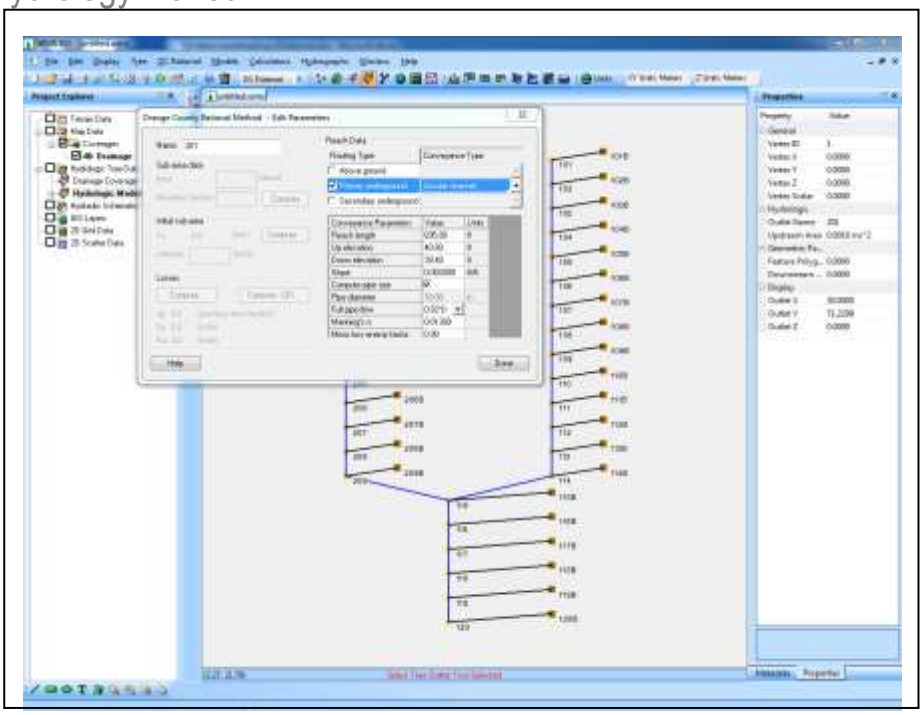
WMS

v. 10.0

WMS 10.0 Tutorial

Watershed Modeling – Orange County Rational Method

Build and run a rational method analysis based on methods in the Orange County (California) hydrology manual



Objectives

Completing this tutorial will demonstrate how to run an Orange County rational method analysis and design and explore options for printing results and saving report files. The first example is based on the example problem on page D-16 of the Orange County Hydrology Manual.

Prerequisite Tutorials

- None

Required Components

- Hydrologic Models

Time

- 15-30 minutes

AQUAVEO™

1 Introduction

It is possible to run Orange County rational analyses in either analysis mode or design mode, which automatically computes required pipe sizes. This exercise demonstrates the analysis mode of the Orange County rational method by opening a WMS project file that contains data for the example problem on page D-16 of the Orange County Hydrology Manual, running the Orange County rational analysis, and exploring options for printing results and saving files. An example of running the Orange County rational method in design mode is also provided.

2 Orange County Hydrology Manual Example

2.1 Open WMS Project File

1. Open WMS. If WMS is already open, select *File* | **New**, then click **No** if prompted to save changes.
2. Switch to the **Hydrologic Modeling** module.
3. Select *File* | **Open…**
4. In the *Open* dialog, locate the "OrangeCounty/Rational" folder in the files for this tutorial. If needed, download the tutorial files from www.aquaveo.com.
5. Select "OCHMRational.wms" and click **Open**.

This file, shown in Figure 1, contains a basic schematic model, which is made up of topologic tree nodes that represent the connectivity of sub-areas and concentration points and store their respective data.

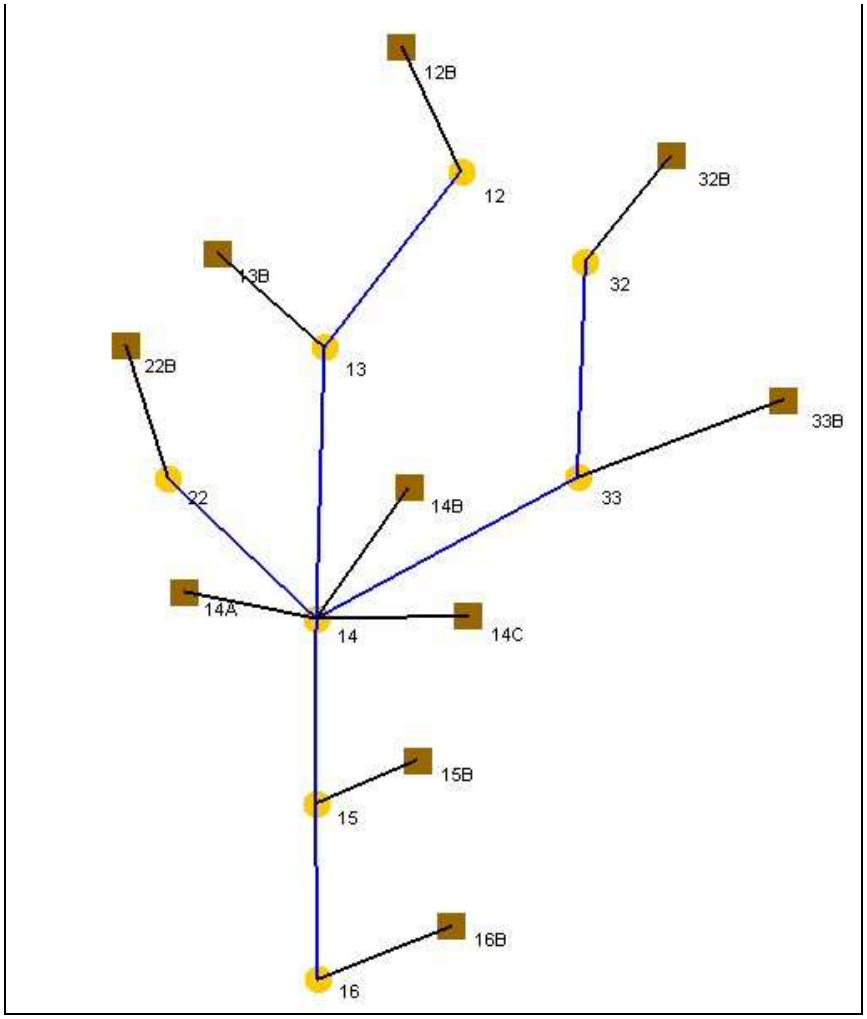


Figure 1 Schematic representation of example problem

2.2 View Data

1. Select the yellow **Select Outlet** tool and select any of the hydrologic tree nodes by clicking once.
2. Select *OC Rational* **| Edit Parameters…** The *Orange County Rational Method – Edit Parameters* dialog will appear.

Reach data are displayed if the selected hydrologic tree node is a concentration point and sub-area data (including initial sub-area parameters and losses) are displayed for hydrologic tree nodes representing sub-areas.

3. Select another hydrologic tree node on the screen without closing the dialog window and notice that the data in the *Orange County Rational Method – Edit Parameters* dialog is updated.
4. Select **Done**.

2.3 Tree Mapping

Concentration points are mapped to their associated downstream sub-areas in order to use the correct areas for performing travel time calculations. WMS automatically maps sub-areas to concentration points if there is only one confluence point upstream from a concentration point. In this model, all concentration points are automatically mapped except for those labeled 22, 13, and 33, which are directly upstream of the confluence point labeled 14 (see Figure 1).

1. Select *OC Rational* | **Tree Mapping…** to access the *Tree Mapping* dialog shown in Figure 2.

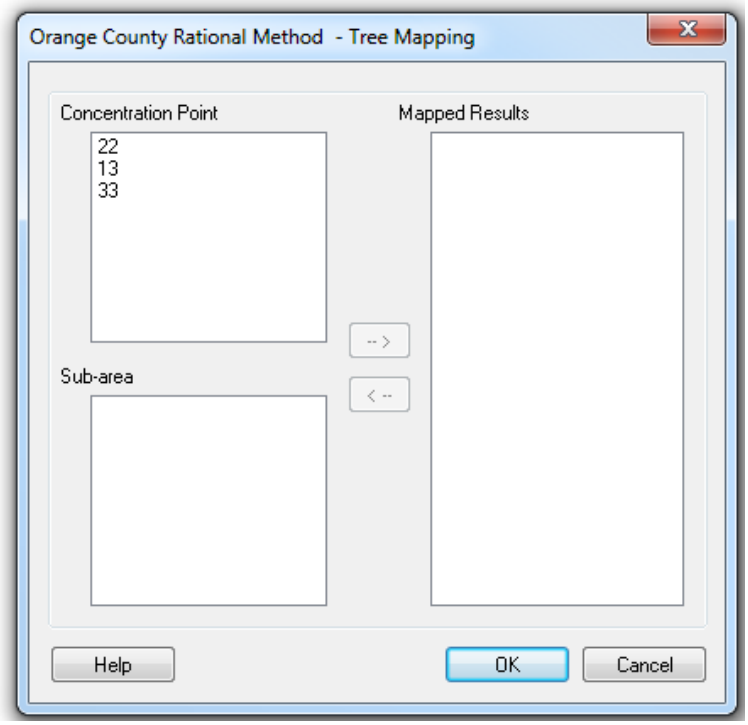


Figure 2 Tree Mapping dialog

This dialog contains a list of unmapped concentration points in the upper left-hand box. As one is selected, a list of unmapped sub-areas that are downstream of the selected concentration point will appear in the lower left-hand box. Simply select the appropriate pair to map and click the --> button.

2. Select concentration point 22.
3. Select sub-area 14A.
4. Click on the Map (-->) button.
5. Map concentration point 13 and sub-area 14B.
6. Map concentration point 33 and sub-area 14C.
7. Select **OK**.

3 Running the Simulation

3.1 Running the Model

Once all of the concentration points have been mapped, the model can be run.

1. Deselect all concentration points by clicking somewhere on the screen
2. Select *OC Rational* | **Run Simulation…**
3. A new dialog named *Select Orange County Rational details output filename* will appear. For the detailed output file name enter "OCHMRational1.txt" and select **Save**.

WMS runs the Orange County rational analysis and displays results in the OC Rational Results dialog shown in Figure 3.

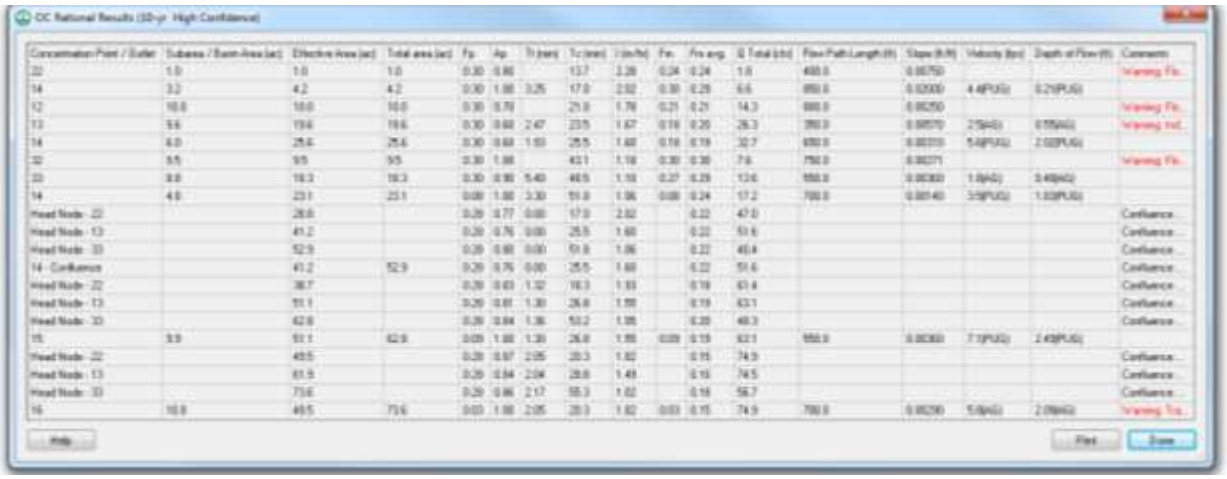


Figure 3 OC Rational Results dialog, complete analysis

4. Select **Done**.

3.2 Viewing Detailed Output

1. Select *File* | **Edit File…**
2. In the *Open* dialog, open "OCHMRational1.txt".
3. Select **OK** to view the file in Notepad, if prompted.
4. Close the file when done viewing it.

3.3 Running the Model up to a Selected Concentration Point

There is also the option of terminating all calculations downstream of a selected concentration point in the model.

1. Use the **Select Outlet** tool to select the concentration point labeled 14.
2. Select *OC Rational* | **Run Simulation…**

3. A new dialog named *Select Orange County Rational details output filename* will appear. For the detailed output file name enter "OCHMRational2.txt" and select **Save**.
4. The OC Rational Results dialog will appear with the results from the simulation only up until the selected concentration point as shown in Figure 4.

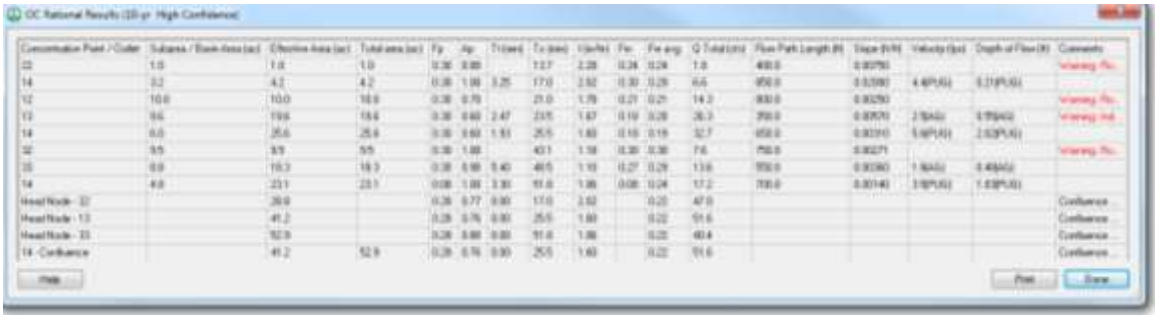


Figure 4 OC Rational Results dialog, partial analysis

4 Printing Results (optional)

The results are displayed in a spreadsheet format. To print them:

1. Click on the **Print** button.

They can also be copied into a spreadsheet program such as Microsoft Excel© for formatting and printing.

2. In the *OC Rational Results* dialog highlight all of the contents and press **Ctrl+C**.
3. Open Microsoft Excel© and paste the data into a spreadsheet using **Ctrl+V**.

The results can now be formatted and printed.

4. Select **Done**.

5 Saving/Reading an Orange County Project File

1. Select *OC Rational* | **Save Simulation…**
2. In the *Select Orange County Rational file name* dialog, name the file "OCHMSimaulation.ocr" and **Save**.

NOTE: The file will have an .ocr extension signifying that it is an Orange County Rational method file.

3. To read an Orange County file into WMS, select *OC Rational* | **Read Simulation…** In this case there is no need to open any file since users just created one.

6 Newland Storm Channel Pipe Design Example

1. Select *File* | **New** .
2. Select **No** if prompted to save changes to the project.

3. Switch to the **Hydrologic Modeling** module. Make sure "OC Rational" is selected in the models box to the right of the modules.
4. Select *OC Rational* | **Read Simulation…**
5. From the *Open* dialog, locate and open "NewlandDesign.ocr".
6. Use the **Select Outlet** tool to select the concentration point labeled 201.
7. Select *OC Rational* | **Edit Parameters…** The *Orange County Rational Method – Edit Parameters* dialog will open.

Notice the pipe diameter specified for this reach is "0.00" in and the *Compute pipe size* option is toggled on.

8. Select **Done**.
9. Deselect the concentration point labeled 201 by clicking somewhere on the screen.
10. Select *OC Rational* | **Run Simulation…**
11. A new dialog named *Select Orange County Rational details output filename* will appear. For the detailed output file name enter "NewlandDesign.txt" and select **Save**.
12. Select **Done**.
13. Use the **Select Outlet** tool to select the concentration point labeled 201.
14. Select *OC Rational* | **Edit Parameters…**

It is possible to view the standard pipe sizes that WMS computes at each design node. Click **Done** when finished.

7 Conclusion

In this tutorial, users should have learned how to run an Orange County rational method analysis and design and explore options for printing results and saving report files.