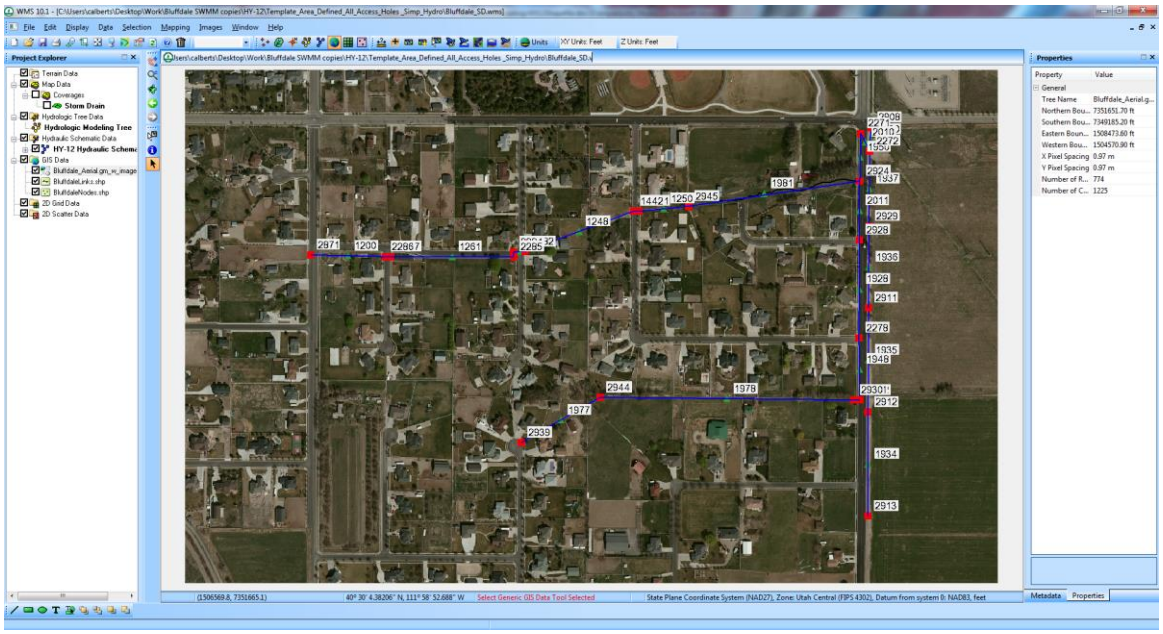
WMS

v. 10.1

WMS 10.1 Tutorial

Storm Drain Modeling – Defining HY-12 Storm Drain Networks with Shapefiles and LandXML files

Set up an HY-12 storm drain model in the WMS interface using common file types such as shapefiles and LandXML files with pre-defined inlet and pipe attributes



Objectives

Define a storm drain network and its associated data using shapefiles and LandXML files with pre-defined inlet and pipe attributes. Make minor modifications to the HY-12 node and link properties. Then run the HY-12 model and view the results.

Prerequisite Tutorials

- Introduction – Basic Feature Objects

Required Components

- Data
- Map
- Hydrology
- Storm Drain

Time

- 30–45 minutes

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1 Introduction

The US Federal Highway Administration's HY-12 is a DOS-based storm drain analysis program that can be used for designing inlets, pipes, and the general layout of a storm drain network. An HY-12 model can be generated by drawing the proposed pipe and inlet locations in a storm drain coverage. The map module locations are then converted to a 1D schematic where the HY-12 model parameters are defined.

Many of the HY-12 computations, such as channel calculations, curb and gutter calculations, and rational method computations, are based on computations in FHWA's Hydraulic Toolbox software.[1] Refer to the documentation in both the Hydraulic Toolbox and in HY-12 installations to learn about the specific computation methods used in HY-12. Many of the computations used in the HY-12 model are described in FHWA's *Urban Drainage Design Manual, Hydraulic Engineering Circular No. 22* (HEC-22).[2]

This tutorial demonstrates creating and analyzing an HY-12 storm drain model network using a shapefile or a land XML file. Importing shapefiles and LandXML files and converting them to a basic HY-12 network schematic of a storm drain is demonstrated. This requires creating two different storm drain networks. The first is a residential storm drain network found in Bluffdale, Utah. The second is a simple pipe network defined by a LandXML file. Both networks have been pre-defined in shapefile format with most of the necessary attributes defined.

The structures will be modified, HY-12 will be run, and the results will be viewed. A LandXML file will then be imported, the HY-12 structures will be modified, HY-12 will be run again, and the new results will be reviewed.

It is recommended to be familiar with basic feature object editing techniques in WMS before attempting this tutorial.

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[1] See https://www.fhwa.dot.gov/engineering/hydraulics/software/toolbox404.cfm.

[2] See https://www.fhwa.dot.gov/engineering/hydraulics/pubs/10009/10009.pdf.

2 Getting Started

Starting WMS new at the beginning of each tutorial is recommended. This resets the data, display options, and other WMS settings to their defaults. To do this:

1. If necessary, launch WMS.
2. If WMS is already running, press *Ctrl-N* or select *File* | **New…** to ensure that the program settings are restored to their default state.
3. A dialog may appear asking to save changes. Click **No** to clear all data.

The graphics window of WMS should refresh to show an empty space.

3 Creating Storm Drain Schematic

3.1 Opening Shapefiles

First open a blank WMS project and load in two shapefiles that have pre-defined attributes such as elevations and dimensions that define the storm drain network.

1. Select *File* | **Open** to bring up the *Open* dialog.
2. Browse to the *HY12Shapefile\HY12Shapefile\HY12Bluffdale* folder.
3. While holding down the *Shift* key, select both "BluffdaleLinks.shp" and "BluffdaleNodes.shp".
4. Click **Open** to exit the *Open* dialog and import the shapefiles.

The project should appear similar to Figure 1.

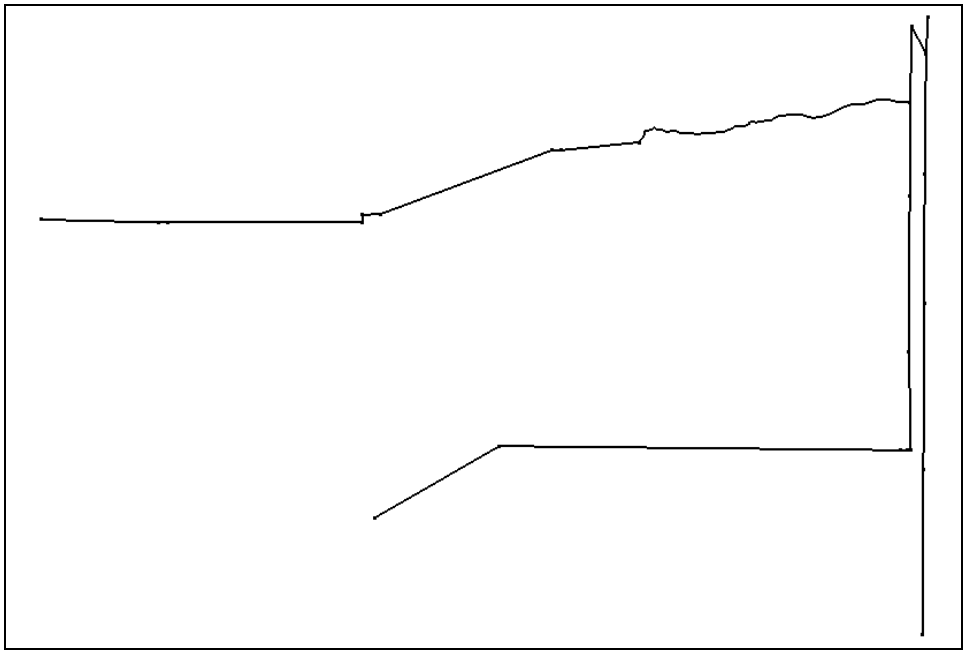


Figure 1 Initial shapefiles after import

3.2 Mapping Shapefiles to Feature Objects

Now convert each shapefile to feature objects. Start by creating a storm drain coverage and then map the shapefiles to the coverage.

1. Right-click "Drainage" in the Project Explorer and select *Type* | **Storm Drain**.

The coverage name should now be "Storm Drain".

2. Switch to the **GIS** module.
3. Select *Mapping* | **Shapes → Feature Objects…** to bring up the *GIS to Feature Objects Wizard* dialog.
4. Click **Yes** if asked to use all shapes in visible shapefiles.
5. Click **Next** to go to the *Step 1 of 3* page of the *GIS to Feature Objects Wizard* dialog.
6. Use the following table to select the appropriate option from the drop-down menus on the *Mapping* row:

	Node_Name	Inv_Elev	Surf_Elev	MH_Diam
Mapping	Node name	Node invert elevation	Node ground elevation	Node structure diameter or width

7. Click **Next** to go to the *Step 2 of 3* page of the *GIS to Feature Objects Wizard* dialog.
8. Use the following table to select the appropriate option from the drop-down menus on the *Mapping* row:

	Mapping
Link_Name	Link name
Pipe_Shape	Link shape
Pipe_Diam	Pipe diameter
Pipe_Lngth	Pipe length
US_Invert	Pipe upstream invert
DS_Invert	Pipe downstream invert
Manning_N	Pipe manning's n
Pipe_Thick	Pipe thickness

9. Click **Next** to go to the *Step 3 of 3* page of the *GIS to Feature Objects Wizard* dialog.
10. Click **Finish** to close the *GIS to Feature Objects Wizard* dialog.
11. Turn off "BluffdaleNodes.shp" and "BluffdaleLinks.shp" in the Project Explorer.

The storm drain coverage will now be the only item displayed in the Main Graphics Window (Figure 2).

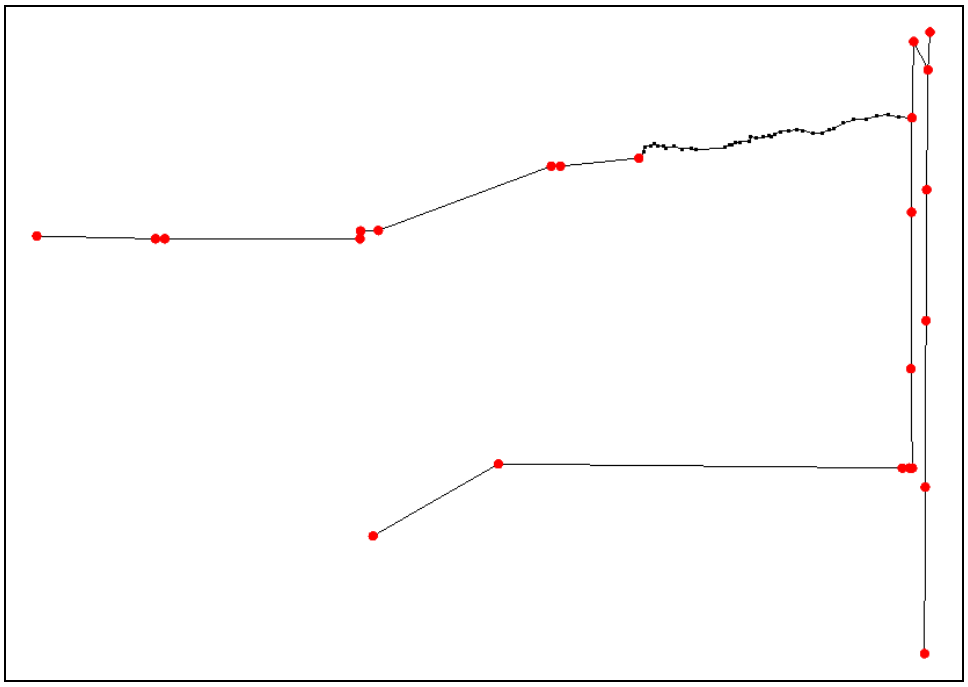


Figure 2 After both shapefiles are mapped

3.3 Mapping Feature Objects to the Hydraulic Modeling Module

Next, reorder the flow direction on the feature arcs and convert the coverage into a 1D HY-12 hydraulic schematic.

1. Select "Storm Drain" to switch back to the **Map** module.
2. Click **Display Options** to bring up the *Display Options* dialog.
3. Select "Map Data" from the list on the left.
4. Turn on *Link Arrows* and click **OK** to close the *Display Options* dialog.

If the pipes were drawn correctly from upstream to downstream in the shapefile, the arrows will be pointing in a direction flowing toward the outfall. In this case, the arcs were not drawn with flow directions in mind, so they need to be corrected.

5. Using the **Select Feature Point/Node** tool, right-click on the outfall node (circled in Figure 3) and select **Reorder Streams**.

This changes all of the pipe flow directions so they flow toward the outfall (circled in Figure 3).

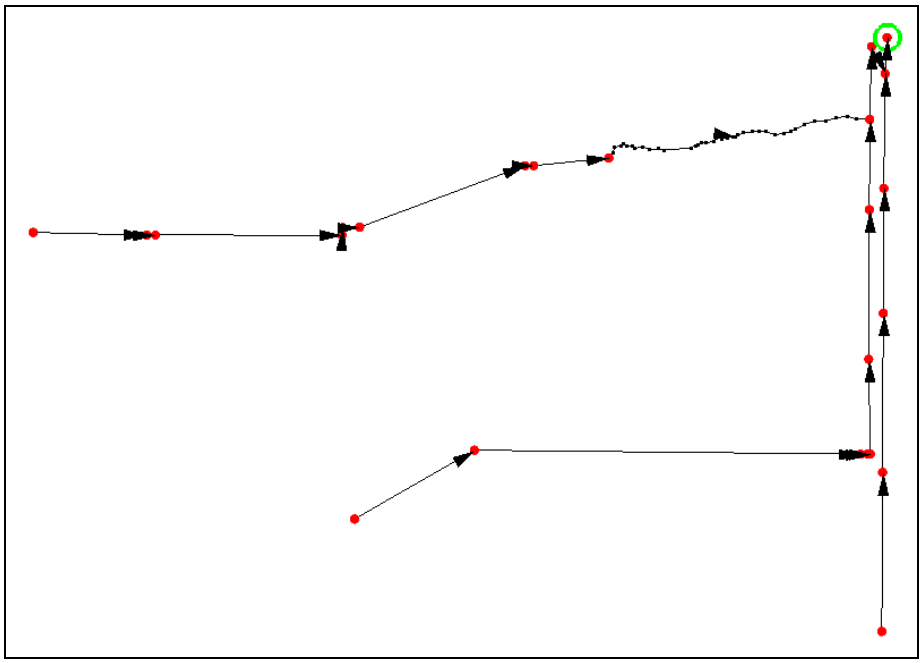


Figure 3 Flow directions toward outfall (circled)

Now map the storm drain network to an HY-12 hydraulic schematic.

6. Select *Storm Drain* | **Map → 1D Schematic** to bring up the *Select Model* dialog.
7. Select "HY-12" from the wide drop-down and click **OK** to close the *Select Model* dialog.

The HY-12 hydraulic schematic has now been created and all the nodes and links should now be labeled (Figure 4).

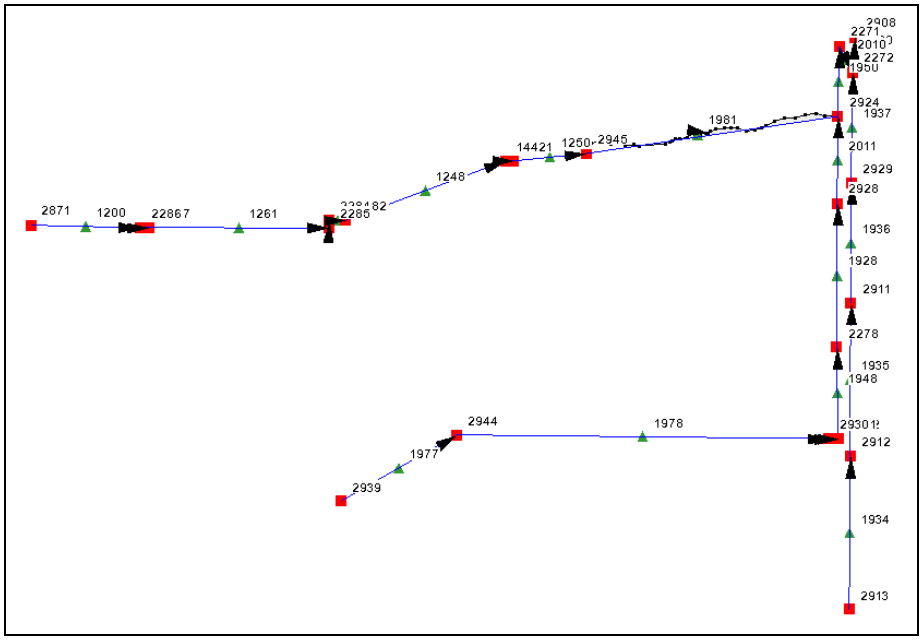


Figure 4 Links and nodes are now named

4 Defining HY-12 Structure Information

After creating the schematic, it is important to define structure information for the HY-12 model. A structure represents a hydraulic or hydrologic computation object that requires input and provides output. Some of the output, such as a discharge flow or a hydrograph from a rational method computation, may be used in a structure located downstream in the model.

One or more structures are defined at each link or node. Structures that *cannot* be represented by a line, such as an access hole, an inlet, or a rational method sub-basin, are defined at nodes:

- Access Hole
- Gutter Inlet
- Junction
- Minor Loss
- Outfall
- Rational Method Basin
- Reservoir
- Transition

Structures that *can* be represented by a line, such as a pipe or a gutter, are defined at links:

- Channel
- Gutter
- Pipe
- Pipe Storage

Some structures only have interfaces in the advanced HY-12 interface and must be defined there rather than in the simplified interface. For more information about each of these structures, their computations, and their file formats, refer to the FHWA HY-12[3] and Hydraulic Toolbox documentation.[4] In this section, enter inlet, access hole, pipe, and outfall names as well as the hydraulic input parameters for these structures.

4.1 Defining Inlets and the Outfall

By default, all of the nodes in the model were assigned to be access holes. While some of the nodes actually represent access holes, others will need to be changed to represent the correct structure types.

1. Select "HY-12 Hydraulic Schematic" in the Project Explorer.

This changes the selected module to the **Hydraulic Modeling** module.

2. Using the **Select Hydraulic Node** tool, double-click on any one of the nodes to open the *HY-12 Properties* dialog.
3. Select "All" from the *Show* drop-down.
4. Select "Name" from the *Sort based on* drop-down.

This sorts all of the nodes in ascending order based on the name.

5. Use the following table to make changes in the *HY-12 Properties* dialog.

[3] See http://wmsdocs.aquaveo.com/HY-12_User_Manual.pdf.

[4] See https://www.fhwa.dot.gov/engineering/hydraulics/software/toolbox404.cfm.

It is recommended to complete each row or column in the table all at once (including the ALL row), as tracking progress by way of row or column makes the process easier.

Make note of the following points:

- Check the boxes marked with ☑, including the outfall node and the *ALL* row in the *Assume Full Capture* column.
- Uncheck the boxes marked with ☐ in the *Define Access Hole* column.
- Enter the numerical values in the *Inflow*, *Inlet Invert Elevation*, *Diameter/Width*, and *Outfall Invert Elevation* columns on the rows as specified in the table.

Name	Define Inlet	Inflow	Inlet Invert Elevation	Assume Full Capture	Define Access Hole	Diameter/ Width	Define Outfall	Outfall Invert Elevation
ALL				☑		2.0		
1441	☑	3.0	4618.2923		☐			
1442	☑	3.0	4618.6243		☐			
2271								
2272								
2278								
2282	☑	4.0	4630.005		☐			
2284								
2285	☑	4.0	4630.731667		☐			
2286	☑	4.0	4647.362667		☐			
2287	☑	4.0	4646.348		☐			
2871	☑	4.0	4657.312		☐			
2908							☑	4594.88
2911								
2912								
2913								
2921	☑	7.0	4618.4683		☐			
2922								
2924								
2928								
2929								
2930								
2939	☑	7.0	4649.4834		☐			
2944								
2945								

6. Once the above node property definitions and setting are entered completely, click **OK** to close the *HY-12 Properties* dialog.
7. Select *File* | **Save As…** to bring up the *Save As* dialog.
8. Select "WMS XMDF Project File (*.wms)" from the *Save as type* drop-down.
9. Enter "BluffdaleSD.wms" as the *File name*.
10. Click **Save** to save the project under the new name and close the *Save As* dialog.

4.2 Reviewing Link Properties

First, view the imported definitions for the links in the network.

1. Using the **Select Hydraulic Link** tool, double-click on any one of the links to bring up the *HY-12 Properties* dialog.
2. Select "All" from the *Show* drop-down.

The imported links shapefile included definitions for elevations, pipe diameter, Manning's *n*, wall thickness, and lengths. Because the default pipe shape in HY-12 is circular, the default of "<NONE>" for all links can be left as is.

3. Click **OK** to close the *HY-12 Properties* dialog.

The inlet angles for pipe links in the model should now be assigned. This helps determine the orientation for the storm drain network in HY-12.

4. Select *HY-12* | **Assign Lengths and Orientations**.

This computes the orientation and lengths of each link and assigns values to the corresponding fields within the *HY-12 Properties* dialog.

5. Click **OK** when advised which links were assigned lengths.
6. Click **OK** when advised which links were assigned orientation.
7. Using the **Select Hydraulic Link** tool, double-click on any one of the links to open the *HY-12 Properties* dialog.
8. Select "All" from the *Show* drop-down.
9. Review the properties that have been assigned to the links. Notice that all of the links have an assigned value in the *Inlet Angle (Degrees)* column.
10. Click **OK** to exit the *HY-12 Properties* dialog.

5 Defining HY-12 Project Parameters

Project parameters are global parameters that are used in the entire project.

1. Select "HY-12 Hydraulic Schematic" in the Project Explorer.
2. Select *HY-12* | **Edit Project Parameters…** to bring up the *HY-12 Properties* dialog.

Project section:

3. Enter "Bluffdale_SD" as the *Project Name*.

4. Enter "Inlet_Inflow" as the *Project Notes*.
5. Enter your name as the *Project Designer*.

Project Run Parameters section:

6. Select "English Units" from the *HY12 Unit System* drop-down.
7. Click **Select File…** in the *Units* column on the *Material Database* row to bring up the *Select an HY-12 Material Database File* dialog.
8. Select "txt file (*.txt)" from the *Files of type* drop-down.
9. Browse to the *HY12Shapefile\HY12Shapefile\HY12Bluffdale* folder and select "materialDB.txt"
10. Click **Open** to exit the *Select an HY-12 Material Database File* dialog.
11. Select "Report Errors, Warnings, and Notices" from the *Error Reporting* drop-down.
12. Select "Specify length, angle and elevations, compute Shape" from the *HY12 Calculate Geometry* drop-down.

Design or Analysis Parameters section:

13. Select "Analyze" from the *Analyze or Design?* drop-down.
14. Enter "1.0" as the *Drop Allowed in an Access Hole*.
15. Select "Match Crown Elevations" from the *Method to match pipes across access holes* drop-down.

Steady or Unsteady Parameters section:

16. Select "Steady Flow" from the *Steady or Unsteady Flow* drop-down.
17. Turn off *Use one IDF for Entire Project* and *Ignore Gutter Inlets*.
18. Turn on *Assume Gutter Inlets Capture All Flow*.

Interface Options section:

19. Turn off *Use Advanced Interface*.
20. Click **OK** to close the *HY-12 Properties* dialog
21. **Save** the project.

6 Running HY-12

The HY-12 model is now set up. Run the model by doing the following:

1. Select *HY-12* | **Run HY-12…** to bring up the *Run HY-12 Simulation* dialog.
2. If the *Filename and path* for the *HY-12 executable* is blank, click **Select File…** to bring up the *Select an HY-12 Executable* dialog.
3. Browse to the location of HY-12 (the default location is *C:\Program Files (x86)\HY-12*), select it, and click **Open** to exit the *Select an HY-12 Executable* dialog.

4. Verify that *Selected Material Database* states "File Exists and Read Correctly". If it does not, click **Select File…** and locate it in the *HY12CadFile\HY12CadFile* folder.
5. Make any other desired changes to the *Input Files* and *Result Files*, then click **Run Simulation** to bring up the *Model Wrapper* dialog.
6. When the HY-12 model finishes, turn on *Read solution on exit*.
7. Click **Close** to exit the *Model Wrapper* dialog and bring up the *View Data File* dialog. If *Never ask this again* was previously turned on, this dialog will not appear. If this is the case, skip to step 9.
8. Select the desired text editor from the *Open With* drop-down and click **OK** to exit the *View Data File* dialog and open the results in the selected external text editor.
9. When done reviewing the HY-12 results file in the external editor, click  to close the text editor and return to WMS.

HY-12 uses and creates a number of text files when it runs. These are available for review in the *Run HY-12 Simulation* dialog.

10. Feel free to review any of the text files used or created by HY-12 by clicking on **View…** in the *View/Notes* column in the *Run HY-12 Simulation* dialog.
11. Once done reviewing the HY-12 text files, click **Close** to exit the *Run HY-12 Simulation* dialog.
12. Select *HY-12* | **View HY-12 Structure IDs** to bring up the *HY-12 ID Lookup* dialog.

This dialog displays a table view of the Link and Node names next to the HY-12 IDs. Use this as a reference when reviewing the "Storm Drainage System Report". The report uses HY-12 IDs to reference the various structures in the simulation. The *Sort based on* drop-down can be used to sort the list of IDs by one of the columns.

13. Click **Done** to close the *HY-12 ID Lookup* dialog when done.
14. **Save**  the project.

7 Viewing HY-12 Output

Whether or not the model run was successful, HY-12 generates a report file. If the run was successful, WMS imports the results, which include the energy and hydraulic grade line (EGL, HGL) elevations at each node in the model. For hydrographic simulations, HY-12 computes a hydrograph at each node in the model.

If desired, view a plot of the EGL or the HGL for a node at each time step in the model. Both of these results are read into WMS after an HY-12 run is completed. This section will show how to view the results in the HY-12 output file and graphically in WMS.

7.1 Viewing Detailed Output

1. **Frame**  the project.
2. Using the **Select Hydraulic Node**  tool, select any node.

3. Select *HY-12* | **View Detailed Link/Node Output…** to bring up the *View Data File* dialog. If the *Never ask this again* option has previously been checked, this dialog will not appear. If this is the case, skip to step 5.
4. Select the desired text editor from the *Open With* drop-down and click **OK** to close the *View Data File* dialog and open the report in the desired text editor.
5. A report giving detailed link and node computation results about the selected node will appear in the text editor. When done reviewing the HY-12 output file, click the  in the top right corner of the text editor window to close the text editor and return to WMS.

Feel free to review any other node computation results as desired.

7.2 Viewing HGL and EGL Plots

Hydraulic Grade Line (HGL) and Energy Grade Line (EGL) plots can be viewed by selecting one or more non-branching links in the model. The plot shows all pipes and access holes between the selected links and nodes.

1. Using the **Select Hydraulic Node**  tool, select the outfall node (node "2908").
2. While holding down the *Shift* key, select node "2871" (an upstream node).
3. Select *HY-12* | **View EGL and HGL Plots…** to bring up the *HGL and EGL Profiles* dialog (Figure 5)
4. Review the HGL, EGL, and ground surface elevation plots and values. When done, click **Done** to close the *HGL and EGL Profiles* dialog.

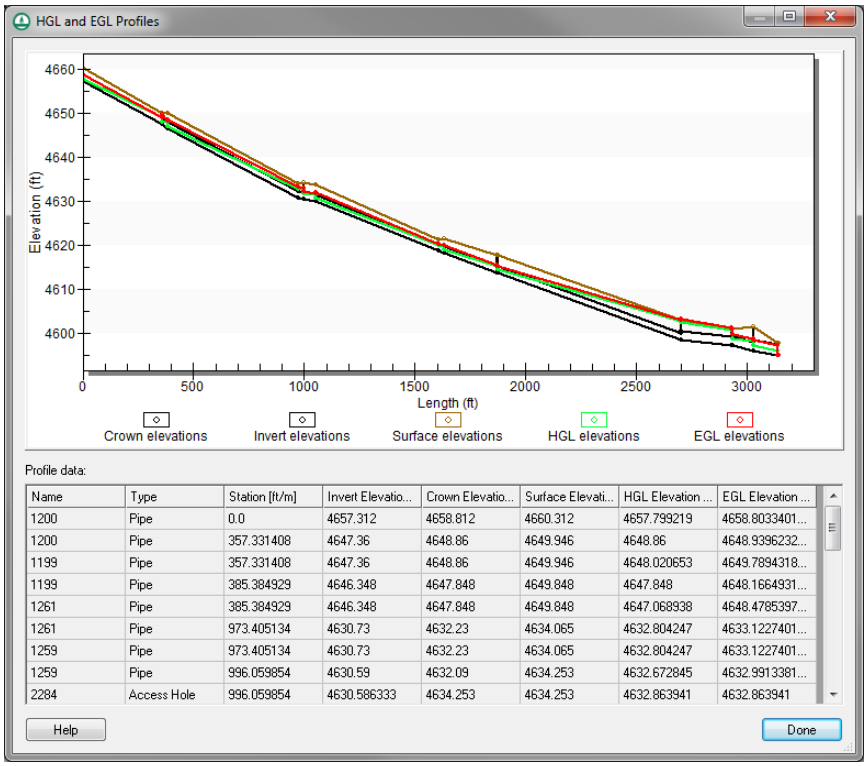


Figure 5 HGL and EGL Profiles dialog

8 Converting LandXML Files

Now use WMS to import a LandXML file containing a defined pipe network. Many of the necessary inputs for HY-12 can be defined in a LandXML file. WMS can read these inputs and use them to create a 1D HY-12 Hydraulic Schematic.

1. Click **New** to restore program settings to their default state.
2. A dialog may appear asking to save changes. Click **No** to clear all data.
3. Click **Open** to bring up the *Open* dialog.
4. Select "All Files (*.*)" from the *Files of type* drop-down.
5. Browse to the *HY12Shapefile\HY12_XML* folder.
6. Select "pipeworks-1.1.xml" and click **Open** to import the XML file and exit the *Open* dialog.

The project should appear similar to Figure 6.

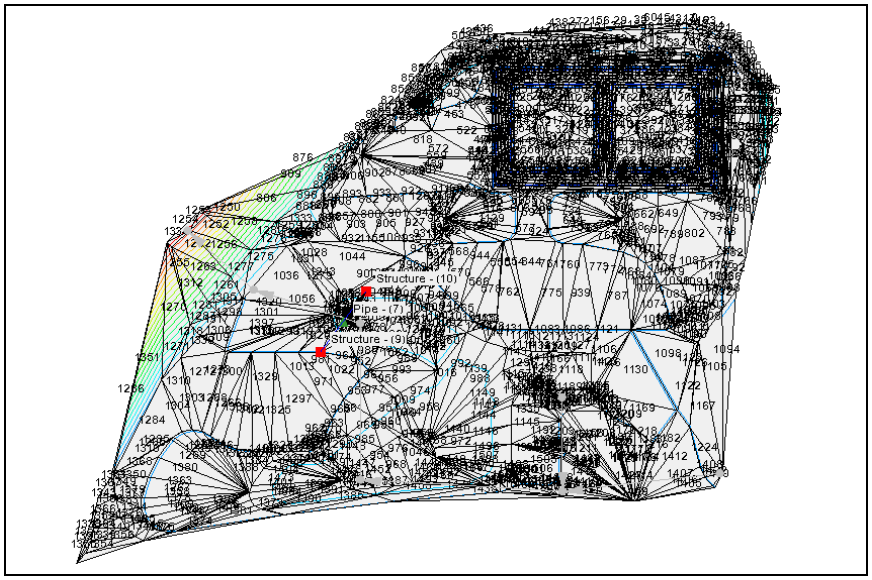


Figure 6 Imported LandXML file

Notice that a TIN defining the ground elevations, as well as three separate coverages defining three pipe networks, were created from the imported XML file. Only one of the networks will be used here, so delete the other two.

7. While holding down the *Shift* key, select "fuelers" and "bldg lateral", then press **Delete** on the keyboard to delete the two coverages.
8. Turn off "Existing Grade".
9. Select "SWMM Hydraulic Schematic" to activate the **Hydraulic Modeling** module.
10. Select "HY-12" from the model drop-down (Figure 7).

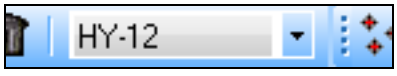


Figure 7 Model drop-down

11. In the *Properties* section of the Main Graphics Window, enter "HY-12 Hydraulic Schematic" in the *Value* column on the *Tree Name* row (Figure 8).

Notice that the "SWMM Hydraulic Schematic" item in the Project Explorer is now named "HY-12 Hydraulic Schematic".

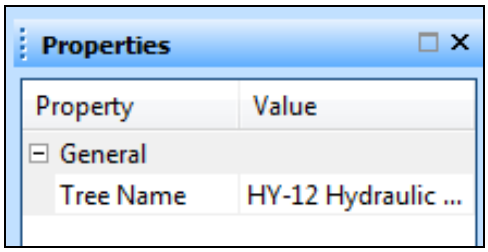


Figure 8 Rename the schematic data tree here

8.1 Defining Link and Node Properties

Now define the inlets and outfall node. This pipe network flows from right to left, with the outfall located on the upper left (Figure 9).

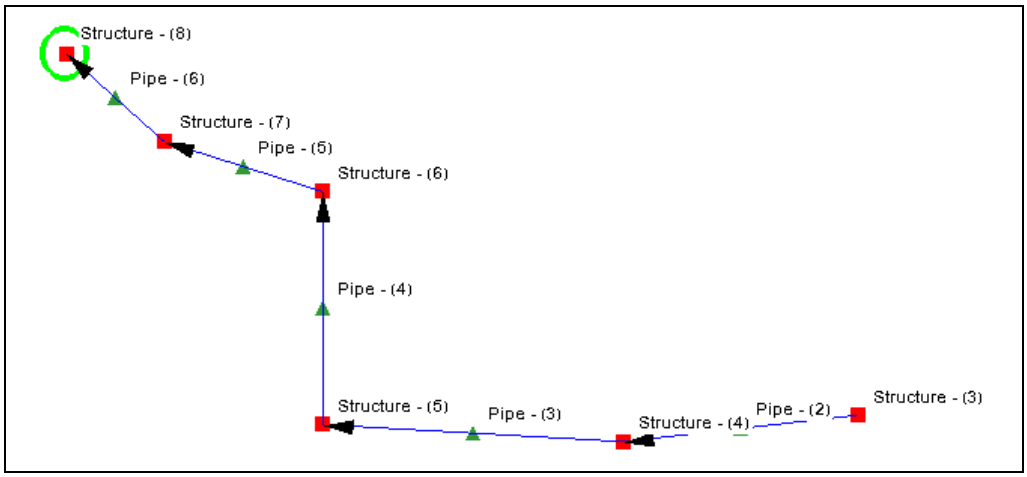


Figure 9 Pipe network with outfall circled

1. Using the **Select Hydraulic Node** tool, double-click on any one of the nodes in the network to bring up the *HY-12 Properties* dialog.
2. Select "All" from the *Show* drop-down.
3. Select "Name" from the *Sort based on* drop-down.
4. Use the following table to make changes in the *HY-12 Properties* dialog.

Make note of the following points:

- Check the boxes marked with ☑, including the outfall node and the *ALL* row in the *Assume Full Capture* column.
- Uncheck the box marked with ☐ in the *Define Access Hole* column.
- Enter the numerical values in the *Inflow*, *Inlet Invert Elevation*, and *Outfall Invert Elevation* columns on the rows as specified in the table.

- The *Inflow* column in the table below refers to the one to the right of the *Define Inlet* column in the dialog (there are four columns named "Inflow" in the dialog).

Name	Define Inlet	Inflow	Inlet Invert Elevation	Assume Full Capture	Define Access Hole	Define Outfall	Outfall Invert Elevation
ALL				☑			
Structure (3)	☑	1.0	149.93379921				
Structure (4)							
Structure (5)	☑	1.0	147.80176509				
Structure (6)							
Structure (7)	☑	1.0	148.16503281				
Structure (8)					☐	☑	127.0

Hint: In order to see the full node names, resize the Name column by double-clicking on the vertical line between the Name column and the Downstream Link Name column.

5. Select "Links" from the *Attribute type* drop-down.
6. Enter "0.016" on the *ALL* row in the *Pipe Manning's n* column.

All of the other link properties have been pre-defined with exception to the inlet angle. This will be computed in the next step.

7. Click **OK** to exit the *HY-12 Properties* dialog.
8. Select *HY-12* | **Assign Lengths and Orientations** to assign a value to the inlet angles for each pipe.
9. Click **OK** when advised which links were assigned length.
10. Click **OK** when advised which links were assigned orientation.

9 Defining HY-12 Project Parameters

The project parameters can now be assigned in preparation to run HY-12.

1. Select "  HY-12 Hydraulic Schematic" in the Project Explorer.
2. Select *HY-12* | **Edit Project Parameters…** to bring up the *HY-12 Properties* dialog.

Project section:

3. Enter "XML_SD" as the *Project Name*.
4. Enter "Inlet_Inflow" as the *Project Notes*.
5. Enter your name as the *Project Designer*.

Project Run Parameters section:

6. Select "English Units" from the *HY12 Unit System* drop-down.

7. Click **Select File…** in the *Units* column on the *Material Database* row to bring up the *Select an HY-12 Material Database File* dialog.
8. Select "txt file (*.txt)" from the *Files of type* drop-down.
9. Browse to the *HY12Shapefile\HY12_XML* folder and select "materialDB.txt"
10. Click **Open** to exit the *Select an HY-12 Material Database File* dialog.
11. Select "Report Errors, Warnings, and Notices" from the *Error Reporting* drop-down.
12. Select "Specify length, angle and elevations, compute Shape" from the *HY12 Calculate Geometry* drop-down.

Design or Analysis Parameters section:

13. Select "Analyze" from the *Analyze or Design?* drop-down.
14. Enter "1.0" as the *Drop Allowed in an Access Hole*.
15. Select "Match Crown Elevations" from the *Method to match pipes across access holes* drop-down.

Steady or Unsteady Parameters section:

16. Select "Steady Flow" from the *Steady or Unsteady Flow* drop-down.
17. Turn off *Use one IDF for Entire Project* and *Ignore Gutter Inlets*.
18. Turn on *Assume Gutter Inlets Capture All Flow*.

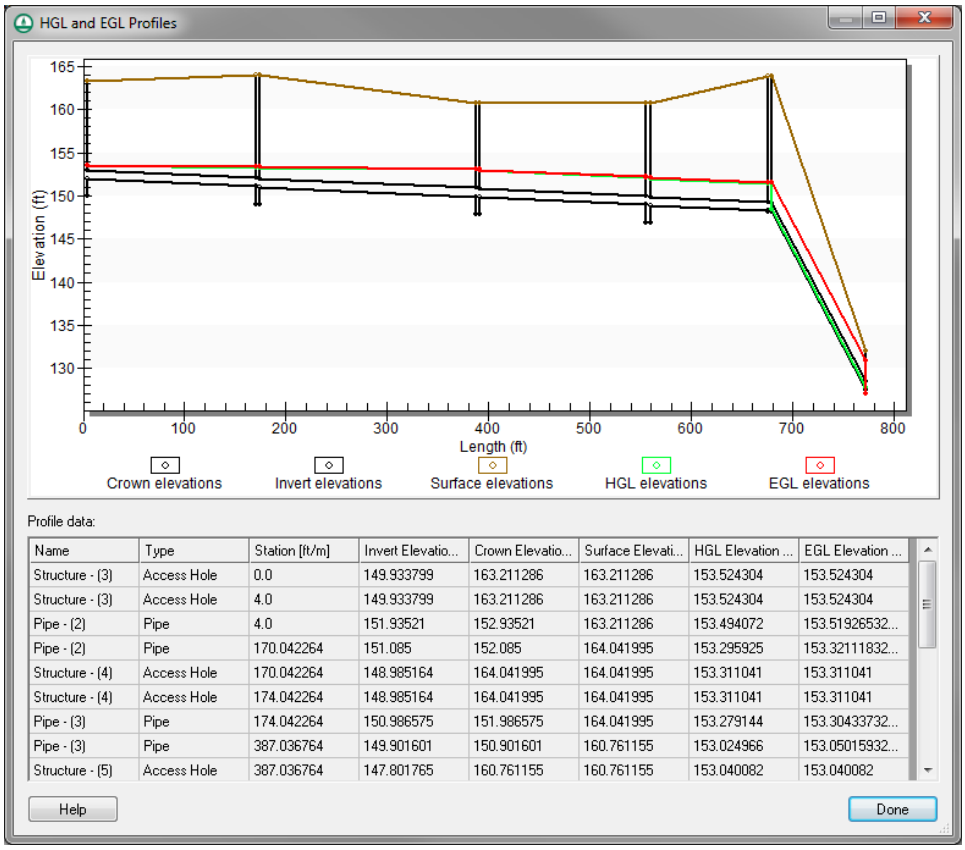
Interface Options section:

19. Turn off *Use Advanced Interface*.
20. Click **OK** to close the *HY-12 Properties* dialog

Now save the project under a new name and run HY-12.

21. Select *File* | **Save As…** to bring up the *Save As* dialog.
22. Select "WMS XMDF Project File (*.wms)" from the *Save as type* drop-down.
23. Enter "XML_SD.wms" as the *File name*.
24. Click **Save** to export the file under the new name and close the *Save As* dialog.
25. Follow the steps in sections 6 and 7, above, to run and review the results, using the outfall ("Structure (8)") and "Structure (3)" for the HGL and EGL plot.

The HGL and EGL plots for the outfall ("Structure (8)") and "Structure (3)" should appear similar to Figure 10.



Name	Type	Station [ft/m]	Invert Elevatio...	Crown Elevatio...	Surface Elevati...	HGL Elevation ...	EGL Elevation ...
Structure - (3)	Access Hole	0.0	149.933799	163.211286	163.211286	153.524304	153.524304
Structure - (3)	Access Hole	4.0	149.933799	163.211286	163.211286	153.524304	153.524304
Pipe - (2)	Pipe	4.0	151.93521	152.93521	163.211286	153.494072	153.51926532...
Pipe - (2)	Pipe	170.042264	151.085	152.085	164.041995	153.295925	153.32111832...
Structure - (4)	Access Hole	170.042264	148.985164	164.041995	164.041995	153.311041	153.311041
Structure - (4)	Access Hole	174.042264	148.985164	164.041995	164.041995	153.311041	153.311041
Pipe - (3)	Pipe	174.042264	150.986575	151.986575	164.041995	153.279144	153.30433732...
Pipe - (3)	Pipe	387.036764	149.901601	150.901601	160.761155	153.024966	153.05015932...
Structure - (5)	Access Hole	387.036764	147.801765	160.761155	160.761155	153.040082	153.040082

Figure 10 LandXML plots in the HGL and EGL Profiles dialog

10 Conclusion

This concludes the "Storm Drain Modeling – HY-12 Analysis with Shapefiles and LandXML" tutorial. The following key topics were discussed and demonstrated:

- Importing shapefiles that define a storm drain network.
- Converting them to an HY-12 network.
- Modifying structures in the HY-12 link/node properties dialog.
- Running and viewing the HY-12 results.
- Importing a LandXML file.
- Modifying structures in the HY-12 link/node properties dialog.
- Running and viewing the HY-12 results.