STREAMLINE
TECHNOLOGIES

## ICPR Modeling Tips for CULTEC Chambers

A new utility has been added to Streamline Technologies' ICPR to automatically calculate stage-area and stage-volume relationships based on manufacturers' geometric data for various types and models of underground stormwater chambers. ICPR currently supports underground chambers manufactured by: CULTEC (models: Contactor 100HD and Recharger 150, 180, 280, 330XL, V8)

The underground chambers are somewhat similar in shape to an arch pipe and are placed on a bed of stone. Stone is also used to fill voids between chambers and for cover above the top of the chambers. The combination of voids in the stone and the open space in the chambers provide subsurface storage for stormwater runoff.
Modeling an underground chamber system is a relatively simple matter in ICPR. It is modeled the same as any other pond. However, the key to modeling these systems correctly is in developing the stage-area or stage-volume table for the node used to represent the chamber system. The following step-by-step instructions guide you through the process. You must have ICPR version 3.10 or higher installed for this to work.
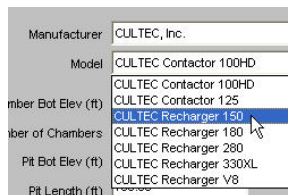
1.
Open a node data form inside ICPR and set the type to either stage-area or stage-volume. With the node data form opened, click Utilities>Chamber Tool as shown to the right.
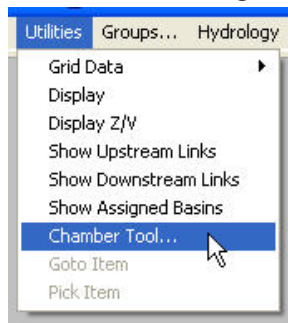
2.
A chamber calculation data form opens. You need to select CULTEC, Inc. from the drop down list and the model for the chamber you wish to use.

3.
Next, fill out the remaining data fields. Note that the chambers must fit completely (horizontally and vertically) into the gravel pit, otherwise an error will occur. Once the data fields have been filled, click the "Calculate" button.

Chamber Tool

Manufacturer	CULTEC, Inc.
Model	CULTEC Recharger 150
Chamber Bot Elev (ft)	96.00
Number of Chambers	100.00
Pit Bot Elev (ft)	95.00
Pit Length (ft)	100.00
Pit Width (ft)	50.00
Pit Height (ft)	4.00
Gravel Porosity	0.4

Calculate   Cancel   Ok

4.
A stage-area-volume table will appear to the right of the input parameters. You might need to scroll down to the bottom to see all of the points. If the total volume is inadequate, then you can make adjustments as necessary until you find a combination that works.

Stage (ft)	Area (ft2)	Volume (ft3)
95.00	2000.00	0.00
96.00	2000.00	2000.00
96.08	3155.75	2214.74
96.17	3146.38	2477.54
96.25	3137.00	2739.24
96.33	3128.00	3000.18
96.42	3118.62	3260.66
96.50	3109.62	3520.07
97.00	2905.25	5033.68
97.08	2847.13	5273.26
97.17	2780.00	5507.91
97.25	2701.63	5736.22
97.33	2608.63	5957.40
97.42	2495.75	6170.25
97.50	2292.87	6369.69
97.54	2000.00	6459.20
99.00	2000.00	9375.80
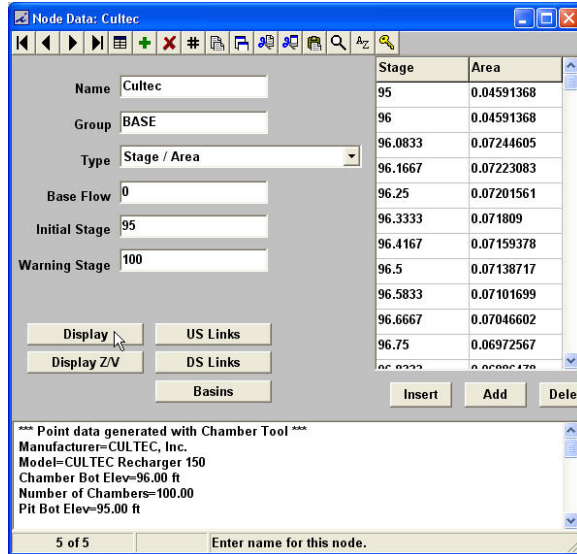
Note: The stage-area table extends only to the top of the stone and does not include surcharged conditions above that point. If you want to account for flooding above the underground storage system, you must add additional data points. This can be done in the ICPR node data form.

5.
If you're satisfied, then click the Ok button as shown to the right. If the node type is set to stage-area, the areas will be converted to acres and transferred automatically to the data form. If you have a stage-volume node type, then the volumes will be converted to acre-feet and transferred to the node form.

Manufacturer	CULTEC, Inc.
Model	CULTEC Recharger 150
Chamber Bot Elev (ft)	96.00
Number of Chambers	100.00
Pit Bot Elev (ft)	95.00
Pit Length (ft)	100.00
Pit Width (ft)	50.00
Pit Height (ft)	4.00
Gravel Porosity	0.40

Calculate   Cancel   Ok

6.
Note that the last chamber
selection parameters are placed
into the comment field as a
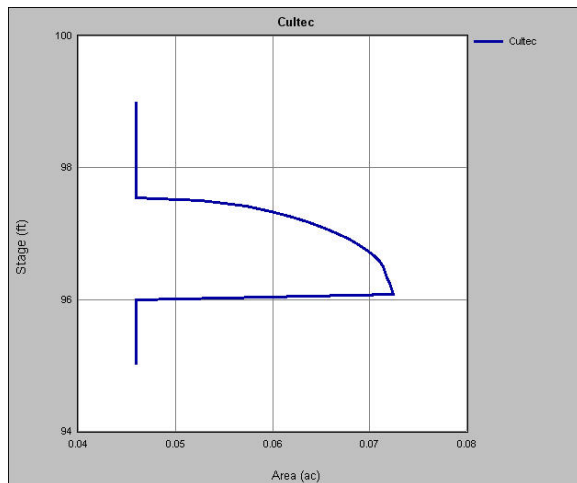record of the stage-area or stage-
volume calculation.

7.
A graph of either the final stage-
area or stage-volume
relationship can be viewed by
clicking the "Display" or
"Display Z/V" button in the node
data form.

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