Map**_____

Site Type

___ Prehistoric scatter
___ Open habitation
___ Mounds, unspecified type
___ Effigy
___ Conical
___ Linear
___ Rockshelter/cave
___ Quarry
___ Petroglyph/pictograph
___ Lithic workshop
___ Isolated burials
___ Village
___ Isolated find
___ Non-mound earthwork
___ Other (specify)_____

___ Earthlodge
___ Habitation with mounds
___ Cache site
___ Resource procurement
___ Historic school
___ Historic farm/residence
___ Historic scatter
___ Structure/building remains
___ Cemetery:___prehistoric or___historic
___ Railroad related
___ Archaeological Road/Trail
___ Industrial
___ Military
___ Abandoned town site

Temporal/Cultural Affiliation

___ Prehistoric, undefined
___ Paleo-Indian
___ Archaic, undefined
___ Early
___ Middle
___ Late
___ Woodland, undefined
___ Early
___ Middle
___ Late

___ Late Prehistoric
___ Protohistoric
___ Historic Euro-American
___ Other (specify)_____

Cultures/Phase Designation (complete if known)_____
Basis for Culture/Phase Designation_____

Dating Methods _____Relative _____Absolute
Describe_____
_____

II. CULTURAL MATERIALS

Prehistoric/ Historic Indian

___ Bone
___ Pottery
___ Charcoal
___ Fire-cracked rock
___ Faunal remains
___ Floral remains
___ Fossils
___ Human remains
___ Projectile point(s)
___ Shell, worked
___ Shell, unworked
___ Stone, chipped
  ___ tools
  ___ cores
  ___ debitage
___ Stone, ground or pecked
___ Trade item (specify)_____
___ Wood
___ Other (specify)_____

Describe Indian Artifacts_____
_____
_____

Indian Artifacts Observed, Not Collected_____
_____

Estimate Reliability of Cultural Affiliation _____Excellent _____Good _____Fair _____Poor

Historic Materials

___ Brick
___ Ceramics
___ Metal
___ Other (describe)_____
___ Bottle glass
___ Window glass
___ Other glass

Describe Historic Artifacts_____
_____
_____

Approximate Historic Site Date Range

___ pre-1700
___ 1700-1750
___ 1750-1775
___ 1775-1800
___ 1800-1825
___ 1825-1850
___ 1850-1875
___ 1875-1900
___ 1900-1925
___ 1925-1950
___ 1950-1975
___ 1975-2000

Historic Materials Observed, Not Collected_____
_____

Location of Artifact Collection _____OSA _____Other (specify)

Collection Method ____Surface ____Shovel Tests ___Excavation _____Other (specify)

Ground Cover during Surface Collection ___Crops ____Woods ____Pasture/grass_____Other

Surface Conditions in Cropland ____Recent Rain, _____Wet, or ____Dry and _____Recently plowed

III. GEOGRAPHIC INFORMATION

Topography/Landform

___ Island
___ Uplands
___ Alluvial/colluvial fan
___ Sand dune
___ Floodplain
___ Bluff top
___ River/stream terrace

Amount of Ground Surface Visible (typically)

___<10% ___50–90% ___Other_____
___10–50% ___90%–100%

NRCS Soil Mapping Unit_____
Date of Soil Map_____

Nearest Water Source_____

Type ___Perennial stream/river ___Marsh/swamp/fen ___Lake
___Intermittent stream ___Other (describe)_____
___Spring

Distance from site (in meters) _____

Elevation_____ft. above _____Mean Sea Level or _____National Geodetic Vertical Datum
(refer to the datum information on the bottom of your USGS quad map)

Other Environmental Data_____
_____
_____
_____

Site Size_____
Basis for Estimate ___Survey instrument ___Range finder ___Shovel test
___Taped ___Topographic map ___Paced
___Visual estimate ___Other (Specify)_____

Confident of Site Boundaries? ___No _____Yes

Degree of Disturbance ___Minimal ___Completely destroyed
___Moderate ___Unknown
___Heavy

Threats to Site_____
_____

Current Land Use ___ Unused ___ Inundated ___ Other (specify)_____
___ Cultivation ___ Recreational _____
___ Forest ___ Residential _____
___ Pasture ___ Industrial _____
___ Road ___ Unknown

IV. REPORTING INFORMATION

Recorder_____**Date of Investigation**_____

Affiliation_____

Mailing Address _____
_____

Level of Investigation
___Phase I
___Phase II
___Phase III
___Research
___Archival
___Interviews
___Other (describe)_____

Recommendations
___No further work
___No effect/No adverse effect
___Field check
___Additional Phase I
___Phase II
___Phase III

Present Owner(s)_____
Address_____
_____
Owner's Attitude Toward Excavation_____

Photos ___No ___B/W ___Color ___Slides _____Other (specify)_____
Photos Curated at_____

National Register Eligibility
___Unknown/Not Determined
___Not Eligible
___Recommended Eligible or Potentially Eligible
___Determined Eligible
___Listed NRHP
Date Listed_____ **Recorder**_____

Report References
_____
_____

OSA PCR/CCR No._____
OSA Research Paper No._____
Other Institutions Report #: Company/No./Year/
_____
_____

V. VERBAL DESCRIPTION

Location: Provide a verbal description of how to locate the site, including distances and direction. This information must be sufficiently detailed to permit accurate site relocation. If possible, include permanent landmarks, roadways, and distances.

Site Description: Describe the site and include dimensions, features, nature and content of artifacts and concentrations, extent and location of disturbances, etc. (A field sketch is optional.)

VI. **Attach a U.S.G.S. topographic quadrangle section map with the site location marked**. If possible, also include sketches of diagnostic artifacts not reposited at the Office of the State Archaeologist.

REQUEST FOR SHPO COMMENT ON A PROJECT

Submit one copy with *each* property for which our comment is requested. Please print or type.
Return to: State Historical Society of Iowa, State Historic Preservation Office, 600 E. Locust St, Des Moines, IA 50319-0290

I. GENERAL INFORMATION

☐ **This is a new submittal**
☐ **This is more information relating to SHPO R&C #:** _____

a. Property Name: _____
b. Property Street & Number: _____
c. County: _____ City: _____ Zip: _____
d. Federal Agency: _____ Federal Funding Program/Permit: _____
e. Agency Project No.: _____ If HUD, circle one: 24 CFR Part *50* or Part *58*
f. Contact Person on Project: _____ Phone: _____
g. Contact Address: _____ Zip: _____ email: _____

II. IDENTIFICATION OF HISTORIC PLACES

Scope of Effort Applied

☐ As agreed in programmatic or other agency agreements with SHPO (if applicable)

☐ Includes the attached elements required under 36 CFR 800.4(a)
1) Area of potential effects, as defined in 800.16(d), is shown on map
2) Existing information has been reviewed on historic properties in the property area at SHPO office and/or other locations of inventory data
3) Information has been sought from parties likely to have knowledge about historic properties in the project area
4) Information gathered from Indian tribes, as appropriate

Identification Results

History and Architecture

☐ An attached Iowa Site Inventory form is completed for each building 50 years of age or older

Archaeology

☐Yes ☐No The project will involve excavation

If yes, submit all of the following information (use attachments of necessary)
1) Precise project location map (preferably U.S.G.S. 7.5 min Quad with name, date, & location)
2) Site plan showing limits of proposed excavation
3) Number of acres in project _____
4) Legal location: Section(s)_____ Township(s)_____ Range(s)_____
5) Description of width and depth of proposed excavation and current conditions of project area

III. APPLICANT CERTIFICATION **(Check Either Adverse Effect or No Adverse Effect for Historic Property Affected category)**

Findings (Check One)

☐ **No historic properties will be affected** (i.e., none are present or there are historic properties present but the project will have no effect upon them) and adequate documentation under 800.11 is provided, including:
1) A description of the undertaking, specifying the Federal involvement, and its area of potential effects, including photographs, maps, drawings, as necessary ***and***
2) A description of the steps taken to identify historic properties, including, as appropriate, efforts to seek information pursuant to 800.4(b) ***and***
3) The basis for determining that no historic properties are present or affected.

I understand that the SHPO has 30 days from receipt to object to the finding, after which the applicant's responsibilities under Section 106 of the Historic Preservation Act are fulfilled.

☐ **An historic property will be affected** for which documentation is provided as required in 36 CFR Part 800.11(e) and, in applying the criteria of adverse effect under 800.5, propose that the project be considered to have **(Check One)**:
☐ A **No Adverse Effect** under which, in consultation with the SHPO, the project will be modified or conditions imposed to avoid adverse effects. I understand that failure of the SHPO to provide a dated response within 30 days from receipt to the finding shall be considered agreement of the SHPO with the finding
☐ An **Adverse Effect** is found and the applicant, or other federally authorized representative, will consult with the SHPO and other consulting parties to resolve the adverse effect under 800.6

Federally Authorized Signature: _____ Date: _____
Type name below ➔

IV. STATE HISTORIC PRESERVATION OFFICE COMMENT

☐ Agree with the finding in section III above (move to reader's file) ☐ See attached follow-up letter
☐ Object to the finding for reasons indicated in attached letter
☐ Cannot review until information is sent as follows: _____

Authorized Signature: _____ Date: _____

Please mail a copy of this signed statement to your contact person at the Federal Agency

Version: 12/18/02

PROCEDURES FOR IMPLEMENTATION OF SECTION 106 REQUIREMENTS

IOWA DEPARTMENT OF TRANSPORTATION HIGHWAY DIVISION

BACKGROUND

In January, 2001, the President's Advisory Council on Historic Preservation (**Council**) placed into effect its revised procedures for compliance with Section 106 of the National Historic Preservation Act (**NHPA**). Contained in 36 CFR, Part 800, the new procedures changed the way the federal agencies, such as the Iowa Division of the Federal Highway Administration (**FHWA**), the state historic preservation officers (**SHPO**), and state departments of transportation (**DOT**) respond to the requirements of Section 106 to consider the effects of their undertakings (projects) upon "Historic Properties" (See Section 800.16(l)(1) for definition).

These procedures document the steps the DOT will follow as it plans and develops state highway improvement projects in Iowa to ensure that the requirements of Section 106 are met. In so doing, the DOT also sets up a formal process under which the local units of government (cities and counties) will develop their projects- if those projects are to be eligible for federal funding participation. These procedures define the process the agencies will follow; they will be formally adopted and agreed by means of a Programmatic Agreement.

OVERVIEW

In Iowa, there is a partnership among the DOT, the FHWA, and the SHPO staff. The DOT, in consultation with FHWA, conceives the projects and takes them through the various stages of planning and development. This includes consideration of the effects the projects may have upon the human and natural environment, and development of designs that will avoid or minimize negative impacts to these resources. The FHWA provides oversight at key points along the path of project development and grants approvals at major points. The effects of proposed projects upon `Historic Properties' is one of the various elements of environmental impact that must be considered before a project may be further developed.

The SHPO plays a key role in the Section 106 [Review & Compliance] process. As the official in each state recognized and designated by Section 106 as the appropriate consulting party regarding 'Historic Properties' concerns, the SHPO performs a combination review and compliance, and consultative role in the project development process. The SHPO reviews `Historic Properties' survey reports received from the DOT for each project and offers comments and suggestions on the significance of `Historic Properties' identified within the

projects' Area of Potential Effect (APE). It either concurs in findings of No Effect or No Adverse Effect, requests additional study, or suggests one or more measures to minimize or avoid impacts of the projects to "significant" historic resources.

In the process of overseeing the development of projects and reviewing their possible environmental impacts, the FHWA relies heavily upon the judgment of the SHPO with regard to impacts on `Historic Properties' and resolution of conflict between the projects and those resources. The parties of this three-way partnership continue to meet bi-monthly, not only to discuss problems associated with specific projects, but also to look at the overall efficiencies and effectiveness of the process they jointly follow. The focus is to streamline the process as much as possible, while ensuring that adequate consideration is given to identification and protection of the resources.

The procedures that follow are based upon many discussions among the parties. They are structured to follow the outline format of the revised (January 11, 2001) Part 800 procedures so that users within any of the agencies can readily associate process steps specified for the Iowa agencies with the requirements of the federal regulations. The reader is advised to have a copy of 36 CFR Part 800, as reissued effective January 11, 2001, at hand for ready reference when learning or administering the procedural steps below. Copies are available at http://www.achp.gov /regs.html

Note that not every section and subsection of the Part 800 regulations is referenced in the left margin of the procedures- only those that require specific interpretation and/or actions by the DOT, FHWA, and/or the SHPO are shown.

Also, be aware that, although the state's procedures that follow attempt to adhere to the order of progression of those presented in Part 800, there are some deviations. These are primarily due to the DOT's Can-Do Project Development Process, which requires that many events in the chain of project development, from planning through construction, overlap or take place concurrently.

IOWA DOT SECTION 106 PROCEDURES
PART 800 -- PROTECTION OF HISTORIC PROPERTIES

Subpart A -- Purposes and Participants

800.1 **Purposes** -- Refer to the regulations for discussion of purposes.

800.2 **Participants in the Section 106 Process** -- For purposes of administering the Section 106 Process (Process) in Iowa, the list of participants will *always* include:

1. the Iowa Division, Federal Highway Administration (**FHWA**) acting as the ***800.2(a) "Agency Official"*** and, in some instances, as the ***(a)(2) "Lead Federal agency";***

2. the Iowa State Historic Preservation Officer (**SHPO**) State Historical Society of Iowa, acting as the ***(c)(1) "State Historic Preservation Officer".*** a "consulting party;"

3. the Iowa Department of Transportation (**DOT**), Highway Division, Office of Environmental Services, having been delegated the legal responsibility to act on behalf of the FHWA in Section 106 matters with said delegation provided by letter of March 1, 2001, to the SHPO, and acting as the ***(c)(4) "Applicant for Federal assistance, permits, licenses, and other approvals,"*** also a "consulting party;" and

4. the President's Advisory Council on Historic Preservation (**Council**), of Washington, D.C., to be involved as defined by the regulations.

In addition to the above permanent participants, the following agencies, groups and individuals *may* be involved as additional "consulting parties" for some projects as situations dictate:

1. designated representatives of Indian tribes (at the time of the writing of these procedures, the parties are agreed that there are no formally-designated "Tribal Historic Preservation Officers" (**THPO**) in Iowa as defined by 800.2(c)(2)(A);

2. designated representatives of local (city or county) units of government having jurisdiction over the area in which the effects of an undertaking proposed by the DOT/FHWA may occur, or if they themselves are the applicant for federal aid; and

3. private groups or individuals having an interest by reason of expertise in the subject area, or by reason of ownership or affiliation with an `Historic Property' likely to be affected by projects proposed by the DOT.

800.2(d) **Plan to Involve the Public - Overview:** In November 1997, the DOT adopted its significantly reorganized project development process, which it labeled the Can-Do process. Can-Do attempts to streamline the planning and design process, with a goal of reducing overall development time, from about ten years down to approximately five to six years. To do so requires consolidation of activities and concurrent completion (or partial overlap) of events. At the same time, the DOT is working to improve its customer service and responsiveness to the public. Increasing effective public involvement in the planning and development processes is a goal of both the DOT and FHWA. Public involvement in Section 106 processing by the parties is obtained by merging the Section 106 requirements with those of the National Environmental Policy Act (**NEPA**).

Many projects are of lesser scale and have correspondingly less potential to affect historic resources. The DOT and FHWA will take these factors into account when deciding upon the level of public involvement that is appropriate for a given project. In addition to project size, scope and complexity, the agencies will consider the likely effects upon resources in the project area, and also the likely level of interest of the public in these effects.

Merging Section 106 requirements with those of NEPA will involve:

Project Management Team- Public Information Meetings and Scoping: The DOT and FHWA have sought to identify ways to combine the agency timesaving goals of Can-Do with the increased public involvement requirements of the revised Part 800 regulations. Under Can-Do, a Project Management Team (**PMT**) is formed for each major project. Membership is made up of representatives of the FHWA, the DOT's district staff, the Corridor Development Unit, the offices of Environmental Services, Design, Right of Way, Bridges and Structures and others involved with the development chain of events. The PMT will decide on how much public involvement a given project needs, and plan the schedule of public information meetings and the public hearing accordingly.

The PMT is formed at the very beginning of Location Planning activities (also known as "Planning Studies") and the first public information meeting about a project is held early in evaluation planning. Early meetings are held with agencies involved with historic, natural and other resources to alert them to a new project and gather input about the resources of interest to them that may

be found in the project's "Area of Potential Effect" (**APE**). Input is sought from both the agencies and the public on what resources may be found in the project area. Local area amateur archaeological collectors, local historians, county historical societies, and others are a valuable source of information.

Tribal Role in Public Involvement: Indian tribes that have been identified as having an interest in Iowa projects are in a unique position. While they need to be informed about upcoming projects by the DOT and FHWA just like the public in general, they also are more likely to be in a position to provide much more information concerning possible historic resources that may be present in the area.

Public Involvement During the NEPA Process: [See 800.2(d)(3)] Under Can-Do, shortly after the PMT is formed and the first public and agency scoping meetings are held, a project moves into active "Location Studies" and environmental assessment activities. As required by NEPA, and FHWA's NEPA implementing regulations, performing a complete environmental study requires considerable early coordination with agencies and the public. This step serves both to keep agencies and the public informed about the project's progress, and also to gather information that becomes part of the Environmental Assessment (**EA**) or Environmental Impact Statement (**EIS**) prepared for the project.

The DOT will also contract with qualified consultants who will perform in-depth surveys and analysis of the APE and surrounding project area to identify and evaluate historic resources that may be affected by the project. Written reports on survey results are prepared and are then reviewed by the consulting parties.

The highlights of the historic surveys and reports are included in the NEPA environmental documents, that are then made available to federal, state, and local agencies (through circulation) and the public (through project area libraries and the DOT's central and district offices) for review in draft form. At this point, every interested party has a chance to provide written input to the DOT and FHWA regarding historic concerns and the project's possible effects on the resources.

NOTE: *Information concerning the specific location of archaeological sites is to be treated as* ***"confidential"*** *under both Iowa law and Section 304 of the National Historic Preservation Act (see Section 800.11(c) of these regulations), and only those persons with a defined "need to know" can obtain the data. This restriction is particularly applicable to the location of prehistoric burial mounds or other mortuary features. For this reason, the actual `Historic Properties' survey reports themselves are* ***not*** *made available to the public.*

Following release of the environmental document, a public hearing may be held. The environmental document is available at the hearing. Information pertaining to significant `Historic Properties' found in the project area (exclusive of confidential portions) is made a part of the formal Project Statement. Attendees have the option of making oral statements at the hearing, or of submitting written comments within 10 days following the hearing. Comments and other input can relate specifically to historic resources, or to many other aspects of a project.

Public Comment on Avoidance and Mitigation Measures: Some projects will unavoidably impact "significant" (in, or eligible for listing in, the National Register of Historic Places [National Register]) `Historic Properties.' In those cases, the consulting parties will have worked with SHPO to plan ways to minimize impact and to mitigate where necessary. The interested public will be given an opportunity to comment on the finding of significance and on the mitigation measure(s) planned. This information normally will be available by the time of the public hearing.

For historic properties that cannot be avoided, that and are considered to be significant for reasons other than the information that can be recovered from them, a U.S. Department of Transportation Act *Section 4(f) Statement* will be required by the FHWA. The Draft 4(f) Statement is made available for agency and public review for a period of 45 days, with its availability being announced either as a part of the public hearing notice, or by means of a special notice. The 4(f) may either stand alone or be incorporated into an EA or EIS. In either case, agencies, consulting parties and the interested public have an opportunity to comment.

The DOT and FHWA will respond in the final environmental document to any comments received. As needed, DOT and FHWA may conduct additional `Historic Properties' surveys, enter into consultation with the consulting parties and/or explore additional alternatives for the project based upon comments or new information obtained from the public involvement steps.

800.2(d)(1) Nature of Public Involvement: The three pages of discussion that precede this section are based upon the assumption that the agencies are dealing with a major new project of significant size and complexity, and having considerable potential to affect historic resources along its corridor.

800.2(d)(2) and (3) Providing Public Notice; and Use of Agency Procedures: Consistent with Section (d)(1), above, and except where precluded by the confidentiality concerns of any tribes involved, the confidentiality concerns of Section 800.11(c), and the Code of Iowa, the DOT and FHWA will provide the

interested public with information about a project and its potential effects on historic resources. They will provide the information using existing agency procedures described in the "Overview" to 800.2(d), preceding. The parties will solicit the public's input and comment on the significance of the resources identified and on the expected effects of the project upon the resources.

Public Involvement in Local Systems Projects: City and county engineers are under the same obligation to protect historic resources as are the FHWA and the DOT whenever their projects are developed with the anticipation that federal funds, license(s) or permit(s) will be involved in the project. Their project corridors must be surveyed in the same manner as are the state's, and the consulting parties must review and comment upon a project's expected effects on historic resources before the project may proceed.

Because local systems projects are usually more limited in size and complexity, the extent of public involvement in the Section 106 process will be scaled down proportionally. Like the state, the local officials will need to make full use of their existing processes for public involvement to inform the public about the results of `Historic Properties' surveys, any adverse effects expected, and any plans developed to minimize or avoid those impacts.

If a local project should involve a significant historic property that one or more Indian tribes have identified as having religious or historic significance to them, the city or county engineer having jurisdiction over the project will coordinate with the DOT and FHWA to involve the tribe(s) in consultation to resolve the adverse effects. Like the state, those officials must also be aware of confidentiality concerns of the tribes and ensure that sensitive information is not publicized.

Subpart B -- The Section 106 Process

800.3 Initiation of the Section 106 Process

800.3 (a) **Establish as Undertaking:** Section 800.3(a) requires the *"Agency Official"* (in this case, FHWA) to determine whether a project proposed by the DOT qualifies as an "undertaking" for purposes of these procedures and as defined by 800.16(y). As defined in that section, an "undertaking" is any action proposed for development with federal involvement. That involvement may include financing, permitting, licensing, administration, or other project approval steps. For Section 106 processing purposes, it is the policy of the DOT to plan and develop all of its highway improvement projects as potential federal aid projects so that, from a Section 106 standpoint, they will be

eligible for federal participation in the cost of their construction- if that participation is so desired.

800.3(a)(1) **No Potential to Cause Effect:** Exhibit "A" of these procedures is a copy of a "Categorical No Historic Properties Affected" Programmatic Memorandum of Understanding (PMOU) as executed by the DOT, the FHWA, and the SHPO in September 1998. By agreement, any DOT/FHWA project that satisfies the criteria contained in the PMOU as a "non-affecting" project has no potential to result in effects upon historic resources, and is considered to be exempt from the need for further Section 106 processing. To achieve the goal of developing all projects to be eligible for federal funding from a Section 106 standpoint, the Office of Environmental Services (OES) will evaluate all proposed projects early in their development to determine if they have the potential to affect `Historic Properties.' Those that meet the criteria of the PMOU will not require further Section 106 evaluation. For them, **Section 106 processing is complete.**

800.3(b) **Coordinate with Other Reviews:** Here, the regulations suggest that the agency official should coordinate the Section 106 review of a project with reviews required by other laws, such as the National Environmental Policy Act, Section 4(f), and others. It is the goal of the DOT and FHWA that the Section 106 process: **1)** be consistent with the regulations of the National Environmental Policy Act (NEPA); and **2)** be initiated early enough in the planning and development of a project that substantive information about the project's anticipated effects on historic resources can be included in the Environmental Assessment, Environmental Impact Statement, or whatever document is prepared appropriate to the scope of the project. That means that surveys, SHPO review, consultation, mitigation planning, etc. need to occur in advance of the anticipated date of release of these documents so that they will contain adequate coverage/discussion of the Section 106 situation.

800.3(c) **Identify Appropriate SHPO and THPO:** The SHPO is the appropriate office for review of projects planned for Iowa. The SHPO is not staffed or funded adequately to actually perform studies or surveys of projects, nor is it their responsibility under Section 106 or the Code of Iowa to do so. The DOT (and other applicant agencies) must do the work, have the results put into a written report and submit same to the SHPO for review and comment.

800.3(c)(1) **THPO Assumption of SHPO Duties:** As mentioned in the Overview, the participants to the Section 106 process in Iowa have established that there currently are no formally designated Native American (Indian) Tribal Historic Preservation Officers (THPO) in the state. There are recognized

spokespersons for various tribes, and these are to be contacted by the FHWA and DOT as described in Sections (d) and (f), following.

800.3(c)(2) **Undertakings Across State Lines:** In the case of projects involving links to adjoining states, their SHPO is also involved. If an agreement has been executed for a given project between the parties of both states in which one of the SHPOs has been designated "Lead SHPO," then that SHPO will coordinate and consult directly with the DOT and SHPO of the adjoining state. If no such agreement has been reached, the DOT of the involved adjoining state will have the responsibility for submitting materials to their respective SHPOs, reviewing sites, arranging consultation, etc.

800.3(d) **Consultation on Tribal Lands:** There are three Indian tribes with tribal lands wholly or partially contained within Iowa's borders. The DOT and FHWA will consult with these tribes any time a project is expected to directly or indirectly involve these lands. The procedure for initiating contacts with the tribes will be as discussed in Section (f), "Identifying other consulting parties," below. The tribes are:

* Mesquakie (Sac & Fox of the Mississippi of Iowa) .....Tama County
* Omaha Tribe .....Monona County
* Winnebago Tribe .....Woodbury County

800.3(e) **Plan to Involve the Public** - Refer to the discussion in Section 800.2(d) beginning on page 4 of these procedures.

800.3(f) **Identify Other Consulting Parties:** The "standard" consulting parties for Iowa projects are the DOT, the FHWA, and the SHPO. Any of these three may identify other parties that have an interest in a particular project and need to be invited to become involved. These are identified in the section on Section 106 "participants" found in Section 800.2(c). Note that, although the regulations of Part 800 continually designate the "Agency Official," in this case FHWA, as the party with the responsibility for taking most of the required actions under Part 800, the DOT, as the project sponsor or applicant, in partnership with FHWA and in consultation with designated delegates, will perform many of the steps. The early coordination steps outlined above will include contact with the interested tribes, agencies, local officials and the public that may have an interest in sites and properties protected by Section 106. Part of the DOT's contact with them will include a request for information about historic resources to be found within or near the project corridors.

800.3(f)(2) **Indian Tribes:** The DOT will prepare contact letters to be sent directly to the tribe(s) listed in Exhibit "C" that may have an interest in a proposed project.

These tribes and their areas of interest have been identified through (1) reference to the Native American Consultation Database (NACD) maintained by the U.S. Department of the Interior's National Park Service, (2) consultation with the SHPO and the IA OSA, and (3) consultation with various area tribes. The contacted tribe will be invited to become a "consulting party" for Section 106 purposes and, if the tribe so requests same in writing, it shall become one.

800.3(f)(3) **Requests to Be Consulting Parties:** The DOT and FHWA will consider granting "consulting party status" to any interested individual, group, organization, or Indian tribe who makes a written request to be such a party. The parties will consult with the SHPO, and any Indian tribe upon whose tribal lands an undertaking occurs or will otherwise affect historic properties of concern to them, to determine which consulting party requests should be granted.

Identification, Evaluation and Treatment of Historic Properties; An Overview of the Iowa DOT Process

Introduction

Sections 800.4, 800.5, 800.6 and 800.7 of the Section 106 Regulations and these Iowa Procedures address "Identification [and evaluation] of Historic Properties," "Assessment of Adverse Effects," "Resolution of Adverse Effects," and "Failure to Resolve Adverse Effects," in that order. The following Overview, which precedes the more detailed discussions of these sections for the Iowa parties, is presented first to give a general look at the Iowa process, from identification of historic properties to resolution of adverse effects. A more in-depth discussion of each stage of the process in Iowa begins with **800.4**, following the Process Overview.

Agency Coordination

The Iowa DOT, the FHWA, and the Iowa SHPO have worked in close cooperation since the early 1970s to establish and follow procedures for the advancement of highway (and other transportation) improvement projects that respond to current requirements of the Section 106 regulations as those regulations have evolved. Beginning in 1989, the parties have met approximately bi-monthly to coordinate their efforts and ensure that their process is as responsive to the Section 106 requirements as possible, while also minimizing processing time and project delays.

These meeting sessions are continuing into 2002 as the parties work to modify, improve and document their procedures in response to the current Section 106 requirements embodied in 36 CFR Part 800, effective January 11, 2001. Development of these procedures has also included active participation of consulting firms key to the Iowa Dot's ongoing historic properties management program. The following paragraphs discuss the Iowa process.

The Process Overview

When the parties to be involved in a project's historic resource processing have been identified, it is time to determine the project's area of potential effect (APE), identify the resources, evaluate their significance, and determine the project's impact on them. The DOT, in conjunction with the FHWA, has developed a process to address these steps that is designed to ensure that the various tasks involved are initiated and carried out in a timely manner so that the project's desired development and construction schedule can be met, while ensuring that thorough consideration is given to protection of significant historic resources.

The DOT and the SHPO have reached agreement on methodology for determining any given project's APE on `Historic Properties.' The determination process is summarized in the table included in the discussion of Section 800.4(a)(1), following this overview. Once the APE has been established, resource identification can proceed. Identification involves field surveys, site records searches, and consultation with parties having knowledge of historic properties in the project area.

At the time of this writing, the DOT does not have the in-house capability to conduct its own `Historic Properties' surveys. The Department relies exclusively upon the work of qualified consulting firms and institutions to complete the needed surveys and prepare the reports. This approach has been very successful and will be continued, with occasional refinement to the methodology of contracting.

For convenience, and to keep the SHPO and other consulting parties properly involved at the appropriate steps, the process adopted by the DOT and recognized by most historic resource consultants, usually divides the survey and reporting process into phases. Archaeological surveys will be conducted in accordance with the SHPO's *Guidelines for Archaeological Investigations in Iowa*, December 1999. Historical surveys will use the *Iowa Historic Property* reporting forms. All surveys and reports will conform to the Secretary of the Interior's Standards for surveys and reports. The usual phases are described as follows:

> **PHASE 1A - Reconnaissance Survey:** Phase 1A is intended to locate and identify 'Historic Properties'. It may only confirm previously identified sites and estimate the potential of the project area, or it may also locate new, previously unknown sites and properties, and it will confirm the location of sites previously discovered. It is primarily a visual examination of a project location, or corridor, involving a pedestrian survey of the ground surface and/or exterior inspection of standing structures. The visual examination is preceded by a background search of the area's history and the results of any previous surveys performed.
>
> **PHASE 1 – Intensive Survey:** If surface visibility is limited by crops or other ground cover, or if soil surveys indicate the potential for buried soils containing prehistoric living surfaces, then systematic surface probing and shovel testing will be used to increase confidence in survey results. Phase 1 surveys are documented in a report that

conforms to format and content guidelines as established in *Guidelines for Archaeological Investigations in Iowa* (1999) and that is intended to convey the results of the survey to the project reviewers. Reports are always submitted by the consultant to the DOT, which checks them for format and content accuracy and then forwards them to SHPO and other consulting parties as appropriate for review and comment. On minor projects, the reports on historic structures and prehistoric archaeological components will be combined; on major projects with multiple sites and properties located, the reports will normally be separate to facilitate SHPO staff review.

PHASE 2 - Determination of Significance: For archaeological sites located during the Phase 1 survey and that the consultant recommends as being potentially significant, a Phase 2 Test/Evaluation will be performed to establish the resource's significance. The "test" is to see if the site or property possesses the features and historic integrity to determine its eligibility for listing in the National Register of Historic Places. For prehistoric sites, Phase 2 involves subsurface studies through post holing, shovel testing, and/or the excavation of test pits at strategic locations within the site.

Again, a report is prepared and submitted through DOT to the SHPO and other consulting parties for review and comment. The consultant will have made a recommendation as to National Register eligibility for each site or property tested, and the SHPO will concur or not concur in its comments.

For historic structures and properties, Phase 2 is usually included in the Phase 1 field work for greatest efficiency and time saving. It involves more extensive research into the interior and exterior architectural features of the structure and/or review of the ownership history and the role of the property in the historic growth of the area in which it is found. The results of the test are combined into the Phase 1 report.

PHASE 3 - Data Recovery and Documentation: Data recovery and Documentation are forms of mitigation for adversely affected archaeological sites and historic properties, respectively, and as such, come later in the Section 106 process. Within the project development time-line, it normally follows consultation and execution of a Memorandum of Agreement (MOA) among the consulting parties. However, it is discussed here because it is last of the "phases" of the Section 106 process referenced above. For more about MOAs, refer to the discussion for Section 800.6(c).

Resources that have been determined eligible for the National Register are afforded a high level of protection under FHWA's environmental processing regulations and procedural guidelines. All state DOT's are required by the U.S. DOT's Section 4(f) Law to avoid impacting significant historic resources if at all possible. If they cannot be

avoided, the agencies must do all possible planning to minimize harm to the resource. And, they must mitigate the impacts that cannot be avoided.

Data Recovery

For archaeological sites of value **only** for the information they contain, "mitigation" means excavating the site to "substantially recover" the scientific data contained within. A Data Recovery Plan (DRP) will have been prepared and approved by the consulting parties in advance of the beginning of recovery.

Documentation

For historic structures, Phase 3 mitigation usually starts with consideration of the question, "Can the structure be moved without destroying its historic integrity?" Although moving still results in a finding of 'Adverse Effect,' it is preferable to demolition. If preservation is not feasible through moving, recording the visual and historical features of the structure through the process known as "documentation" prior to demolishing it is the chosen mitigation measure. Photography, archival research, and written narrative describing the architectural features (if any) that make the resource historically significant are all a part of documentation.

For both prehistoric and historic properties, reports are prepared and, again, they reach the SHPO and others through the DOT's Office of Environmental Services (OES).

Other Forms of Mitigation: Mitigation planning often takes the form of negotiation among the consulting parties. The parties have made increasing effort in the last few years to be as creative as possible in their planning. The SHPO has encouraged creative additions to the straight 'recovery of archaeological' data and 'documentation' of historic structures. Public interest booklets produced by qualified consultants have been prepared for several historical projects and have received good response from the interested public.

This concludes the overview of the Iowa process for identification, evaluation, and mitigation. The specific tasks to be performed in response to the various requirements of the Part 800 regulations are as follows:

800.4 Identification, Evaluation, and Treatment of Historic Properties

800.4(a) **Determine Scope of Identification Efforts:** Once it has been established that a project is an "undertaking," the appropriate parties, including tribes, to be involved are identified, and the public involvement activities planned as required by part 800.3, the DOT will begin the critical phase of identifying known or potentially significant `Historic Properties' that the project may affect. The extent to which any project will affect the resources is directly related to the

size and work scope of the project. The projects range in scope from simple shoulder widening or pavement patching to full construction of four-lane divided facilities on new location.

The regulations require that the project sponsors consult with the SHPO (before resource surveys are started) so that agreement may be reached as to what the scope of impact identification should be. Given the number of projects being advanced by the DOT each year, this step becomes time-prohibitive if done one at a time for individual projects. The parties hereto have therefore agreed upon the following systematic approach to establish the scope of identification effort that will be required.

800.4(a)(1) Determine and Document the Area of Potential Effects (APE) The parties have agreed to the criteria shown in the table below as a practical means of identifying the APE of the many types of transportation improvement projects proposed by the DOT. Once the APE is known, the scope of identification effort can be readily identified. In the table, the left column presents the various types of projects based upon size and scope; the right column presents the criteria for determining the corresponding APE. Agreement by the parties with the criteria in the APE Table, as evidenced by their signature upon the enabling Programmatic Agreement adopting these procedures, is intended to satisfy the requirement for consultation with SHPO to determine the scope of effort required. The reader is referred to Section 800.16(d) for a more detailed definition of APE.

Area of Potential Effect (APE) Determination

Process Project Type	APE Criteria
1. bridge replacement (with minimum approach work) 2. culvert replacement (with minimum approach work) 3. minor widening, adding turning or climbing lanes, intersection improvements, shouldering, ditching for snow storage. 4. horizontal or vertical curve re- alignment	(1-7) Length & width of construction; plus channel changes, permanent & temporary construction easements, potential future alignment changes, wetland mitigation and borrow areas; include immediately adjacent known or potentially known sites
5. two-lane reconstruction on existing alignment- rural or urban 6. four-lane construction on existing alignment 7. two or four-lane relocation	(6-7) * any potential *additional* APE to be determined in consultation with SHPO on a case-by-case basis e.g.: changes in project view shed, access, secondary impacts, etc.

The above criteria can normally be applied to all projects that will require either additional right of way, or Temporary and/or Permanent Easements, or both. As initially drawn during the Phase IA Reconnaissance Survey, the APE will take into account any known significant sites or properties in the project area. If additional, previously unknown sites or properties

are discovered during the Phase I Intensive Survey within the initial APE, the parties, in consultation with SHPO, will determine if the initial APE needs to be shifted, enlarged, or otherwise changed to adequately reflect the extent of the new discovery(ies). For standing structures, visual impacts to and from view sheds associated with the new discovery will be considered if the parties find it necessary to redefine the APE.

800.4(a)(2) **Search of Existing Information:** As the DOT goes about its process of identifying and evaluating `Historic Properties' through the use of qualified consultants, it has been, and will continue to be, standard operating procedure for these consultants to perform a thorough search of the literature- both printed and electronic sources-, the site records at the Iowa Office of the State Archaeologist, the file records of the SHPO and other background literary sources as a preface to ALL project area field investigations. The search will be concentrated upon known sites and properties, but will also focus on any data concerning possible `Historic Properties' that have not yet been identified and evaluated.

800.4(a)(3) **Other Sources of Information:** In addition to literary sources, the consultants will seek out and interview local amateur collectors and historians in the project area , plus other "interested parties" who may have information relevant to historic resources in the area. Agencies and local organizations such as county historical societies will be included in the data gathering preceding or during the field work phase. The names of all such external sources of information, the date of contact with them, and a summary of the information gathered will be included in the consultant's report to the DOT on the results of its investigations.

800.4(a)(4) **Tribal Sources of Information:** It is essential to keep the appropriate Indian tribe(s) who have been identified as having an interest in a project area informed and involved in the Section 106 processing for the project. Initial project-related contacts with the affected tribe(s) are made through the DOT. Subsequent communications with the affected tribes on a given project, may be accomplished by providing them copies of correspondence between the DOT and SHPO.

In addition to the project-specific information provided by the agencies to the tribe, the tribe, in turn, will be asked to provide information about known or potential prehistoric resources in the project area. However, confidentiality, particularly for mortuary sites, is a primary issue with all tribes and will, at all times, be respected by the parties to this agreement as they attempt to make contact and exchange information.

800.4(b) **Identify Historic Properties:** Since 1970, the DOT has successfully obtained its needed `Historic Properties' data from a growing network of qualified consultants. Under this process, the DOT assigns projects to contracted consulting firms and institutions as projects enter the planning stage of development. The consultant performs the necessary surveys- both prehistoric and historic- and prepares a report. Reports are forwarded to the DOT's OES where they are checked for format and content. DOT then submits the reports to the consulting parties for review and comment. If significant `Historic Properties' have been identified by the consultant, and the SHPO concurs in the findings, additional consultation among the parties, and any affected tribes, will be performed as described later in these procedures.

The DOT includes provisions in its contracts for historical resources consultant services that require the consultant to gather the preliminary background information as described in 800.4(a) above as a preface to its field work in a project area. In accordance with the aims of the Can Do process, the DOT's OES assigns projects to its historical resources consultants at the appropriate time in a project's development time line such that the data required will be available to planning and design staff for consideration early in their work efforts.

The consultant gathers the preliminary data, performs the surveys, writes the report, and submits it to the OES, who reviews it for completeness and, if acceptable, forwards the report to the SHPO and other consulting parties for review and comment. Within the 30-day window allotted to them, the consulting parties review the report and respond to the DOT as appropriate, either concurring in the consultant's conclusions with respect to the project's expected effects upon historic resources, requesting additional surveys/information, or requesting consultation to resolve specific issues of conflict between the project and significant sites or properties.

800.4(c) **Evaluate Historic Properties:** As described in the preceding process overview, all identified sites must be evaluated for significance: i.e., are they eligible, either individually or collectively as a district, for inclusion in the National Register of Historic Places (NRHP). It is part of the role of the consultant in the DOT's process to present written description and evaluation of the sites and properties identified in its report(s) on the project surveys. Some sites or properties are quite clearly either eligible or not eligible based only upon the results of the Phase 1 survey. Others will require the additional information that a Phase 2 Test can provide before the determination can be made with confidence by the SHPO.

For historic/architectural sites, and because of the applicability of Section 4(f) of the U.S. DOT Act, it is highly desirable to combine the Phase 1 and Phase 2 work into a single survey. The DOT's Can Do process envisions this being done to reduce project development time. The combination is possible because research for historic sites typically involves much less "on-site" work, but much more literary records work. This contrasts with prehistoric archaeological work, which is highly site dependent and so requires extensive commitments of time, money, and worker resources to complete. It is prudent, with these, to make sure that the site likely is significant, and to have the SHPO's concurrence in that finding before a Phase 2 level of effort is undertaken.

NOTE: *Sections 800.4(c)(1) and (2) , as with other sections of the Section 106 regulations, refer to the "Agency Official" as the party applying the National Register criteria of significance and criteria of effect. By definition in the regulations (Section 800.16), this refers to the federal agency official, in this case, the FHWA. As referenced in the discussion for 800.2(3) on page four of these procedures, the DOT has been delegated by the FHWA to perform many of the tasks of the Section 106 process on its behalf. Although the DOT may perform the tasks, the FHWA still retains overall responsibility to see that functions assigned to the [federal] 'Agency Official' are performed properly and timely.*

By agreement among the parties involved in the Section 106 process for transportation in Iowa, the DOT has the responsibility to receive the survey information, review it, and forward it on to the SHPO and other consulting parties. The reports identify resources, evaluate the project's effect on them, and offer the consultant's preliminary assessment of their significance. The consulting parties have the responsibility to review the findings of the consultant and provide comment to the DOT. By means of these shared responsibilities, the parties have collectively ensured that FHWA's responsibility to act as the "Agency Official" in these matters is fulfilled.

In those rare cases where the SHPO and the FHWA, acting as "Agency Official" cannot reach agreement on the National Register eligibility of a resource (per 800.4(c)(2), the FHWA will request a determination of eligibility for the resource from the Secretary, U.S. Department of the Interior (DOI). This responsibility is delegated by the Secretary to the Keeper, National Register of Historic Places, a function of the DOI's National Park Service.

800.4(d) **Results of Identification and Evaluation** The activities of subsection (c) where project locations and corridors are examined by qualified consultants, resources are identified, and determinations of significance are reached leads

to two fairly obvious next questions: *1) **Are** there any significant 'historic' properties in the project area; and, 2) if yes, **is** the project (undertaking) going to affect them?* These are crucial questions for their answers directly affect the future of the proposed project. The point where these questions are asked also represents the first plateau in the Section 106 process where the FHWA and DOT will be required to stop and provide official notice to the public, including interested Indian tribes, that the process is happening for the project, and what the results and conclusions are to this point. These issues are covered in the following two subsections.

800.4(d)(1) No Historic Properties Affected: If the DOT's surveys find that *either* there are no significant `Historic Properties' present in the project area, *or* that there are properties in the area, but the project is not going to affect them, then the DOT is required to "provide documentation of this finding" to the SHPO and to all consulting parties, including the tribe(s), as defined in 800.3. DOT will also make the project documentation available for public inspection before giving any major approvals that would advance the project in its development.

By agreement the DOT performs these tasks, in consultation with FHWA as necessary. The OES addresses a letter to the SHPO announcing the results of work to this point in the Section 106 process. It provides copies of the letter of notification to the interested tribe(s). The letter either transmits actual copies of the documentation, if practical, or advises that it is available. The letter to the SHPO states the finding made by DOT that 'no historic properties will be affected.' That finding is appropriately documented and the SHPO and the tribes have 30 days in which to respond; the SHPO may either concur in the finding or object to it, giving its reasons.

The public also must be informed of the findings and given an opportunity to comment on them before the project can advance further in development. Here, the parties intend to make as much use as possible of processes already in place to notify the public about its project activities and solicit its input. Refer to previous discussion in Sections 800.2(d) on public involvement and 800.3(b) concerning 'coordination with other reviews.'

When they are published for the DOT's own projects, notice of the findings will be added to already-planned public notices in newspapers announcing project-related events such as public information meetings, public hearings, or environmental documents publication and availability. If other such notices are not available timely, then a special notice dedicated to the Section 106 findings will be published in newspapers located in the project area. As appropriate, the

notices will direct potentially interested readers to contact either the DOT's District Office having jurisdiction over the project, or the OES at Ames.

NOTE: *For Local Systems projects, similar newspaper notices will be used. In addition, city and county engineers will also make an effort to make maximum use of other existing opportunities to notify the potentially interested public about the findings of the 'Historic Properties' survey. These can include, as available, inclusion in notices for the activities of other public agencies, such as the official minutes of meetings of the county board of supervisors. The notice(s) would announce the survey and findings results, and direct interested persons to the applicable city or county engineer's office to view copies of the documentation.*

All parties: the SHPO, the public and the consulting parties, including the interested tribe(s), will be granted a 30-day period in which to comment on the findings. Sufficient time in addition to the 30 days to allow for less-than-daily news publications and mailing times will be added to the basic 30 days. It is understood that these are calendar days. If, at the end of these 30+ days, there have been no objections raised, then Section 106 has been completed and the project may proceed.

800.4(d)(2) **Historic Properties Are Affected:** If it is determined that the surveys and SHPO consultation process have shown that there *are* significant historic sites or properties that will or may be affected by the project, *or* if the SHPO and/or Council objects to a finding that none will be affected, then the FHWA and DOT will notify all consulting parties, including the tribe(s), and the public using previously described means to reach the interested public. (Also see Section 800.5(a).)

The DOT will draft and send the letters to the consulting parties. The consulting parties letter will discuss the project situation with respect to Section 106 and invite recipients to comment, either upon the question of a particular resource's eligibility for the register, or upon the question of whether the project may affect the resource, or both. The letter will ask that any responder who believes that an eligible resource will be affected also address the question of whether or not the affect to the resource is *adverse*. This is preliminary to Section 800.5, following, which addresses the issue of "assessment of adverse effects."

A 30 + calendar day period for return of comments will be granted to all those parties contacted. With or without responses from the consulting parties, the FHWA and the DOT will proceed to enter into consultation with the SHPO (and the Council if they are involved) to identify ways to resolve the conflict.

800.5 Assessment Of Adverse Effects

800.5(a) **Apply Criteria of Adverse Effect:** Having found that there are one or more significant `Historic Properties' present in the project area, and having determined that at least one of them will be affected by the project, the next step is to determine whether the effect is adverse to the resource(s). The DOT, will apply the **"Criteria of Adverse Effect"** as found in Section 800.5(a)(1)and(2) of the new regulations. In making their decision, the parties will consider any comments previously received from consulting parties, including the tribe(s). Note that the regulations specify that the criteria of adverse effect are to be applied to resources that are located within the project's APE.

If the initial indication of the criteria application is that the effect may be adverse, then the DOT shall consult with its design representatives to determine whether the effect can be minimized or eliminated through adjustments to project location and/or design. The goal will be to eliminate the effect, or reduce its impact to the point where, based upon the criteria, it can then be judged 'not adverse.'

800.5(b) **Finding of 'No Adverse Effect':** The DOT, will conclude that a finding of no adverse effect is appropriate for a particular project and its affected resource when either **1)** the projects effects *do not* meet the criteria of Section 800.5(a)(1), or **2)** they initially do meet the criteria, but the location and/or design of the project can be modified by the DOT in such a way that the effects will no longer meet the criteria.

800.5(c) **Consulting Party Review:** If the DOT, in consultation with SHPO, is able to conclude that there will be no adverse effect, either initially or following project modification, then the parties will notify all consulting parties, including tribes, of the finding, provide copies of any key documentation developed in conjunction with the finding, and request comments. Again, refer to Section 800.3(b) for discussion of ways the agencies will endeavor to blend these Section 106 notifications to the public with notifications/reviews of other environmental information for a project.

800.5(c)(1) **Agreement with 'No Adverse Effect' Finding:** The SHPO will have 30 days *from its receipt of the notification* to return a response to the DOT. If SHPO responds within the 30 days that it concurs with the 'no adverse effect finding,' then Section 106 processing is considered completed at that point, and the project may proceed. If no response is received from the SHPO within the 30-day period, then the parties may *assume* SHPO concurrence, and the project may proceed.

800.5(c)(2) **Disagreement with 'No Adverse Effect' Finding:** If the SHPO, or any of the established consulting parties disagrees, and files its response with the DOT and FHWA within the 30-day review period, then further consultation between the parties must be undertaken to resolve the disagreement to the satisfaction of all concerned. If the consultation fails to resolve the disagreement, the FHWA will contact the Council and request that it review the finding. See Section 800.5(c)(3), below.

800.5(c)(2)(ii) **Tribal Disagreement with Finding:** If a tribe that has been recognized as a consulting party (by virtue of having advised the DOT or FHWA that it attaches religious and cultural significance to a site subject to the 'no adverse effect finding') has objected to the finding, then that tribe must specify the reasons it objects, and it may choose to request that the Council review the finding if the FHWA has not already done so.

800.5(c)(3) **Council Review of Finding:** When the FHWA contacts the Council to request its review of the disputed finding, it must include copies of certain documentation required and defined by Section 800.11(e) of the new regulations. (Refer to that section of the new regulations for details.) If the correct documentation has been supplied to the Council, it must, under the regulations, and within 15 days of its receipt of the materials, review the 'no adverse effect' finding and notify the FHWA of its decision as to whether it believes the adverse effect criteria have been correctly applied; it must specify the basis for its decision.

When the Council has taken the above steps, the FHWA will proceed in accordance with the Council's determination with respect to the project. If the Council has not contacted the FHWA within the allotted 15 day time period, the DOT and FHWA may *assume* the Council's agreement with the finding, and the project may proceed.

800.5(d) **Results of Assessment of Project Effects** The DOT, will maintain a complete file of the activities relating to the surveys and 'no adverse effect' finding and make copies of same available to the interested public upon request. **However**, the parties will limit the information it provides to the public to respect and comply with the confidentiality requirements of both 800.11(c) of the Section 106 regulations and applicable Iowa State Law. Specifically, no information pertaining to the location of archaeological sites- especially prehistoric burial features, or other sites known to have religious or cultural significance attached to them by the tribes- will be released to the public. All employees of the DOT, the FHWA, and the SHPO will, at all times treat this type of information with the utmost respect and confidentiality.

NOTE: *It is the policy of the Iowa DOT that archaeological site location information will only be provided to professionals with a demonstrated 'need to know' for purposes of ensuring DOT compliance with the applicable environmental laws. Any questions about the release of such information will be referred to the Iowa Office of the State Archaeologist, which has the statutory responsibility to protect the confidentiality of the locations of prehistoric burials and other archaeological sites information under Iowa law.*

If the DOT decides to revise a project that has received a 'no adverse effect' assessment finding as originally proposed, the 106 process must be repeated should the project be modified in location or design. If major changes are being made in the scope and/or location of the project, it may be necessary to revisit the step of defining the project's APE in consultation with the SHPO. The need for this step must be judged on a case-by-case basis.

800.5(d)(2) **Finding of Adverse Effect:** If the result of the assessment of the project's effects upon the resource(s) is that there *will* be an adverse effect, then the FHWA and DOT will continue Section 106 consultation with SHPO and other consulting parties as outlined in Section 800.6, following.

800.6 Resolution Of Adverse Effects

800.6(a) **Continue Consultation:** For those projects where it has been established that a project will have an adverse effect on a `Historic Property' that has been found to be significant, the parties first goal must be to look for ways to avoid or minimize the effect. The FHWA, acting through the DOT, will continue consultation with the SHPO, any involved tribes, and any other consulting parties to identify and evaluate location and/or design modifications to the project that would avoid, minimize, or mitigate the adverse effects.

The DOT's Office of Environmental Services (OES) will take steps internally to contact and request input from all offices that are involved in the location and design of the project. If a PMT (Project Management Team) has been assembled, it will be asked to review the conflict and make recommendations for possible project changes that would lessen or eliminate the effect.

800.6(a)(1) **Notify the Advisory Council and Determine Advisory Council Participation** Using a letter and documentation prepared by the OES, the FHWA will contact the Council and inform it of the 'adverse effect finding' for the project. The contact letter will transmit the 'documentation' required by Section 800.11(e) of the regulations. It will invite the Council to participate in the consultation any time one or more of the following conditions apply:

A. the FHWA has determined that it desires the Council's participation;
B. the adverse effect will be upon a *National Historic Landmark*;
C. a Programmatic Agreement, as provided for under Section 800.14(b) of the regulations, will be prepared; or
D. an Indian tribe or other consulting party has requested the Council's participation.

NOTE: *A tribe or other consulting party may independently request the Council's participation at any time.*

Advisory Council Response: Under the regulations, the Council has fifteen (15) days (after it receives the request for participation) in which to advise the FHWA and all consulting parties as to whether it will, or will not, participate in the consultation attempting to resolve the adverse effect. [Should it elect to get involved, the Council will, prior to entering the discussions, have provided a written notice to the FHWA, and the consulting parties, that its participation meets the criteria set forth in Appendix A of the regulations. The Council must also advise the Federal Highway Administrator that it has decided to enter the process.]

NOTE: *The above notifications are to be carried out by the Council and do not require any action on the part of the Iowa parties to these procedures. The primary responsibility of the DOT and FHWA is to do the best possible job of providing the various items of 'documentation' required by Section 800.11(e). The documentation needs to be as complete as possible so that the Council has the best possible information available to it on the basis of which to make a decision concerning its involvement in the consultation. The documentation also provides the basis on which the Council will make its future recommendations to the FHWA regarding resolution of the conflict.*

When consultation is undertaken to resolve adverse effects to a significant historic resource with Council participation, the process must be conducted in accordance with Section 800.6(b)(2). Refer to that section of the regulations for details. If the Council does not join the consultation, the consulting parties proceed on their own, following the procedures of Section 800.6(b)(1), addressed in following sections of these procedures.

800.6(a)(2) and (3) Involving Other Consulting Parties: The consulting parties and the Council (if participating), may agree to invite other individuals or organizations to also become consulting parties- if it is viewed that their involvement is appropriate by reason of their special interest or expertise, or by jurisdiction over the resource. Specifically, the FHWA must invite any person or organization that it is anticipated will assume a definite role or responsibility in

any upcoming *Memorandum of Agreement* to participate as a consulting party. County or other local historical societies, or organized preservation groups, or other state or local governmental agencies that apply for federal funds are examples of parties the FHWA (and DOT) '**must** invite.' County or local historical societies or preservation groups who do not have specific, defined responsibilities for the development of the project or protection of the resources are examples of '**should** invites.' Also refer to the discussion for Section 800.2 on page 4 of these procedures.

The DOT will provide copies of the documentation required under 800.11(e), plus any other relevant information to any party invited (and accepting) to become an additional consulting party. **Note, however,** that this sharing of information is subject to the *confidentiality provisions* of Section 800.11(c).

800.6(a)(4) **Involve the Public:** The regulations again require the Agency Official (FHWA acting through DOT) to make information [about the adverse effect finding and attempts to resolve them] available to the public. The information to be 'made available' includes the material specified by 800.11(e): again, the information sharing process is subject to the confidentiality provisions of Section 800.11(c).

The DOT or FHWA will make information regarding a projects' expected adverse effects to a resource, and the status of efforts to resolve those effects, available to the interested public for each project where such a situation exists. Making information "available" means that the agencies will follow procedures previously discussed in connection with implementing 'public involvement' requirements in Section 800.2(d) on pages 5 - 9 of these procedures. The reader is referred to this section for more detail on public involvement steps to be taken.

The approach is to publish sufficient public notices and/or other news accounts about a project, and its anticipated effects upon significant historic resources in the corridor, to make persons or organizations who may have an interest aware. It is also to let them know where they can go for access to the project and resource information. For DOT projects, they can contact the District Engineer or the Ames central offices, Office of Environmental Services. For city or county projects, they must turn to local sources, **such** as the city or county engineer.

The notices will explain that the public may express their views on measures being proposed, or yet to be identified, to eliminate or minimize the adverse effects. Valid new suggestions from knowledgeable persons will be given serious consideration by the DOT and FHWA during the consultation process.

A time limit of 15 days, from the last date of publication of the notice(s), will be established for return of comments from the public.

Limitations on Public Involvement: In deciding the extent to which they need to implement the above steps to involve the public in consultation aimed at reducing the adverse effects of a project on historic resources, the FHWA and DOT (or city or county engineer for local projects) will take into account the following factors:

- X the type and size of the project, and its anticipated APE;
- X the nature or severity of the adverse effect upon the resource(s);
- X the relationship of the federal involvement to the project; and
- X the extent of previous notice to the public about the project and historic preservation issues, the level of public interest generated by previous attempts, and any specific requests that may have been received as a result of those attempts made earlier in the Section 106 process for the project. The extent of effort to involve the public in consultation to reduce adverse effects must be sufficient to satisfy the standards set for public involvement in Section 800.2(d) of the regulations, which defines participants to the Section 106 process.

800.6(a)(5) Restrictions on Disclosure of Information If an involved Indian tribe(s) has indicated to the FHWA or the DOT that the historic resource site (that is the subject of efforts to minimize or avoid adverse effects) is one of religious or cultural significance to them, and objects to the disclosure of information about the site to the general public, then the FHWA and the DOT will comply with Section 800.11(c) to limit the disclosure. Cities and counties developing projects for federal funding participation are bound by these same restrictions. Local officials will coordinate with the DOT when their projects involve significant historic properties to ensure that adequate confidentiality is maintained.

800.6(b)(1) Resolution of Adverse Effects *Without* the Advisory Council:

(i) Look for Ways to Avoid Initially, it will be the responsibility of the DOT to explore all possible ways to avoid or minimize adverse effects to significant historic resources. The DOT will consult with the FHWA and the SHPO in an attempt to identify feasible and prudent changes that may be possible for the project's location and/or design that would accomplish the goal. Within DOT, the OES will confer with its district engineer(s), its offices of Design, Bridges and Structures, Right of Way, Construction, and any others as necessary in order to discover and evaluate all possible avoidance and minimization measures.

In some cases, it will be possible to avoid affecting the historic resource entirely; in others, it will be possible only to reduce the severity of the adverse effect. At times, nothing can be done if project location and/or design constraints are severe. In these cases where the impacts to the resource simply cannot be entirely avoided and the resource involves an historic structure or an archaeological site not limited to significance just for the information it contains, Section 4(f) of the U.S. DOT Act will apply and compliance with the requirements of Section 4(f) will guide and document these efforts to minimize and mitigate.

(ii) Standard Treatments The DOT and FHWA may make use of 'standard treatments' as established by the Council. The reader is referred to Section 800.14(d). The treatments may be used to form a basis for a Memorandum of Agreement between the parties regarding mitigation of the adverse effect(s).

(iii) Advisory Council Involvement If the Council decides to get involved in the consultation regarding adverse effects at this point, then the FHWA and DOT will shift ahead to follow the steps prescribed in Section 800.6(b)(**2**).

(iv) Memorandum of Agreement If the FHWA/DOT, SHPO, and any consulting parties *do* reach agreement on how to resolve the problem of the project's adverse effects, then they execute a Memorandum of Agreement (MOA) among them. When all *consulting* parties, and any additional invited *concurring* parties have signed the MOA, the DOT provides the FHWA with a draft transmittal letter and the documentation required by Section 800.11(**f**). The FHWA transmits the MOA, with its attached information package, to the Council for its files **prior** to granting further project development or construction approvals to the DOT.

If the Council is not a signatory to the MOA, the MOA is effective upon its signing by the FHWA. Only the signatures of the consulting parties are required. Lack of signatures by concurring parties does **not** prevent execution of the MOA.

NOTE 1: *When the FHWA, the DOT and the SHPO reach agreement on how to resolve a project's adverse effects without Council involvement, and an MOA is prepared and executed only among the Iowa parties to these procedures, and pursuant to this section of the regulations, that MOA is still considered (by the regulations) to be the equivalent of an agreement with the Council, itself, even though it was not a signatory.*

NOTE 2: *When an MOA has been executed that stipulates measures to avoid, minimize and/or mitigate a project's adverse effects to an historic resource,*

the DOT and FHWA share responsibility for ensuring that the project is advanced and developed in a manner that is in full compliance with the stipulations of that MOA. The DOT initiates the steps to avoid, minimize or mitigate the effects while the FHWA consults, approves and oversees the process to ensure compliance with its regulations. Local governments who have signed an MOA for ***their*** *projects also share the responsibility for ensuring compliance with Section 106, NEPA, Section 4(f) and any other applicable regulations.*

(v) Failure to Agree: If the FHWA/DOT and SHPO *fail* to agree on the terms of an MOA, then the FHWA must submit the documentation package specified in Section 800.11(**g**) to the Council and request the Council to join in the consultation process. *If* the Council decides to become involved, the parties will proceed as prescribed in Section 800.6(b)(**2**), (following). If the Council decides *not* to join the process, it will first notify the FHWA to that effect, and then proceed to offer its comments in accord with Section 800.7(**c**).

800.6(b)(2) **Resolution *With* Advisory Council Participation:** If the Council *does* decide to participate in the consultation to resolve the adverse effects, then the FHWA will proceed to consult with the SHPO, the Council and other 'consulting parties,' including Indian tribe(s) with an interest as recognized under Section 800.2(c)(3). The goal will be to seek ways to avoid, minimize and/or mitigate the adverse effect(s). *If* the parties, with the Council's involvement, do reach agreement on how the adverse effects will be resolved, they will prepare and sign a Memorandum of Agreement among them to document their decisions.

800.6(c) **Memorandum of Agreement:** An MOA, properly prepared, signed and carried out as prescribed by Section 800.6 of the regulations is considered to be of critical importance, a kind of 'milestone' document. It evidences that the FHWA has complied with the requirements of Section 106, and it also governs the further development and construction of the project for which it was prepared.

General Notes on MOAs:

The timely completion of Section 106 events is recognized by the designers of the DOT's Can Do process as being critical to successful achievement of the goal of reducing overall project development time. The timing of each major phase of the Section 106 activities is specified in Can Do and will be tracked as events in the process of timely project development. The intent is to make sure that events- such as execution of an MOA, when required,- are carried out at the designated point in the process and within the allotted time frame so that eventual project construction letting is not delayed by the Section 106

process. For details of the time sequences of Section 106 activities, the reader is referred to the most recent report of the Can Do Process Implementation Team.

MOA Procedures: To develop the MOA to the satisfaction of all parties, the DOT and FHWA will consult with SHPO and other consulting parties to determine and establish verbal agreement on the best means of protecting the resource, prior to actually drafting the MOA. If they agree that protection/preservation is not feasible, then discussion shifts to the best means of documenting the resource (historic properties) or recovering the data it contains (prehistoric sites) for posterity. The appropriate mitigation measure(s) to be adopted will vary from project to project, and will vary depending upon whether the resource is an *archaeological site* (below ground; usually prehistoric but, may be historic), or an *historic property* (above ground; usually a bridge, building or other standing structure).

For Archaeological Sites: A qualified consultant (usually the same one who performed the Phase 2 Test for Site Significance) will be asked to prepare a detailed Data Recovery Plan for the site(s). The Data Recovery Plan must be reviewed by the SHPO and any comments incorporated into a revised design prior to actual recovery being initiated. The DOT uses the 'standard treatment' developed by the Council as its basis for MOAs for archaeological sites that are only valuable, and of significance, for the information they contain. The MOA for the project will include and refer to the Data Recovery Plan as the basis for mitigation measures being stipulated by the parties to resolve the adverse effect upon the resource.

For Standing Historic/Architectural Properties The FHWA/DOT and SHPO have developed standard MOA language for the description of various measures designed to mitigate the adverse effects of projects upon different types of historic standing structural properties. With all of these properties, consideration is first given (when practicable) to preservation through moving to an alternative site without compromising historic features of the structure that make it historically significant. Assistance with moving costs can be offered as an incentive.

Whether moved or not, the historic structure must be 'archivally documented' to some level prior to its moving or demolition. The SHPO has written *Iowa Historic Properties Study Appendices*, which provide guidelines for effective documentation of the various types of standing historic properties.

Although 'archival documentation' (photos, site records, and historical narrative) is the more common mitigation measure, the SHPO will occasionally

request that alternative measures be carried out. These have included published pamphlets or soft cover booklets based upon research and designed to present in lay language the story of the standing historic resource and its significance to the general public. The MOA for mitigation of adverse effects to `Historic Properties' will specify in some detail the measures that the parties have agreed to for a given project.

For all `Historic Properties' requiring an MOA, the Iowa parties review MOAs previously prepared for similar situations and strive to achieve consistency in wording and level of detail being employed in current agreements.

800.6(c)(1) **Signatories to the MOA:** Under the regulations, only signatories have the authority to execute, amend or terminate an MOA. An MOA *must* be signed to become valid. The question of who becomes a designated signatory depends upon how agreement was reached; i.e. was the Council involved, or not. In Iowa, the list of signatories *always* includes:

- X the FHWA and the DOT;
- X the SHPO (usually the Deputy SHPO); and
- X tribes *if* the affected resource is located *on* tribal land

If these parties could not reach agreement and the Council became involved in the consultation, then it becomes an additional required signatory.

NOTE: *If none of the procedures already covered in Section 800.6, preceding, are successful in resolving the adverse effect(s), and the parties are forced to shift ahead to 800.7 procedures ("Failure to Resolve Adverse Effects"), then the signatories are limited to the Council and the FHWA.*

800.6(c)(2) **Invited Signatories to the MOA:** In addition to the 'core group' of signatories, there may be others, depending upon the location of the project and the nature of the affected resource, who may be invited by the FHWA to also become a signatory to the MOA. Foremost among these would be: **1)** any Indian tribe that has indicated it attaches religious and cultural significance to a resource located *off* tribal lands (may be invited); or **(2)** any party who would be assuming a responsibility under an MOA (should).

NOTE: *The refusal of any of these invited parties to become signatories to an MOA does not invalidate the MOA, or prevent the project from going forward.*

800.6(c)(3) **Concurring Parties to the MOA:** The FHWA *may* invite all parties, not already mentioned in (a)(2) above, but involved in the consultation to resolve the adverse effect, to concur in the MOA. In addition, the signatories may elect to invite still others, as appropriate, to concur in the MOA. Again, the refusal of

any of these invited concurring parties to concur does not invalidate the MOA or prevent the project from going forward.

800.6(c)(4) **Reports on MOA Implementation:** Where the signatories agree that it would be useful and appropriate, the MOA may include a clause that provides for monitoring of the mitigation activity and reporting on its results. In Iowa, any MOA prepared for the mitigation of adverse effects to an archaeological site will normally include a provision that the SHPO's archaeological staff representative(s) will visit a data recovery site at least once while it is in progress. At the visit, the SHPO representative will see a summary of the field work methodology and results, and have an opportunity to interview the consultant performing the work. The SHPO will be looking for evidence that the provisions of both the Data Recovery Plan and the MOA have been (or are being) fulfilled.

In some cases, it may be necessary for the DOT to request that the SHPO representative visit the recovery site when work is essentially completed, but the excavations have not yet been backfilled. If project development schedules are extremely tight, it will be advantageous to the DOT and FHWA if the SHPO is able to conduct such a post-recovery visit and can approve the field work phase of the recovery. This will allow the project to proceed to construction prior to completion of the final data recovery report.

800.6(c)(5) **Duration of the MOA:** An MOA must, under the regulations, contain a provision that allows the MOA to be terminated or reconsidered if the project for which it was prepared has not been implemented within a specified period of time after execution of the MOA. The Iowa MOAs normally provide a period of up to five years after signatures for the stipulated measures to be completed. On a case-by-case basis, some MOAs may require completion in less time, such as three years.

800.6(c)(6) **Late Discoveries:** When the signatories to an MOA agree that it is appropriate, the agreement will include one or more provisions that spell out specifically how late discoveries (additional resources or effects revealed only after the mitigation work has been initiated and requiring additional consideration by the parties) will be handled. The DOT has made it a policy of the agency and a provision of its consultant contracts that all consultants performing historic resources work for it stop work and notify the OES immediately in the event such late discoveries are made.

Additionally, if the late discovery is determined or suspected of being a prehistoric burial feature, a notification process is initiated among the DOT, the Iowa Office of the State Archaeologist (OSA), the DOT's Indian Ancestral

Preservation liaison, and tribal consulting parties. These parties, in addition to FHWA and the SHPO, will confer (usually at the site) and determine the appropriate course of action with regard to the new information. The data recovery work is suspended, or moved to a different area until the decisions regarding the new information have been made, appropriate actions taken, and the consultant has been instructed by DOT to resume work at the late discovery site.

800.6(c)(7) **Amendments to the MOA:** The signatories to the MOA may agree to amend it as necessary.

NOTE: *If the Council was not a party to the original MOA and the signatories do execute an amended agreement, then the FHWA must submit a copy of the amended agreement to the Council.*

800.6(c)(8) **Termination of the MOA:** If it should happen that one or more of the signatories determines that the terms of an MOA cannot be, or could be but are not being, carried out as written, then the signatories will consult to look for suitable amendments that can be successfully implemented. If that can be done, then an amended MOA will be executed as provided for in 800.6(c)(7), above. However, if no agreement on suitable amendment(s) can be reached, then any of the signatories may terminate the MOA. In that event, the FHWA will notify the Council and request its comments and participation under the provisions of Section 800.7(a), following.

800.6(c)(9) **Copies of the MOA:** The DOT, will provide copies of an executed MOA to all 'core group' and invited consulting parties/signatories. In addition, the DOT and FHWA will include a copy of the MOA in the applicable environmental document(s) as prepared for the project to which the MOA pertains. Internally, the OES will provide copies of the MOA to the DOT's offices of [Road] Design, Right of Way and others as needed along with explanatory information, when necessary, to ensure that the provisions of the MOA are properly incorporated into road design plans and specifications, and into Right of Way actions and documents.

800.7 Failure To Resolve Adverse Effects

Procedures to be followed: The Iowa parties to these procedures, and the authors of the regulations all recognize that there might be situations for which agreement cannot be reached, and an MOA cannot, therefore, be executed. The regulations provide that, if either the FHWA, the SHPO, or the Council reach the conclusion that agreement is not being reached, and that further consultation in an attempt to resolve the adverse effects will not be

meaningful or productive, any of those may decide to terminate the consultation process. If any of these parties do make that decision, they must so inform the other two in writing and provide the reasons for their action. The regulations provide a detailed set of steps to be followed in this event that involve the SHPO, the FHWA and the Council. The steps vary slightly depending upon which of the three has terminated the consultation process. Regardless, the steps all lead to the Council giving its comments to the FHWA, the FHWA considering those comments, and then making its final decision about how, or if, the undertaking (project) is to proceed. It is important to note that the final decision about any federal aid project rests with the FHWA, as the 'lead federal agency,' or "Agency Official." The involvement of both the SHPO and the Council is *advisory in nature only*.

The parties to these Iowa Section 106 Procedures will follow the steps outlined in 800.7 whenever an impasse is reached in the consultation process to resolve adverse effects. The reader is referred to the regulations for details about the steps.

800.8 Coordination of the Section 106 Process with the National Environmental Policy Act: The DOT does not formally integrate Section 106 and the National Environmental Policy Act (NEPA). The processes run concurrently and the public hearings are integrated. The results of the Section 106 process are summarized in the NEPA document.

800.9 Advisory Council Review Of Section 106 Compliance

800.9(a) Assessment of Agency Official [FHWA] Compliance for Individual Undertakings : If any individual, agency or organization is dissatisfied with decisions reached, or processes followed, by the DOT and FHWA with regard to a particular project having Section 106 involvement, that person or organization may contact the Council and request that it review and comment upon the adequacy of the parties' compliance with the Section 106 process. Or, the Council may undertake to offer those comments on its own initiative. Either way, the comments are *advisory* with respect to the project. If the comments are received by the FHWA prior to any decisions having been made with respect to the project or Section 106 matter in question, then the FHWA must *consider* the Council's views before making its decisions about how the particular project is to proceed, with respect to the Section 106 involvement.

800.9(b) Agency [FHWA] Foreclosure of Advisory Council's Opportunity to Comment The regulations recognize (in this section) that, if the DOT and FHWA should fail to complete the requirements of Section 106 for a particular project *prior to* approving that project for construction, that may mean that the Council's

opportunity to comment on the Section 106 aspects of the project has been foreclosed. The Council has the right to review any project situation where it believes its opportunity to comment has been foreclosed. To initiate such a review, the Council must notify the FHWA (Iowa), and the FHWA's Washington Office Historic Preservation Officer, and allow those parties 30 days to respond and provide information that would answer the foreclosure question.

If it receives information in response to its inquiry that leads the Council to conclude that such a 'foreclosure' *has* occurred, it must then submit a written copy of its determination to the Federal Highway Administrator. The Council *must*, under its own regulations, also make the foreclosure determination available to the public, and to any specific parties known to be interested in the project and its Section 106 involvement.

800.9(c) **Intentional Adverse Effect by Applicants [DOT]:** The FHWA is prohibited by Section 110(k) of the National Historic Preservation Act from approving any DOT project to be constructed with federal funding participation if it knows that the DOT, with the intent to avoid the requirements of Section 106, has intentionally significantly and adversely affected a 'Historic Property' located within the project's corridor, or did not prevent the adverse effect from happening when it had the legal power to do so. The only exception to this rule is that the FHWA may approve such a project *if* it has first consulted with the Council on the matter and then determined that the particular project circumstances justify the approval even though the adverse effect has occurred. In this event, the FHWA must consider the Council's opinion in the matter, and must notify the Council, the SHPO and any other parties known to be interested in the project before approving the project.

Section 800.9(c) of the regulations contains several specific steps the FHWA must take to approve such a project when Section 110(k) applies. In the event the Iowa agencies should be faced with this specific situation, they would follow the steps outlined in this section of the regulations to ensure that their compliance with Section 106 is not jeopardized. The reader is referred to Section 800.9(c) of the regulations for additional information about the required steps.

800.9(d) **Evaluation of Section 106 Operations [by the FHWA]:** Section 203 of the National Historic Preservation Act (Act) allows the Council to obtain information from federal agencies, including the FHWA, and evaluate it to determine how well they are meeting their Section 106 responsibilities with regard to administration of daily project work. Based upon the information received, and its subsequent evaluation of the data, the Council may make recommendations to the FHWA for actions it believes need to be taken to

improve the efficiency and effectiveness of the process being used by the agencies. Should such a 'performance review' be undertaken in Iowa, the DOT and FHWA would endeavor to cooperate fully with the Council by providing the requested information, and by responding positively to any suggestions received from the Council for improving its Section 106 processes.

800.10 Protecting National Historic Landmarks

800.10(a) **Statutory Requirements:** A `Historic Property' that is designated and listed as a National Historic Landmark (**NHL**) is highly significant and commands the highest level of preservation and protection. An NHL is afforded maximum protection under the law (Act). The Section 106 regulations require the DOT and FHWA to make the maximum effort possible to protect historic properties as they go about the planning and design of highway projects. Direct, adverse effects to an NHL are to be avoided by the agencies' projects. When the Council comments on a project that stands to cause an adverse effect to an NHL, it will follow the process set out in Section 800.6 - 800.7, and give special consideration to protecting an NHL.

800.10(b) **Resolution of Adverse Effects:** The FHWA is required to contact the Council and request its participation *any time* consultation is being initiated as described in Section 800.6 to resolve adverse effects to an NHL.

800.10(c) **Involvement of the Secretary of the U.S. Dept. of the Interior:** The FHWA will notify the Secretary, U.S. Department of the Interior, Acting through the Director, National Park Service (Secretary) of any Section 106 consultation being initiated to resolve adverse effects to an NHL, and invite the Secretary to participate in the consultation. The Council may request a report from the Secretary if it believes the report would assist in the consultation process.

800.10(d) **Report of Consultation Outcome:** Whenever the Council gets involved in consultation under this section of the procedures, it must report the outcome of the Section 106 process by providing a written report, or copy of any MOA to which it becomes a signatory, both to the Secretary and to the Federal Highway Administrator, Washington, D.C.

These actions are the responsibility of the Council in these NHL matters, and do not require any specific action by the Iowa agencies, *unless* the Council should request additional project data or other information from the agencies in order to complete its required report to the Secretary.

800.11 Documentation Standards

800.11(a) **Adequacy of Documentation:** Under the 'partnership' arrangement between the FHWA and the DOT for completing the Section 106 process in Iowa, and the formal letter of notification to the SHPO of March 1, 2001, the DOT normally prepares the various items of documentation for each project processed, and the FHWA reviews it for adequacy. As a practical matter, the FHWA does not so review each and every piece of correspondence and report generated between the DOT and its consultants, or the DOT and SHPO. However, under the regulations, the FHWA does have the responsibility to check and ensure that written 'determinations,' 'findings' or 'agreements' prepared by the DOT or its consultants for Section 106 are supported by sufficient documentation to enable any other reviewing party to understand their basis.

This requirement is flexible with regard to historic property identifications or significance evaluations being conducted on a 'phased' basis. That is, the level of detail expected in a Phase 1 report is, by definition (See pages 14 - 15), less than that expected for a Phase 2 report; a Phase 2 is less than for a Phase 3 report.

If the Council (or the SHPO, if the Council is not involved), upon review of project documentation, determines that it does *not* meet the standards of this section, then the Council (or SHPO) will notify the FHWA of the deficiency and proceed to specify what information needs to be added or revised in order to be acceptable. The FHWA, or any involved consulting party, has the option of asking the Council to review any disputes that may arise over the adequacy of documentation that has been prepared. The Council will then review the dispute and offer its views on the situation to the FHWA and/or to the involved consulting parties.

800.11(b) **Format of Section 106 Documentation:** The FHWA and the DOT have the option of using documentation that has been prepared to comply with other laws (such as the NEPA or Section 4(f) of the DOT Act) to fulfill their responsibilities under Section 106. However, the substituted documentation must meet the standards of this section for format and content.

800.11(c) **Confidentiality of Historic Property Information:** On occasion, an historic property that has been identified by the DOT in connection with Section 106 activities may turn out to be of religious or other cultural significance to one or more Indian tribes or other interested parties. Prehistoric mortuary sites containing burial mounds or other features are of primary concern. Section 263B.10 of the Code of Iowa requires that information about these sites, or other archaeological sites that may be at risk as a result of public exposure, be

treated as confidential to prevent their being excavated by amateur collectors or other unauthorized persons. Section 304 of the National Historic Preservation Act also recognizes this potential and provides a remedy for the FHWA and the DOT.

Under 304, the FHWA may withhold information about such sites when it determines that release would jeopardize the sanctity and significance of the property. Specifically, 304 states: "... after consultation with the Secretary, [the FHWA] shall withhold from public disclosure information about the location, character, or ownership of a historic property when [it believes such] disclosure may result in a significant invasion of privacy; risk physical harm to the property; or impede the use of a traditional religious site by practitioners. When this occurs, the Secretary is obliged to consult with the FHWA as needed and then determine who shall have access to the information for the purpose of continuing the Section 106 processing.

In doing so, the Secretary shall, in turn, consult with the Council in reaching the determinations needed regarding withholding of data and deciding whom may have access to the data. If requested, the FHWA may need to provide information to the Council concerning the views of the SHPO, as well as any affected tribes, about the confidentiality issues. The Council has 30 days, beginning *only after* its receipt of adequate documentation, to comment to the FHWA and the Secretary.

DOT Confidentiality Procedures Data developed by consultants and presented to the DOT about historic properties located within proposed highway corridors that are thought to meet the criteria above for sensitive information are always to be regarded as confidential. The data are to be shared *only* with those persons in governmental agencies concerned with the project and having a need to know about the sites. The incorporation of such data into NEPA environmental documents, planning reports, public hearing or information meeting displays and other mediums will not be allowed.

800.11(d) **Documentation of a Finding of 'No Historic Properties Affected':** When the DOT has followed the Section 106 process to Section 800.4(d) and determined that the project will result in a finding of "no [significant] historic properties affected," it must provide documentation to the SHPO and other designated consulting parties and also make it available for public inspection. The documentation must substantiate the 'No Historic Properties Affected' finding and include the information given in items (1) - (3), below.

NOTE: *The previously stated rules regarding protecting the confidentiality of the historic site information will be applied to this disclosure with respect to sharing data with the public.*

800.11(d)(1) Project Description: Define the physical limits of the project, the APE that has been agreed upon, and the nature of the federal involvement. Include, as necessary, maps, plan sheets, photos or aerial photos, or other materials to adequately describe the location, concept and extent of the proposed project.

NOTE: *The Programmatic Memorandum of Understanding (PMOU) to which these procedures are attached may contain "standard" definitions of APE for specific project types. If the APE for a given project varies from the standard for whatever reason, the SHPO may comment upon the adequacy of that APE. Information from which to determine if the standard APE applies can best be located in the project's concept statement, the project description of the applicable NEPA document, or the introductory sections of the `Historic Properties' survey report.*

800.11(d)(2) Steps Taken to Identify Historic Properties: It is essential that the SHPO, other consulting parties, and any public reviewers of documentation developed in support of a finding of 'No Historic Properties Affected' be presented with a complete description of steps taken by the DOT to identify historic properties that a proposed project could affect. A presentation of the results of the surveys conducted to satisfy Section 800.4(b) of the regulations will usually be satisfactory.

800.11(d)(3) Basis for Finding of 'No Historic Properties Affected': The 800.4(b) survey results and project location and/or design information provide the basis. If there is any question, the SHPO will be consulted at the time the determination is being made. Special care needs to be exercised in those situations where significant properties are present in the general area of a project, but are thought to be far enough away (well outside the APE) that they will not be affected. The SHPO's comment will be solicited any time there is a question before the determination is finally made.

NOTE: *(d)(1) through (d)(3), above, is the same information that is regularly sent from DOT to SHPO to document a finding [by DOT] for a specific project that 'no historic properties are affected'. It normally consists of: 1) a cover letter stating the DOT's conclusions; 2) the `Historic Properties' survey report; and 3) a completed project summary form. For Transportation Enhancement projects, the package includes the Findings and Recommendations Form as developed for this purpose by the SHPO.*

800.11(e) Documentation of Finding of 'No Adverse Effect', or 'Adverse Effect': For these findings, the documentation package will be provided to the SHPO and other designated consulting parties. The documentation will include:

800.11(e)(1) Project Description: A complete description of the overall project specifying the nature of the federal involvement, the physical features of the project, the Area of Potential Effect (APE), and photographs, maps and drawings as needed to adequately define the project and its expected area of impact to `Historic Properties'. Again, a copy of any `Historic Properties' survey report or NEPA documentation already prepared, or excerpts from these reports, can be used to provide the necessary descriptions.

800.11(e)(2) Steps Taken to Identify Historic Properties: A description of steps taken to identify historic properties likely to be affected by the project as required by Section 800.4(b) of the regulations.

800.11(e)(3) Description of Historic Properties Affected: This property description must include complete information on the aspects or characteristics of each property that makes it eligible for the *National Register*. Again, a copy of the `Historic Properties' survey report, or suitable excerpts from the report can be used to provide this information.

800.11(e)(4) Description of Project Effects on Historic Properties: A description of the nature and extent of the project's effects on each historic property. Here, maps or aerial photographs should be used to graphically show the relationship between a property and the proposed project.

800.11(e)(5) Application of Criteria: A discussion of how the 'Criteria of Adverse Effect' were applied to each affected property and how the conclusion was reached for each that the criteria were applicable or inapplicable. This discussion should also include information on any steps the agencies have identified pertaining to project location and/or design that would result in either complete avoidance, or at least minimization, of any adverse effects. There should also be a description of any measures that will be taken to mitigate those adverse effects that cannot be avoided through changes to project location and/or design.

800.11(e)(6) Input from Others Parties: The documentation package in support of a finding of 'adverse effect' or 'no adverse effect' should include a copy or summary of comments received from other consulting parties, reviewing agencies or organizations, and the public that pertain to the adverse or no adverse effect finding for each property affected by the project.

800.11(f) **Documentation for a Memorandum of Agreement:** By the time an MOA is filed with the Council, documentation for the earlier steps (properties, effects, etc.) will already have been prepared and provide good background support information for the Council's reference as it looks at a proposed MOA. However, the DOT and FHWA will need to look at what they submitted for 800.6(a)(1), (getting the Council involved in resolution of adverse effects) for completeness and include, with the MOA submittal, information describing any substantive revisions or additions to the project, affected properties, and any measures proposed to avoid or minimize, plus proposed mitigation.

If any NEPA documents (FONSIs, Section 4(f) Statements, FEISs, RODs, etc.) have been completed, a copy of those should be included with the supplemental documentation. The documentation should also include copies of any input received from other 'Consulting Parties,' agencies, organizations, or the public pertaining to the adverse effects, avoidance, mitigation, etc. since the earlier documentation submittals to the Council.

NOTE REGARDING DOCUMENTATION: *The DOT has relied extensively upon the use of NEPA documents and excerpted sections, or full copies, of its `Historic Properties' project completion reports to provide project and affected resources descriptive data in its submittals to the Council. NEPA documents are prepared in compliance with CEQ and FHWA guidelines and requirements, and so follow the standards established for format and content. Complete descriptions of the projects, their purpose and need, their APE's and historic resources that may be affected are a normal part of these documents. The `Historic Properties' survey Project Completion Reports (PCRs) are prepared exclusively by consultants for the DOT, and so, some variety in format and content is found. However, the SHPO has published guidelines that define what it expects for format and content in `Historic Properties' survey PCRs; the DOT requires its consultants to adhere to these guidelines.*

Additionally, the DOT has developed supplemental guidelines for its consultants that describe in greater detail what is expected for format and content in PCRs. Project descriptions, survey area boundaries, maps and graphics, and summary tables are among the items addressed in the guide. A copy is appended to these procedures as ***Exhibit "C"*** *for reader reference. All of these format and content requirements are imposed in the interest of facilitating a more expeditious review of reports by DOT staff and the SHPO at the heart of the Review & Compliance Process (R&C). Consistency in format and content, including detail and quality of graphics, is considered essential to efficient processing of reports. The agencies believe that this approach to report preparation makes them entirely suitable (usually) for submittal to the*

Council as essential elements of documentation packages required by Section 800.11 of the regulations.

800.12 Emergency Situations

Section 800.12 of the regulations encourages agencies such as the FHWA and DOT to develop, in consultation with their SHPO and any affected Indian tribe(s), procedures for taking historic properties into account when they must take quick action in response to a natural disaster that threatens life or property, or an emergency declared by the President, the IA Governor, or a tribal government. If such procedures are developed, and approved by the Council, they will govern the agencies' handling of their historic preservation responsibilities during any disaster or emergency *in lieu of* compliance with Sections 800.3 through 800.6 of the regulations. The regulations provide that if an emergency or disaster occurs, and the agencies do *not* have procedures approved by the Council in place, then they have two choices. They may either:

800.12(b)(1) follow special procedures that have been set up in advance for this purpose by means of a Programmatic Agreement between them that contains specific provisions outlined by Section 800.14(b) of the Regulations for dealing with historic properties in emergency situations; **or**

800.12(b)(2) notify the Council, the SHPO and any Iowa Indian tribe that may attach religious and cultural significance to historic properties likely to be affected *prior* to proceeding with the emergency work, and affording them an opportunity to comment within seven (7) days of notification.

NOTE: *If the FHWA determines that circumstances of the emergency do not permit them to wait the full seven days for return of comment, it will still notify these same parties, explain the urgency of the situation, and invite them to respond by the quickest available means within whatever time frame it believes is available.*

The Iowa parties have used a modified version of these procedures. Here, the DOT will notify the FHWA and the SHPO of the emergency and determine, in consultation with those agencies, the most appropriate course of action that will remedy the emergency situation and still take historic preservation into account. If an archaeologist and/or architectural historian is requested to survey the area(s) involved in the emergency, that survey must be conducted immediately, or as soon as weather or other conditions permit. A verbal report is requested and is then reviewed with the SHPO. If the SHPO gives verbal approval, the work may proceed but the written report must follow within 30 days. FHWA will take into account the verbal report as requested and

reviewed in reaching a decision on how to proceed with the emergency undertaking.

800.13 Post Section 106 Review Discoveries

800.13(a) Planning for Post-Section 106 Discoveries: Regardless of the level of effort and expertise expended to identify historic properties and coordinate results with SHPO, tribes, and the interested public in a timely manner (well in advance of a project's actual construction), there always remains the possibility that resources will be unexpectedly discovered during construction. The DOT and FHWA have long recognized this fact and have devised various strategies over the last nearly 30 years to deal with this situation.

There is particular concern when human remains are unexpectedly unearthed during construction and examination reveals that they are prehistoric (greater than 150 years) in age. The DOT has made it a policy and a standing commitment to the state's Indian representatives to make every effort to protect and preserve these resources during highway construction and maintenance activities.

DOT Burial Encounter Procedures
By informal agreement with the Iowa Office of the State Archaeologist (official having prehistoric mortuary responsibilities in Iowa) and the designated Indian tribal representative, the following steps are to be taken any time human remains are unearthed, or other artifacts associated with mortuary features are found during project construction or maintenance activities in Iowa:

1) The contractor will immediately cease excavation work in the area of the discovery and secure the site from any further possible disturbance; then,

2) the contractor will notify the DOT's construction site representative who shall immediately notify the DOT's designated representative. The designated representative will, in turn, immediately contact the DOT's tribal ancestral preservation representative, the Iowa Office of the State Archaeologist (OSA), and the Director, Office of Environmental Services; DOT, then

3) Environmental Services will notify the FHWA, the SHPO, and tribal consulting parties; and

4) the parties will confer (at the site, if deemed necessary by any of the three) to identify the discovery, determine the likely project impacts if left in place, and the most appropriate avoidance, minimization, or mitigative measure(s) for

dealing with the discovery. Wherever possible, the DOT will attempt to have a qualified archaeologist visit the discovery area the same day or the next working day to assist with identification and determination of appropriate procedural steps; then

5) although the SHPO does not have responsibility or authority under Iowa law to make decisions regarding disposition of mortuary discoveries, it will be consulted and its comments considered within the purview of its responsibilities under Section 106; then

6) when arrangements have been made to deal with the discovery that are acceptable to all concerned and relocation of artifacts or other steps agreed upon have been completed, the Office of Environmental Services (OES) will advise its construction site representative that work may be resumed. OES will convey to the construction staff any special precautions or limitations to be placed on the contractors activities as a result of the discovery.

Additional Information Concerning Discoveries in Iowa

1) All construction contractors performing work for the DOT are bound by the provisions of the DOT's publication entitled *"Standard Specifications for Highway and Bridge Construction, Series 1997"*. **Specification 2102.10, "Archaeological Salvage"** which states in its entirety as follows:

> "Whenever the Contractor's operations encounter remains of prehistoric people's dwelling sites, burial sites, or artifacts of historical or archaeological significance, the operations shall be temporarily discontinued at the site. The [DOT] Engineer, in conjunction with proper archaeological authorities of the State of Iowa, will promptly examine the exposure and determine the disposition.
>
> When directed by the Engineer, the Contractor shall excavate the site in a manner to preserve the artifacts encountered and remove them for delivery to the custody of the proper State authorities".

2) When design plans are finalized for a project where the potential for occurrence of subsurface prehistoric deposits is considered high- even though no surface evidence was observed during survey by qualified archaeologists- a note will be placed at one or more locations within the plan set alerting the contractor to the possibility that historic resources may be exposed, urging caution, and directing his attention to Specification 2102.10.

3) Contracts of the DOT with historic resource consulting firms or institutions for all phases of `Historic Properties' survey, testing or data recovery contain language requiring the consultant to immediately suspend work at the site and notify the OES in the event bone known or suspected of being human is unexpectedly unearthed. The three-way notification process described above will be followed.

4) The DOT's staff in the OES is available to assist local city and county engineers with these procedures when discoveries are made on their construction projects. The DOT's District Offices provide the interface and coordination with the local officials and will transmit the decisions of FHWA, SHPO, OSA, and the tribal representative(s) regarding disposition of their discoveries.

800.13(b) **Discoveries Without Prior Planning:** The regulations now provide that, if historic properties, or effects to historic properties are identified *after* the Section 106 Process has been completed, but a formal process for dealing with these discoveries as suggested by 800.13(a) has *not* been established, the DOT and FHWA should make reasonable efforts to avoid, minimize or mitigate adverse effects to those properties. The agencies acknowledge this requirement and are agreed that the Iowa notification and conflict resolution process outlined for Section 800.13(a), above, has satisfactorily responded to the concept of this provision of the regulations in the past. With the addition of notification to any *other* interested tribe (along with the designated Iowa tribal representative), and the inclusion of FHWA's assessment of the *National Register* eligibility of the late discovery in the notification, these procedures are still valid.

Subpart C -- Program Alternatives

800.14 Federal Agency Program Alternatives

800.14(a) **Alternate Procedures:** The regulations provide that the DOT and FHWA *may* [if desired], develop their own set of procedures with which to implement Section 106 requirements. They may substitute same for all or just a part of Subpart B of the regulations (800.3 through 800.13, the entire process as applied to federally assisted undertakings) ***if*** they are consistent with the Council's own procedures and regulations. (See Section 110(a)(2)(E) of the *National Historic Preservation Act.)* At the time of the writing of *these* procedures, the SHPO, the DOT and FHWA do not anticipate that development of such 'Program Alternatives' would be of benefit to the Iowa agencies involved with historic preservation activities, and they have not contemplated

developing any in addition to the 1998 Programmatic Memorandum of Understanding already in effect between them (see 800.14(c), following).

800.14(b) **Programmatic Agreements:** The January 2001 version of the regulations contains a new provision (denoted as 800.14(b)(**4**) that authorizes the *Council* to create what is referred to as "prototype programmatic agreements" that can provide a model for other subsequent PA's to be prepared and executed between a federal agency (FHWA) and a SHPO for the same type of program, or for a repetitious `program type' [class of undertakings] *without* Council participation. This approach may offer a more expeditious way to develop and implement PA's.

The Iowa agencies have agreed, informally, that they do not wish to adopt a full program *alternative* to the *standard* Section 106 process. Rather, they will simply plan to continue following the standard process prescribed by Part 800, and prepare fairly detailed written procedures to document how they will follow the Part 800 process from start to finish. Those written procedures are the subject of this document, and they are prepared as much for the benefit of other, outside agencies (such as the U.S. Army Corps of Engineers) with whom the DOT and FHWA interact frequently during project development as they are for FHWA, DOT and SHPO, themselves. The intent is to document and attest to the commitment of the three-party Iowa group to follow the process to its required conclusion for all applicable projects.

Any Part 800 procedural PA developed by the Iowa agencies would be prepared and used in accordance with the provisions of Section 800.14(b) of the regulations. The reader is referred to that section for details.

800.14(c) **Exempted Categories of Programs or Projects:** The regulations provide that the FHWA *may* elect to establish a program or category of agency undertakings (projects) that may be exempted from the normal Section 106 review process. Although a significant time saving approach, such an exemption program may only be used if:

(i) the actions within the program or category(ies) would otherwise qualify as "undertakings" as defined in Section 800.16 of the regulations; and

(ii) the potential effects of the program or category(ies) upon historic properties are known or predictable, and likely to be minimal or not adverse; and]

(iii) exemption of the program or category(ies) is not inconsistent with the purposes and intent of the *National Historic Preservation Act.*

Note on Iowa Programmatic Memorandum of Understanding: *In September1998, the FHWA, the SHPO, and the DOT executed a "Categorical No Historic Properties Affected Programmatic Memorandum of Understanding" (PMOU) among them that was designed to exempt (from normal Section 106 review) several categories of minor scale highway improvement actions and Transportation Enhancement Program projects. Although not a signatory to the PMOU, the Council did review and comment upon drafts of the agreement, and was in concurrence with its concept and provisions at the time it was executed. The Iowa agencies have found this agreement to be an effective means of reducing the time and paperwork demands of their historic preservation program while ensuring that resources are afforded an adequate level of consideration and protection. At the time of the writing of these procedures, the Iowa agencies expect to keep the agreement in force until circumstances surrounding the Council's regulations or historic preservation needs in Iowa suggest that a change is desirable.*

800.14(c)(2) Public Participation in Developing Exemptions: If new agreements to exempt programs or projects from Section 106 review are advanced in Iowa in the future, their development will include public, and other affected parties, participation. The extent of such participation would be commensurate with the expected extent to which the public, agencies, or organizations would be affected by the exemption agreement. It is expected that the SHPO would play a leading role in the identification of other agencies or organizations that should be contacted for input. The DOT and FHWA would take the necessary steps to solicit comments from the interested public.

800.14(c)(5) Advisory Council Review of Proposed Exemptions: Future new agreements would, as in the past, require the review of the Council. Supporting documentation would include descriptions of the programs or undertaking categories for which the exemption is sought, a discussion of how the criteria of (c)(1), above, are met, and a discussion of how input from other agencies, organizations, Indian tribes (if applicable) and the public was obtained. Any such input would be summarized and responded to as appropriate.

800.14(f) Consultation With Indian Tribes When Developing Section 106 Program Alternatives: In the event that the DOT, SHPO, and FHWA should elect to supplement existing or develop additional exemption agreements for the Iowa historic preservation program, the agencies would ensure that the development process includes consultation with any Indian tribes identified as having an interest in programs and projects of the agencies in Iowa. The extent of the consultation would be commensurate with the expected level of interest of the tribe(s) and the degree to which they stand to be affected by the exemption

agreement. (See Section 800.2(d) for additional discussion on level of involvement.)

This document presents the operating procedures that will be followed in Iowa by the FHWA, SHPO, and DOT in response to the ACHP revised Section 106 guidelines issued in January 2001. These procedures for the implementation of Section 106 requirements have been reviewed by all parties and agreed upon. Questions regarding the content of this document may be directed to:

James P. Rost, Director
Office of Environmental Services
Iowa Department of Transportation
Ames, Iowa 50010
Phone: (515) 239-1798

or

David B. Drake
Environmental Coordinator
Iowa Department of Transportation
Ames, Iowa 50010
Phone: (515) 239-1251

or

Randall B. Faber
Historical Programs Manager
Iowa Department of Transportation
Ames, Iowa 50010
Phone: (515) 239-1215

Form 536002
08-05

Iowa Department of Transportation

TRIBAL NOTIFICATION

Date | IA DOT Contact

IADOT Project # | Phone # 515-239-XXXX / FHWA# 515-233-7300

Location | E-mail

Description

Type of Project *(see map)*

- ☐ VERY SMALL - Disturb less than 12-inch depth (*plow zone*)
- ☐ SMALL - Grading on existing road, shouldering, ditching, etc.
- ☐ SMALL - Bridge or culvert replacement
- ☐ LARGE - Improve existing road from 2 lanes to 4 lanes
- ☐ LARGE - New alignment
- ☐ OTHER

Type of Coordination/Consultation Points

- ☐ 1 - Early project notification (*project map and description)*
- ☐ 2 - Notification of survey findings (*Phase I*)
- ☐ 2a - Notification of site evaluation (*Phase II*)
- ☐ 3 - Consultation regarding site treatment
- ☐ 4 - Data Recovery Report
- ☐ 5 - Other

Type of Findings

- ☐ No American Indian site found --Section 106 Consultation Process ends*
- ☐ Potentially significant American Indian sites found (*see map and list of sites*)
- ☐ American Indian sites found but not eligible for National Register listing -- Section 106 Consultation Process ends*
- ☐ American Indian sites eligible for National Register listing cannot be avoided (*see map*)
- ☐ Avoided American Indian sites eligible for National Register listing *(see map and list of sites)* --Section 106 Consultation Process may or may not end
- ☐ Potential Burial site found

* *In the event of a late discovery, consultation will be reopened*

_____ # of non-significant prehistoric sites

_____ # of potentially significant prehistoric sites

_____ # of National Register-eligible prehistoric sites

Affected National Register Properties

- ☐ Investigating avoidance or minimizing harm options
- ☐ Avoided
- ☐ Protected
- ☐ Data Recovery/MOA

* ***Please Respond*** *

Who should we contact for site/project-related discussions?

Name | Street Address | City, Zip Code

Phone | E-mail

Do you know of any sensitive areas within or near the project the FHWA/DOT should avoid (*please describe*)?

- ☐ Thank you for the information; however, we do not need to consult on this particular project.
- ☐ We do not have a comment at this time, but request continued notification on this project.
- ☐ Please send a copy of the archaeology report.
- ☐ Thank you for the information. We are satisfied with the planned site treatment.
- ☐ We have concerns and wish to consult.
- ☐ We wish to participate in the Memorandum of Agreement for this project.

Comments

Name | Tribal name | Date

(Comments continued on back)

Iowa Department of Transportation
800 Lincoln Way, Ames, Iowa 50010 515-239-[*xxxx*] *Fax* 515-239-1726

[*Date*]

[*Tribal Representative*]
[*Address*]

Ref. No: [*Project Number*]
[*County*]
[*Primary / Local Systems*]

Dear [*Tribal Representative*]:

RE: [*Reason for Correspondence, Project Type, and Project Location*]

The [*Applicant*] in coordination with the Federal Highway Administration (FHWA) and the Iowa Department of Transportation (IDOT) is proposing to [*project description and location(s)*].

In the spirit of Section 106 of the National Historic Preservation Act, we are contacting you regarding [*Reason for correspondence, i.e., early coordination, archaeological report findings, data recovery, etc. Include detailed information regarding the reason for correspondence.*]

We request that you contact us if you have any concerns that the project could impact sites of religious or cultural importance to your tribe. We will provide any additional project information that may be of interest to you as it becomes available.

Enclosed with the map is a postage-paid notification form that you may use, if you wish, to return comments about the project. Please feel free to call me at 515-239-[*xxxx*]. If you wish to contact a representative of the U.S. Government, call Mr. Michael LaPietra, Federal Highway Administration, Iowa Division, at (515) 233-7302.

If you have any questions, please feel free to contact me.

Sincerely,

[*Cultural Resources Project Manager*]
Office of Location and Environment
[*CR Project Manager*@dot.iowa.gov]

Enclosure
cc: [*FHWA Representative*], FHWA
[*Additional Tribal Representative, Tribe*]
[*SHPO Archaeologist*], SHPO
[*NEPA Env. Spec. Senior*], NEPA / OLE

Tribal Notification List

The following tribal contacts are not necessarily an inclusive list. Contact the Cultural Resources Section for an up-to-date listing.

Ho-Chunk Nation
Ms. Suzette La Mere
CR Dept Director
PO Box 667405 Airport Rd.
Black River Falls, WI 54615

Iowa Tribe of Kansas and Nebraska
Tribal Chairperson
3345 Thrasher Rd. #B
White Cloud, KS 66097-4028

Iowa Tribe of Oklahoma
Tribal Chairperson
R1, Box 721
Perkins, OK 74059

Otoe-Missouria Tribe
Mr. John Shalton
RR 1, Box 61
Red Rock, OK 74651

Ms. Barbara Childs-Walton
NAGRPA
RR 1, Box 61
Red Rock, OK 74651

Pawnee Nation of Oklahoma
Ms. Alice Alexander
PO Box 470
Pawnee, OK 74058

Sac & Fox Nation of Mississippi in Iowa
Mr. Jonathon Buffalo
THPCoordiator
349 Meskwaki Road
Tama, IA 52339-9629

Sac & Fox Nation of Missouri
Ms. Deanne Bahr
NAGPRA
305 N. Main St.
Reserve, KS 66434-9723

Sac & Fox of Oklahoma
Ms. Sandra Massey
NAGPRA
Route 2 - Box 246
Stroud, OK 74079

Sisseton-Wahpeton Dakota Nation
Mr. Franky Jackson
THPO
100 Veterans Memorial Dr.
PO Box 509
Agency Village, SD 57262

Tribal Chairperson
Route 2 –Agency Village
Box 509
Sisseton, SD 57262

Winnebago Tribe of Nebraska
Mr. John Blackhawk
Tribal Chairperson
Box 687
Winnebago, NE 68071

Yankton Sioux Tribe
Mr. Francis Bernie
THPO
PO Box 248
Marty, SD 57361

Tribal Chairperson
PO Box 248
Marty, SD 57361

Technical Report Checklist

_____ Description of the project

_____ Location of the project by section, township, and range

_____ Project corridor survey area in acres as well as the width and length in feet or miles

_____ GPS coordinates and a polygon of the survey boundaries*

_____ Name of the property owner(s) and any tenant(s) with address and telephone number

_____ Abstract at the beginning of the report that provides a summary of the project and survey

_____ Table of findings for larger reports

_____ FHWA structure number (if project includes a bridge)

_____ Information on bridge size, type, and date of construction (if project includes a bridge)

_____ GPS coordinates and a polygon for each archaeological site*

_____ Archaeological survey site number from OSA

_____ Completed archaeological site form

_____ GPS coordinates and a street address for each historic site*

_____ Completed Iowa Site Inventory Form for each historic structure and district over 50 years old

_____ State Inventory Number from SHPO for historic sites

_____ Determination of eligibility for listing on the National Register (excluding reconnaissance surveys)

_____ Original site forms with original photos and negatives

_____ Materials and information for submittals to SHPO and tribal contacts

All technical reports MUST be submitted to the Cultural Resources Management Section in the Iowa DOT Office of Location and Environment. CRMS personnel will review and forward the reports to SHPO.

*All GPS coordinates need to be listed in both State Plane and UTM.

Historical Architectural Data Base

Data Entry Form for Studies and Reports

Doc. No.: _____

Source of Study: ☐ Certified Local Government Project ☐ Section 106 Review & Compliance Project
☐ Historical Resource Development Program Project ☐ Other

Project Reference #: _____

Authors/Editor/Compiler/Originator:

_____

Author Role: ☐ Consultant ☐ Private Researcher/Writer ☐ Teacher ☐ Student
☐ Project employee/volunteer ☐ Site Administrator ☐ Other: _____

Title of Work:

_____

Year Issued: ____

Type of Work Performed:
(*check one only*)

Survey:

- ☐ Windshield survey minimum level documentation
- ☐ Reconnaissance survey to make recommendations for intensive survey(s).
- ☐ Intensive survey
- ☐ Mixed intensive and reconnaissance survey

Plan:

- ☐ Planning for Preservation/Survey
- ☐ Community Preservation Plan

Property Study:

- ☐ Iowa Historic Property Documentation Study
- ☐ Historic American Building Survey (HABS)
- ☐ Historic American Engineering Record (HAER)
- ☐ Management or Master Plan
- ☐ Historic Structure Report
- ☐ Feasibility/Re-use Study
- ☐ Architectural/Engineering Plans and Specs.

National Register:

- ☐ Multiple Property Documentation Form

Other (e.g., private research, school project, video): _____

Kind of Work Produced:
(*fill in one section only: Report or Monograph or Chapter, etc.*)

Report: Published/produced by: _____

Place issued: _____

Client: _____

If applicable, include:

Series Title: _____

Volume #: _____ Report #: _____

Monograph: Publisher Name: _____

Place: _____

Chapter: In: _____ First pg. #: _____ Last pg. #: _____

Journal: Name: _____ Vol. _____ No. _____ Pages: _____ to _____

Thesis: Degree (check one): ☐ Ph.D. ☐ LL.D. ☐ M.A. ☐ M.S. ☐ B.A. ☐ B.S.

Name of College/University: _____

Paper: Meeting: _____

Place: _____

Other: _____

Geographic Scope of Study:

☐ City/town ☐ Township(s) ☐ County ☐ Region of Iowa ☐ Statewide ☐ Other: _____

State:				
County:				
Town:				
Township:				
Range:				

Time Focus: (check any decades that receive particular attention)

☐ before 1830 ☐ 1830s ☐ 1840s ☐ 1850s ☐ 1860s ☐ 1870s ☐ 1880s ☐ 1890s

☐ 1900s ☐ 1910s ☐ 1920s ☐ 1930s ☐ 1940s ☐ 1950s ☐ 1960s ☐ 1970s ☐ 1980/later

Keyword: (Index of any subjects, topics, or people given prominent attention in the report)

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Site Inventory Form

State Historical Society of Iowa
(December 1, 1999)

State Inventory No. _____ ☐ New ☐ Supplemental
☐ Part of a district with known boundaries (enter inventory no.) _____
Relationship: ☐ Contributing ☐ Noncontributing
☐ Contributes to a potential district with yet unknown boundaries
National Register Status:(any that apply) ☐ Listed ☐ De-listed ☐ NHL ☐ DOE
9-Digit SHPO Review & Compliance Number _____
☐ Non-Extant (enter year) _____

1. Name of Property

historic name _____

other names/site number _____

2. Location

street & number _____
city or town _____ ☐ vicinity, county _____
Legal Description: (If Rural) Township Name _____ Township No. _____ Range No. ___ Section ___ Quarter ___ of Quarter ___
(If Urban) Subdivision _____ Block(s) _____ Lot(s) _____

3. State/Federal Agency Certification [*Skip this Section*]

4. National Park Service Certification [*Skip this Section*]

5. Classification

Category of Property (Check only one box)
☐ building(s)
☐ district
☐ site
☐ structure
☐ object

Number of Resources within Property

If Non-Eligible Property Enter number of:		*If Eligible Property, enter number of:* Contributing	Noncontributing
___	buildings	___	___ buildings
___	sites	___	___ sites
___	structures	___	___ structures
___	objects	___	___ objects
___	Total	___	___ Total

Name of related project report or multiple property study (Enter "N/A" if the property is not part of a multiple property examination).
Title _____ *Historical Architectural Data Base Number* _____

6. Function or Use

Historic Functions (Enter categories from instructions)

_____
_____
_____

Current Functions (Enter categories from instructions)

_____
_____
_____

7. Description

Architectural Classification (Enter categories from instructions)

_____
_____
_____
_____

Materials (Enter categories from instructions)

foundation _____
walls _____
roof _____
other _____

Narrative Description (☒ SEE CONTINUATION SHEETS, WHICH MUST BE COMPLETED)

8. Statement of Significance

Applicable National Register Criteria (Mark "x" representing your opinion of eligibility after applying relevant National Register criteria)

☐ Yes ☐ No ☐ More Research Recommended	A	Property is associated with significant events.
☐ Yes ☐ No ☐ More Research Recommended	B	Property is associated with the lives of significant persons.
☐ Yes ☐ No ☐ More Research Recommended	C	Property has distinctive architectural characteristics.
☐ Yes ☐ No ☐ More Research Recommended	D	Property yields significant information in archaeology or history.

County ___ Address ___ Site Number ___
City ___ District Number ___

Criteria Considerations

- ☐ A Owned by a religious institution or used for religious purposes.
- ☐ B Removed from its original location.
- ☐ C A birthplace or grave.
- ☐ D A cemetery
- ☐ E A reconstructed building, object, or structure.
- ☐ F A commemorative property.
- ☐ G Less than 50 years of age or achieved significance within the past 50 years.

Areas of Significance (Enter categories from instructions)

_____

_____

Significant Dates

Construction date

_____ ☐ check if circa or estimated date

Other dates

_____

Significant Person

(Complete if National Register Criterion B is marked above)

_____

_____

Architect/Builder

Architect

_____

Builder

_____

Narrative Statement of Significance (☒ SEE CONTINUATION SHEETS, WHICH MUST BE COMPLETED)

9. Major Bibliographical References

Bibliography ☒ See continuation sheet for citations of the books, articles, and other sources used in preparing this form

10. Geographic Data

UTM References *(OPTIONAL)*

	Zone	*Easting*	*Northing*		*Zone*	*Easting*	*Northing*
1	___	_____	_____	2	___	_____	_____
3	___	_____	_____	4	___	_____	_____

☐ See continuation sheet for additional UTM references or comments

11. Form Prepared By

name/title _____

organization _____ date _____

street & number _____ telephone _____

city or town _____ state _____ zip code _____

ADDITIONAL DOCUMENTATION (Submit the following items with the completed form)

FOR ALL PROPERTIES

1. ***Map:*** showing the property's location in a town/city or township.
2. ***Site plan:*** showing position of buildings and structures on the site in relation to public road(s).
3. ***Photographs:*** representative black and white photos. If the photos are taken as part of a survey for which the Society is to be curator of the negatives or color slides, a photo/catalog sheet needs to be included with the negatives/slides and the following needs to be provided below on this particular inventory site:

Roll/slide sheet # _____ Frame/slot # _____ Date Taken _____
Roll/slide sheet # _____ Frame/slot # _____ Date Taken _____
Roll/slide sheet # _____ Frame/slot # _____ Date Taken _____

☐ See continuation sheet or attached *photo & slide catalog sheet* for list of photo roll or slide entries.
☐ Photos/illustrations without negatives are also in this site inventory file.

FOR CERTAIN KINDS OF PROPERTIES, INCLUDE THE FOLLOWING AS WELL

1. ***Farmstead & District:*** (List of structures and buildings, known or estimated year built, and contributing or non-contributing status)
2. ***Barn:***
   a. A sketch of the frame/truss configuration in the form of drawing a typical middle bent of the barn.
   b. A photograph of the loft showing the frame configuration along one side.
   c. A sketch floor plan of the interior space arrangements along with the barn's exterior dimensions in feet.

State Historic Preservation Office (SHPO) Use Only Below This Line

Concur with above survey opinion on National Register eligibility: ☐ *Yes* ☐ *No* ☐ *More Research Recommended*
☐ *This is a locally designated property or part of a locally designated district.*

Comments: _____

Evaluated by (name/title): _____ *Date:* _____

Iowa Department of Cultural Affairs
State Historical Society of Iowa

Iowa Site Inventory Form Continuation Sheet

Site Number

Related District Number

Name of Property	County
Address	City

DATA CATEGORIES FOR ARCHITECTURAL CLASSIFICATION

01 NO STYLE

02 COLONIAL
02A French Colonial
02B Spanish Colonial
02C Dutch Colonial
02D Postmedieval English
02E Georgian

03 EARLY REPUBLIC
03A Early Classical Revival
03B Federal

04 MID-19TH CENTURY
04A Greek Revival
04B Gothic Revival
04C Italian Villa
04D Exotic Revival
04E Octagon Mode

05 LATE VICTORIAN
05A Gothic
05B Italianate
05C Second Empire (Mansard)
05D Queen Anne
05E Stick/Eastlake
05F Shingle Style
05G Romanesque
05H Renaissance

06 LATE 19TH AND 20TH CENTURY REVIVALS
06A Beaux Arts (Beaux Arts Classicism)
06B Colonial Revival
06C Classical Revival (Neo-Classical Revival)
06D Tudor Revival
06E Late Gothic Revival
06F Mission/Spanish Colonial Revival
06G Italian Rennaissance
06H French Rennaissance
06I Pueblo

07 LATE 19TH & EARLY 20TH CENTURY AMERICAN MOVEMENTS
07A Prairie School
07B Commercial Style
07C Chicago
07D Skyscraper
07E Bungalow/Craftsman

08 MODERN MOVEMENT
08A Moderne
08B International Style
08C Art Deco
08D Wrightian/Usonian

09 OTHER
09A HOUSE
09A01 Front-Gabled Roof
09A02 Gabled Front and Wing
09A03 Side-Gabled Roof, One Story
09A04 Side-Gabled Roof, Two Story (I-house)
09A05 1-Story Pyramidal or Hip (2 rooms deep)
09A06 Four-Square (2-Story Hipped Roof)
09A07 Ranch
09A08 Split Level
09A09 Cross Gable
09A10 1½ Story
09A11 2½ Story
09A12 Cape Cod

09B BARN
09B01 Crib
09B02 English Single-Level (Side gable without basement)
09B03 Bank (Raised basement with ramp)
09B04 Bank (Basement built into hillside)
09B06 Dutch
09B07 Transverse-Frame/Three-Portal
09B08 Broad Roof Hay/Cattle Feeder
09B09 Pole
09B10 Round / Polygonal
09B11 Square
09B12 Specialized Dairy
09B13 Specialized Horse

09C CONSTRUCTION METHOD
09C01 Frame: Heavy Timber (Hewn)
09C02 Frame: Heavy Timber (Sawn)
09C03 Frame: Mixed Heavy and Light
09C04 Frame: Plank
09C05 Frame: Balloon
09C06 Frame: Platform
09C07 Frame: Laminated Rib
09C08 Frame: Pole
09C09 Roof Support: King-post Truss
09C10 Roof Support: Queen-post Truss
09C11 Roof Support: Howe Truss
09C12 Roof Support: Pratt Truss
09C13 Roof Support: Scissor Beam Truss
09C14 Roof Support: Warren Truss
09C15 Roof Support: Wing Joist/Cantilever
09C16 Roof Support: Shawver Truss
09C17 Roof Support: Clyde/Iowa Truss
09C18 Roof Support: Braced Rafter/Wing Joist
09C19 Pre-fabricated/Pre-cut
09C20 Welded Frame
09C21 Curved (Laminated) Rafter

09D ROOF FORM
09D01 Flat
09D02 Gable
09D03 Gambrel
09D04 Gothic Curved
09D05 Hip
09D06 Mansard
09D07 Pyramidal
09D08 Round/Gothic
09D09 Monitor (Full and half type)
09D10 Saw Tooth Sky Light
09D11 Saltbox

09E BRIDGE
09E01 Pratt Through Truss
09E03 Pratt Pony Truss
09E05 Pratt Truss Subtype: Parker
09E06 Pratt Truss Subtype: Camelback
09E07 Pratt Truss Subtype: Whipple
09E08 Pratt Truss Subtype: Pennsylvania
09E09 Kingpost Truss
09E10 Bedstead Truss
09E11 Deck Truss
09E12 Warren Through Truss
09E13 Warren Pony Truss
09E14 Pipe Truss
09E15 Timber Pile
09E16 Timber Truss (covered)
09E17 Timber Stringer
09E18 Bowstring Through Arch-Truss
09E19 Bowstring Pony Arch-Truss
09E20 Mississippi/Missouri River
09E21 Steel Beam: Steel Stringer
09E22 Steel Beam: Steel Plate Deck Girder
09E23 Steel Beam: Steel Plate Through Girder
09E24 Concrete Girder
09E25 Concrete
09E26 Concrete Culverts
09E27 Concrete Melan Arch
09E28 Concrete Luten Arch
09E29 Concrete Marsh Arch
09E30 Concrete Filled Spandrel Arch
09E31 Concrete Open Spandrel Arch
09E32 Stone Masonry Arch

09F COMMERCIAL
09F01 False Front
09F02 Broad Front
09F03 Arcaded Block
09F04 Iron Front
09F05 Brick Front
09F06 Gable Front
09F07 Artistic Front

09G CHURCH
09G01 Center Steeple
09G02 Gable End
09G03 Steepled Ell
09G04 Side Steeple
09G05 Twin Towers
09G06 Temple Front

99 MIXED

DATA CATEGORIES FOR MATERIALS

01 EARTH

02 WOOD
02A Weatherboard
02B Shingle
02C Log
02D Plywood/Particle Board
02E Shake
02F Board and Batten

03 BRICK

04 STONE
04A Granite
04B Sandstone (Including Brownstone)
04C Limestone
04D Marble
04E Slate

05 METAL
05A Iron
05B Copper
05C Bronze
05D Tin
05E Aluminum
05F Steel
05G Lead
05H Nickel
05I Cast Iron

06 STUCCO

07 TERRA COTTA

08 ASPHALT
08A Shingle
08B Rolled

09 ASBESTOS

10 CONCRETE
10A Block
10B Poured

11 ADOBE

12 CERAMIC TILE

13 GLASS
13A Block
13B Carara

14 CLOTH/CANVAS

15 SYNTHETICS
15A Fiberglass
15B Vinyl
15C Rubber
15D Plastic

16 CLAY TILE

17 OTHER

DATA CATEGORIES FOR AREAS OF SIGNIFICANCE

01 AGRICULTURE

02 ARCHITECTURE

03 ARCHEOLOGY
- 03A Prehistoric
- 03B Historic Aboriginal
- 03C Historic – Non-Aboriginal

04 ART

05 COMMERCE

06 COMMUNICATIONS

07 COMMUNITY PLANNING AND DEVELOPMENT

08 CONSERVATION

10 ECONOMICS

11 EDUCATION

12 ENGINEERING

13 ENTERTAINMENT/RECREATION

14 ETHNIC HERITAGE
- 14A Asian
- 14B Black
- 14C European
  - 14C01 Ireland
  - 14C02 Germany
  - 14C03 Norway
  - 14C04 Sweden
  - 14C05 Denmark
  - 14C06 Bohemia/ Czechoslovakia
  - 14C07 Holland
  - 14C08 England/Canada/ Wales/Scotland
  - 14C09 Luxembourg
  - 14C10 France
- 14D Hispanic
- 14E Native American
- 14F Pacific Islander
- 14G Other

15 EXPLORATION/SETTLEMENT

16 HEALTH/MEDICINE

17 INDUSTRY

18 INVENTION

19 LANDSCAPE ARCHITECTURE

20 LAW

21 LITERATURE

22 MARITIME HISTORY

23 MILITARY

24 PERFORMING ARTS

25 PHILOSOPHY

26 POLITICS/GOVERNMENT

27 RELIGION
- 27A Baptist
- 27B Catholic
- 27C Congregationalist
- 27D Episcopalian
- 27E Friends (Quakers)
- 27F Jewish
- 27G Latter Day Saints
- 27H Lutheran
- 27I Methodist
- 27J Presbyterian
- 27K Unitarian
- 27L United Brethren
- 27M Other Protestant

28 SCIENCE

29 SOCIAL HISTORY

30 TRANSPORTATION

31 OTHER

Iowa Department of Transportation

800 Lincoln Way, Ames, Iowa 50010 515-239-[*xxxx*] *Fax* 515-239-1726

[*Date*]

[*SHPO Archaeologist / Historian*]
Review and Compliance
Bureau of Historic Preservation
State Historical Society of Iowa
600 East Locust
Des Moines, IA 50319-0290

Ref. No: [*Project Number*]
[*County*]
[*Primary / Local Systems*]

R&C: _____

Dear [*SHPO Archaeologist / Historian*]:

RE: [*Report Type, Project Type, and Project Location, FHWA Number (if applicable)*]

Enclosed for your review and comment is the [*report type*] completed for the above mentioned federal funded project. This project proposes to [*project description and project location*].

The proposed project will require a maximum of additional ROW extending [*length and width using feet or meters. Also include the number of acres surveyed.*].

This [*survey type*] consists of [*list all applicable types of methodology.*].

[*List any historical properties identified during the investigation of the project area. Include each location and any recommendations for further investigation as well as eligibility for the National Register of Historic Places.*]

Based on the evaluation of this investigation, the determination is [***No Historic Properties Affected / No Adverse Effect / Adverse Effect***]. If you concur, please sign the concurrence line below, add your comments, and return this letter. If you have any questions, please contact me.

Sincerely,

[*Cultural Resources Project Manager*]
Office of Location and Environment
[*CR Project Manager*@dot.iowa.gov]

Enclosure
cc: [*NEPA Env. Spec. Senior*], NEPA / OLE
[*Engineer*], [*District / Local Systems*] Engineer
[*Engineer*], [*County*] County Engineer
[*Principal Investigator, Consulting Firm*]

Concur: _____ Date: _____
[*SHPO Archaeologist / Historian*]

Comments:

Subpart F—Fees

AUTHORITY: 5 U.S.C. 552; 31 U.S.C. 9701; 49 U.S.C. 322; E.O. 12600, 3 CFR, 1987 Comp., p. 235.

SOURCE: Amdt. 1, 63 FR 38331, July 16, 1998, unless otherwise noted.

Subpart A—General Provisions

§ 7.1 General.

(a) This part implements 5 U.S.C. 552, and prescribes rules governing the availability to the public of DOT records. Many documents are made available to the public for inspection and copying through DOT's Primary Electronic Access Facility and public record unit locations that are discussed in subpart B of this part, which contains the DOT regulations concerning the availability to the public of opinions issued in the adjudication of cases, policy issuances, administrative manuals, and other information made available to the public, without need for a specific request.

(b) Subpart C of this part describes the records that are not required to be disclosed on DOT's own action under this part, but that may be available upon request under FOIA.

(c) Indices are maintained to reflect all records subject to subpart B of this part, and are available for public inspection and copying as provided in subpart B.

§ 7.2 Definitions.

Unless the context requires otherwise, the following definitions apply in this part:

Act and *FOIA* mean the Freedom of Information Act, 5 U.S.C. 552, as amended.

Administrator means the head of each component of DOT and includes the Under Secretary for Security, the Commandant of the Coast Guard, the Inspector General, and the Director of the Bureau of Transportation Statistics.

Concurrence means that the approval of the person being consulted is required in order for the subject action to be taken.

Consultation means that the approval of the person being consulted is not required in order for the subject action to be taken.

Department means the Department of Transportation, including the Office of the Secretary, the Office of Inspector General, and the following DOT components, all of which may be referred to as DOT components. Means of contacting each of these DOT components appear in §7.15. This definition specifically excludes the Surface Transportation Board, which has its own FOIA regulations (49 CFR Part 1001):

(1) United States Coast Guard,
(2) Federal Aviation Administration,
(3) Federal Highway Administration,
(4) Federal Railroad Administration,
(5) National Highway Traffic Safety Administration,
(6) Federal Transit Administration,
(7) Saint Lawrence Seaway Development Corporation,
(8) Maritime Administration,
(9) Research and Special Programs Administration, and
(10) Bureau of Transportation Statistics.
(11) Transportation Security Administration.

Primary Electronic Access Facility means the electronic docket facility in the DOT Headquarters Building, 400 7th Street, S.W., Washington, D.C. 20590.

Reading room records are those records required to be made available to the public under 5 U.S.C. 552(a)(2) as described in §7.5 of Subpart B of this part. These records are made available through DOT's Primary Electronic Access Facility. Other records may also be made available at DOT's discretion at DOT inspection facilities, including DOT's Primary Electronic Access Facility.

Record includes any writing, drawing, map, recording, tape, film, photograph, or other documentary material by which information is preserved. The term also includes any such documentary material stored by computer.

Responsible DOT official means the head of the DOT component concerned, or the General Counsel or the Inspector

General, as the case may be, or the designee of any of them, authorized to take an action under this part.

Secretary means the Secretary of Transportation or any person to whom the Secretary has delegated authority in the matter concerned.

[Amdt. 1, 63 FR 38331, July 16, 1998, as amended at 67 FR 54746, Aug. 26, 2002]

Subpart B—Information Required To Be Made Public by DOT

§ 7.3 Publication in the Federal Register.

This section implements 5 U.S.C. 552(a)(1), and prescribes rules governing publication in the FEDERAL REGISTER of the following:

(a) Descriptions of DOT's organization, including its DOT components and the established places at which, the officers from whom, and the methods by which, the public may secure information and make submittals or obtain decisions;

(b) Statements of the general course and methods by which DOT's functions are channeled and determined, including the nature and requirements of all formal and informal procedures available;

(c) Rules of procedure, descriptions of forms available or the places at which forms may be obtained, and instructions as to the scope and contents of all papers, reports, or examinations;

(d) Substantive rules of general applicability adopted as authorized by law and statements of general policy or interpretations of general applicability formulated and adopted by DOT; and

(e) Each amendment, revision, or repeal of any material listed in paragraphs (a) through (d) of this section.

§ 7.4 Publication required.

(a) *General.* The material described in § 7.3 will be published in the FEDERAL REGISTER. For the purposes of this paragraph, material that will reasonably be available to the class of persons affected by it will be considered to be published in the FEDERAL REGISTER if it has been incorporated by reference with the approval of the Director of the Federal Register.

(b) *Effect of nonpublication.* Except to the extent that he/she has actual and timely notice of the terms thereof, a person may not in any manner be required to resort to, or be adversely affected by, any procedure or matter required to be published in the FEDERAL REGISTER, but not so published.

§ 7.5 Availability of opinions, orders, staff manuals, statements of policy, and interpretations and indices.

(a) This section implements 5 U.S.C. 552(a)(2). It prescribes the rules governing the availability for public inspection and copying of the following reading room materials:

(1) Any final opinion (including a concurring or dissenting opinion) or order made in the adjudication of a case.

(2) Any policy or interpretation that has been adopted under DOT authority, including any policy or interpretation concerning a particular factual situation, if that policy or interpretation can reasonably be expected to have precedential value in any case involving a member of the public in a similar situation.

(3) Any administrative staff manual or instruction to staff that affects any member of the public, including the prescribing of any standard, procedure, or policy that, when implemented, requires or limits any action of any member of the public or prescribes the manner of performance of any activity by any member of the public. However, this does not include staff manuals or instructions to staff concerning internal operating rules, practices, guidelines, and procedures for DOT inspectors, investigators, law enforcement officers, examiners, auditors, and negotiators and other information developed predominantly for internal use, the release of which could significantly risk circumvention of agency regulations or statutes.

(4) Copies of all records, regardless of form or format, that have been released to any person under subpart C of this part and which, because of the nature of their subject matter, a DOT component determines have become or are likely to become the subject of subsequent requests for substantially the same records.

(5) A general index of the records listed in this paragraph.

(b) Any material listed in paragraph (a) of this section that is not made available for public inspection and copying, or that is not indexed as required by §7.7, may not be cited, relied on, or used as precedent by DOT to affect any member of the public adversely unless the person to whose detriment it is relied on, used, or cited has had actual timely notice of the material.

(c) This section does not apply to material that is published in the FEDERAL REGISTER or covered by subpart C of this part.

§ 7.6 Deletion of identifying detail.

Whenever it is determined to be necessary to prevent a clearly unwarranted invasion of personal privacy, identifying details will be deleted from any record covered by this subpart that is published or made available for inspection. Whenever it is determined to be necessary to prevent the disclosure of information required or authorized to be withheld by another Federal statute, such information shall be deleted from any record covered by this subpart that is published or made available for inspection. A full explanation of the justification for the deletion will accompany the record published or made available for inspection.

§ 7.7 Access to materials and indices.

(a) Except as provided in paragraph (b) of this section, material listed in §7.5 will be made available for inspection and copying to any member of the public at DOT document inspection facilities. It has been determined that it is unnecessary and impracticable to publish the index of materials in the FEDERAL REGISTER. Information as to the kinds of materials available at each facility may be obtained from the facility or the headquarters of the DOT component of which it is a part.

(b) The material listed in §7.5 that is published and offered for sale will be indexed, but is not required to be kept available for public inspection. Whenever practicable, however, it will be made available for public inspection at the appropriate DOT reading room.

(c) Each DOT component will also make the reading room records identified in section 7.5(a) that are created by DOT on or after November 1, 1996, available electronically. This includes indices of its reading room records as required by law after December 1, 1999.

§ 7.8 Copies

Copies of any material covered by this subpart that is not published and offered for sale may be ordered, upon payment of the appropriate fee, from the Docket Offices listed in §7.10. Copies will be certified upon request and payment of the fee prescribed in §7.43(f).

§ 7.9 Protection of records.

(a) Records made available for inspection and copying may not be removed, altered, destroyed, or mutilated.

(b) 18 U.S.C. 641 provides for criminal penalties for embezzlement or theft of government records.

(c) 18 U.S.C. 2071 provides for criminal penalties for the willful and unlawful concealment, mutilation or destruction of, or the attempt to conceal, mutilate, or destroy, government records.

§ 7.10 Public records.

Publicly available records are located in DOT's Primary Electronic Access Facility at 400 7th Street, S.W., Washington, D.C. 20590.

(a) The Primary Electronic Access Facility maintains materials for the Office of the Secretary, including former Civil Aeronautics Board material, and materials for the DOT components. This facility is located at Plaza Level 401, and the hours of operation are 10:00–17:00.

(b) Certain DOT components also maintain public record units at regional offices and at the offices of the Commandant and District Commanders of the United States Coast Guard. These facilities are open to the public Monday through Friday except Federal holidays, during regular working hours. The Saint Lawrence Seaway Development Corporation has facilities at 180 Andrews Street, Massena, New York 13662–0520.

(c) Operating Administrations may have separate facilities for manual records. Additional information on the location and hours of operations for Docket Offices and inspection facilities can be obtained through DOT's Primary Electronic Access Facility, at (202) 366–9322.

Subpart C—Availability of Reasonably Described Records Under the Freedom of Information Act

§ 7.11 Applicability.

(a) This subpart implements 5 U.S.C 552(a)(3), and prescribes the regulations governing public inspection and copying of reasonably described records under FOIA.

(b) This subpart does not apply to:

(1) Records published in the FEDERAL REGISTER, opinions in the adjudication of cases, statements of policy and interpretations, and administrative staff manuals that have been published or made available under subpart B of this part.

(2) Records or information compiled for law enforcement purposes and covered by the disclosure exemption described in § 7.13(c)(7) if—

(i) The investigation or proceeding involves a possible violation of criminal law; and

(ii) There is reason to believe that—

(A) The subject of the investigation or proceeding is not aware of its pendency, and

(B) Disclosure of the existence of the records could reasonably be expected to interfere with enforcement proceedings.

(3) Informant records maintained by a criminal law enforcement component of DOT under an informant's name or personal identifier, if requested by a third party according to the informant's name or personal identifier, unless the informant's status as an informant has been officially confirmed.

§ 7.12 Administration of subpart.

Authority to administer this subpart and to issue determinations with respect to initial requests is delegated as follows:

(a) To the General Counsel for the records of the Office of the Secretary other than the Office of Inspector General.

(b) To the Inspector General for records of the Office of Inspector General.

(c) To the Administrator of each DOT component, who may redelegate to officers of that administration the authority to administer this part in connection with defined groups of records. However, each Administrator may redelegate the duties under subpart D of this part to consider appeals of initial denials of requests for records only to his or her deputy or to not more than one other officer who reports directly to the Administrator and who is located at the headquarters of that DOT component.

§ 7.13 Records available.

(a) *Policy*. It is DOT policy to make its records available to the public to the greatest extent possible, in keeping with the spirit of FOIA. This includes providing reasonably segregable information from documents that contain information that may be withheld.

(b) *Statutory disclosure requirement*. FOIA requires that DOT, on a request from a member of the public submitted in accordance with this subpart, make requested records available for inspection and copying.

(c) *Statutory exemptions.* Exempted from FOIA's statutory disclosure requirement are matters that are:

(1)(i) Specifically authorized under criteria established by Executive Order to be kept secret in the interest of national defense or foreign policy, and

(ii) In fact properly classified pursuant to such Executive order;

(2) Related solely to the internal personnel rules and practices of an agency;

(3) Specifically exempted from mandatory disclosure by statute (other than the Privacy Act or the Government in the Sunshine Act), provided that such statute—

(i) Requires that the matters be withheld from the public in such a manner as to leave not any discretion on the issue, or

(ii) Establishes particular criteria for withholding or refers to particular criteria for withholding or refers to particular types of matters to be withheld;

(4) Trade secrets and commercial or financial information obtained from a person and privileged or confidential;

(5) Inter-agency or intra-agency memorandums or letters that would not be available by law to a party other than an agency in litigation with the agency;

(6) Personnel and medical files and similar files the disclosure of which would constitute a clearly unwarranted invasion of personal privacy;

(7) Records or information compiled for law enforcement purposes, but only to the extent that the production of such law enforcement records or information—

(i) Could reasonably be expected to interfere with enforcement proceedings,

(ii) Would deprive a person of a right to a fair or an impartial adjudication,

(iii) Could reasonably be expected to constitute an unwarranted invasion of personal privacy,

(iv) Could reasonably be expected to disclose the identity of a confidential source, including a State, local, Tribal, or foreign agency or authority or any private institution that furnished information on a confidential basis, and, in the case of a record or information compiled by a criminal law enforcement authority in the course of a criminal investigation, or by an agency conducting a lawful national security intelligence investigation, information furnished by a confidential source,

(v) Would disclose techniques and procedures for law enforcement investigations or prosecutions or would disclose guidelines for law enforcement investigations or prosecutions if such disclosure could reasonably be expected to risk circumvention of the law, or

(vi) Could reasonably be expected to endanger the life or physical safety of any individual;

(8) Contained in or related to examination, operating, or condition reports prepared by, on behalf of, or for the use of an agency responsible for the regulation or supervision of financial institutions; or

(9) Geological and geophysical information and data, including maps, concerning wells.

(d) *Deleted information.* The amount of information deleted from frequently-requested electronic records that are available in a public reading room will be indicated on the released portion of the record, unless doing so would harm an interest protected by the exemption concerned. If technically feasible, the amount of information deleted will be indicated at the place in the record where the deletion is made.

§ 7.14 Requests for records.

(a) Each person desiring access to or a copy of a record covered by this subpart shall comply with the following provisions:

(1) A written request must be made for the record.

(2) Such request should indicate that it is being made under FOIA.

(3) The envelope in which a mailed request is sent should be prominently marked: ''FOIA.''

(4) The request should be addressed to the appropriate office as set forth in § 7.15.

(5) The request should state the format (*e.g.*, paper, microfiche, computer diskette, etc.) in which the information is sought, if the requestor has a preference.

(b) If the requirements of paragraph (a) of this section are not met, treatment of the request will be at the discretion of the agency. The twenty-day limit for responding to requests, described in § 7.31, will not start to run until the request has been identified, or would have been identified with the exercise of due diligence, by an employee of DOT as a request pursuant to FOIA and has been received by the office to which it should have been originally sent.

(c) *Form of requests.* (1) Each request should describe the particular record to the fullest extent possible. The request should describe the subject matter of the record, and, if known, indicate the date when it was made, the place where it was made, and the person or office that made it. If the description does not enable the office handling the request to identify or locate the record

sought, that office will notify the requestor and, to the extent possible, indicate the additional data required.

(2) Each request shall—

(i) Specify the fee category (commercial use, news media, educational institution, noncommercial scientific institution, or other) in which the requestor claims the request to fall and the basis of this claim (see subpart F of this part for fees and fee waiver requirements),

(ii) State the maximum amount of fees that the requestor is willing to pay or include a request for a fee waiver, and

(iii) A request seeking a fee waiver shall, to the extent possible, address why the requestor believes that the criteria for fee waivers set out in §7.44(f) are met.

(3) Requesters are advised that the time for responding to requests set forth in subpart E will not begin to run—

(i) If a requestor has not sufficiently identified the fee category applicable to the request,

(ii) If a requestor has not stated a willingness to pay fees as high as anticipated by DOT,

(iii) If a fee waiver request is denied and the requestor has not included an alternative statement of willingness to pay fees as high as anticipated by DOT, or

(iv) If a fee waiver request does not address fee waiver criteria.

(d) *Creation of records.* A request may seek only records that are in existence at the time the request is received. A request may not seek records that come into existence after the date on which it is received and may not require that new records be created in response to the request by, for example, combining or compiling selected items from manual files, preparing a new computer program, or calculating proportions, percentages, frequency distributions, trends, or comparisons. In those instances where DOT determines that creating a new record will be less burdensome than disclosing large volumes of unassembled material, DOT may, in its discretion, agree to creation of a new record as an alternative to disclosing existing records. Records will be provided in the form or format sought by the requestor if the record is readily reproducible in the requested format.

(e) *Search for records.* (1) Each record made available under this subpart will be made available for inspection and copying during regular business hours at the place where it is located, or photocopying may be arranged with the copied materials being mailed to the requestor upon payment of the appropriate fee. Original records ordinarily will be copied except in this instance where, in DOT's judgment, copying would endanger the quality of the original or raise the reasonable possibility of irreparable harm to the record. In these instances, copying of the original would not be in the public interest. In any event, original records will not be released from DOT custody. Original records, regardless of format, may be returned to agency service upon provision of a copy of the record to the requestor, or, in the case of a denial, upon creation and retention of a copy of the original for purposes of FOIA processing.

(2) DOT will make a reasonable effort to search for requested records in electronic form or format, unless doing so would significantly interfere with operation of the affected automated information system.

(f) If a requested record is known not to exist in the files of the agency, or to have been destroyed or otherwise disposed of, the requestor will be so notified.

(g) Fees will be determined in accordance with subpart F of this part.

(h) Notwithstanding paragraphs (a) through (g) of this section, informational material, such as news releases, pamphlets, and other materials of that nature that are ordinarily made available to the public as a part of any information program of the Government will be available upon oral or written request. A fee will be not be charged for individual copies of that material so long as the material is in supply. In addition DOT will continue to respond, without charge, to routine oral or written inquiries that do not involve the furnishing of records.

§ 7.15 Contacts for records requested under the FOIA.

Each person desiring a record under this subpart should submit a request in writing (via paper, facsimile, or electronic mail) to the DOT component where the records are located:

(a) FOIA Offices at 400 7th Street, S.W., Washington, DC 20590:

(1) Office of the Secretary of Transportation, Room 5432.

(2) Federal Highway Administration, Room 4428.

(3) National Highway Traffic Safety Administration, Room 5221.

(4) Federal Transit Administration, Room 9400.

(5) Maritime Administration, Room 7221.

(6) Research and Special Programs Administration, Room 8419.

(7) Bureau of Transportation Statistics, Room 3430.

(8) Office of Inspector General, Room 9210.

(b) Federal Aviation Administration, 800 Independence Avenue, S.W., Room 906A, Washington, DC 20591.

(c) United States Coast Guard, 2100 2nd Street, S.W., Room 6106, Washington, DC 20593–0001.

(d) Director, Office of Finance, Saint Lawrence Seaway Development Corporation, 180 Andrews Street, P.O. Box 520, Massena, New York 13662–0520.

(e) Federal Railroad Administration, 1120 Vermont Avenue NW, 7th Floor, Washington, DC. (Mailing address: 400 Seventh St., SW, Washington, DC 20590.)

(f) Transportation Security Administration, 301 Seventh Street, SW. (General Services Administration Regional Office Building), Room 3624, Washington, DC (Mailing address: 400 Seventh Street, SW., Washington, DC 20590).

(g) Certain DOT components also maintain FOIA contacts at regional offices and at the offices of the Commandant and District Commanders of the United States Coast Guard. Additional information on the location of these offices can be obtained through the FOIA contact offices listed in this section.

(h) If the person making the request does not know where in DOT the record is located, he or she may make an inquiry to the Chief, FOIA Division, Office of the General Counsel (voice: 202.366.4542; facsimile: 202.366.8536).

(i) Requests for records under this part, and Freedom of Information Act inquiries generally, may be made by accessing the DOT Home Page on the Internet (www.dot.gov) and clicking on the Freedom of Information Act link (www.dot.gov/foia).

[Amdt. 1, 63 FR 38331, July 16, 1998, 67 FR 54746, Aug. 26, 2002]

§ 7.16 Requests for records of concern to more than one government organization.

(a) If the release of a record covered by this subpart would be of concern to both DOT and another Federal agency, the determination as to release will be made by DOT only after consultation with the other interested agency.

(b) If the release of the record covered by this subpart would be of concern to both DOT and a State, local, or Tribal government, a territory or possession of the United States, or a foreign government, the determination as to release will be made by DOT only after consultation with the interested government.

(c) Alternatively, DOT may refer the request (or relevant portion thereof) for decision by a Federal agency that originated or is substantially concerned with the records, but only if that agency is subject to FOIA. Such referrals will be made expeditiously and the requestor notified in writing that a referral has been made.

§ 7.17 Consultation with submitters of commercial and financial information.

(a) If a request is received for information that has been designated by the submitter as confidential commercial information, or which DOT has some other reason to believe may contain information of the type described in § 7.13(c)(4), the submitter of such information will, except as is provided in paragraphs (c) and (d) of this section, be notified expeditiously and asked to submit any written objections to release. At the same time, the requestor will be notified that notice and an opportunity to comment are being provided to the submitter. The submitter

purposes of this subpart, when a computer search is required two hours of search time will be considered spent when the hourly costs of operating the central processing unit used to perform the search added to the computer operator's salary cost (hourly rate plus 16 percent) equals two hours of the computer operator's salary costs (hourly rate plus 16 percent).

(b) A fee is not to be charged for any time spent searching for a record requested under subpart C if the records are not for commercial use and the requestor is a representative of the news media, an educational institution whose purpose is scholarly research, or a non-commercial scientific institution whose purpose is scientific research.

(c) A fee is not to be charged for duplication of the first 100 pages (standard paper, not larger than 8.5 x 14 inches) of records provided to any requestor in response to a request under Subpart C unless the records are requested for commercial use.

(d) A fee is not to be charged to any requestor under subpart C to determine whether a record is exempt from mandatory disclosure unless the record is requested for commercial use. A review charge may not be charged except with respect to an initial review to determine the applicability of a particular exemption to a particular record or portion of a record. A review charge may not be assessed for review at the administrative appeal level. When records or portions of records withheld in full under an exemption that is subsequently determined not to apply are reviewed again to determine the applicability of other exemptions not previously considered, this is considered an initial review for purposes of assessing a review charge.

(e) Documents will be furnished without charge or at a reduced charge if the official having initial denial authority determines that disclosure of the information is in the public interest because it is likely to contribute significantly to public understanding of the operations or activities of the government and is not primarily in the commercial interest of the requestor.

(f) Factors to be considered by DOT officials authorized to determine whether a waiver or reduction of fees will be granted include:

(1) Whether the subject matter of the requested records concerns the operations or activities of the Federal government;

(2) Whether the disclosure is likely to contribute to an understanding of Federal government operations or activities;

(3) Whether disclosure of the requested information will contribute to the understanding of the public at large, as opposed to the individual understanding of the requestor or a narrow segment of interested persons;

(4) Whether the contribution to public understanding of Federal government operations or activities will be significant;

(5) Whether the requestor has a commercial interest that would be furthered by the requested disclosure; and

(6) Whether the magnitude of any identified commercial interest to the requestor is sufficiently large in comparison with the public interest in disclosure that disclosure is primarily in the commercial interest of the requestor.

(g) Documents will be furnished without charge or at a reduced charge if the official having initial denial authority determines that the request concerns records related to the death of an immediate family member who was, at the time of death, a DOT employee or a member of the Coast Guard.

(h) Documents will be furnished without charge or at a reduced charge if the official having initial denial authority determines that the request is by the victim of a crime who seeks the record of the trial or court-martial at which the requestor testified.

§ 7.45 Transcripts.

Transcripts of hearings or oral arguments are available for inspection. Where transcripts are prepared by a nongovernmental contractor, and the contract permits DOT to handle the reproduction of further copies, § 7.43 applies. Where the contract for transcription services reserves the sales privilege to the reporting service, any duplicate copies must be purchased directly from the reporting service.

§ 7.46 Alternative sources of information.

In the interest of making documents of general interest publicly available at as low a cost as possible, alternative sources will be arranged whenever possible. In appropriate instances, material that is published and offered for sale may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402; U.S. Department of Commerce's National Technical Information Service (NTIS), Springfield, Virginia 22151; or National Audio-Visual Center, National Archives and Records Administration, Capital Heights, MD 20743–3701.

PART 8—CLASSIFIED INFORMATION: CLASSIFICATION/DECLASSIFICATION/ACCESS

Subpart A—General

Sec.

Subpart B—Classification/Declassification of Information

Subpart C—Access to Information

AUTHORITY: E. O. 10450, 3 CFR, 1949–1953 Comp., p. 936; E. O. 12829, 3 CFR, 1993 Comp., p. 570; E. O. 12958, 3 CFR, 1995 Comp., p. 333; E. O. 12968, 3 CFR, 1995 Comp., p. 391.

SOURCE: 62 FR 23661, May 1, 1997, unless otherwise noted.

Subpart A—General

§ 8.1 Scope.

This part sets forth procedures for the classification, declassification, and availability of information that must be protected in the interest of national security, in implementation of Executive Order 12958 of April 17, 1995, ''Classified National Security Information;'' and for the review of decisions to revoke, or not to issue, national security information clearances, or to deny access to classified information, under Executive Order 12968 of August 2, 1995, ''Access to National Security Information''.

§ 8.3 Applicability.

This part applies to all elements of the Department of Transportation.

§ 8.5 Definitions.

As used in this part:

Classification means the act or process by which information is determined to be classified information.

Classification levels means the following three levels at which information may be classified:

(a) Top secret. Information that requires the highest degree of protection, and the unauthorized disclosure of which could reasonably be expected to cause exceptionally grave damage to the national security that the original classification authority is able to identify or describe.

(b) Secret. Information that requires a substantial degree of protection, and the unauthorized disclosure of which could reasonably be expected to cause serious damage to the national security that the original classification authority is able to identify or describe.

(c) Confidential. Information that requires protection and the unauthorized disclosure of which could reasonably be expected to cause damage to the national security that the original classification authority is able to identify or describe.

Classified information or ''classified national security information'' means information that has been determined under Executive Order 12958, or any predecessor or successor order, to require protection against unauthorized disclosure, and is marked to indicate