IOWA DOT

Design Bureau

Superelevation Transition Evaluation Tool

Design Manual
Chapter 21
Automation Tool
Instructions
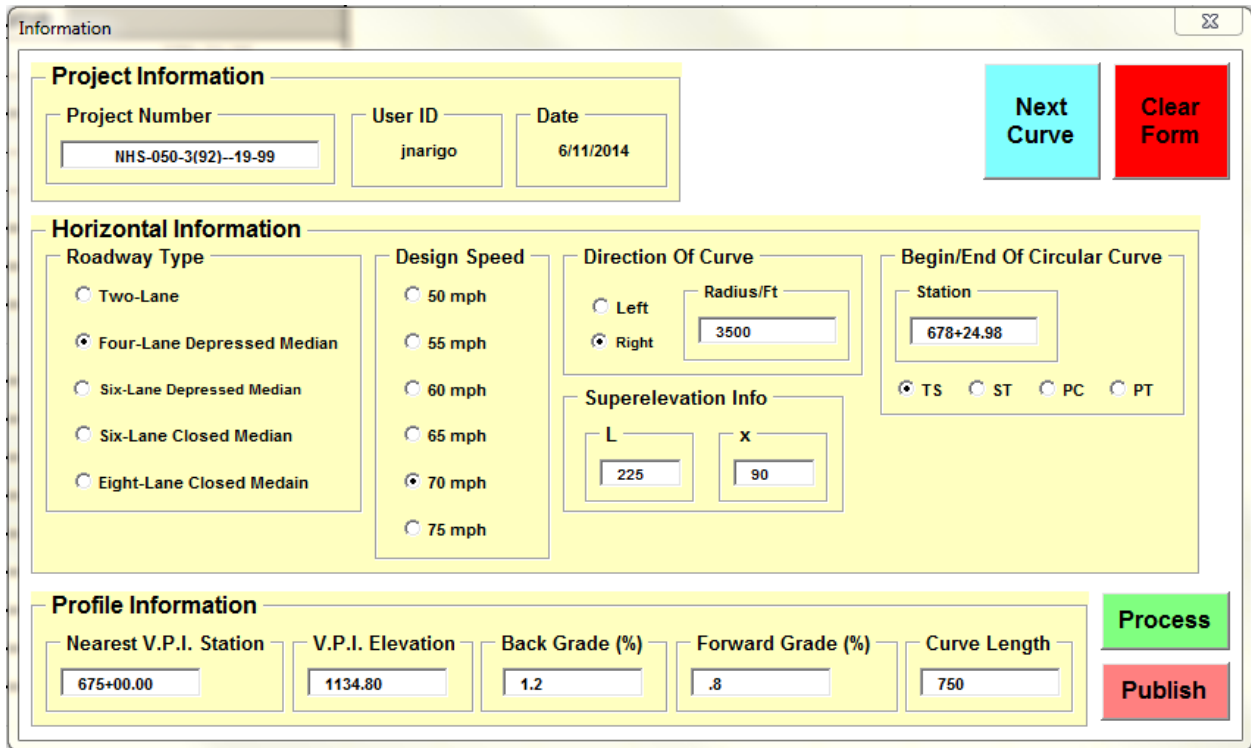Originally Issued: 07-22-14
Revised: 06-25-19

The Superelevation Transition Evaluation Tool is an Excel spreadsheet application that provides a graphical representation of pavement slopes near the location of zero cross slope.

Application Use

The Superelevation Transition Evaluation Tool can be accessed for download as follow:

- Iowa DOT designers:
  W:\Highway\Design\Design Bureau\SuperelevationTransitionEvaluationTool.xlm.

- External designers:
  Link to Automation Tools. Click on Seed files (ZIP file) to open. Open the seed_files folder, then open the SpreadSheets folder. Open SuperelevationTransitionEvaluationTool.xlm

The input page appears as shown below:

Information						
Project Information						

Project Information

Project Number	User ID	Date
NHS-050-3(92)--19-99	jnarigo	6/11/2014

Next Curve   **Clear Form**

Horizontal Information

Roadway Type
- ○ Two-Lane
- ◉ Four-Lane Depressed Median
- ○ Six-Lane Depressed Median
- ○ Six-Lane Closed Median
- ○ Eight-Lane Closed Medain

Design Speed
- ○ 50 mph
- ○ 55 mph
- ○ 60 mph
- ○ 65 mph
- ◉ 70 mph
- ○ 75 mph

Direction Of Curve
- ○ Left
- ◉ Right

Radius/Ft
3500

Superelevation Info
L	x
225	90

Begin/End Of Circular Curve
Station
678+24.98

◉ TS   ○ ST   ○ PC   ○ PT

Profile Information

Nearest V.P.I. Station	V.P.I. Elevation	Back Grade (%)	Forward Grade (%)	Curve Length
675+00.00	1134.80	1.2	.8	750

Process

Publish

All of the input required is on this form. It is necessary to enter information into each field and to choose one radio button for each set of buttons for the application to run.

Roadway type determines which Standard Road Plan superelevation detail (PV-300 series) will be applied for the calculations.

> ⚠ If the superelevation attainment method does not conform to the appropriate standard, the results provided may not be accurate.

Radius and curve length values are entered in measurements of feet.

Stationing can be entered with or without the plus (+).

Grade information should be provided as a percentage; e.g., 4.5 for + 4.5% grade.

Once all the information is input, the designer selects the **Process** button.

This evaluation should be completed separately for each end of all curves.

Procedure

The location of zero cross slope is calculated based upon the PV-300 standard road plan corresponding to the roadway type chosen and geometric information provided. The application calculates elevations on a two-foot grid and determines the nominal resultant slope of each panel near the zero cross slope location. Any highlighted area should prompt further review or modification to the design.

Output

Based upon the information provided, the analysis will select the appropriate standard and provide a graphical display similar to Figure 1.

⚠ Areas highlighted red have a surface slope of less than 0.3%; yellow indicates a surface slope of 0.3 to 0.5%. Ideally, the profile will be modified such that all slopes are greater than 0.5% which allows some tolerance for construction imperfections.
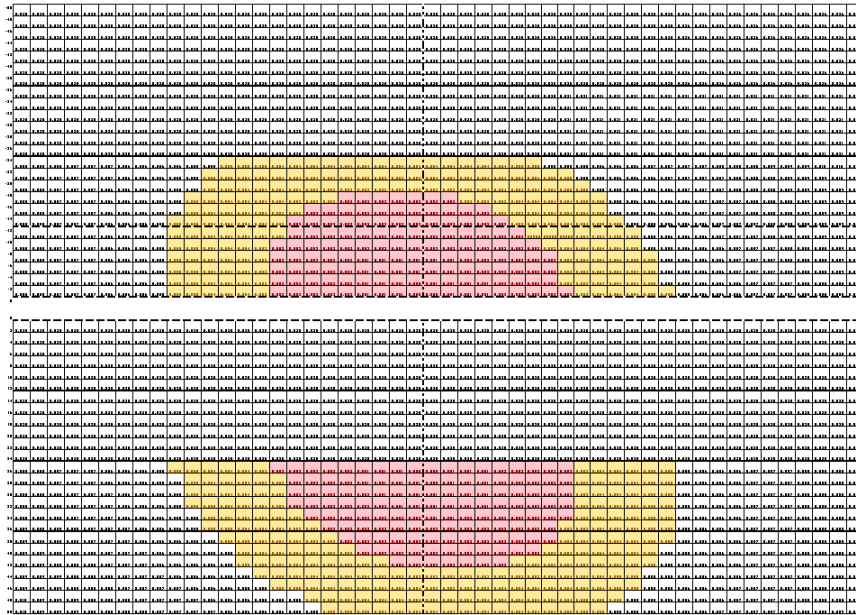

Figure 1: Graphic output.

Chronology of Changes to Design Manual Section:

021M-051 Superelevation Transition Evaluation Tool

6/25/2019   Revised

Updated hyperlinks.
Updated header logo and text.

12/8/2016   Revised

Added information regarding how designers download the tool.

7/22/2014   NEW

New