LAB 10 - Create Hydraulics graphics

Chapter Objectives:

After completing this exercise you will know how to:

- Use the CDOT Menu to place Hydraulics custom lines (pipes)
- Use the CDOT Menu to place Hydraulics cells (inlets)
- Use the CDOT Menu to place Hydraulics terminators (RCES)

Lab 10.1 - Create the Hydraulics Model File

1. In MicroStation, select **File** > **Open**.

2. Set the directory to **\12345\Hydraulics\Drawings\Reference Files**

3. Select the file **12345HydraulicsModel##.dgn** and select **Open**.
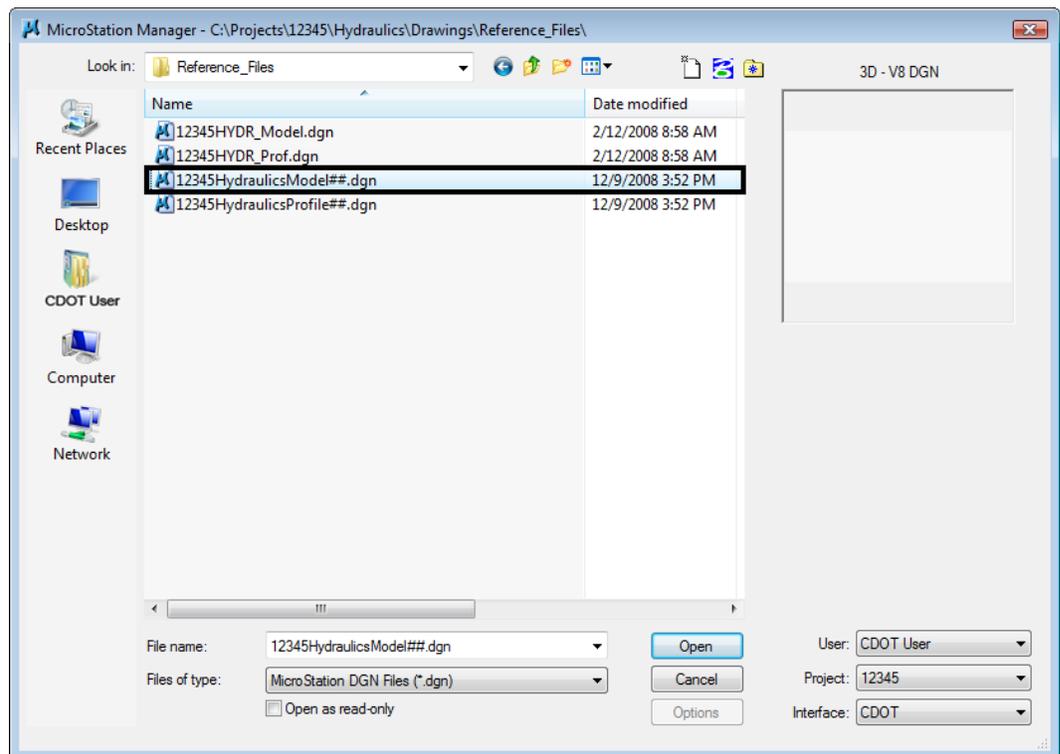
4. Select **File** > **Save As**… and set the directory to **\Hydraulics\Working**

5. Change the file name to **CU12345HydraulicsModel.dgn** and select **Save** to save a copy to the **Working** folder.
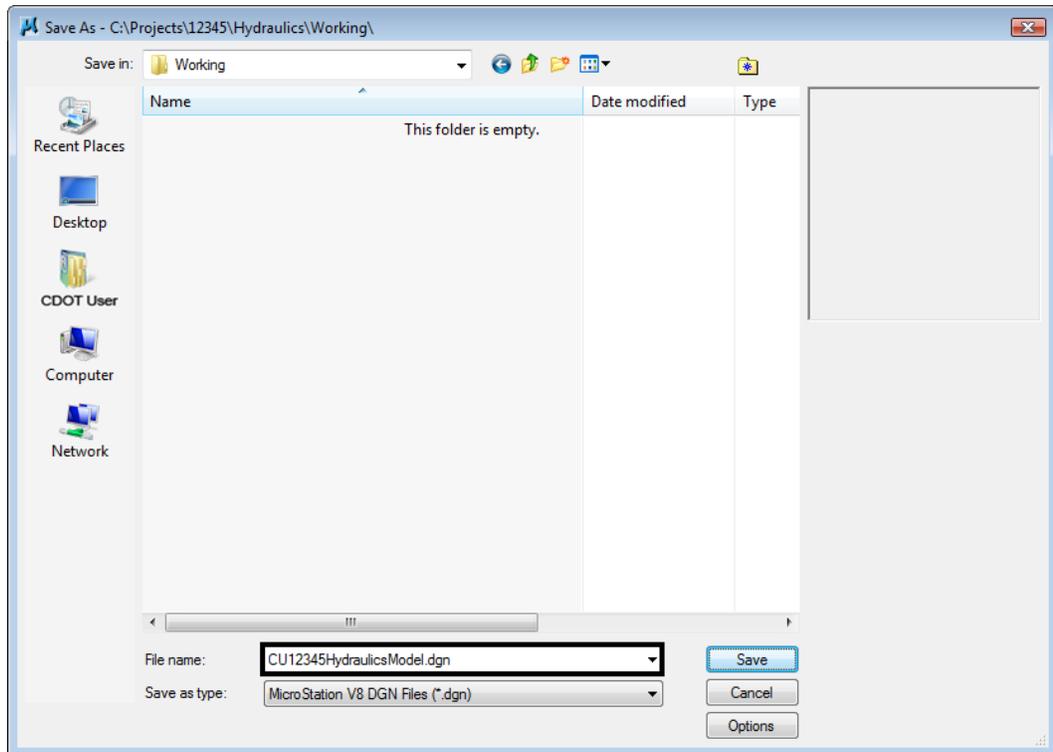
6. Select **References** from the **Primary** toolbar.

7. Using what you've learned, attach the Design model reference (from Design's **\Drawings\ Reference_Files** folder), **Coincident-World** and at a **1:1** scale. **Copy Attachments** at a depth of **1** to bring in the Survey/Topo file as direct attachments. See below.
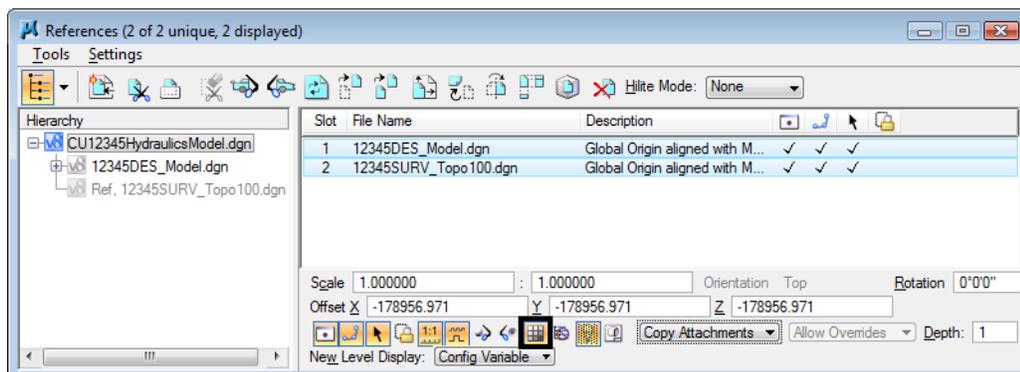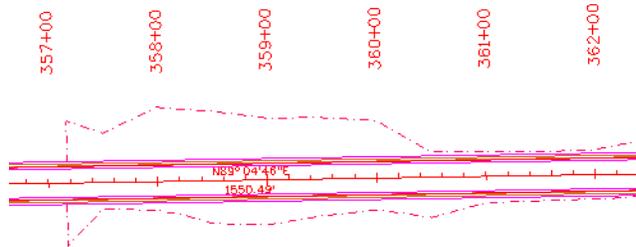

8. From the **References** dialog, turn off the display of the design model's raster references.
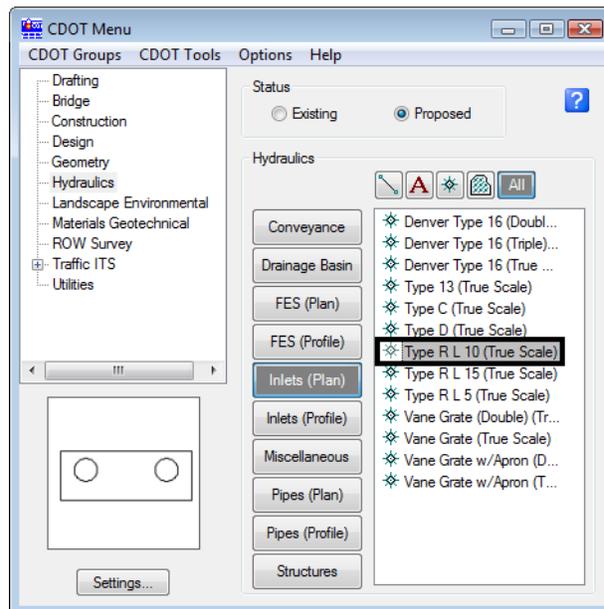
Place Inlets

Using known coordinates and the **CDOT Menu**, place proposed Type R inlets along the curb flowline at the end of the project.

1. Window into the area shown near the end of the project.

This area of the projects is a proposed 2-Lane urban section with curb, gutter and sidewalk. You'll first place inlets along the curb flowline.

2. Select **Locks** from the status bar and make sure **Depth lock** is turned **off**.

3. On the CDOT Menu, select the **Hydraulics Group**.

4. Set the **Status** to **Proposed**, select the **Inlets (Plan)** category, and then select the **Type *R L 10*** item.


Note: This automatically sets the active level to **HYDR_Inlets** and selects the **Place Cell** command. The inlet cell is attached to your cursor at the origin point. Since you know the coordinate location for the inlets, you can place them with precision keyins.

5. Select **Settings** and set **Active Scale** to *1* and **Active Angle** to *180*. **Apply** and then **Close**.

6. For the 1st inlet, key in ***xy=3292424.652, 1553316.387, 6351.8***

    The inlet appears in the location shown.
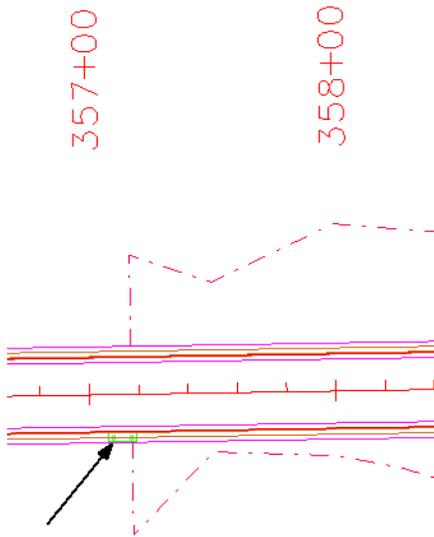
> ***Note:*** If you don't see the inlet, it could be outside your display depth. Key in ***dp=0,7000*** Enter, and then select the view. You could also fit the view and then window back to this location.

7. For the 2nd inlet, key in ***xy=3292674.652, 1553320.404, 6350.4***

8. For the 3rd inlet, key in ***xy= 3292900.384, 1553324.031, 6348.8***

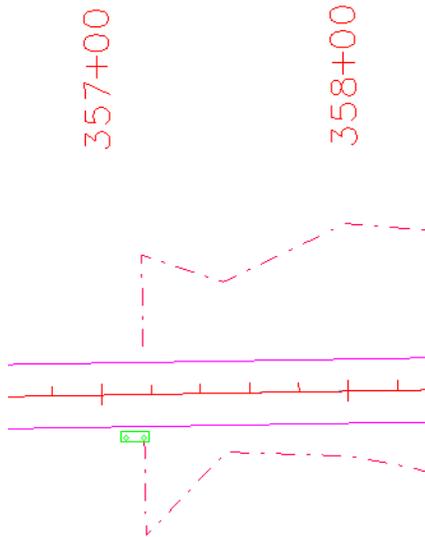9. **<R>** to exit the **Place Active Cell** command

10. Turn off the **Design** reference levels shown to better see the inlets.
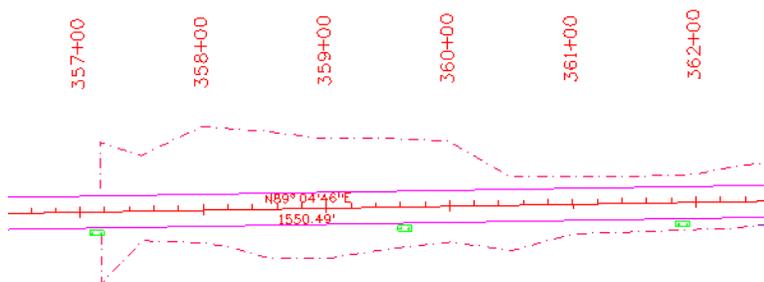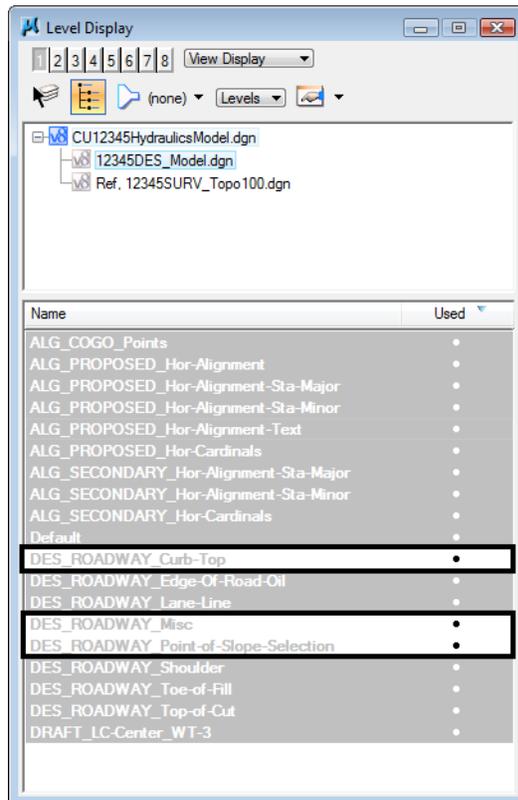
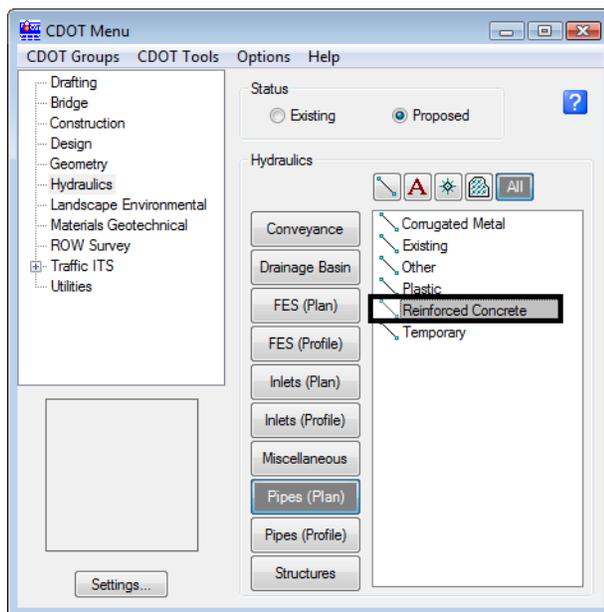# Connect the inlets with pipes

Place the pipes

1. Zoom in on the first inlet.

2. Verify that **Depth lock** is still turned **off**.

   When placing pipes, you want to pick up the elevation of the inlets, therefore you need to turn **Depth lock off**.

3. On the **CDOT Menu**, set the category to **Pipes (Plan)**.

4. Select the item **Reinforced Concrete**.

> ***Note:*** This automatically set the active level to **HYDR_PIPES_Concrete** and selects the **SmartLine** tool.

5. **AccuSnap** on the right-side midpoint of the inlet to begin the pipe.

6. Pan to the right and **AccuSnap** on the left-midpoint of the second inlet.

7. Pan to the right and **AccuSnap** on the right-midpoint of the third inlet.

8. **<R>** when done.
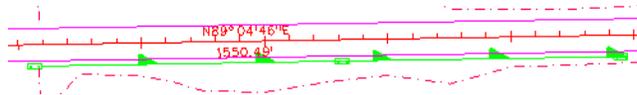
> ***Note:*** This connects the inlets with the concrete pipe. Notice how the directional arrow on the pipe custom line style falls on top of the last inlet. You can correct this by shifting the custom line style.
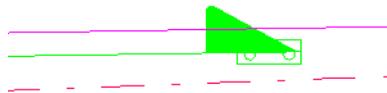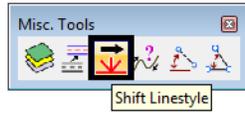

Shift the line

1. Select the **Change Element Attributes** toolbar from the **Main** toolbar.

2. Select the **Modify Line Style Attribute** command.

3. Set the **Modify** option to **Shift**.
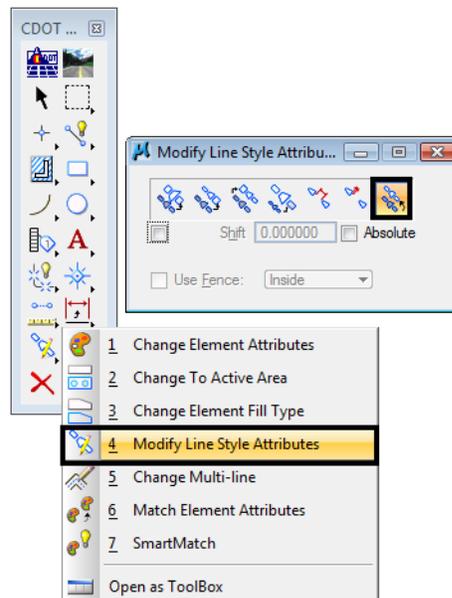
> ***Note:*** The Shift command is also located on the CDOT Misc. Toolbar.

4. **<D>** on the concrete pipe that you just placed and move your cursor to the left. Note how the custom line style shifts as you move your cursor. When the arrow is moved off of the inlet, **<D>** to accept.
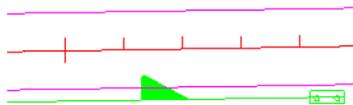

> ***Note:*** Use the **Modify Line Style** command to shift custom lines styles as needed, especially in corners where there may be gaps.

Place a Type C inlet and connect pipes

Turn on the Survey/Topo reference

To help determine the location of the inlet, turn on the Survey/Topo Reference and the Contour reference.

1. On the Reference dialog, select the Design reference set the **Copy Attachment Depth** to **2**.
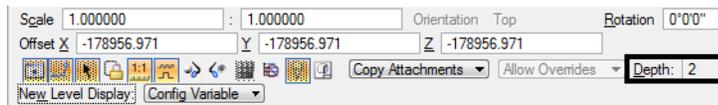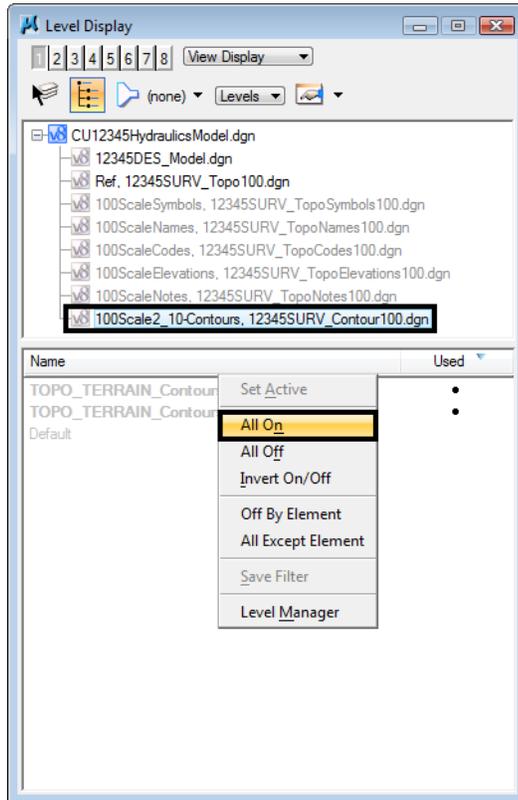

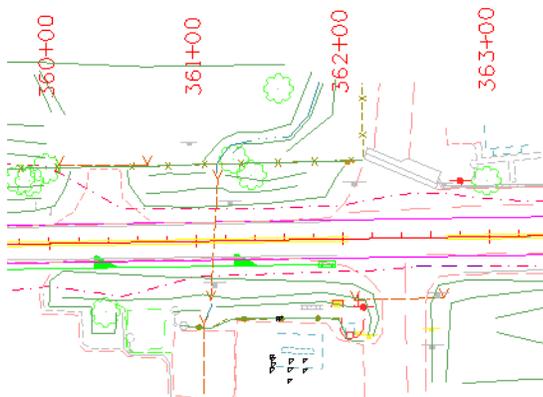> ***Note:*** This brings in the Contour reference since the Contour model file is referenced to the Survey/Topo file.

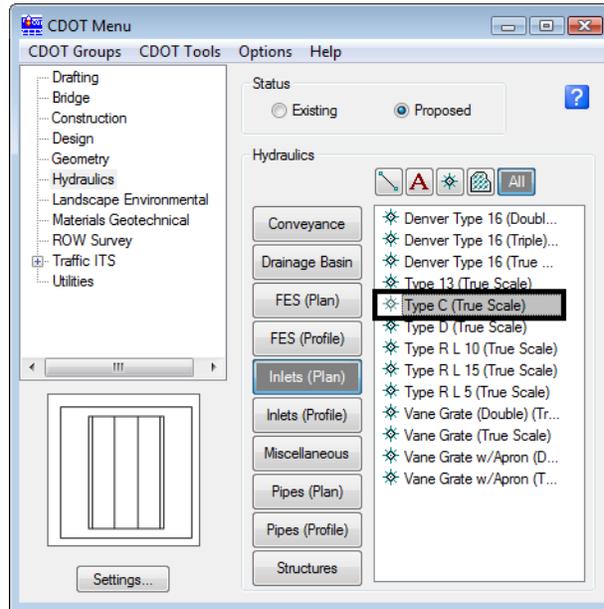2. Be sure the display of all other reference files are off.

Turn on reference levels

1. In the **Level Display** box, turn **on** all of the **Survey/Topo** reference levels.
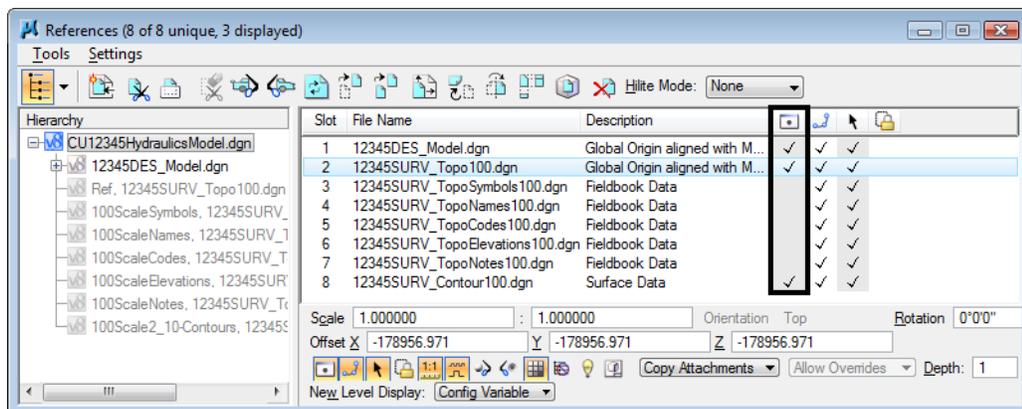
2. Turn **on** all **Contour** reference levels.

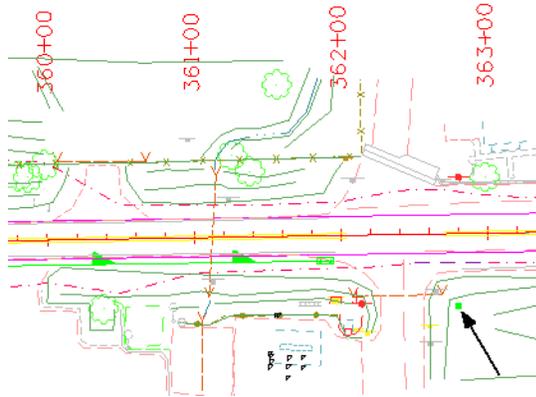

3. Window into the location shown.

4. On the CDOT Menu, select the **Inlets (Plan)** category and then select the **Type C** item.

>   ***Note:*** This automatically sets the active level to **HYDR_Inlets** and selects the **Place Cell** command. The inlet cell is attached to your cursor at the origin point.

5. Key in ***xy= 3292986.899, 1553291.431, 6347.0***

6. **<R>** to exit the **Place Active Cell** command.

7. On the **CDOT Menu**, set the category to **Pipes (Plan)** and select the **Reinforced Concrete** item again.

8. Key-in **AZ=6346** then **<D>** in the view to set the active depth to 6346.0. This will allow the placement of the pipe outlet at the correct elevation.

9. **AccuSnap** on the right-midpoint of the last Type R L 10 inlet.

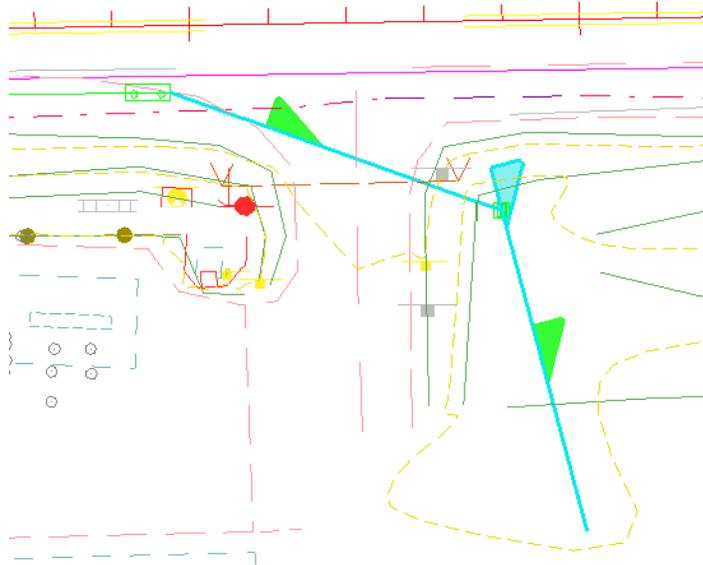10. Select the **Origin** snap mode and **AccuSnap** on the Type C inlet. (see below).
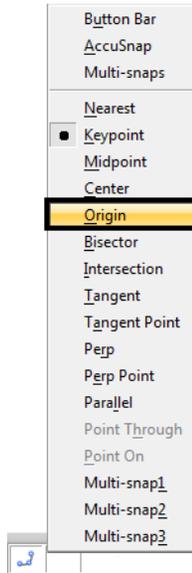
11. Place a final **<D>** in the location shown for the end of the pipe near the contour line (see below).
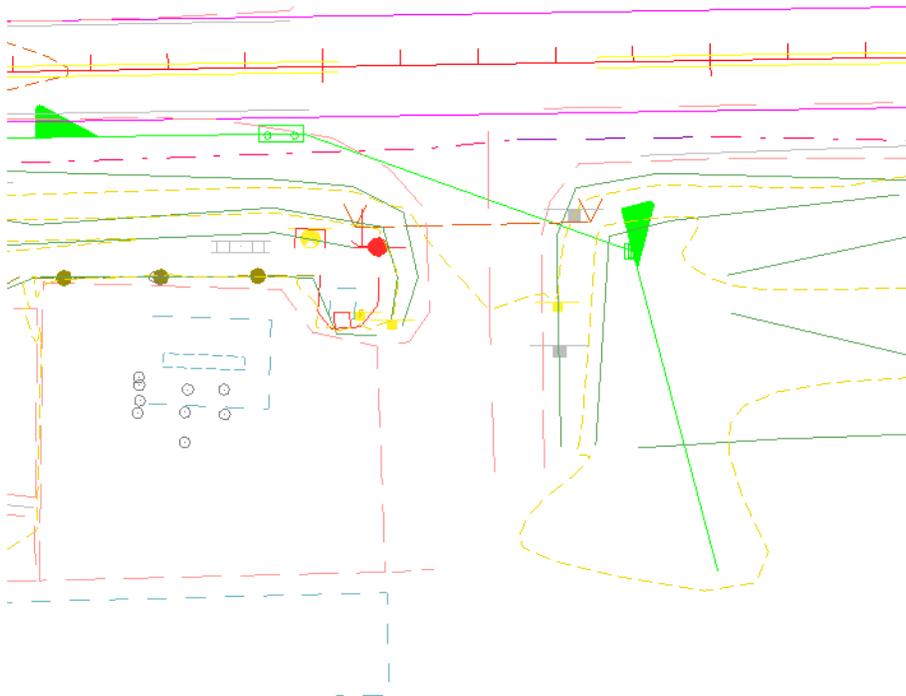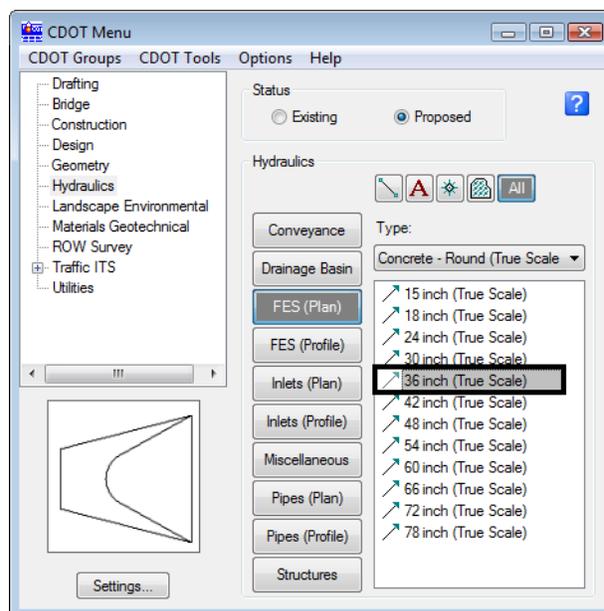

12. **<R>** when done.

13. Use the **Modify Line Style** again command and **Shift** the pipe line style as necessary to ensure the arrow does not fall on top of an inlet.

Place the pipe terminator

The pipe terminates at a 36" RCES, which you can place as a cell line terminator.

1. On the CDOT Menu, set the category to **FES (Plan)**.

2. Set **Type** to **Concrete – Round**.

3. Select the **36 inch** item.

> *Note:*   This automatically set the active level to **HYDR_FES** and selects the **Place Active Line Terminator** tool from the **Cells** toolbar.

4.   **<D>** on the end of the concrete pipe as shown.

5.   **<D>** to accept.

> *Note:*   The RCES terminator is automatically rotated to the appropriate angle and placed on the end of the pipe.

6.   **Save Settings**.

7.   **Exit** MicroStation.