

Technical Note

TN 6.34 Modeling StormTech® Chambers in HydroCAD®

The following steps provide instructions for modeling StormTech chambers as a pond in the HydroCAD Stormwater modeling software. HydroCAD can be used to route a hydrograph through a pond. This document does not address setting up a hydrograph or connecting inlet and outlet devices. This document is for the sole purpose of modeling the chamber stage-storage volume. For information and details on how to set up hydrographs and attached inflow and outlet connections go to www.hydrocad.net.

Please Note: HydroCAD 9.0 has the StormTech SC-310 and SC-740 model profiles built into the software. The newer StormTech SC-160LP, DC-780, SC-800, MC-3500, MC-4500, and MC-7200 chambers are available as updates at www.hydrocad.net/stormtech.htm.

StormTech chambers are modeled in HydroCAD either using the Chamber Wizard or entered manually. We recommend modeling them manually for the best accuracy. When manually modeling, the StormTech chambers are placed or “embedded” in a stone envelope. The first step when modeling the chambers is to enter the dimensions of the stone envelope. The stone envelope includes the one foot (min.) stone perimeter around the chambers and the excavation volume around the manifold (if the manifold volume is to be included in the total storage volume).

To Manually Model StormTech Chambers in HydroCAD:

1. Open HydroCAD and create a new project (If not already in a HydroCAD project).
2. Create a new pond.
3. Double click on the pond to open the “Edit” screen.
4. On the edit pond screen select “Detention Pond”.
5. Click on the “Storage” tab and select “Edit Storage”.
6. Select the option for “Prismatoid” in the first row and click OK.
Note: If a non-rectangular bed is designed, select “Custom Stage Data” in step 6 and select “Surface Area” as your Stage Type. Enter the surface area at the bottom and top elevations of the stone bed in step 7. (The two areas will usually be the same.) You can uncheck the “Use Large Areas” box to allow entry of surface area in square-feet instead of acres.
7. Enter the invert, length, width and height of the stone envelope.
8. Set the following parameters and click OK:
 - a. Embed inside – Nothing
 - b. Storage Multiplier – 1
 - c. Voids – 40% (as appropriate for your stone)
 - d. Shape - Prismatic
9. Double click on the next blank row below the Prismatoid defined in steps 7 & 8.
10. Select “Prefab Chamber”.
11. Click on “Model” and select “ADS_Stormtech”, then the desired StormTech chamber.
12. Enter the invert (bottom) of the chamber (The minimum distance above the bottom of stone depends on the chamber model being used).

13. Enter the following parameters:
 - a. Embed Inside – Volume 1 (the PrismaToid previously defined)
 - b. Storage Multiplier – Number of chambers for the system
 - c. Invert Elevation - Bottom of chamber elevation
 - d. Voids – 100%
 - e. Click OK to close the prefab chambers screen
14. For the MC-3500 and MC-4500 chambers, the end caps are also modeled to show storage. In addition to the parameters in step 13, adjust the number of rows to be half of the number of end caps on the design.
15. Additional storages can be defined in a similar manner. For example, to define a manifold ADS® N-12® can be added as a new line item and embedded inside volume. The inlet stubs can be embedded by defining the length of each stub and setting the storage multiplier to the number of stubs.

For example: To embed (20) 12" (300 mm) manifold stubs that are each 18" (450 mm) long set the following parameter:

 - a. Double click on the next blank row below the StormTech chamber row
 - b. Select "Prefab Chamber", then "ADS" then select the size
 - c. Set the following parameter:
 - i. Set invert elevation – (from plans typically 1 to 2 inches (25-50 mm) above chamber bottom)
 - ii. Embed Inside – Volume 1
 - iii. Length – 1.5 ft (0.46 m)
 - iv. Storage Multiplier – 20
 - v. Voids – 10
 - vi. Click OK to close horizontal cylinder screen
16. Click the OK button to save the pond description.
17. Double-click the pond to view the data for the chamber system.
18. The "storage" tab contains the information on the modeled chambers (viewable in both tabular and graphical formats).
19. The "Summary" tab contains a report for the overall system including volume of excavation (system only), the volume of the embedded storage, the amount of stone backfill, and the final storage results.
20. Click "Edit" to modify or change any parameters.
21. To analyze the behavior of the chamber system under actual rainfall conditions, create one or more sub catchments (or use in an existing design) and route them into the chamber system.
22. Outlets are defined under the "outlet" tab of the pond description. With no outlet, the chamber system will need to be sized to store the entire volume of the design storm runoff.

For additional details please visit www.hydrocad.net

