

**Overview:** Create the core trench for a pond embankment. A surveyed site with a surface model covering the footprint of the dam is needed. Final elevations of the normal pool, auxiliary spillway, and top of settled dam have already been computed.

*Software:* AutoCAD Civil 3D 2018, Civil 3D Workspace, NRCS C3D 2018 template

<b>Notation:</b>  <i>Displayed Text</i> <b>Icon</b> <u>Action</u> {Text to Enter} <i>Menu Item...</i>
--

### Prerequisite

Create an OgnD Surface and Stripping surface. Create user defined contours as described in *Pond Embankment* to identify the limits of the core trench.



## Core Trench

### Placing the Core Trench bottom

Draw the centerline of the core trench using a 2D Polyline.

1. Tool Palette>NRCS 11x17B... Click *Plan Commands... Alignment Generic*
2. Draw a line that represents the centerline for the core trench, starting and ending at the contour line of the normal pool. (Use shift + right-click. Click *Apparent intersection...* if needed)

Create a feature line for the core trench.

3. Click *Home... Create Design... Feature Line... Create Feature Line from Objects...*
4. Click on the Core Trench alignment. Press Enter.
5. In the Create Feature Lines dialog box:
  - set the *Site* to *Core Trench*,
  - set *Style* to *Core Trench Feature Line*.
  - check *Erase Existing Entities*,
  - check *Assign Elevations*,
  - uncheck *Weed points*,
6. Click 
7. In the Assign Elevations box: select *From Surface* and set the Surface to *OgnD*,  
Checkmark *Insert Intermediate grade break points*.  
Checkmark *Relative elevation to surface*.  
Input the amount to lower the core trench below ground. E.g. {-4}
8. Click  and the feature is created.

Create the US & DS edge of the core trench.

9. Select the core trench feature line. Verify that the line has vertices at the ground grade breaks in addition to the end points. Press ESC.
10. Click *Home... Create Design... Feature Line... Create Feature Line from Stepped Offset...*
11. Input the ½ bottom width distance to offset. E.g. {6} Press Enter.
12. Select the Core Trench CL. Click upstream of the Core Trench CL.
13. Input the relative elevation {0}. Press Enter.

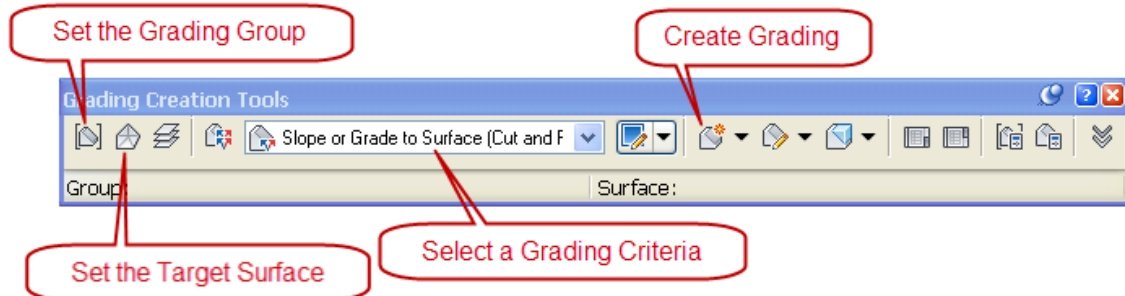
14. Select the Core Trench CL. Click downstream of the Core Trench CL.
15. Input the relative elevation {0}. Press Enter. Press Enter.




Close the ends of the core trench bottom

16. Set osnap to use endpoints: Right Click the **Osnap Status**. Click *Settings...* and checkmark only *End Point* and *Object Snap On*. Click **OK**.
17. Click *Home... Create Design... Feature Line... Create Feature Line...*
18. In the dialog box set the *Site* to *Core Trench*. Click **OK**
19. Click to the left end of the US edge of core trench. Press Enter to accept the elevation.
20. Click on the left end of the DS edge of core trench. Press Enter. Press Enter.
21. Click *Home... Create Design... Feature Line... Create Feature Line...*
22. In the dialog box set the *Site* to *Core Trench*. Click **OK**
23. Click to the right end of the US edge of core trench. Press Enter to accept the elevation.
24. Click on the right end of the DS edge of core trench. Press Enter. Press Enter.
25. Select the Upstream feature line. Use *Feature Line... Edit Geometry...Join...*
26. Select the right end of the core trench, then the downstream edge of the core trench, then the left end of the core trench. Press Enter and they will be joined.

### Placing the Cut Slopes and Infill of the Core Trench

27. Save the drawing.
28. Click *Home... Create Design... Grading... Grading Creating Tools...*





29. Click **Set the Grading Group** .
30. Set the *Site* to *Core Trench*. Click **OK**
31. If needed click **Create a Grading Group** .
32. Input a Grading Group *Name* as {*Core Trench*}, Checkmark *Automatic Surface Creation*. Set the *Surface Style* to *Grid Magneta (5x5)*. Click **OK**
33. Verify the *Surface name* and *Style* to be used by the *Core Trench surface*. Click **OK**
34. Click **Set the Target Surface** . Select *Strip*. Click **OK**

Core Trench Cut slopes

35. Pull down the **Select a Grading Criteria**  to *Slope or Grade to Surface (Cut)*
36. Click **Create Grading**. 

37. Select the Core Trench feature line. Click outside of the core trench.
38. Apply to entire length? Input Y Press Enter
39. Slope or grade? Input S Press Enter.
40. Cut Slope? Input 1.5. Press Enter
41. Press ESC to exit the command

#### Core Trench Infill





42. Click the pulldown by **Create Grading**  and switch to **Create Infill** 
43. Click inside of the core trench bottom and Press Enter.
44. The final Core trench surface will be displayed.
45. Close the Grading Creations Tools toolbar.
  
46. Select the *Core Trench* slope grading. In Properties: Set Style=*Core Trench Grading*
47. Select the *Core Trench* catch line. In Properties: Set Style=*Core Trench Catch Line*
48. Save the drawing.

Verify the surface & lock it

49. Select the Core Trench surface. Right-Click, Click Object Viewer.
50. Press ESC when done visually reviewing the surface.
51. *Home... Palettes... Coordinate Tracker...* will track elevations.
52. Toolspace> Prospector... *Surfaces...* Right-Click *Core Trench...* Click *Lock...*

### Computing the Earthwork Volume for the Core Trench

Compute core trench volume

53. Click *Analyze... Volumes and Materials... Volumes Dashboard* 
54. In Panorama click **Create new Volume Surface** 
55. Input a Name E.g. {V Core Trench - Strip}
56. Set the Style = *<off>* Click **Ok**
57. Set the Base Surface = *Strip*. Set the Comparison Surface = *Core Trench*
58. Click **Ok**
59. A volume surface gets created and the Cut column will show the volume.
60. Save the drawing.
  
61. Use **Generate Cut/Fill Report**  to create a report. It can be saved or information can be copied from the report into Word or Excel Document
62. In Civil 3D click dismiss  to close the **Volumes Dashboard** Panorama.
  
- Hide the Core Trench grading and surface.
63. Select the *Core Trench* surface. Right-Click, Click *Surface Properties..Information..* Set the Surface Style to *<off>*.
64. *Home... Layers... Layer Properties...* Freeze the *C.Topo.Cort.Ctch*, *C.Topo.Cort.Slop*, and *C.Topo.Cort.Feat* layers. Close the Layer Properties Manager.