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Eagle Point Solution to a Frequently Asked Question

How to Design a Vegetated Waterway Using RoadCalc – Survey Method – Part II

Summary:

This document explains the process of designing a vegetated waterway in RoadCalc using the Survey Method.

Product: Eagle Point Software™ 2004

Release: 2004 Q3 or 4.3.0 and greater

Platform: All

Related documents: *How to Design a Vegetated Waterway Using RoadCalc – Survey Method A; How to Design a Vegetated Waterway Using RoadCalc – Survey Method B; How to Design a Vegetated Waterway Using RoadCalc – Survey Method C*

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Notation Method

Button to Press *Displayed Text* **Icon** Action {Text to Enter} Menu Item...

Things to do First

Use one of the Part I methods to create the existing ground cross-sections and profile.

Switching between Views

- Use *NRCS/EP... WW RoadCalc >>Alignment... View Alignment...* to see the alignment (plan) view drawing.
- Use *NRCS/EP... WW RoadCalc >>Cross Section... Edit Data...* and click Query Cross Section to view cross-sections.
- Use *NRCS/EP... WW RoadCalc >>Profile... View Profile Graphics...* to see the profile view.

Review the Original Ground Profile

1. Click *NRCS/EP... Waterway RoadCalc>> Profile: Edit Data...*
2. Pull down to *Ognd*.
3. To print the data, click the **Generate Profiles Report icon** and select the *Ognd Profile* as the one to print.

Create the Design Profile (Centerline of Waterway) – Graphical Option

1. Use *NRCS/EP... WW RoadCalc >> Profile: View Profile...* to make sure you are in the profile view.
2. Click **Polyline**.
3. Draw a line which represents the proposed profile of the centerline of waterway. Do not worry about the correctness of these lines yet. Just get the general location of it.
4. Click *NRCS/EP... WW RoadCalc >> Profile:Convert Object...*
5. Select the line for the proposed FL of Waterway.

6. Press **Enter**.
7. Click **Next**.
8. Pull down to *Centerline*.
9. Click **Finish**. The waterway profile line becomes red.
10. Click *NRCS/EP... WW RoadCalc >> Profile: Edit Data...*
11. Pull down to *Centerline*.
12. Double click to edit any VPI.
13. Change the stations to "even" amounts. Input the correct elevations for the VPIs.
14. Click **Apply**.
15. Click **Close**.
16. Double click to edit the next VPI.
17. Change the stations to "even" amounts. Input the correct elevations for the VPIs.
18. Click **Apply**.
19. Click **Close**.
20. Repeat as needed.
21. Note the Grades for each reach of the waterway. (To print the data, click the **Generate Profiles Report icon** and select the *Centerline Profile* as the one to print.)
22. To check elevations of the Original Ground:
 - A) Click **Spot Elevations...**.
 - B) Pull down Profile to *Ognd*.
 - C) Input the Station where you want to know the elevation.
 - D) Click **Calculate**.
 - E) Click **Close**.
23. Click **Close**.

Create the Design Profile (Centerline of Waterway) – Data Entry Option

1. Click *NRCS/EP... WW RoadCalc >> Profile: Edit Data...*
2. Pull down to *Centerline*
3. Click **New VPI**.
4. Input the beginning Station. Press **Tab**.
5. Input the Planned Elevation. Click **Apply**.

6. Pull down Method to <i>Station/Elevation</i> .	Or	Pull down Method to <i>Grade/Distance</i> .
7. Input the Station.		Input the Grade.
8. Input the Elevation.		Input the Distance.
9. Click Apply .		Click Apply .

10. Repeat for as many reaches as you need.
11. Watch for the Red planned Centerline Profile polyline in the CAD drawing.
12. Click **Close**.
13. Note the Grades for each reach of the waterway. (To print the data, click the **Generate Profiles Report icon** and select the *Centerline Profile* as the one to print.)
14. Click **Close**.

Determine Shape of Waterway

1. Click *NRCS/EP... WW RoadCalc >> Define WW Channel Shape...* to display the Define Channel box that shows the planned reaches of the waterway.
2. Click **Calculate Shape** to open up your default software for designing a waterway.
3. Compute the waterway design shape for all reaches, print those results, and then minimize or close the external waterway tool.

Create the Typical Section for your Waterway Shapes

1. From the *Design Channel* screen click **New Channel Shape** to create templates for the design shapes.
2. Pull down to the desired shape {*Parabolic*} or {*Trapezoidal*}.

3. **If** the shape is parabolic
 - A) Pull down to Parabolic
 - B) Input the planned Width and Depth.
4. **Or**, If the shape is trapezoidal
 - A) Pull down to Trapezoidal
 - B) Input the Bottom Width, Depth, and Side Slope.
5. Click Apply if you need to input more channel shapes.
6. Click OK when you are done entering the last shape.

Assign the Typical Section for your Waterway Shapes

- 1) In the *Design Channel* screen, pull down the Channel Section to the correct designed shape for each Reach.
- 2) Click OK when you are done selecting each shape.

Run the Preliminary Design and View the Sections

1. Click *NRCS/EP...WW RoadCalc >> Process: Run Design....*
2. Pull down Method to *Step Through All*.
3. Click Run.
4. Pull down the surface name to *Waterway*. Notice the depth of cut or fill at the various locations on the cross section by clicking the **Move left** or **Move right** arrows.
5. Click **View Next Cross-Section** to scroll through the sections
6. Click Close.

View the Centerline Profile Cut Values

1. Click *NRCS/EP...WW RoadCalc >> Output: Elevation/Depth at Offsets....*
2. Click Depth.
3. Pull down Bottom Top to *Ognd*.
4. Pull down Bottom Surface to *Waterway*.
5. Click **New Offset** icon.
6. Input 0 for the offset value to get the Centerline Cut/Fill. Click OK.
7. If you wish to print the result click the **Printer** icon.
8. Click Close.

View the Cut Values at the Edges of the Waterway

1. Click *NRCS/EP...WW RoadCalc >> Output: Cross Section Staking....*
2. Click Calculate.
3. View the *Toe Depth* Column to see the amount of cut or fill at the edge of the waterway at each cross-section. A Cut means that the WW edge is in excavation. The Toe Offset is ½ of the top width at that station. If you scroll right you can see other info.
4. If you wish to print the results click the **Printer** icon. Click Print.
5. Click Cancel.

Review and Print Volumes

For Cross-Sectional Volume Calculations (Starts and Stops at Non-Phantom Cross-Sections)

1. Click *NRCS/EP...WW RoadCalc >> Output: Volumes....*
2. Click **Print**.
3. Click Close.

Develop Cross-Section Sheets

1. Click *NRCS/EP...WW RoadCalc >> Output: Cross Section Sheets....*
2. Click Stations to Plot.
3. Highlight Stations to plot or not plot and Click mark on or mark off.
4. Click OK.

5. Pull down Format to *Sheet Settings*.
6. Click Edit.
7. On the Sheet Dimensions Tab make changes to the # of Columns, etc.
8. On the Grid Spacing Tab make changes to the Scales, etc.
9. Click OK.
10. Click **New Cross-Section Sheets**.
11. Click OK.
12. Highlight the Sheet Number that you want to view.
13. Click **View Cross-Section Sheets**. (Binoculars)
14. Click Close.

Develop Profile Sheet

1. Click *NRCS/EP...WW RoadCalc >> Output: Plan & Profile Sheets...*
2. Pull down Format to *Sheet Settings*.
3. Click Edit.
4. Select the Profile Tab and make changes to the Datum Elevation Interval. Click OK.
5. Pull down Format to *Station/Elevation Intervals*.
6. Click Edit.
7. Make changes to the Profile View Stationing & Elevation Intervals. Click OK.
8. Click **New Plan & Profile Sheets**.
9. Click OK.
10. Click **View Cross-Section Sheets**. (Binoculars)
11. Click *View... Regen All...* if needed to make the grids reappear.
12. Click Close.
13. To adjust the fit on the sheets click *NRCS/EP...WW RoadCalc >> Output: Adjust Plan & Profile Sheets*.
14. Click the black arrows to shift the sheet to line up the profile better.

Other Notes

If you change the Profile scales, you must go back to *View Profile Graphics* in order for them to be rescaled correctly.

When you change a design, it does not delete the drawing sheets that are created using *NRCS/EP...WW RoadCalc >> Output: Cross-section...* or *NRCS/EP...WW RoadCalc >> Output: Plan & Profile...* You can remove them by highlighting those sheets in the dialog box and click on the **Delete Sheets** button if that particular sheet is not currently open.

Submitted by Norman Friedrich.