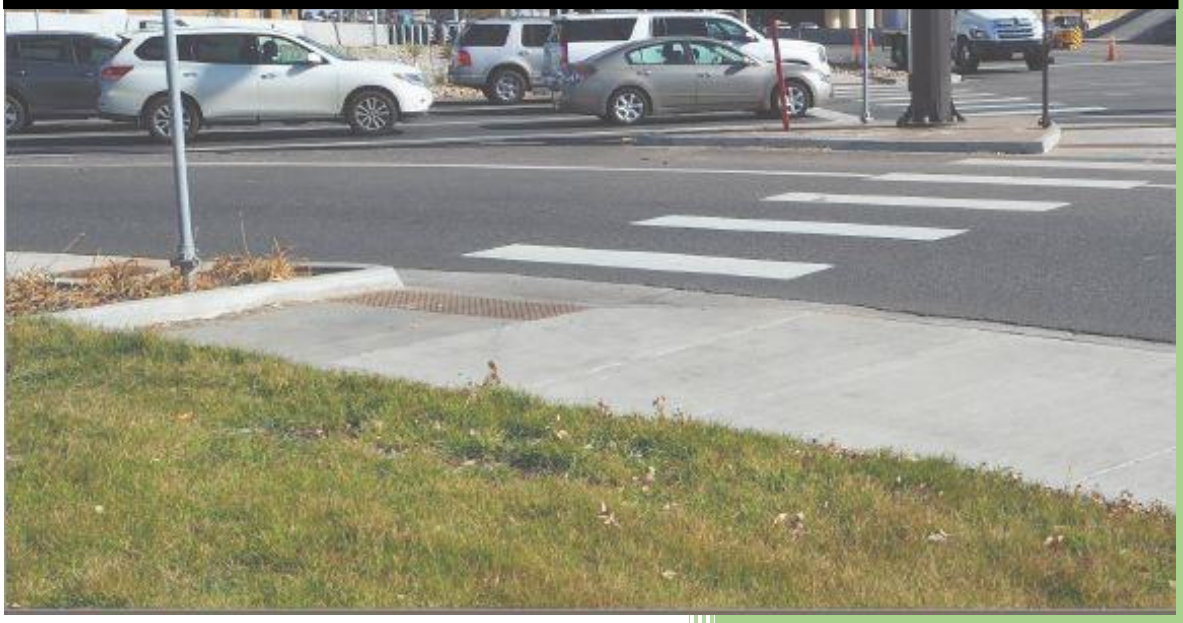
Manual

AUTOMATION CURB RAMP DESIGN



CESS LLC

1/1/2020

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1. INTRODUCTION

1.1 What Is Automation Curb Ramp Design

Automation Curb Ramp Design (ACRD) is a smart and user-friendly engineering software exclusively developed for civil engineers by CESS LLC. Currently, no other software packages that are currently in the marketplace serve similar purposes; ACRD Software presents a groundbreaking approach in providing a reliable yet easy-to-use solution that integrates the cutting-edge computer engineering technologies with our extensive experience in curb ramp design, obtained through numerous civil engineering projects. The powerful features of ACRD software have enabled us as well as our clients to maximize the efficiency and productivity in a timely and cost-effective manner.

With a framework that was exclusively developed for curb ramp design based on local design standards and specifications, ACRD Software offers users the flexibility to either use an existing curb ramp in previous projects or simply use the established template to effectively perform curb ramp design and quantity take-off of all pay items in a curb ramp.

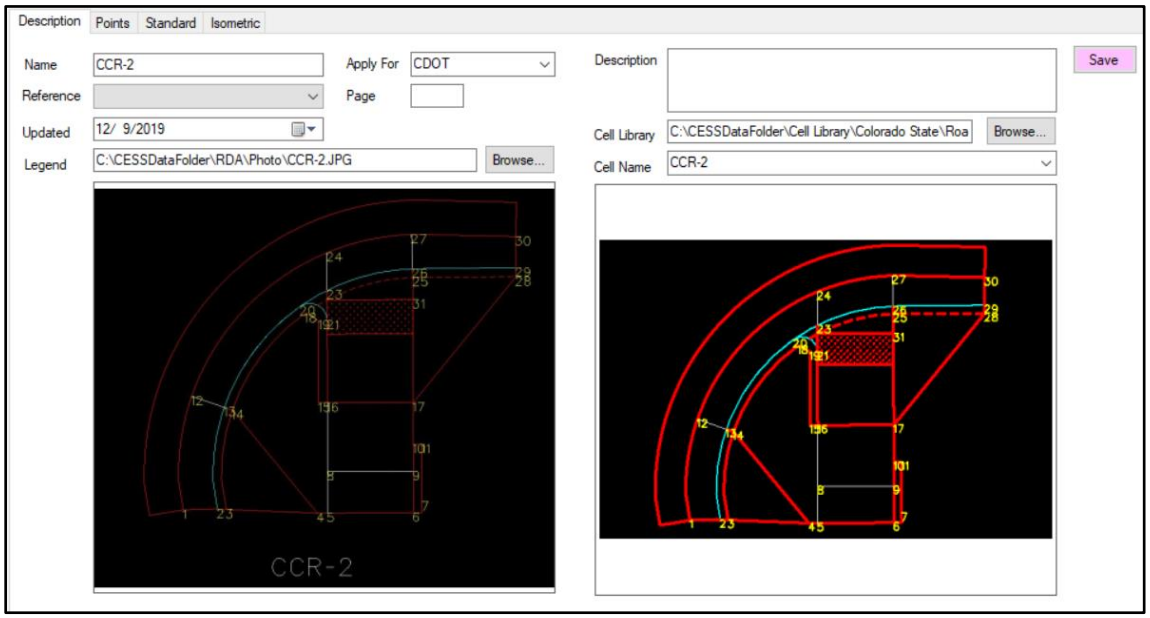
1.2 Features of Automation Curb Ramp Design (ACRD)

- ***Automation*** - ACRD can be done automatically without any manual intervention.
- ***Efficiency*** - All work and reports can be done within the timespan of at least an hour for one curb ramp design.
- ***Precision*** - Slopes and quantities of different items included in curb ramp can be calculated with 100% accuracy.
- ***Flexibility*** - Discrete Random Variables are applied and provides users flexible methods for curb ramp design.
- ***Consistency*** - All components included in curb ramp are pre-set and keep all work consistent through all projects.
- ***Once and For All*** - All curb ramp templates are created once and can be used forever.
- ***WYSIWYG*** - All water flow directions, slopes, etc. can be checked and displayed in MicroStation at any time during the design immediately.
- ***No Data Input*** - All data can be obtained automatically through just a few clicks of a button, for the entire process of curb ramp design.
- ***User-Friendly Design*** - The software is a very intuitive and easy to master even for infrequent users.
- ***Fully Integrated with CAD Platforms*** - All curb ramp designs can be added to, updated, or removed from MicroStation or AutoCAD Automatically.

2. TEMPLATE

2.1 New Template

The figure below is the interface for new curb ramp template. There are four modules in curb ramp template: Description, Points, Standards, and Isometric.

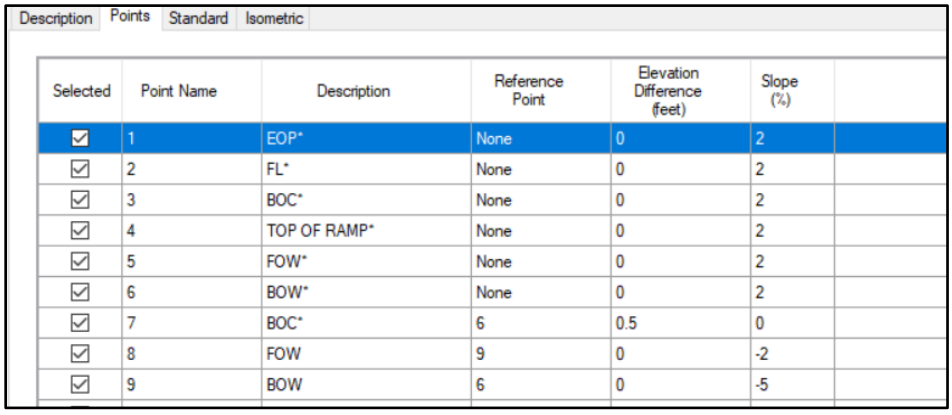


Description

In this tab, the user must input the basic information for their desired curb ramp, including Name, Apply For, Description, Reference and Page, Legend, and Cell of curb ramp. Click the ***Save*** button to save.

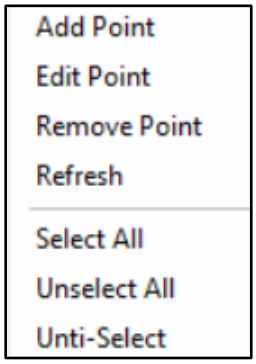
I. Points

The figure below is the Points tab, and all points in template are listed in the data grid.



Selected	Point Name	Description	Reference Point	Elevation Difference (feet)	Slope (%)
☑	1	EOP*	None	0	2
☑	2	FL*	None	0	2
☑	3	BOC*	None	0	2
☑	4	TOP OF RAMP*	None	0	2
☑	5	FOW*	None	0	2
☑	6	BOW*	None	0	2
☑	7	BOC*	6	0.5	0
☑	8	FOW	9	0	-2
☑	9	BOW	6	0	-5

Right click on the data grid, and a menu with seven sub menus will display.



Add Point: See details below

Edit Point: Similar to Add Point

Remove Point: Delete point from the template.

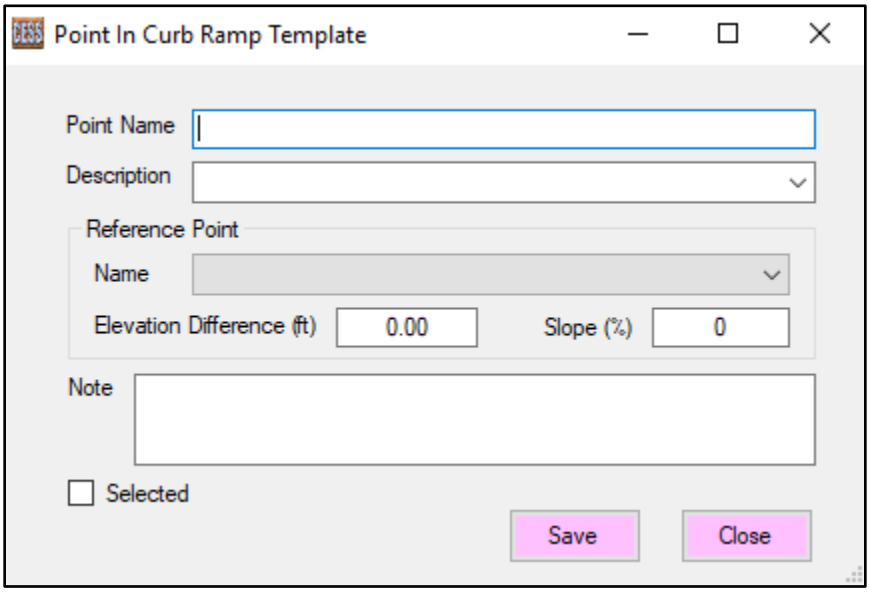
Refresh: Reload all points in the template

Select All: Select all Points

Unselect All: Unselect all points

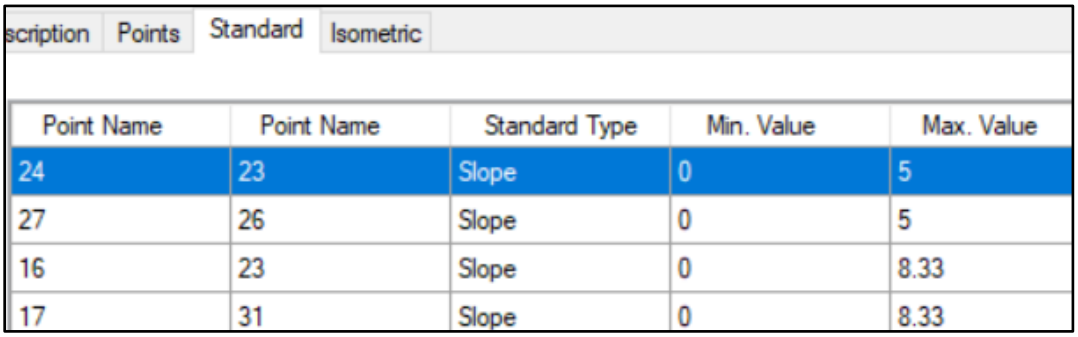
Unti-Select: Select all unselect point and unselect other

Add Point: The figure below is the interface for adding a point. Input information of point, including Point name, description, reference point, delta elevation, and slope of reference point, and click ***Save*** button.

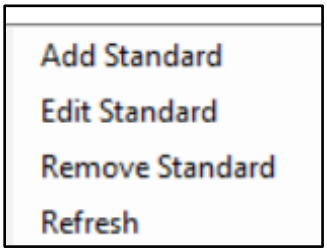


II. Standards

The figure below is the Standard tab and all standards are listed in data grid.



Right click on the data grid, and a menu with four sub menus will display.



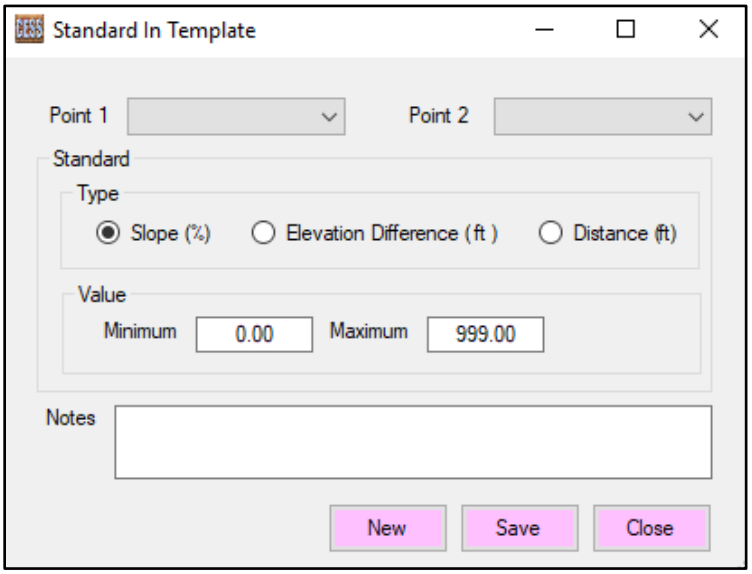
Add Standard: See details below

Edit Standard: Similar to Add Standard

Remove Standard: Delete standard from template

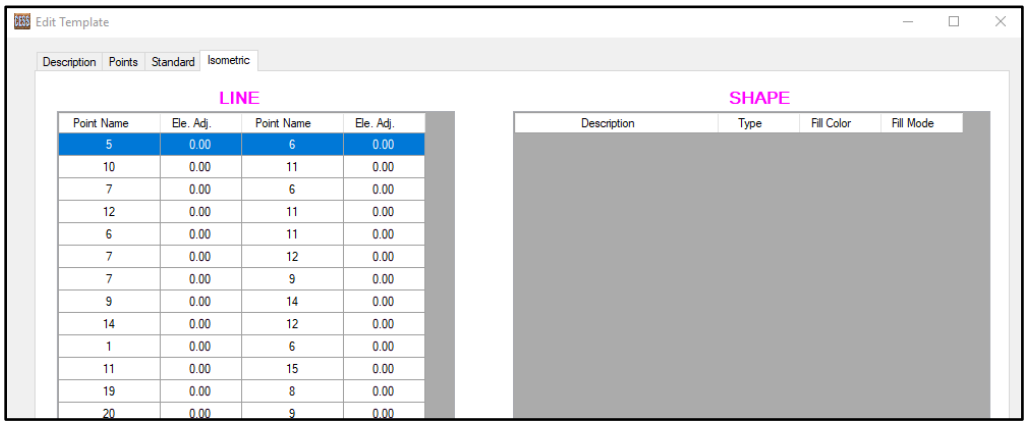
Refresh: Reload all standards

Add Point: The figure below is the interface for adding a standard. Firstly, select point 1 and point 2, choose the standard type, input minimum value, maximum value, and Notes, then click the ***Save*** button to save the standard.

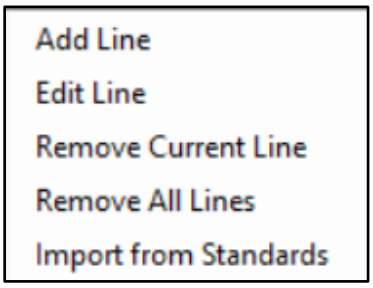


III. Isometric

The figure below is the Isometric tab, which includes Line and Shape.



Right click on left data grid, a menu with five sub-menus will display.



Add Line: Select two points in template to create a line

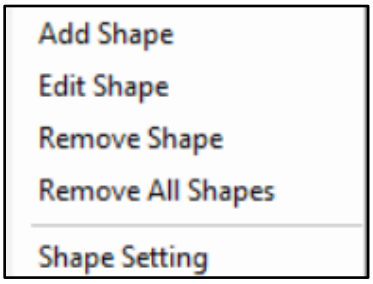
Edit Line: Similar to Add Line

Remove Current Line: Delete current line from template

Remove All Lines: Delete all lines from template

Import from Standards: Add lines generated from Standards

Right click on right data grid, a menu with five sub menus will display.



Add Shape: See details below (**A**)

Edit Shape: Similar with Add Shape

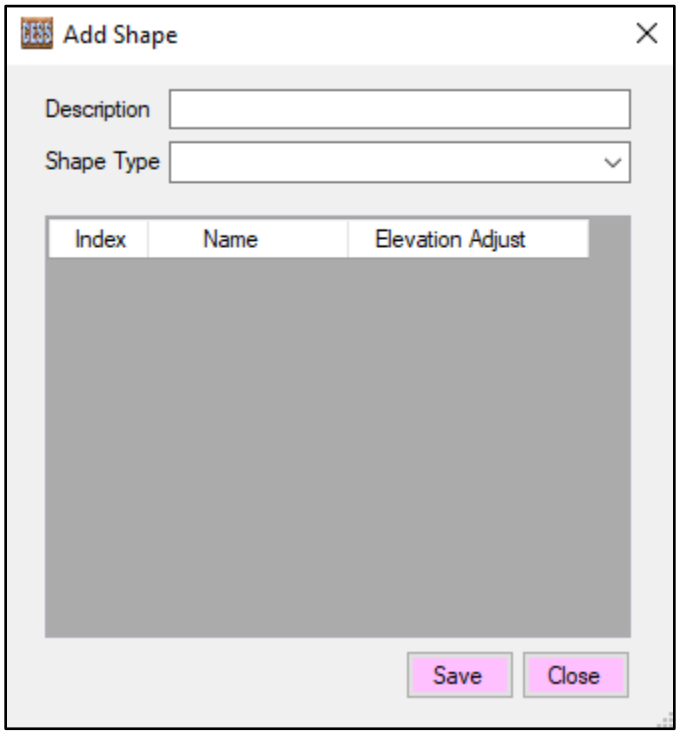
Remove Shape: delete current Shape

Remove All Shapes: Delete all shapes

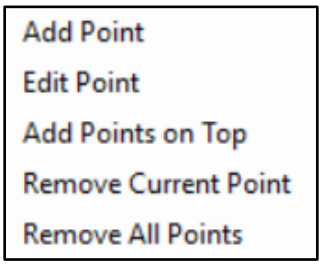
Shape Setting: See details below (**B**)

A. Add shape

The figure below is the interface for adding a new shape.



Firstly, input the description and select shape type, then add points for the shape. To add a point for the shape, right click on the data grid, and a menu with five sub menus will display (see figure below), and using these sub-menus, points can be added, edited, or removed from the shapes.



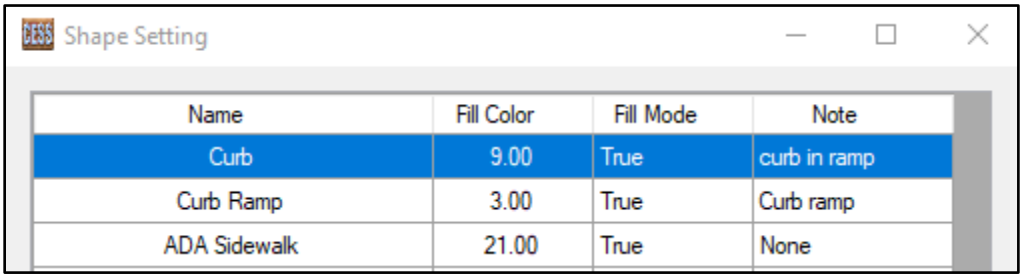
Add Point: Select a point and input the Elevation Adjust value and index for the shape.

Add Points on Top: New points are above the existing points in the data grid if the elevation value is positive. Otherwise, the new points are below the existing points.

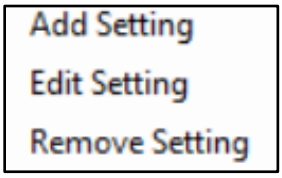
Click ***Save*** button, the shape is saved for the curb ramp.

B. Shape Setting

The figure below is the setting page for Shapes, and all shape categories are listed in the data grid.



Right click on data grid, and a menu with three sub-menus will display.

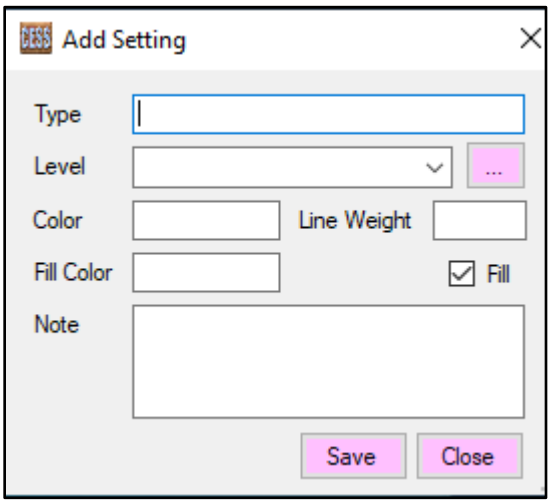


Add Setting: See details below (**C**)

Edit Setting: Similar to Add Setting

Remove Setting: Remove existing setting

Add Setting (C)



Type: Name of shape type

Level: Level of Shape

Color: Color of Shape

Line Weight: Line Weight of Shape

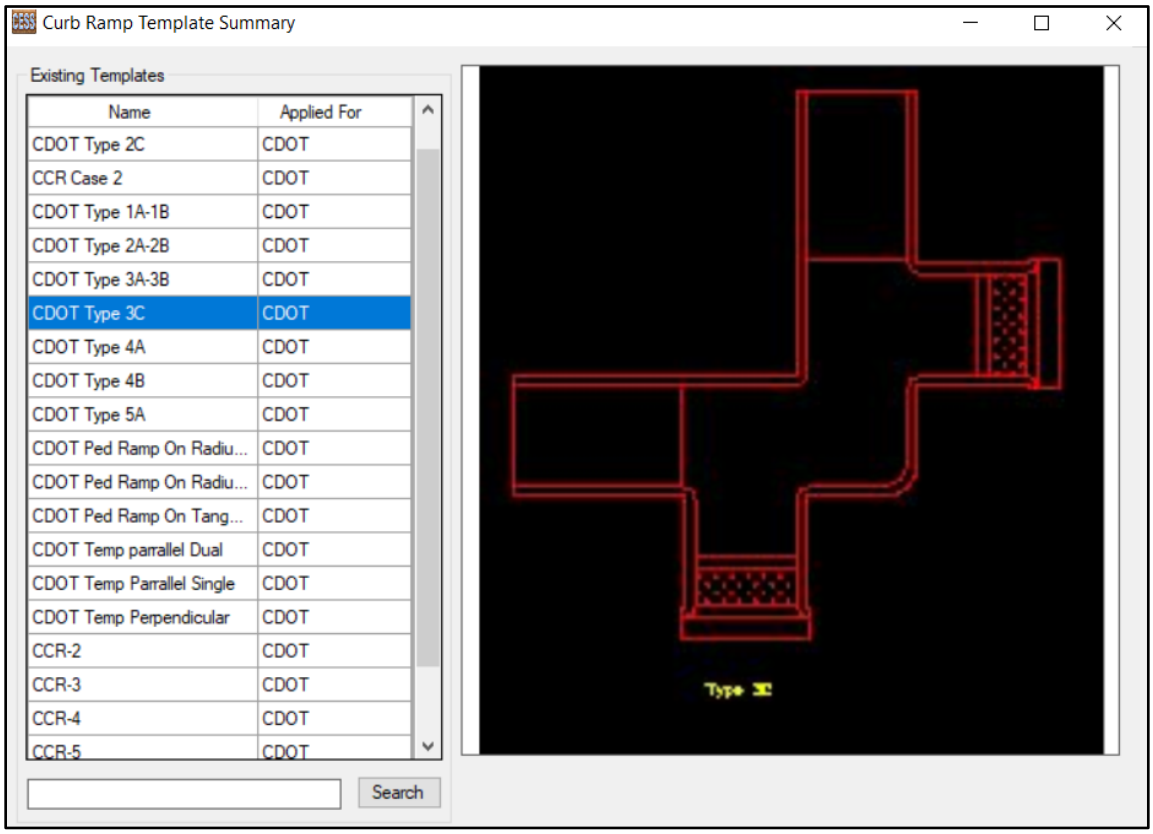
"Fill" Check Box: Whether shape gets filled or not.

Fill Color: Fill color of Shape (if box is checked)

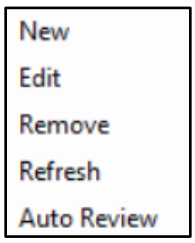
Note: Take notes for Shape

2.*2* Template Summary

All curb ramp templates are listed in the data grid.



Input text and click ***Search*** button, all templates containing text are selected and reloaded in data grid. Right click on data grid, a menu with five sub menus will display-- see figure below:



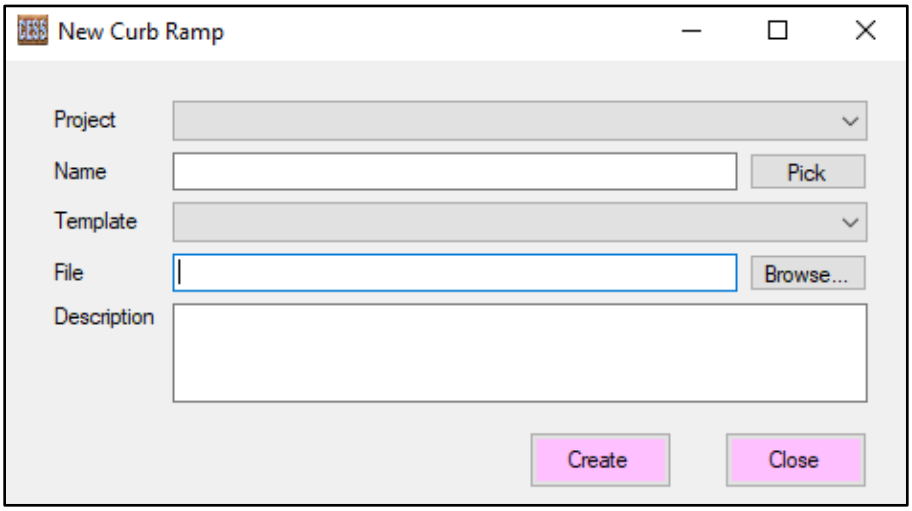
Refresh: Reload all templates

Auto Review: Review template automatically, and click data grid, or photo, auto review stops.

1. AUTOMATION CURB RAMP DESIGN

3.1 New Curb Ramp

The figure below is the interface for new curb ramp design:

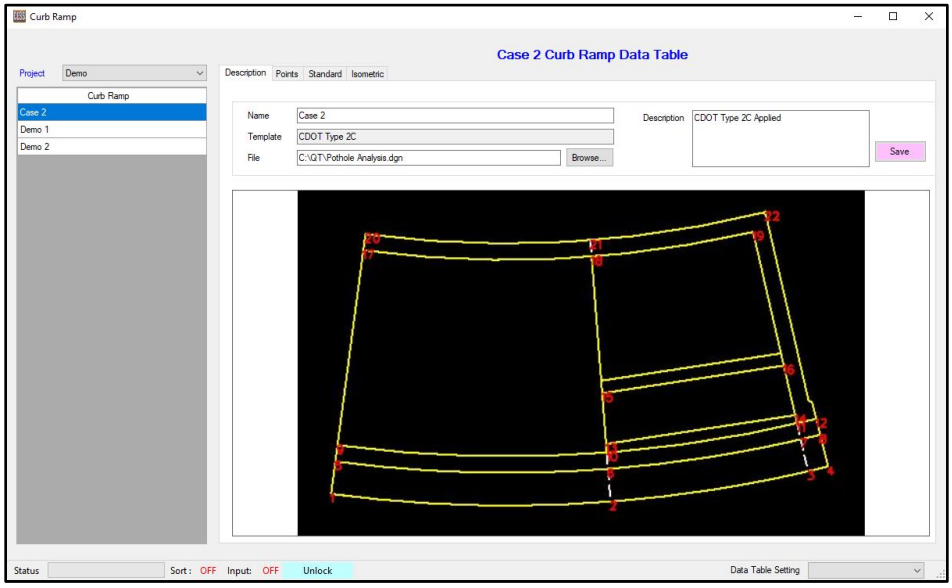


Select Project and template, input name (can be retrieved from MicroStation text element by clicking ***Pick*** button), design file, and description; Then click Create button, and a new curb ramp is created.

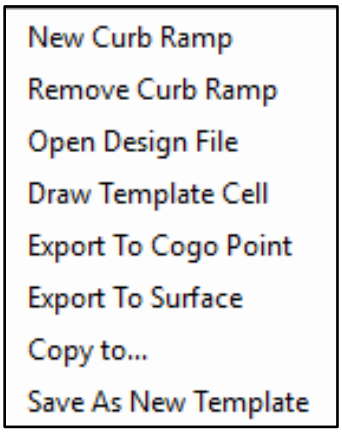
All points, standards, isometric information in the template are imported for the new curb ramp when a template is selected.

3.2 Curb Ramp Design

The following figure is the interface for curb ramp design. Select a project, and all curb ramps in the project are listed in the left side data grid.



Click a curb ramp in data grid, and all information of the curb ramp is loaded. Right click on the data grid, and a menu with eight sub-menus will display.



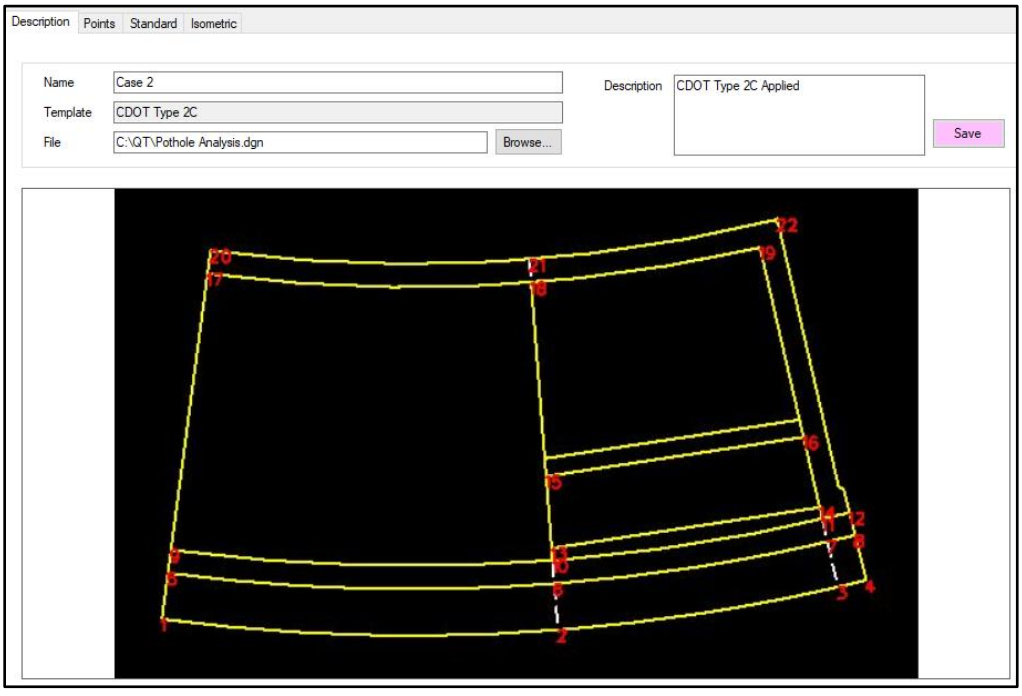
Remove Curb Ramp: Removes curb ramp from the project.
Open Design file: Opens curb ramp design file.
Draw Template Cell: Draws the template cell in the design file.
Export to Cogo Point: Exports all points to text file as Cogo point format and applied in Inroads.
Export to Surface: Exports all points to text file as surface format and applied in Inroads.
Copy to…: Saves curb ramp to another curb ramp.
Save as New Template: Saves the curb ramp as template.

Note: Many functions in curb ramp design are same as in Template introduced previous

Similar as the curb ramp template, there are four tabs for curb ramp design. If curb ramp is created based on a template, all points, standard, and isometric are copied from template and loaded.

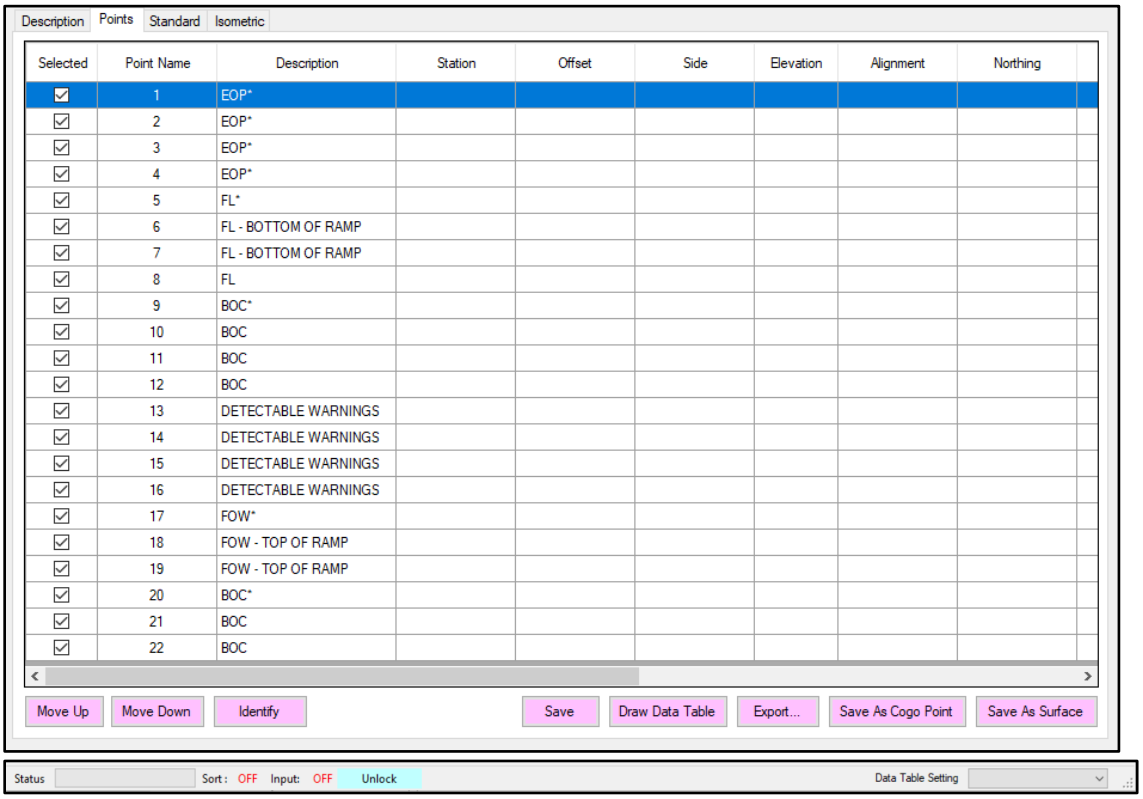
I. Description

In this tab, curb ramp name, design file, and description can be edited and saved.



II. Points

All points are listed in data grid, comparing with Template module, many additional functions are provided to handle the points.



The following is an introduction to the buttons found at the bottom of the screen.

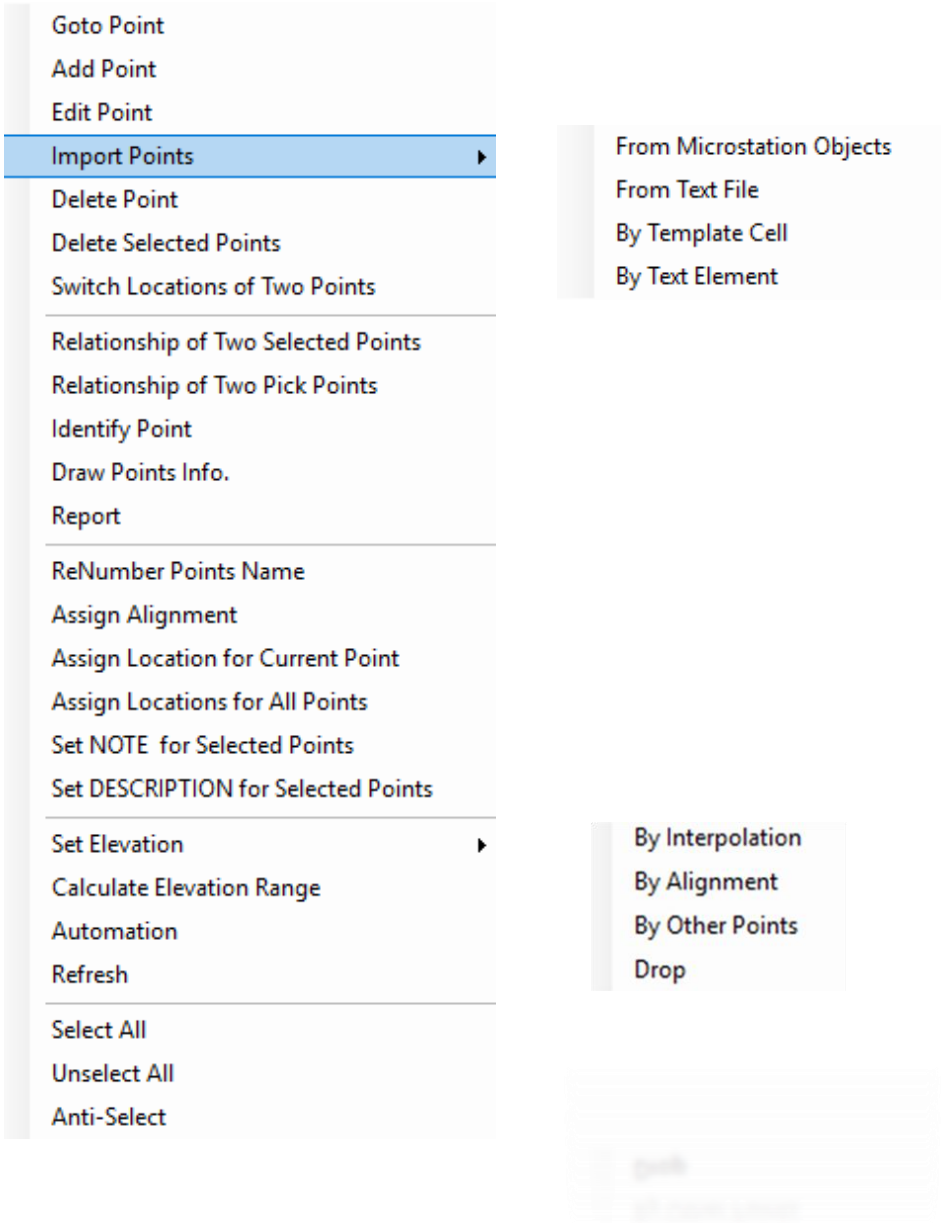
1. ***Move Up***: Moves current point up in data grid.
2. ***Move Down***: Moves current point down in data grid.
3. ***Identify***: An unknown point can be identified by clicking identify button and clicking a point in MicroStation. The selected point will be highlighted in data grid.
4. ***Save***: Save all change of points to database.
5. ***Draw Data Table***: All selected points' information is drawn in MicroStation. A Data Table Setting should be selected first.
6. ***Export***…: All selected points are exported to spreadsheet.
7. ***Save As Cogo Point***: See same function introduced previously.
8. **Save As Surface**: See same function introduced previously.

Followings are the items listed in status bar:

1. ***Status***: Display status of the application.
2. ***Sort***: If ***Sort*** button reads on, the user can sort the points present in data table. If it reads off, the current point order Is locked and cannot be changed. Can be toggled by clicking on the red text.

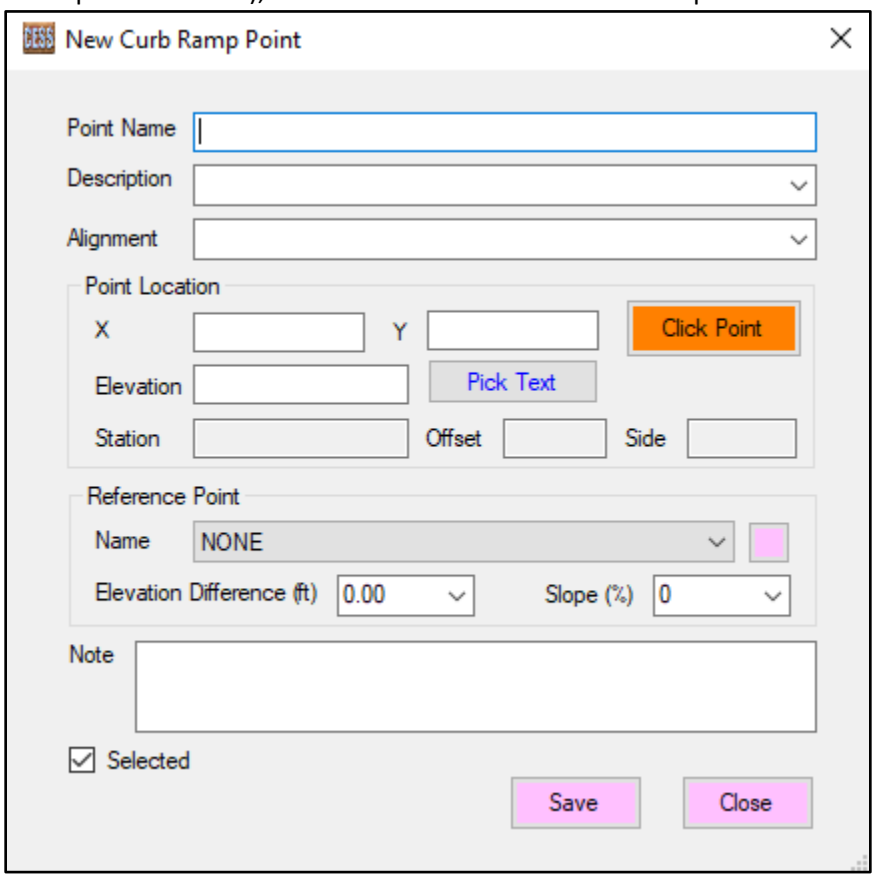
3. ***Input On/Off***: Input status can be changed by clicking on the red text. The user can input information in data grid by just selecting text element in MicroStation and clicking in the data grid if input status is on.
4. ***Lock/Unlock***: When locked, curb ramp will be frozen, and a password is required to unfreeze the curb ramp.
5. ***Data Table Setting***: Settings for the data table is required before data table is drawn.

The following are menus for the points when a user right clicks on a data grid.



1. ***Goto Point***: Go to the selected point location in MicroStation.

2. ***Add Point***: The figure below is the interface for a new point; input point name, description, alignment (if available), and specify point location and elevation, select reference point, elevation difference and slope (for some independent point, such as existing ground point, set reference point to NONE), then click ***Save*** button to save new point.



3. ***Edit Point***: Similar to Add Point function.
4. ***Import Points***

   There are four methods for importing points:

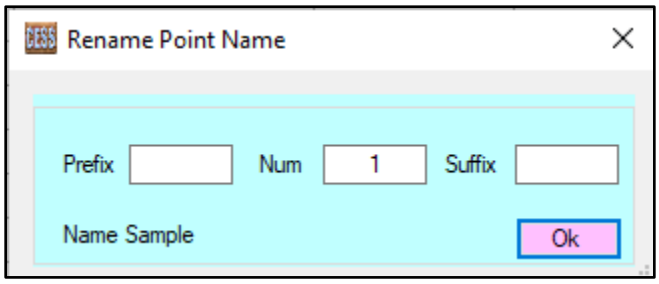
   I. ***From MicroStation Objects***: All points in selected elements in MicroStation are imported to data grid.

   II. ***From Text File***: Import points from Text file, which includes point information, such as Cogo point file generated in Inroads.

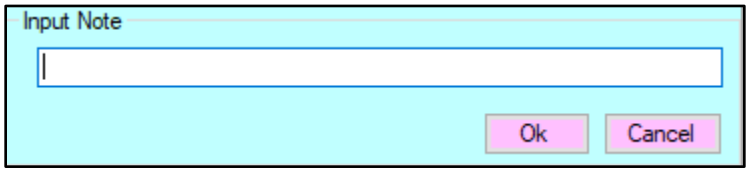
   III. ***By Template Cell***: Import points from curb ramp template cell which includes points names.

   IV. ***By Text Element***: Import points from selected Text elements in MicroStation.
5. ***Delete Point***: Remove current point in data grid from curb ramp.
6. ***Delete Selected points***: Remove all selected points.
7. ***Switch locations of two points***: Switch locations of two selected points.
8. ***Relationship of Two Selected Points***: Display the relationship of two selected points in data grid, including slope, elevations, elevation difference.

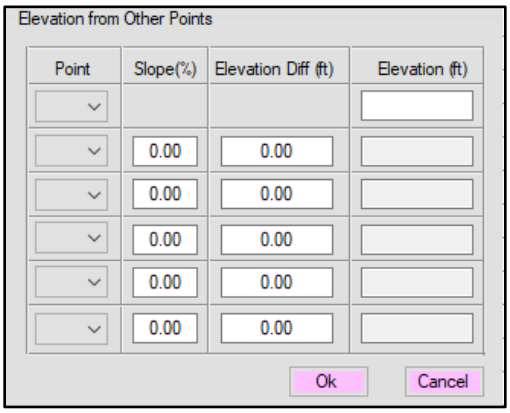
9. ***Identify Point***: Obtain point information by clicking in MicroStation, and the point is selected in data grid.
10. ***Draw Point Info.***: Draw point information in MicroStation.
11. ***Report*:** Generate report for the relationship of all points in curb ramp.
12. ***Rename Point Names***: The figure below is the interface to rename point names. Input Prefix, start number, and Suffix, click ***Ok*** button, and all points will be renamed.



13. ***Assign Alignment***: Specify alignment for all points, and station, offside, and side of selected points are calculated automatically.
14. ***Assign Location for Current Point***: Allocate location for the point by clicking a point in MicroStation.
15. ***Assign locations for all Points***: Allocate locations for all points by picking points in MicroStation continually.
16. ***Set NOTE for Selected Points***: The figure below is the interface to input Notes for all selected points. Input notes and then click ***Ok*** button

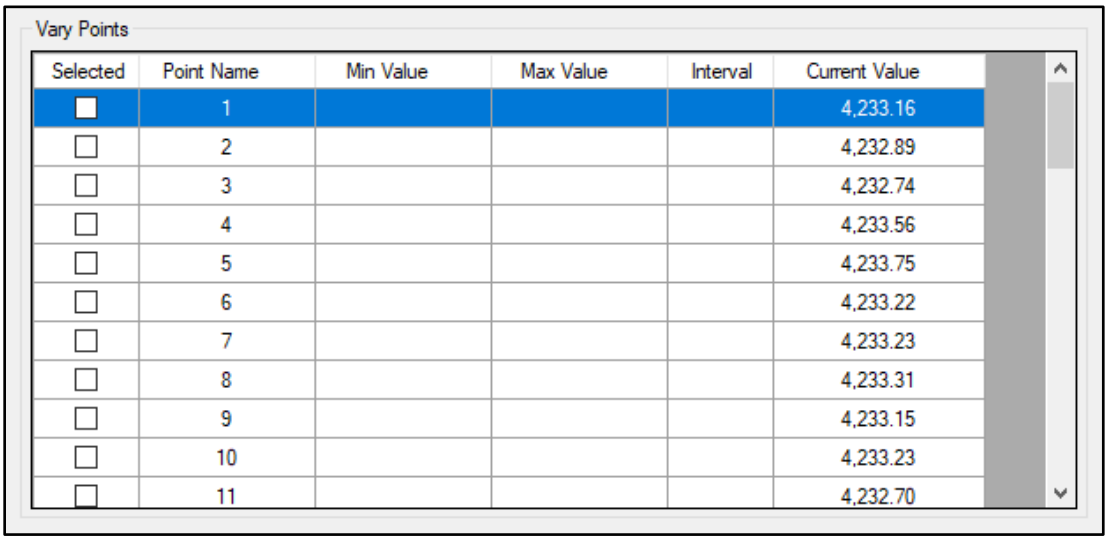


17. ***Set DESCRIPTION for Selected Points***: Similar as NOTE introduced above.
18. ***Elevation by Interpolation***: Calculate point elevation based on two points with Interpolation method.
19. ***Elevation from Other Points***: The figure below is the interface which calculates elevation of multiple points at same time. Input base elevation and each slope and elevation difference with previous points, then click ***OK*** button, and the elevation of all points are calculated and updated in point data grid.

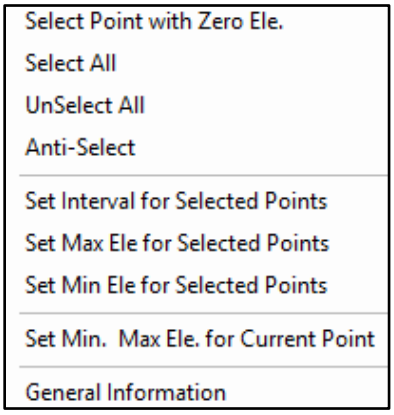


20. ***Calculate Elevation Range***: Obtain elevation range of current point based on the selected standards.
21. ***Automation***: Procedures are introduced step by step below.

    Step 1: Select varying points; the user can select a maximum of 20 points at one time. The default value of interval is 0.05 feet, and minimum value and maximum value of each point are calculated automatically.

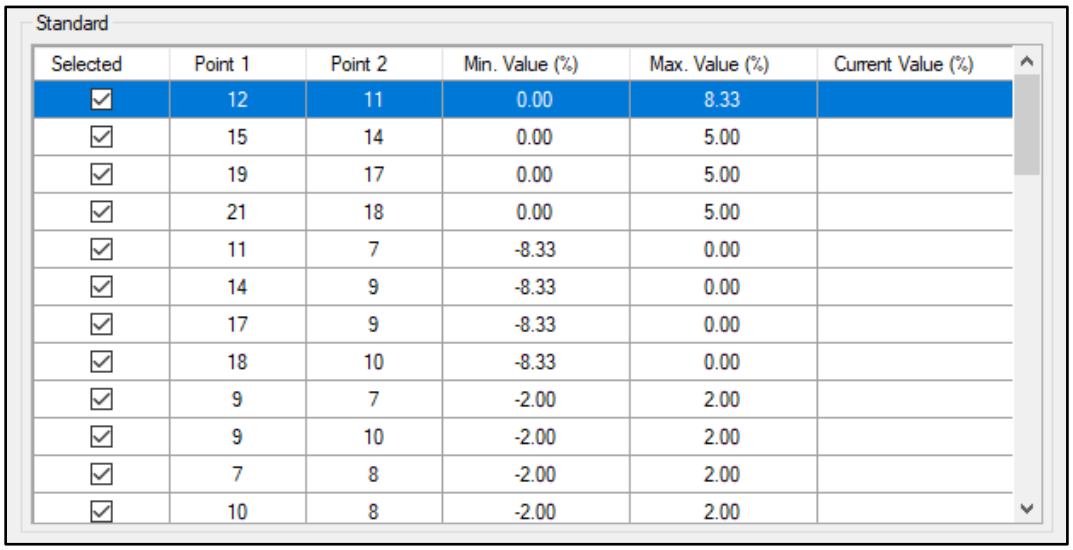


Application also provides some functions to set these values, and a menu displays when right clicking on data grid, see figure below.

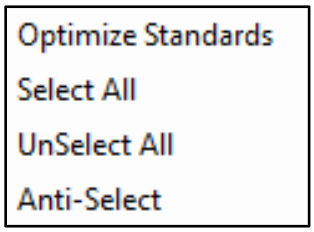


Select Point with Zero Ele.: Select all points with zero elevation.
Set Interval for Selected Points: Assign interval for all selected points.
Set Max Ele for Selected Points: Assign maximum elevation for all selected points.
Set Min Ele for Selected Points: Assign minimum elevation for all selected points.
Set Min. Max Ele. for Current Points: Assign minimum and maximum elevation for current points.

Step 2: Select Standards. The selected standards are applied to calculate elevations of the varying points.



Right click on data grid, a menu with four sub-menus displays:



Optimize Standards: All necessary standards are selected automatically based on selected varying points.

Step 3: Click ***Run*** button, a solution is found automatically if a solution exists, otherwise a warning message displays.

Step 4: Click ***Continue*** button to find next solution if necessary.

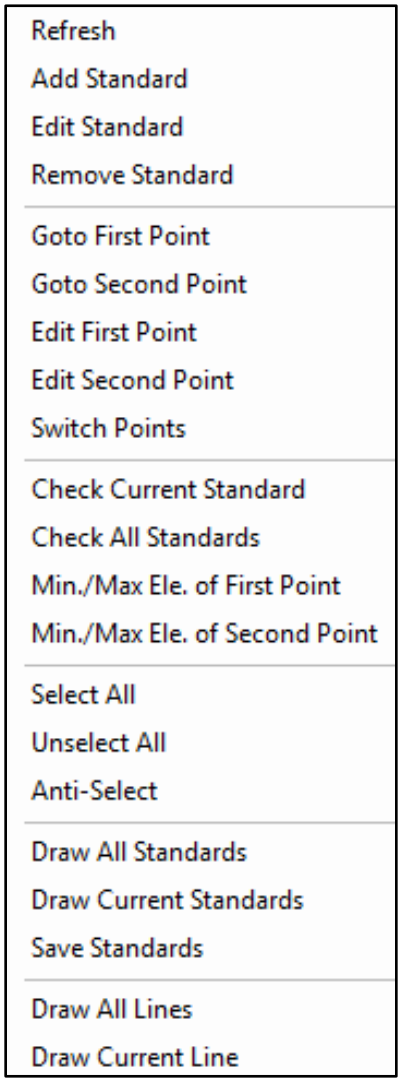
Step 5: Click ***Save*** button, and all elevations of varying points are saved and updated in data grid

22. ***Refresh***: Recalculate elevations of all points based on their reference points.

III. Standards

All standards applied in curb ramp are listed in the data grid. The rows with a yellow background indicate that current values do not meet criteria and need to be adjusted.

Right click on the data grid, and a menu with twenty-one sub menus will display.



Most functions are similar to functions introduced in curb ramp template introduced.

Switch Points: Change order of points in the standard.

Check Current Standard: Calculate the value and check whether the value meets the standard.

Check All Standards: Check all values whether they meet the criteria.

Min./Max. Ele. of First Point: Calculate the minimum and maximum elevation of first point based on selected standards.

Min./Max. Ele. of Second Point: See above.

Draw All Standards: Draw all standards in MicroStation including the value and slope direction.

Draw Current Standard: Draw current standard in MicroStation.

Save Standards: Save values to database.

Draw All Lines: Draw all lines from points in standards in MicroStation.

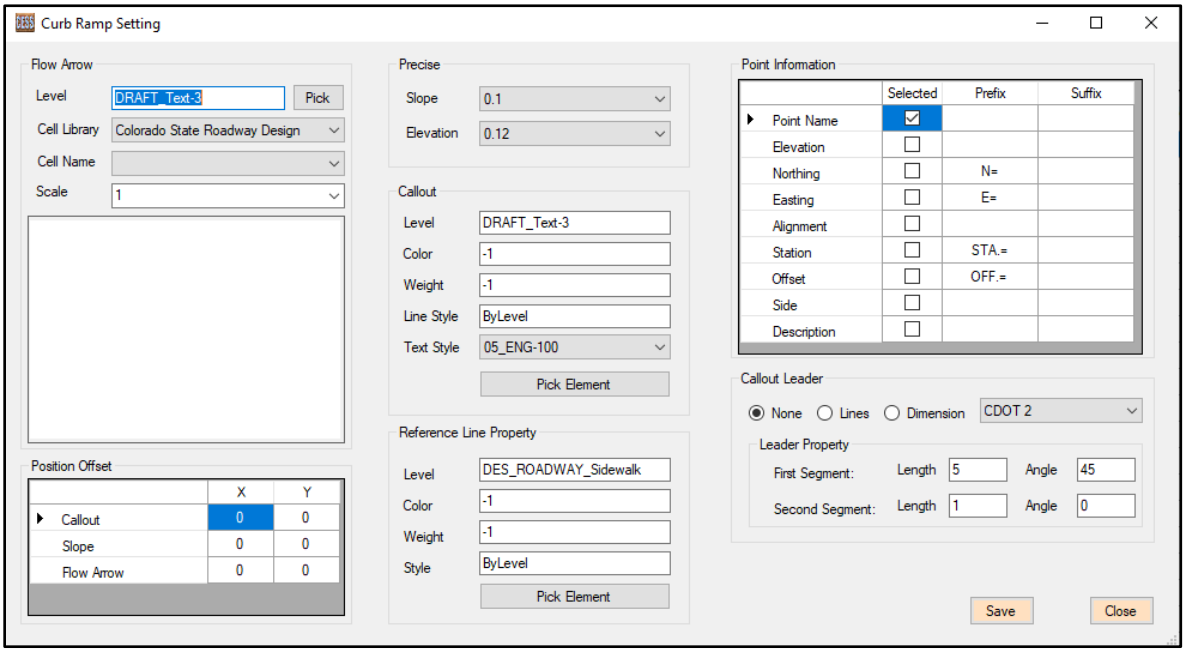
Draw Current Line: Draw line by current standard in MicroStation.

Isometric

Same as curb ramp template.

4 CURB RAMP SETTING

The figure below is the interface for curb ramp setting.



I. **Flow Arrow**
   - ***Level***: flow arrow level
   - ***Cell Library:*** *Cell library which includes flow arrow.*
   - ***Cell Name:*** *Name of flow arrow cell.*
   - ***Scale:*** *Scale when drawing flow arrow in MicroStation.*

II. **Position Offset**
   - ***Callout***: Offset of Callout of a point based on its location.
   - ***Slope***: Offset of Slope of two points based on their middle points.
   - ***Flow Arrow***: Offset of flow arrow based on their middle points.

III. **Precise**: Set slope and elevation format.

IV. **Callout**: Set properties of callout in MicroStation.

V. **Reference Line**: Set Reference line properties in MicroStation

VI. **Point Information**: Set point information including prefix, suffix, and the items to draw when drawing point information into MicroStation.

VII. **Callout Leader**: Set Leader type, length, angle etc.