

## Earthen Storage Pond

**Overview:** Create the grading, surface model and earthwork volumes for a rectangular earthen storage pond. A surveyed site with a surface model covering the footprint of the embankment is needed. The NRCS Storage Pond tool is used.

Software: AutoCAD Civil 3D 2016, NRCS C3D 2016 Customization & template

### C3D Steps

#### Notation Method

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

#### Prerequisite


Follow the instructions for creating *Original Ground Contours*.

### Earthen Storage Pond

Place an Earthen Storage Pond object onto the project

- 1) Click *NRCS ... NRCS Storage Ponds... Storage Pond...*
- 2) Input the dimensions, slopes and top of fill elevation.
- 3) Pulldown *Inner Feature Line Style = Embankment Feature Line*
- 4) Pulldown *Outer Feature Line Style = Embankment Feature Line*
- 5) Pulldown *Elevation Label Style = Feature Line Elevations Start End*
- 6) If you are inserting more than one Storage Pond, rename the *AcadGroup Name*. (e.g. StoragePond2, etc)
- 7) Click Insert into Drawing.
- 8) Select the point in CAD for the lower left corner of the inside top of fill.

Adjust the location and elevation of the storage pond layout

- 9) Click *NRCS ... NRCS Storage Ponds... Turn On:Selection by Group*  to enable the object group selection.
  - 10) Turn off the OsnapZ elevation setting: Type *Osnapz* Press Enter, Type *1* Press Enter (This allows you to use Osnaps without changing the Elevation of the objects.)
  - 11) To move the group and maintain the same elevation:
    - a) Select any line of the pond, Click the group's **grip**.
    - b) Click the new location of the storage pond.
  - 12) To change the elevation of the storage pond:
    - a) Select any line of the group,
    - b) Right-Click *Rasie/Lower Feature lines*
    - c) Input the elevation change. E.g. {1.5}. Enter. Use negative to lower.
  - 13) To rotate the storage pond:
    - a) Select the group.
    - b) Right-Click *Basic Modify... Rotate...*
    - c) Click to set a pivot point.
    - d) Move your cursor to obtain the new rotation angle and click.
  - 14) When done moving and rotating type *Osnapz* Press Enter, Type *0* Press Enter
- These steps can also be used after the grading has been applied.

## Earthen Storage Pond

Create the outer grading to the ground surface.

15) *Home... Create Design... Grading... Grading Creating Tools...*

16) Click **Set the Grading Group** .

17) Set the Site to *Storage Pond*. Click 

18) Click **Create Grading Group**

19) Input a Grading Group Name E.g. { *Storage Pond 1* } Click 

20) Click **Set the Target Surface** . Select *Ognd*. Click 

21) Pulldown the **Select a Grading Criteria**  to *Slope or Grade to Surface (Cut and Fill)*

22) Click **Create Grading.** 

23) Select the outer storage Pond line. Click outside of the storage pond.

24) Apply to entire length? Input *Y* Press Enter

25) Slope or grade? Input *S* Press Enter.

26) Cut Slope? Input *3*. Press Enter

27) Slope or grade? Input *S* Press Enter.

28) Fill Slope? Input *3*. Press Enter

29) Press ESC to exit the command

30) Close the Grading Creation Toolbar

Create the storage pond surface

31) Select the outer grading.

32) *Grading... Modify... Grading Group Properties...*

33) On the Information Tab checkmark *Automatic Surface Creation*.

34) Type = *TIN Surface*. Set the Name to *Storage Pond*. Style = *Grid Magneta 5x5*.


35) Click . Click . Click .

36) Select the Storage Pond group. (Not the outer grading.)

37) Right-click... Click *Add to Surface as Breaklines...*

38) Select Surface = *Storage Pond*. Click .

39) Supplementing factors: Checkmark Distance = *5'*

40) Click .

41) If Panorama displays crossing breaklines click the checkmark to dismiss the message.


### Computing the Cut and Fill Volume for the Storage Pond

Compute earthwork volumes

42) Click *Analyze... Volumes and Materials... Volumes Dashboard* 

43) In Panorama click **Create new Volume Surface** | 

44) Input a Name E.g. { *V Storage Pond - Ognd* }


45) Set the Style = *\_<off>* Click 

46) Set the Base Surface = *Ognd*. Set the Comparison Surface = *Storage Pond*


47) Click 

48) In Panorama click **Create new Volume Entry** | 



49) Input a Name E.g. { *V Storage Pond - Strip* }

50) Set the Style = *\_<off>* Click 

## Earthen Storage Pond

- 51) Set the Base Surface = *Strip*. Set the Comparison Surface = *Storage Pond*
- 52) Click 
- 53) Volume surfaces get created and Quantities will be displayed in the Dashboard.
- 54) Save the drawing.

You can go back and modify the location, rotation, or elevation of the grading to improve the volumes and layout. Be sure to select the Storage Pond selection group and NOT the outer grading. The outer grading will update automatically.




- 55) In Composite Volumes click **Re-compute Volumes** to make sure they are current.
- 56) 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
- 57) In Civil 3D click dismiss  to close the **Volumes Dashboard** Panorama.

To track depths of the Storage Pond.

- 58) Use *Home...Palettes* ▼.. *Coordinate Tracker*  on the *V Ogn* – *Storage Pond* surface to see the Cut or Fill depths.

Tools in the NRCS Ribbon:

*NRCS ... NRCS Storage Ponds...*

- *Manage Object Groupings* . Allows you to manage and modify objects within a group.
- *Turn Off: Selection by Group* . When Selection by Group is turned off, objects in a group are selected individually.
- *Turn On: Selection by Group* . When Selection by Group is turned on, all objects in a group are selected just by selecting one object.