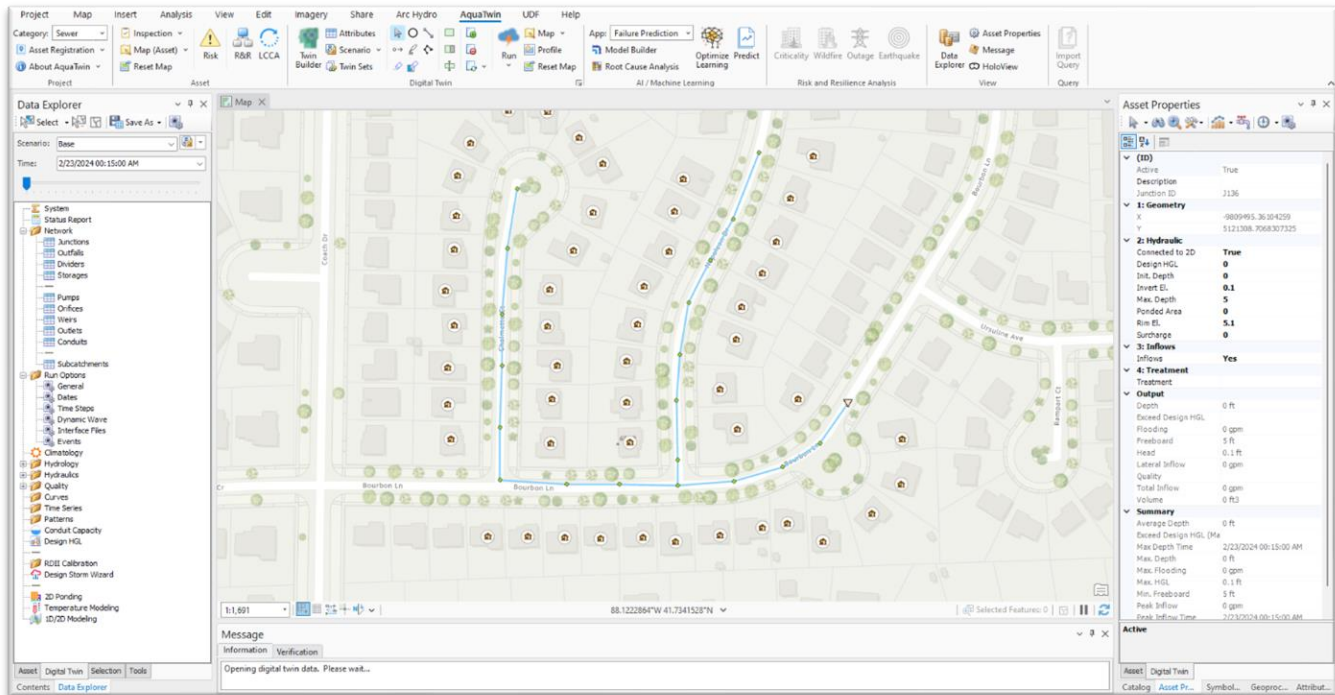


Assigning Inflows



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Introduction

This tutorial will go through where inflows are stored in *AquaTwin Sewer* and how to edit and allocate inflows at junctions.

1. Open the *Assigning Inflows* ArcGIS Pro project.

Individual Junctions Inflow Table

The inflow table for individual junctions can be found in the *Digital Twin* tab in the *Asset Properties*.

1. Use an AquaTwin Selection (see red rectangle in **Figure 1**) to select a junction.

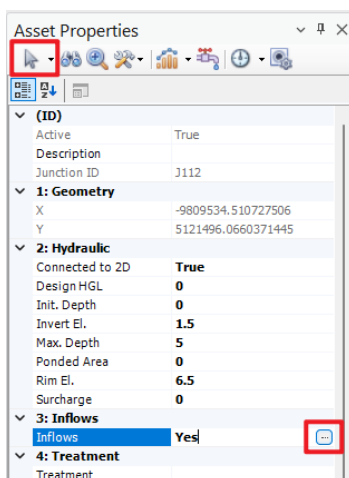


Figure 1: The location of the AquaTwin Selection in the *Asset Properties*.

2. Click the ellipses in the red rectangle in **Figure 1**. If a junction has inflows, the *Inflows* input will say **Yes**. **Figure 2** will open. A junction can have an unlimited number of direct and dry weather inflows.

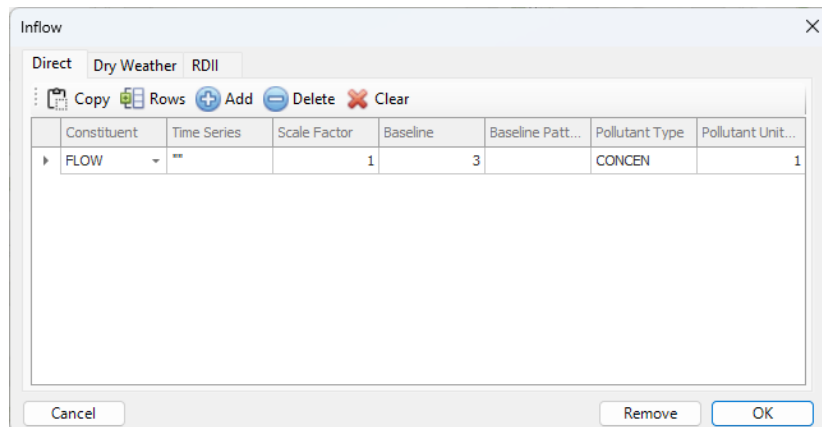


Figure 2: The inflow table for individual junctions.

Global Junction Inflow Table

The global junction inflow table is located in the *Junction Twin Attribute Table* and is a global table of all inflows for junctions currently selected in ArcGIS Pro.

1. Open the *Junction Twin Attribute Table* which is located in the *Digital Twin* tab in the *Data Explorer* (**Figure 3**).

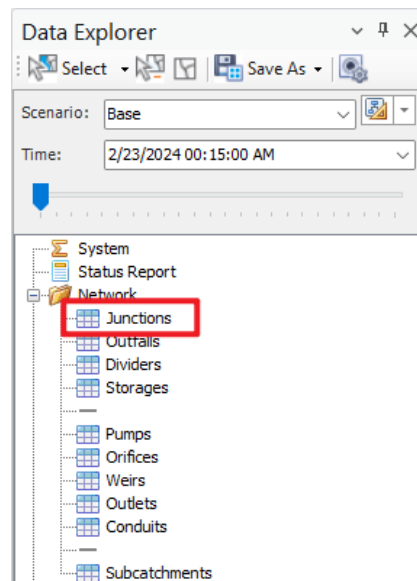


Figure 3: The location of the *Junction Twin Attribute Table*.

2. Click on *Edit Table* and then *Inflow – Direct* (the only type of inflow currently assigned in this project). Note that the only junctions in the *Twin Attribute Table* in **Figure 4** and the junction inflow table in **Figure 5** are those currently selected in ArcGIS Pro. If nothing is selected, all the junctions will be shown.

In the top left corner of the *Twin Attribute Table* is an ArcGIS selection shortcut. Select some junctions in the map and see the table update.

Junction ID	Active	Description	Av	Max Depth TI...	Max. HGL	Peak Lateral	Peak Inflow	Peak Inflow TI...	Max. Flooding	Min. Freeboard	Exceed Desig...
1100	✓		0.06 ft	2/23/2024 00...	1.69 ft	18 gpm	18 gpm	2/23/2024 00...	0 gpm	4.91 ft	
1102	✓		0.1 ft	2/23/2024 00...	1.6 ft	4 gpm	22 gpm	2/23/2024 00...	0 gpm	4.9 ft	
1104	✓		0.09 ft	2/23/2024 00...	1.49 ft	3 gpm	25 gpm	2/23/2024 00...	0 gpm	4.91 ft	
1106	✓		0.11 ft	2/23/2024 00...	1.31 ft	3 gpm	28 gpm	2/23/2024 00...	0 gpm	4.89 ft	
1108	✓		0.1 ft	2/23/2024 00...	1.2 ft	2 gpm	30 gpm	2/23/2024 00...	0 gpm	4.9 ft	
1110	✓		0.13 ft	2/23/2024 00...	1.03 ft	3 gpm	33 gpm	2/23/2024 00...	0 gpm	4.87 ft	
1112	✓		0.04 ft	2/23/2024 00...	1.54 ft	4 gpm	4 gpm	2/23/2024 00...	0 gpm	4.96 ft	
1114	✓		0.05 ft	2/23/2024 00...	1.35 ft	2 gpm	6 gpm	2/23/2024 00...	0 gpm	4.95 ft	
1116	✓		0.05 ft	2/23/2024 00...	1.25 ft	3 gpm	9 gpm	2/23/2024 00...	0 gpm	4.95 ft	
1118	✓		0.07 ft	2/23/2024 00...	1.07 ft	2 gpm	11 gpm	2/23/2024 00...	0 gpm	4.93 ft	
1120	✓		0.07 ft	2/23/2024 00...	0.97 ft	2 gpm	13 gpm	2/23/2024 00...	0 gpm	4.93 ft	
1122	✓		0.07 ft	2/23/2024 00...	0.87 ft	1 gpm	14 gpm	2/23/2024 00...	0 gpm	4.93 ft	
1124	✓		0.07 ft	2/23/2024 00...	0.67 ft	0 gpm	14 gpm	2/23/2024 00...	0 gpm	4.93 ft	
1126	✓		0.15 ft	2/23/2024 00...	0.65 ft	1 gpm	52 gpm	2/23/2024 00...	0 gpm	4.85 ft	
1128	✓		0.12 ft	2/23/2024 00...	0.92 ft	1 gpm	34 gpm	2/23/2024 00...	0 gpm	4.88 ft	
1130	✓		0.11 ft	2/23/2024 00...	0.81 ft	3 gpm	37 gpm	2/23/2024 00...	0 gpm	4.89 ft	
1132	✓		0.15 ft	2/23/2024 00...	0.55 ft	4 gpm	56 gpm	2/23/2024 00...	0 gpm	4.85 ft	

Figure 4: The location of the direct inflow table for junctions.

3. **Figure 5** shows all the direct inflows for the junctions in the model (or only the selected junctions).

Asset Id	Description	Constituent	Time Series	Scale Factor	Baseline	Baseline Pa...	Pollutant Ty...	Pollutant Uni...
J100		FLOW	***	1	18		CONCEN	1
J102		FLOW	***	1	4		CONCEN	1
J104		FLOW	***	1	3		CONCEN	1
J106		FLOW	***	1	3		CONCEN	1
J108		FLOW	***	1	2		CONCEN	1
J110		FLOW	***	1	3		CONCEN	1

Figure 5: The direct inflow junction table.

Adding Inflows in a Tabular Format

1. In the top left corner of **Figure 5**, copy the table to your clipboard and open a blank Excel file.
2. Paste the table into the Excel file (**Figure 6**).
3. Click *Clear* in the direct inflows table to remove all inflows. If you want to remove inflows from certain junctions, this can be done through an ArcGIS selection.
4. Copy the pasted data in Excel. This will be pasted back into the direct inflow table, and this is how new inflows can be assigned in a tabular format. The format of the data in excel may need to be rearranged to match the format in the inflow table.

	A	B	C	D	E	F	G	H	I	J
1	J100		FLOW		1	18		CONCEN	1	
2	J102		FLOW		1	4		CONCEN	1	
3	J104		FLOW		1	3		CONCEN	1	
4	J106		FLOW		1	3		CONCEN	1	
5	J108		FLOW		1	2		CONCEN	1	
6	J110		FLOW		1	3		CONCEN	1	
7	J112		FLOW		1	4		CONCEN	1	
8	J114		FLOW		1	2		CONCEN	1	
9	J116		FLOW		1	3		CONCEN	1	
10	J118		FLOW		1	2		CONCEN	1	
11	J120		FLOW		1	2		CONCEN	1	
12	J122		FLOW		1	1		CONCEN	1	
13	J126		FLOW		1	1		CONCEN	1	
14	J128		FLOW		1	1		CONCEN	1	
15	J130		FLOW		1	3		CONCEN	1	
16	J132		FLOW		1	4		CONCEN	1	
17	J134		FLOW		1	1		CONCEN	1	
18	J136		FLOW		1	3		CONCEN	1	

Figure 6: Inflow data in Excel that will be brought back into AquaTwin Sewer.

5. There should be 18 rows in the excel data. Click on *Rows* in the ribbon of the inflow table (**Figure 5**) and add 18 rows.
6. Paste the data into the inflow table and click *Save*. Inflows are now assigned via a tabular assignment.

Spatially Assigning Inflows from Points

Inflows can also be assigned spatially using the *Inflow Builder*.

1. Open the *Inflow Builder* (**Figure 7**) in the *Tools* tab of the *Data Explorer*.

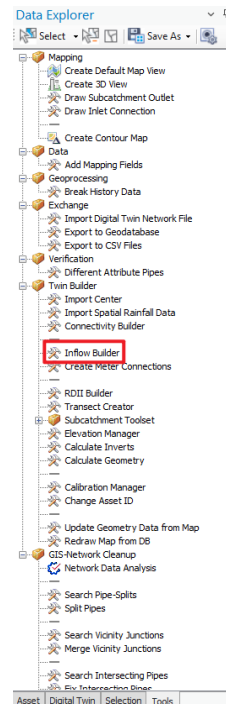


Figure 7: Location of Inflow Builder.

2. Click *Clear Inflow Data* as highlighted in **Figure 10** and then *Yes*. This will clear **all** inflow data. To remove inflows using an ArcGIS selection, use the inflow tables as described in the previous chapter.
3. Close the Inflow Builder.
4. In the ArcGIS *Contents* pane, right click on the *Meters* feature class and go to its ArcGIS attribute table (**Figure 8**).
5. In the external point feature class, a new field (text data type) will need to be created to write the assigned Pipe/Junction ID to the external feature class. Click *Add* (**Figure 9**) and then create a new field called AllocationID with a Text data type (default is *Long* data type, so this needs to be changed to *Text*).

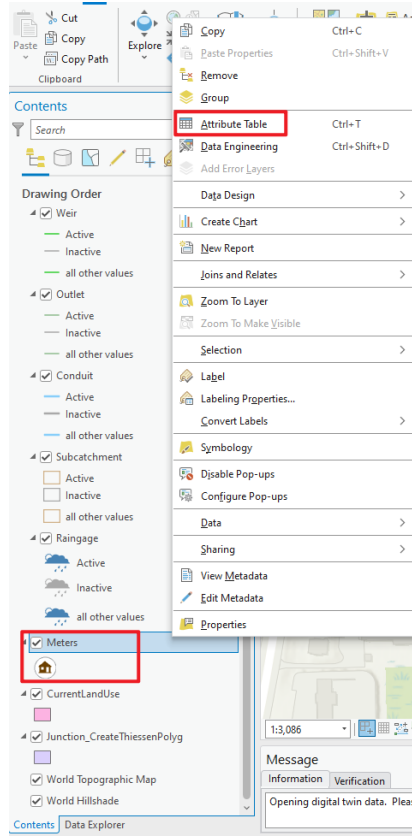


Figure 8: Open the Meters ArcGIS attribute table.

Field:	Add	Calculate	Selection:	Select By Attributes	Zoom To	Print
OBJECTID *	SHAPE *	Category	Demand	AllocationID		
1	1	Point Z Residential	1	<Null>		
2	2	Point Z Residential	1	<Null>		
3	3	Point Z Residential	1	<Null>		
4	4	Point Z Residential	1	<Null>		
5	5	Point Z Residential	1	<Null>		
6	6	Point Z Residential	1	<Null>		
7	7	Point Z Residential	1	<Null>		
8	8	Point Z Residential	1	<Null>		
9	9	Point Z Residential	1	<Null>		
10	10	Point Z Residential	1	<Null>		
11	11	Point Z Residential	1	<Null>		

Figure 9: Click Add to create a new field.

6. Reopen the Inflow Builder and fill out the Inflow Builder as shown in **Figure 10**.

For the datasource, *Metter/Billing data* uses a point feature class and *Parcel/Landuse data* uses a polygon feature class to assign inflows. See the *AquaTwin Sewer* online help file for detailed descriptions about the input data in the Inflow Builder.

7. Click *Next*.

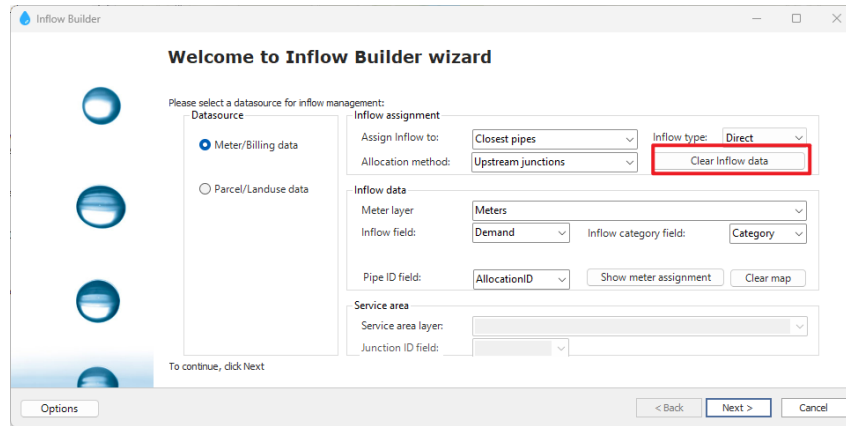


Figure 10: The Inflow Builder window in AquaTwin Sewer.

8. Click **Load** (**Figure 11**). All the unique categories names will be loaded from the category field in the Meters layer from **Figure 10**). Each category type can be assigned a different coefficient and pattern.

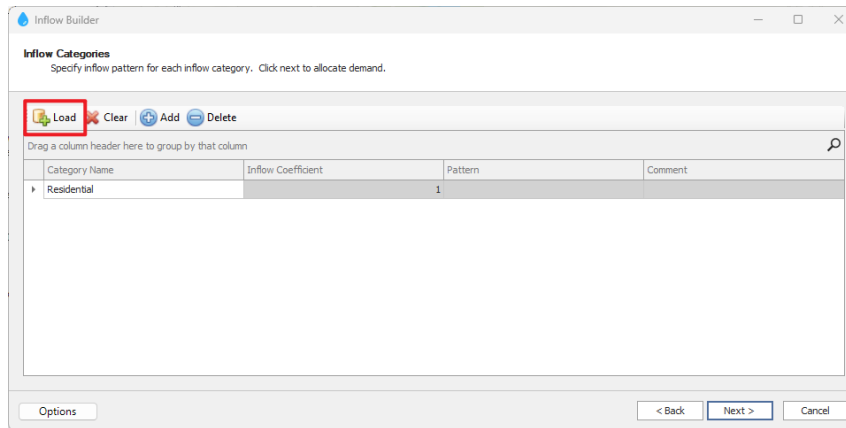


Figure 11: The Inflow Categories window in the Inflow Builder.

9. Click **Next**. A summary will appear of the inflow assigned.
10. Click **Finish** and then **Yes** to save.
11. If you reopen the Inflow Builder and click **Show meter assignment**, a line will be drawn from the meter layer to the closest pipe as shown in **Figure 12** (remember allocation method is the upstream junction of the closest pipe).
12. You can click **Clear map** in the inflow builder to remove these lines.

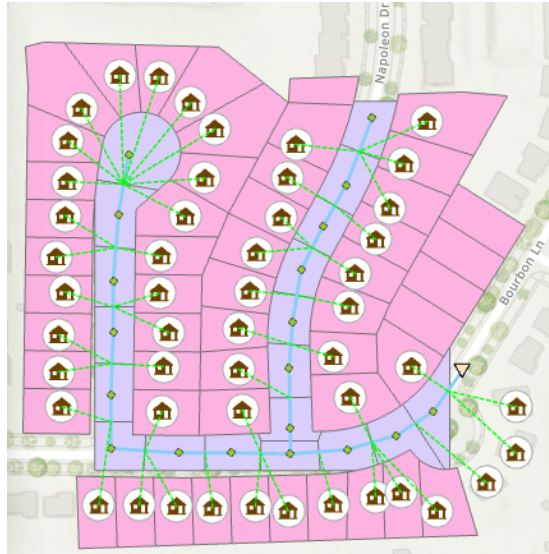


Figure 12: Meter assignments in the map.

Workflow for Manually Reassigning meters.

If you notice one of the meters is drawn to the incorrect place in **Figure 12**, you can manually adjust where the meter is drawn to, and then reassigning the inflows.

1. Select the pipe you want the meter to be directed to using an AquaTwin Selection at the top of the *Digital Twin* tab in the *Asset Properties* (**Figure 13**).
2. Click the *Reassign Meters* button (**Figure 13**).

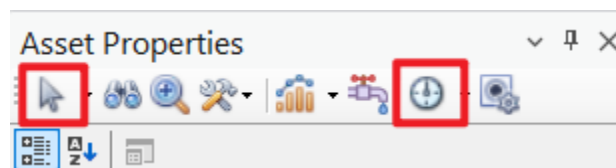


Figure 13: The AquaTwin Selection and the Reassign Meters buttons.

3. Select the meter (point) you want to reassign. The green line will move to the selected pipe. This changed the assigned Pipe ID in the meter feature class.
4. Reopen the *Inflow Builder* and click *Clear Inflow Data*.
 - a. Users have the option of clearing all of the inflow data and rerunning the *Inflow Builder* tool to assign the updated inflows.
 - b. Users can also use an ArcGIS Pro selection of the pipes and junctions to be updated, clear the inflows from the selected junctions in the junction *Twin Attribute Table*, and then run the *Inflow Builder* on the selected pipes.

5. Change the *Assign Inflow to* field to *Designated Pipes* (**Figure 14**). This will assign the inflows according to the Pipe ID field in the meter layer (that has now been updated).
6. Click *Next* and follow previous steps to assign inflow.

The screenshot shows the 'Inflow Builder' window with the title 'Welcome to Inflow Builder wizard'. On the left, under 'Please select a datasource for inflow management:', the 'Meter/Billing data' radio button is selected. In the 'Inflow assignment' section, the 'Assign Inflow to:' dropdown is set to 'Designated pipes' (highlighted with a red box), and the 'Allocation method:' is 'Upstream junctions'. The 'Inflow type:' is 'Direct'. Below this, the 'Inflow data' section shows 'Meter layer' as 'Meters', 'Inflow field' as 'Demand', and 'Inflow category field' as 'Category'. The 'Pipe ID field' is 'AllocationID'. There are buttons for 'Show meter assignment' and 'Clear map'. The 'Service area' section has 'Service area layer' and 'Junction ID field' dropdowns. At the bottom, there are 'Options', '< Back', 'Next >', and 'Cancel' buttons. A 'Clear Inflow data' button is also present next to the 'Inflow assignment' section.

Figure 14: Inflow Builder assigned to designated pipes.

Spatially Assigning Inflows from Polygons

1. Open the *Inflow Builder* and click *Clear Inflow data*. Click *Yes*.
2. Close the *Inflow Builder*.
3. Toggle off the *Meters* layer and toggle on the *Service Areas* and *CurrentLandUse* layers. The service areas were created using the Theissen Polygon tool in ArcGIS Pro.
4. Open the *Inflow Builder* and fill out the fields as shown in **Figure 15**.

The screenshot shows the 'Inflow Builder' window with the title 'Welcome to Inflow Builder wizard'. On the left, under 'Please select a datasource for inflow management:', the 'Parcel/Landuse data' radio button is selected (highlighted with a red box). In the 'Inflow assignment' section, the 'Assign Inflow to:' dropdown is set to 'Designated pipes', and the 'Allocation method:' is 'Upstream junctions'. The 'Inflow type:' is 'Direct'. Below this, the 'Inflow data' section shows 'Parcel layer' as 'CurrentLandUse', 'Inflow field' as 'Inflow', and 'Inflow category field' as 'LANDUSEDE'. The 'Service area' section has 'Service area layer' as 'Service Areas' and 'Junction ID field' as 'AssetID'. At the bottom, there are 'Options', '< Back', 'Next >', and 'Cancel' buttons. A 'Clear Inflow data' button is also present next to the 'Inflow assignment' section.

Figure 15: Inflow Builder using Parcel/Landuse data.

The inflow data is now using the polygon land use feature class to obtain inflow data, similar to how the meter layer was used in the previous example.

The service area defines the area for a particular junction's (Junction ID field to tie polygons to junctions) inflow data to be taken from. For example, the junction in **Figure 16** has a service area that encompasses parts of Multi Family, Single Family, and Town House land uses. Since the service area does not completely encompass the land use (inflow) polygons, only a percentage of the inflow from the inflow polygon will be allocated to the junction. If the service area encompasses 50% of an inflow polygon, only 50% of the inflow will be assigned.

Note that the polygons need to be in the same spatial reference.

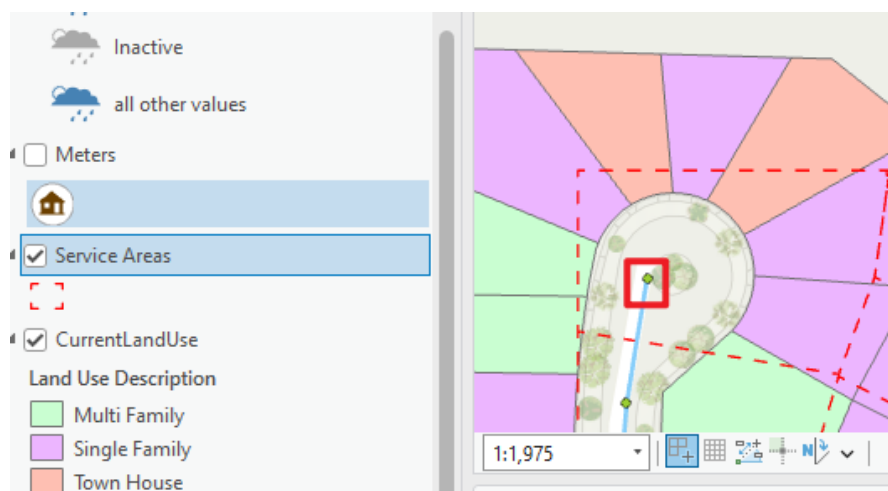


Figure 16: An example of how inflows are assigned using polygons.

5. Click *Next*, *Clear*, and then *Load* to load in the unique land use types. Note that a different multiplier coefficient and pattern can be assigned for each land use type.
6. Click *Next*.
7. A summary of the inflows will appear. Click *Finish* to assign the inflows.