# Continuous Simulation using SWMM 5 LID and Groundwater Features in a Linked 1D/2D Network using InfoSWMM 2D for a 50 Year Period

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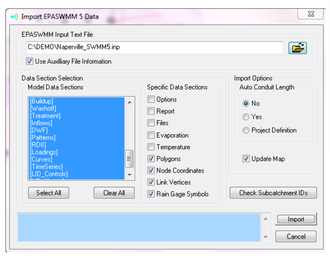
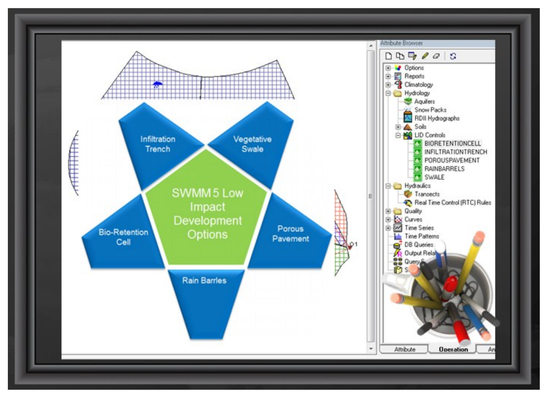
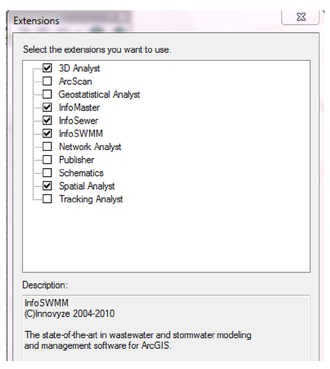
Import and Export from SWMM 5 and EPANET is very important to all of our software . All of our software shown above either imports EPANET or SWMM 5. We find that an EPANET or SWMM 5 file is a common means of model transfer throughout the world.

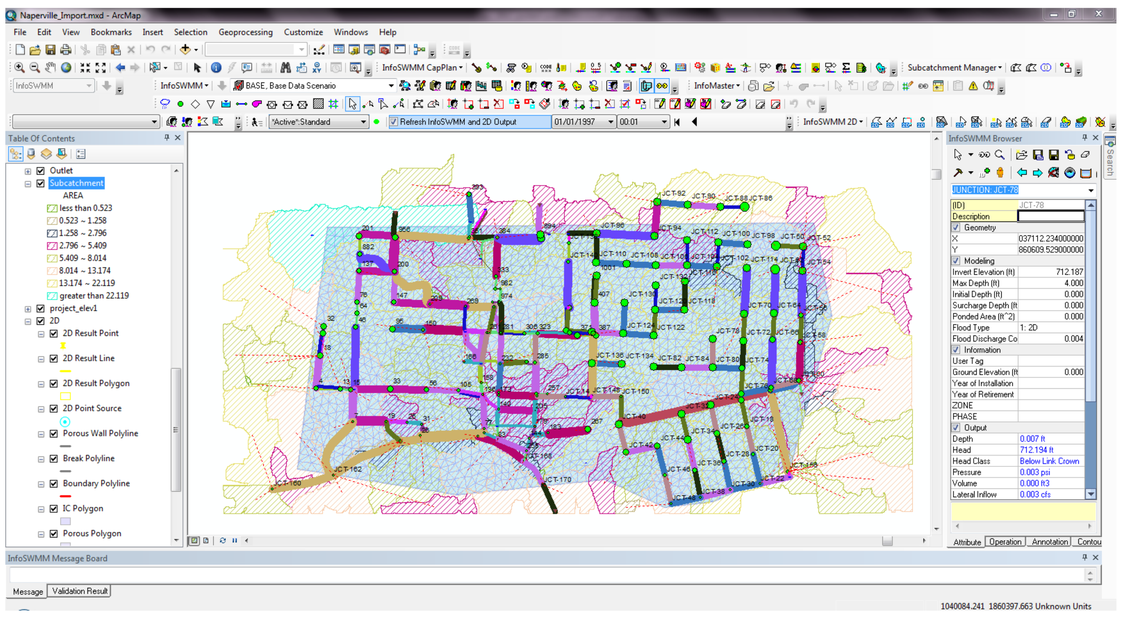


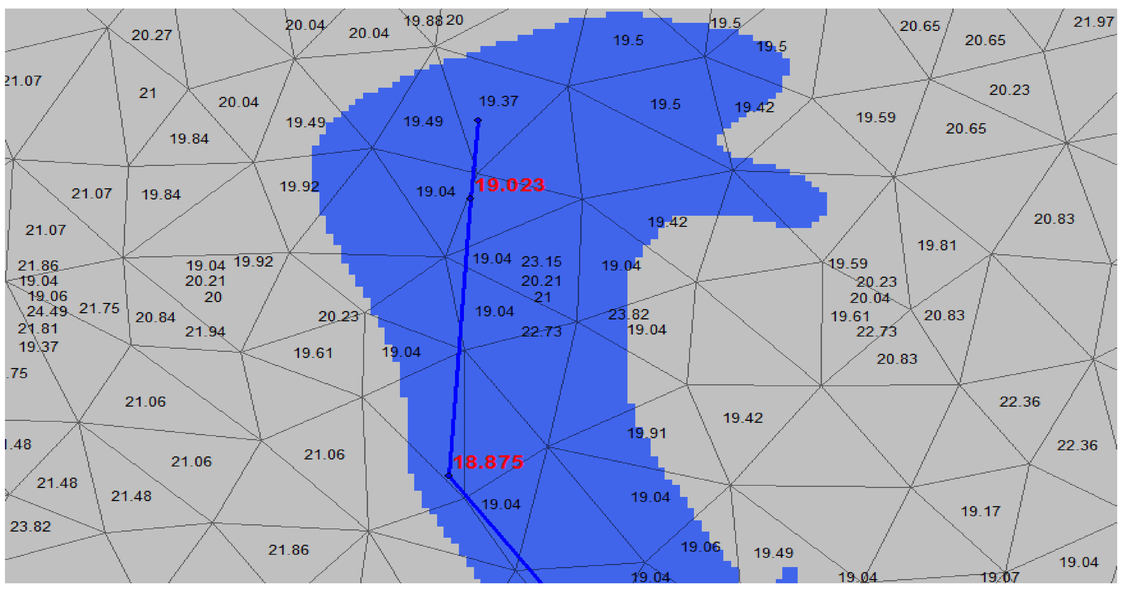
InfoSWMM 2d can import, export and actually uses a SWMM 5 input data file for the Simulation engine. The 2D components connecting to a node in InfoSWMM are connected with weir, orifice and outfall components.



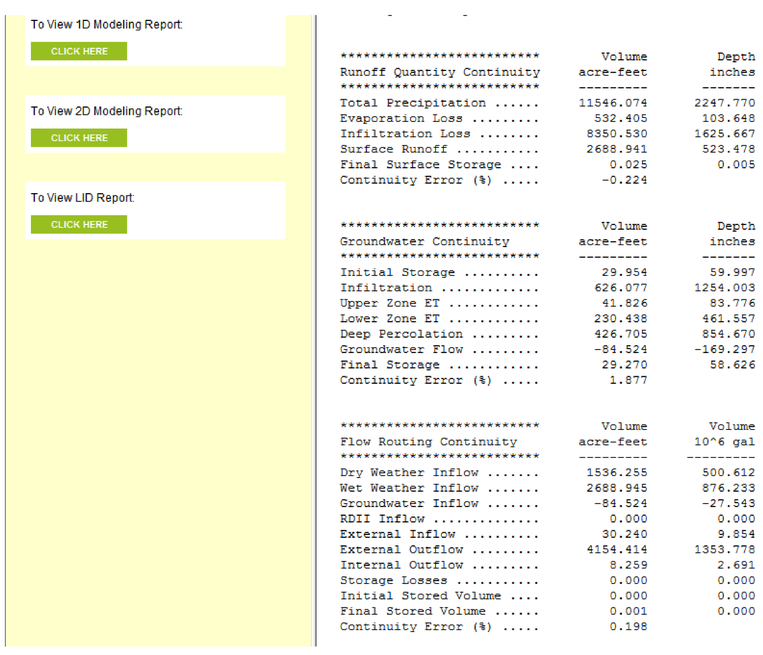
InfoSWMM and InfoSWMM 2D are extensions in Arc Map 9.3 and Arc Map 10 and 10.1. The layers of InfoSWMM and InfoSWMM 2D are editable in the Arc Map Table of Contents and all of the Arc Map Toolbox commands and layer property commands can be used to manipulate InfoSWMM data layers.






A simulation of 125 Subcatchments, 225 pipes and 225 nodes with 3500 2D Meshes for 50 years with LID's and Groundwater for each Subcatchment takes about 1 hour on a Quad Core PC.

The 2D Mesh calculations ONLY take place when nodes are flooding and the flow is going to the 2D Meshes. This lessens the computational time for the 2D Simulation.



A 50 year simulation with 2D Meshes, LID Modeling and Groundwater is both stable and without continuity error in the 2D and 1D sections of the InfoSWMM HTML Output file.

Existing SWMM 5 components are used to connect the 1D Node to the 2D Mesh. The flooded water flow out a bottom outlet orifice to the 1D Outfall and then the 2D Mesh. The 2D mesh can also flow back into the 1D mesh though the same Outfall.

[ORIFICES]
JCT-154_ORIFICE JCT-154 JCT-154_OUTFALL BOTTOM 6.991000 0.004000 NO
JCT-156_ORIFICE JCT-156 JCT-156_OUTFALL BOTTOM 4.000000 0.004000 NO

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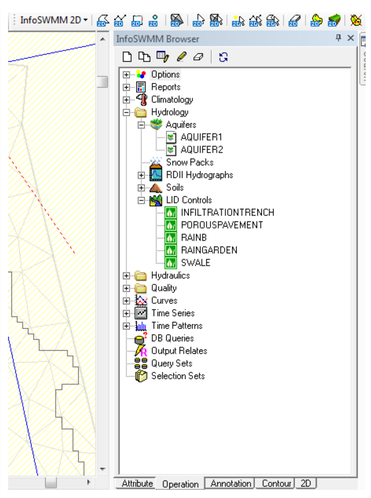
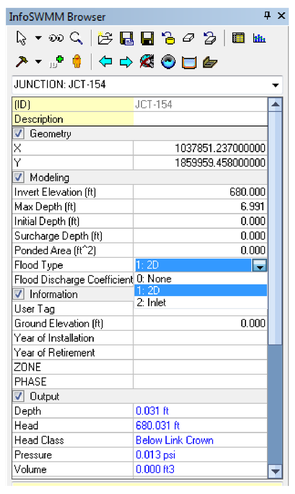
Connection to 2D Mesh is through a SWMM 5 orifice to a SWMM 5 Outfall which is in the middle of the Mesh.

The LID Controls are created either as DB item in the Operations Tab of the InfoSWMM Brower or created using the DB editor. The number and type of LID control along with Subcatchment specific information is entered for each Subcatchment using the InfoSWMM Attribute Tab of the Brower or in the LID Subcatchment Coverage DB.

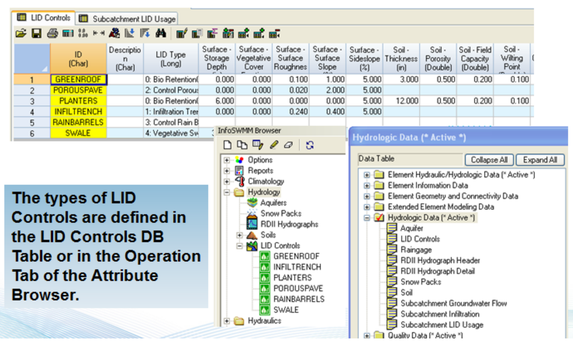
You can plot all of the SWMM 5 LID Report Variables for each LID in each Subcatchment.

The Aquifers for the model are also defined in the Operations Tab of the InfoSWMM Browser and then either the Groundwater DB Table or the Attribute Tab of the InfoSWMM Browser ties the Aquifer to Subcatchment Specific Groundwater data.



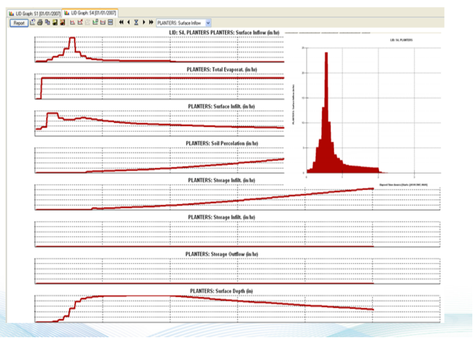


## LID Controls in DB Tables

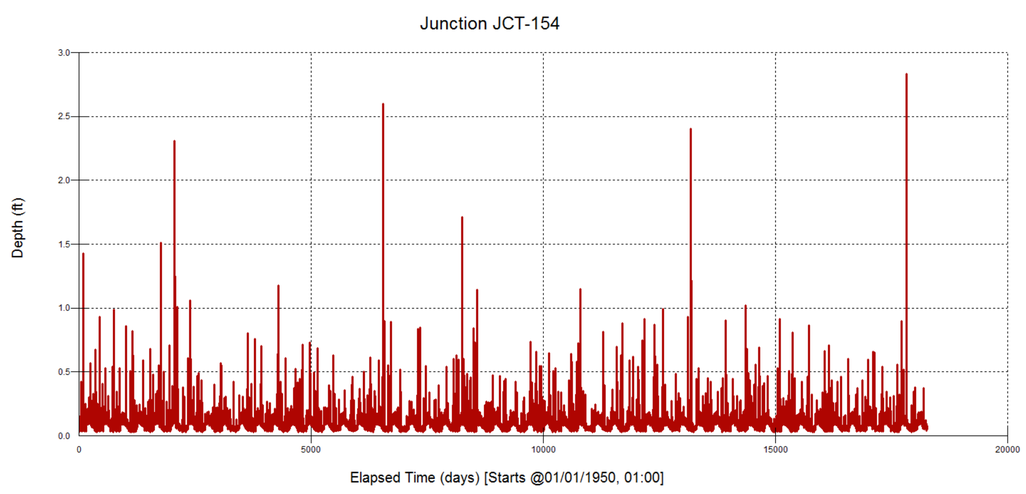


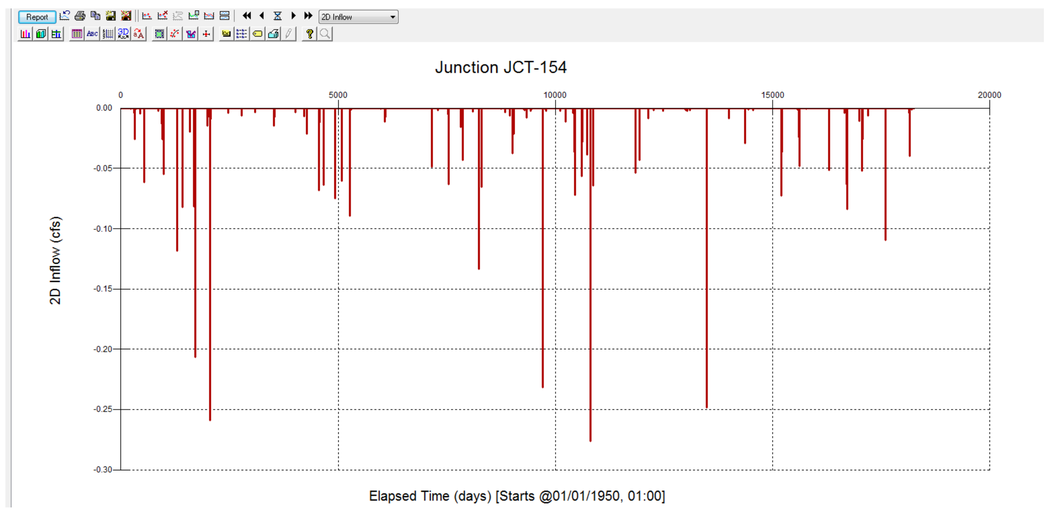
The types of LID Controls are defined in the LID Controls DB Table or in the Operation Tab of the Attribute Browser.

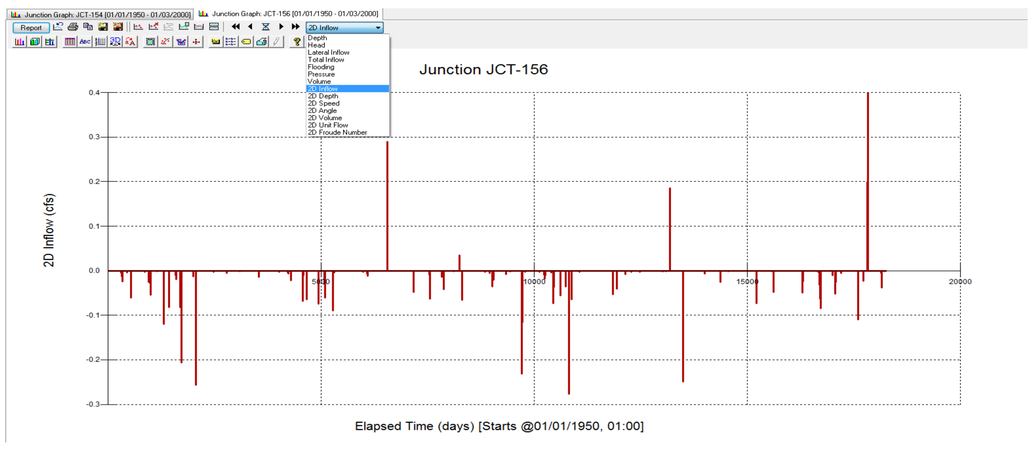
## LID Graphs by Subcatchment



Graph of the Junction depth for a Node that connects the 1D Drainage Network to the 2D Mesh for 50 years and the flow OUT of the 1D Node to the 2D Mesh is shown for the 50 years. The flow can be positive or negative depending on whether the flow is out of the 2D Mesh or into the 2D Mesh.




The Output Statistics Manager of InfoSWMM analyzes the statistics for up to 500 locations at the same time for a continuous simulation. In the case of this example, there were 189 events in which the 1D Network flooded to the 2D Network or flow from the 2D network flowed into the 1D network.