



Getting Started with the ArcGIS Utility Network

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Agenda



Getting Started

Planning for the Utility Network

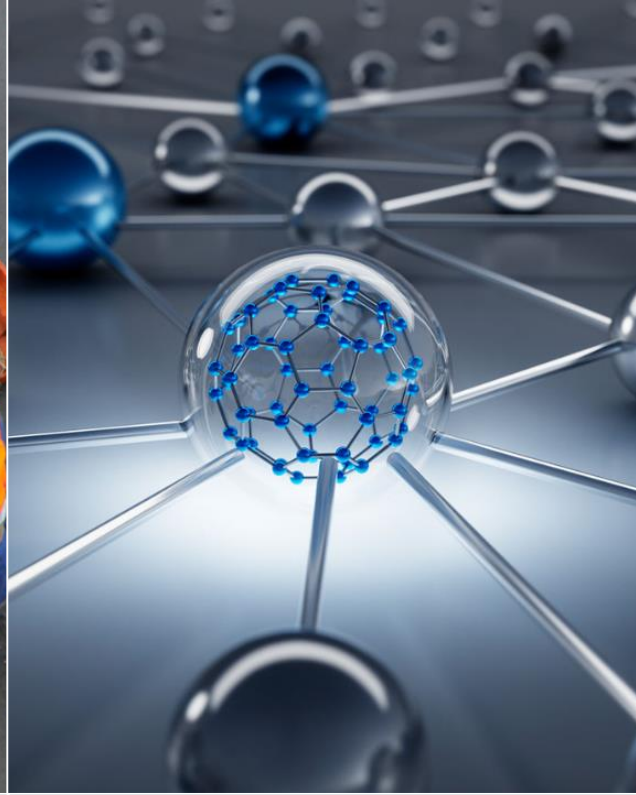
Migrating Your Data

Creating the Utility Network

Implementation

Working with the Utility Network





Introduction

The ArcGIS Utility Network is a framework for the real-world modeling of utility systems, such as gas, water, wastewater, storm sewer, and telecommunications. This presentation will cover some of the key fundamentals necessary for deploying the Utility Network in the Enterprise GIS environment



Getting Started

Compatibility Matrix

- Beginning with ArcGIS Pro 2.7, the version of ArcGIS Pro and ArcGIS Enterprise determines the **Utility Network Version** value when creating or upgrading a utility network:

Utility Network Version	ArcGIS Pro release	ArcGIS Enterprise release
1	2.1.x	10.6 and later
2	2.2.x	10.6.1 and later
2	2.3.x	10.6.1 and later
3	2.4.x	10.7 and later
3	2.5.x	10.7 and later
4	2.6.x	10.8.1 and later
5	2.7.x	10.9 and later
5	2.8.x	10.9 and later
5	2.9.x	10.9 and later

Utility Network Foundation Solution

What's Included

- Pro Project
- Asset Package (with sample data)
- Sample Utility Network
- Data Dictionary



ArcGIS
Solutions



District Energy Utility Network Foundation

District Energy Utility Network Foundation can be used to accelerate district heating and cooling utility network implementations.



Stormwater Utility Network Foundation

Stormwater Utility Network Foundation can be used to accelerate stormwater utility network implementations.



Water Distribution Utility Network Foundation

Water Distribution Utility Network Foundation can be used to accelerate water distribution utility network implementations.



Sewer Utility Network Foundation

Sewer Utility Network Foundation can be used to accelerate sewer utility network implementations.

ArcGIS Pro Packages

In order to install ArcGIS Pro packages, you must clone the environment

The screenshot displays the Python Package Manager interface in ArcGIS Pro. The left sidebar contains navigation options: New, Open, Save, Save As, Portals, Licensing, Options, Python, Add-In Manager, Help, About, and Exit. The main area is titled "Python Package Manager" and shows the "Project Environment" as "arcgispro-py3-clone [C:\Users\vanderveen\AppData\Local\ESRI\conda\envs]". Below this, there are buttons for "Manage Environments", "Installed Packages", "Update Packages", and "Add Packages".

The "Installed Packages" section lists 196 installed packages. The following table shows a portion of these packages:

Name	Version
appdirs	1.4.4
arcgis	1.9.1
arcpy	2.9
arrow-cpp	1.0.1
asn1crypto	1.4.0
atomicwrites	1.4.0
attrs	21.2.0
azure-core	1.12.0
azure-storage-blob	12.8.0
backcall	0.2.0
black	19.10b0
blas	1.0
bleach	3.3.0
blinker	1.4
brotlipy	0.7.0
cached-property	1.5.2
cachetools	4.2.2
certifi	2021.10.8
cffi	1.14.5

Below the table, there is a link to "Learn more about Conda packages".

The "Manage Environments" dialog box is open, showing a list of environments. The "Active" environment is "arcgispro-py3-clone" with the path "C:\Users\vanderveen\AppData\Local\ESRI\conda\envs". Other environments include "arcgispro-py3" with the path "C:\Users\vanderveen\AppData\Local\Programs\ArcGIS\Pro\bin\Python\envs". The dialog has "Add" and "Clone Default" buttons at the top, and "OK" and "Cancel" buttons at the bottom.

ArcGIS Pro Packages

- untools
- dltsolutions

Python Package Manager

Project Environment
arcgispro-py3-clone [C:\Users\vvanterveen\AppData\Local\ESRI\conda\envs]
Manage Environments

Installed Packages
Update Packages
Add Packages

Add Packages
Python packages let you do more with ArcGIS Pro. The list below includes available Python packages that can be optionally installed.

dlt

Name	Versions
dltsolutions	2.7.1
r-cditools	0.14

dltsolutions

Version: 2.7.1
Esri Solutions Data Loading Tools

Homepage License:

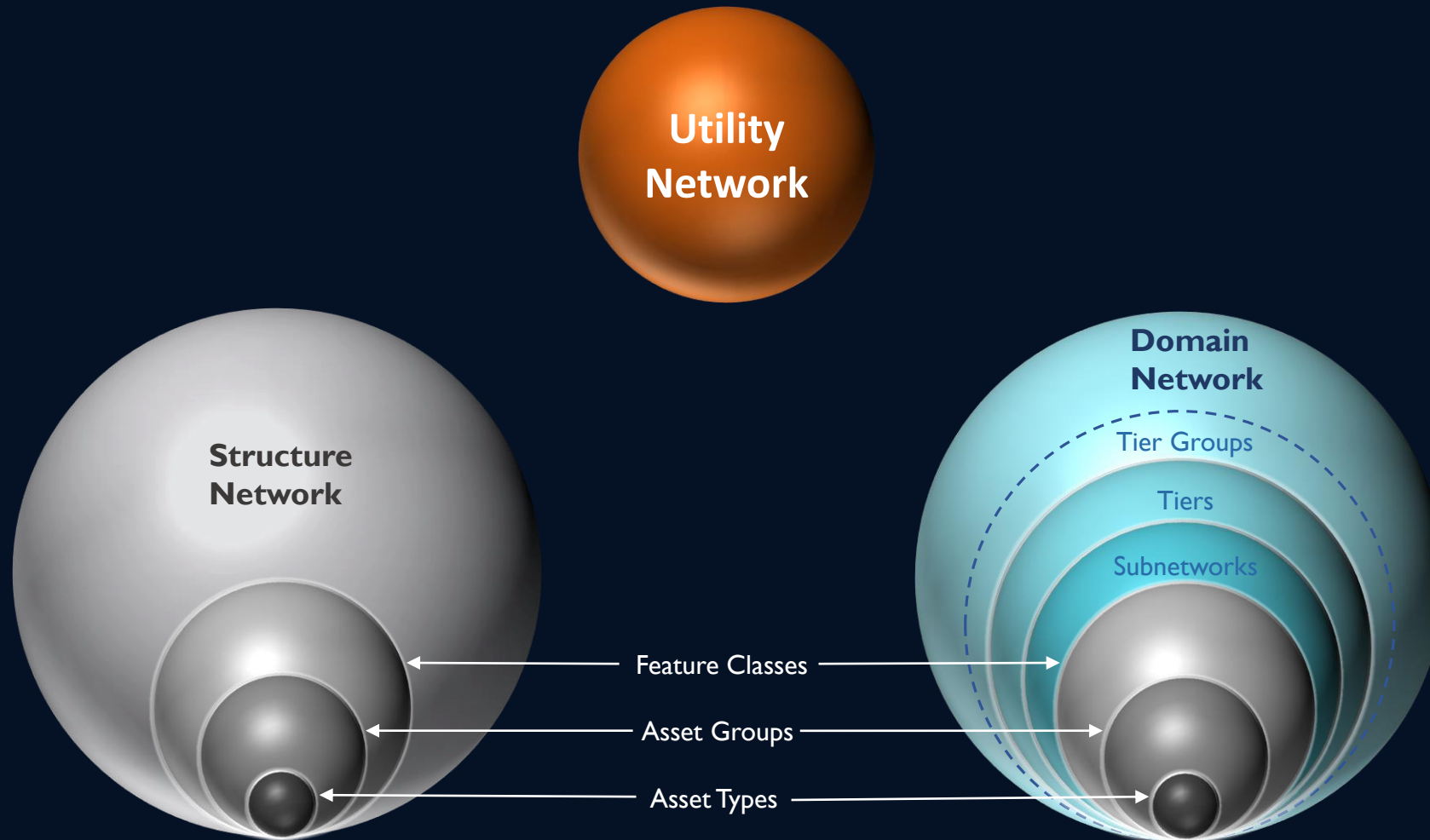
Description
The Data Loading Tools streamline loading data from a source to a target dataset and provide the ability to perform in-process data transformation. After installation through the Python Package Manager in ArcGIS Pro, the tools are available in the Geoprocessing pane.



Planning for the Utility Network

Planning for your Network

UNDERSTANDING THE DATA MODEL



Planning for your Network

UNDERSTANDING THE DATA MODEL

Domain Network

Devices

Assemblies

Junctions

Lines

Layers

Structure Network

Structure Junction

Structure Line

Structure Boundary

Planning Tips

Explore the Naperville Utility Network and asset package data

Use a spreadsheet to list current feature classes with the new corresponding asset group

Document any changes you plan to make to the asset package



Migrating Your Data

Data Migration Steps

- Run the Change Asset Package Spatial Reference Tool
- Add the fields 'assetgroup' and 'assettype' to your existing feature classes * **DO NOT CHANGE OR DELETE EXISTING FIELDS!**
- Add any additional fields to the feature classes
- Add any new domains or add to existing domains
- Add additional asset types * **DO NOT DELETE ANY ASSET TYPES!**

Clipboard: Paste, Cut, Copy, Copy Path

Navigate: Explore, Bookmarks, Go To XY

Layer: Add Preset, Add Graphics Layer

Selection: Select, Select By Attributes, Select By Location, Attributes, Clear

Inquiry: Measure, Locate, Infographics, Coordinate Conversion

Labeling: Pause, Lock, View Unplaced, More

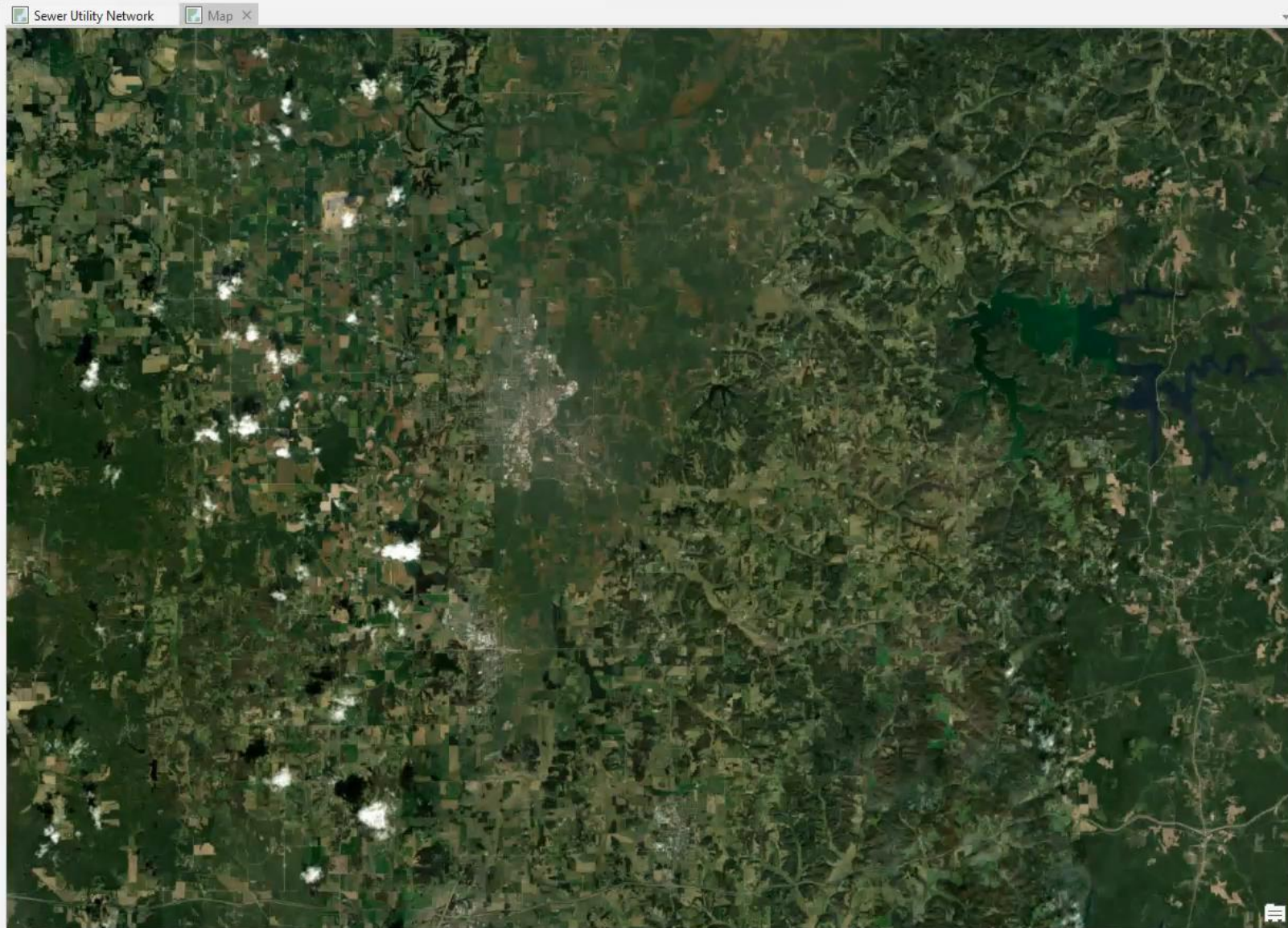
Offline: Convert, Download Map, Sync, Remove

Contents

Search

Drawing Order

- Map
- World Imagery



Geoprocessing

Find Tools

Favorites Toolboxes Portal

- 3D Analyst Tools
- Analysis Tools
- Aviation Tools
- Business Analyst Tools
- Cartography Tools
- Conversion Tools
- Crime Analysis and Safety Tools
- Data Interoperability Tools
- Data Loading Tools
 - Append with Transformation
 - Create Data Loading Workspace
 - Execute Data Load
 - Generate Predefined Mapping Table
- Data Management Tools
- Data Reviewer Tools
- Defense Tools
- Editing Tools
- GeoAnalytics Desktop Tools
- Geocoding Tools
- Geostatistical Analyst Tools
- Image Analyst Tools
- Indoor Positioning Tools
- Indoors Tools
- Intelligence Tools
- Linear Referencing Tools
- Location Referencing Tools
- Maritime Tools
- Multidimension Tools
- Network Analyst Tools

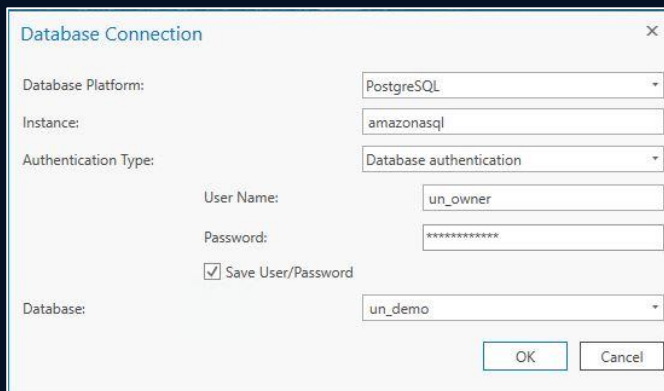
Catalog Geoprocessing Modify Subnetwork Controller



Creating the Utility Network

ENTERPRISE GEODATABASE TASKS

- Create a database user with read/write permissions
- Create an Enterprise geodatabase (if you're not using an existing database)
- Make a connection the newly created database as the Utility Network database user
- Make sure to register your new Enterprise geodatabase with the ArcGIS Server



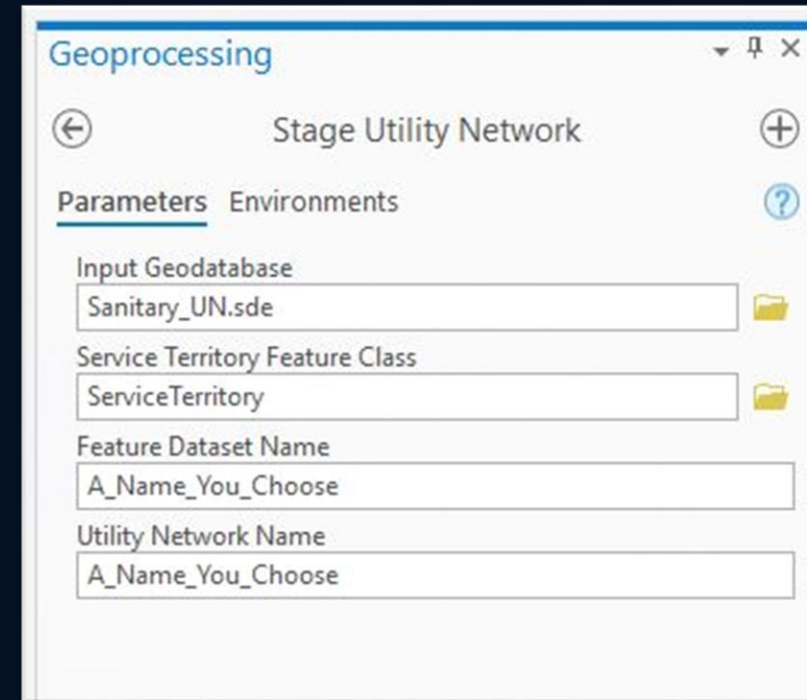
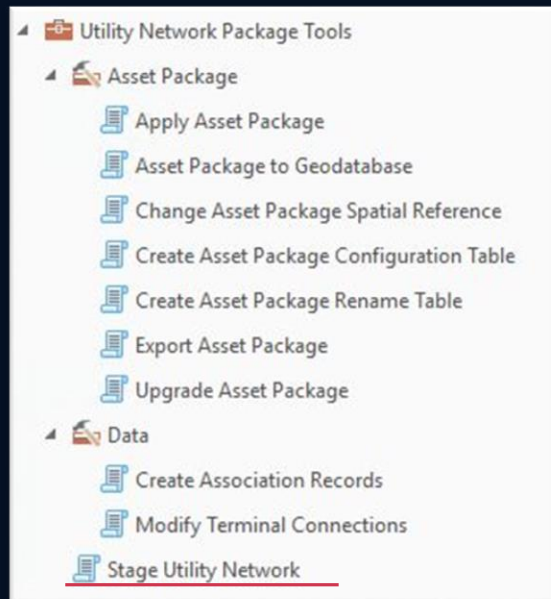
The screenshot shows a 'Database Connection' dialog box with the following fields and options:

- Database Platform: PostgreSQL
- Instance: amazonasql
- Authentication Type: Database authentication
- User Name: un_owner
- Password: [Redacted]
- Save User/Password
- Database: un_demo

Buttons: OK, Cancel

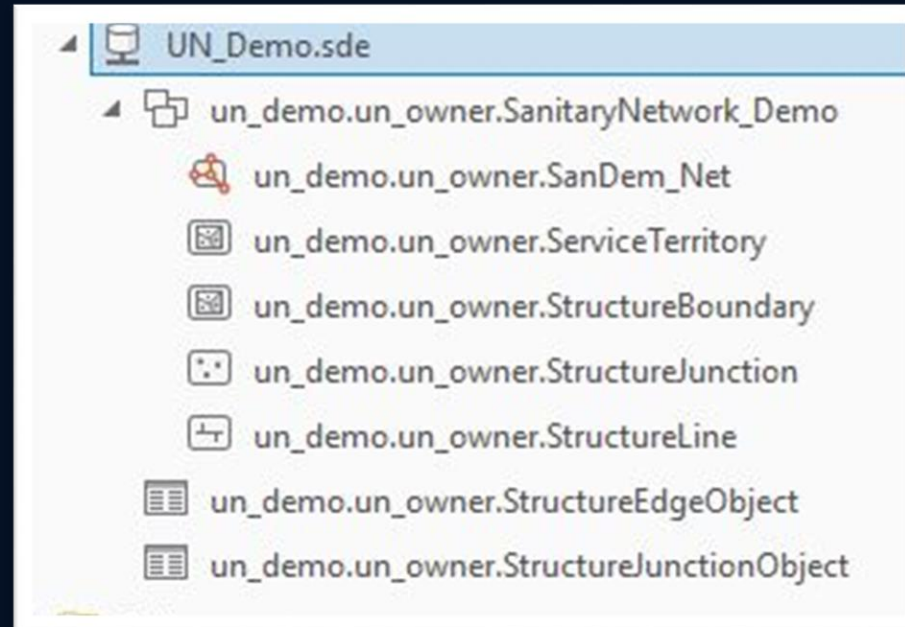
STAGING THE UTILITY NETWORK

- Create a service territory boundary
- Use the Stage Utility Network geoprocessing tool located in the Utility Network Package Tools toolbox



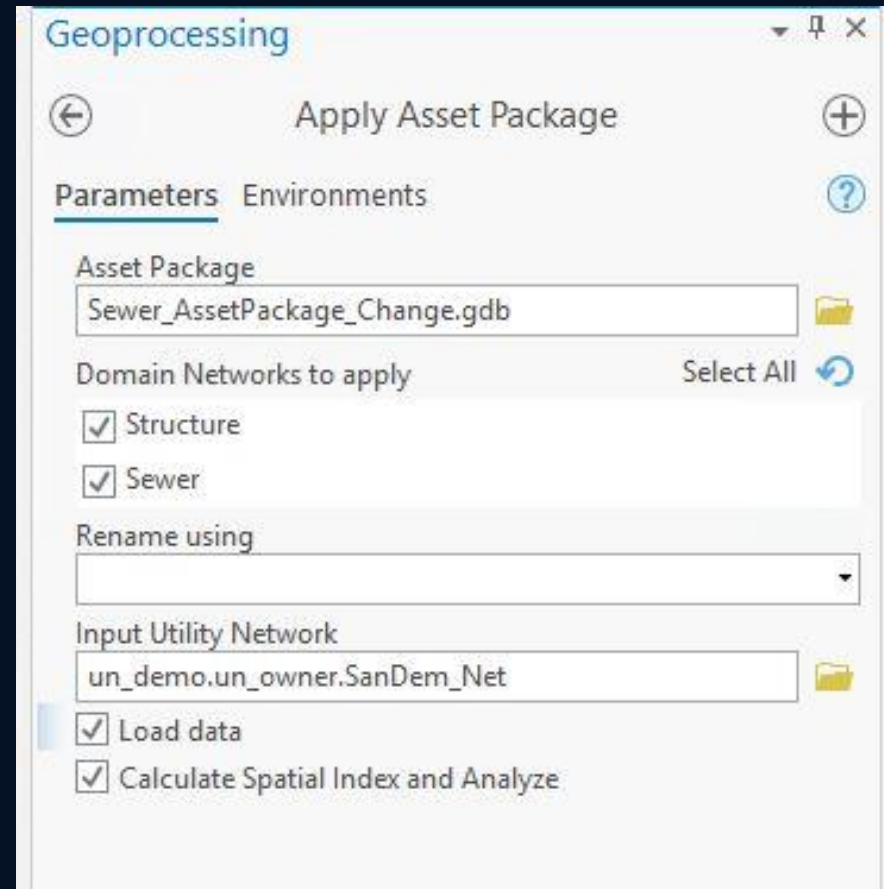
STAGING THE UTILITY NETWORK

Once you've staged the Utility Network, you will see the layers in the Utility Network dataset related to the Structure Network. The Domain Network feature classes will be added after you apply the asset package



APPLY THE ASSET PACKAGE

Apply the asset package using the Apply Asset Package geoprocessing tool located in the Utility Network Package Tools toolbox



Notes

- Many administrative functions for the utility Network will require topology to be disabled
- You cannot change the utility Network database owner without having to recreate the data
- You can change the Utility Network Portal owner using the update Portal Dataset Owner geoprocessing tool
- Updating the Utility Network to the latest version using the Upgrade Dataset tool, only updates the schema for feature classes and geodatabase objects, this will not move you to a new Asset Package. To move to a new asset package, you will need to export your utility network as an asset package and proceed to migrate the data into the new asset package



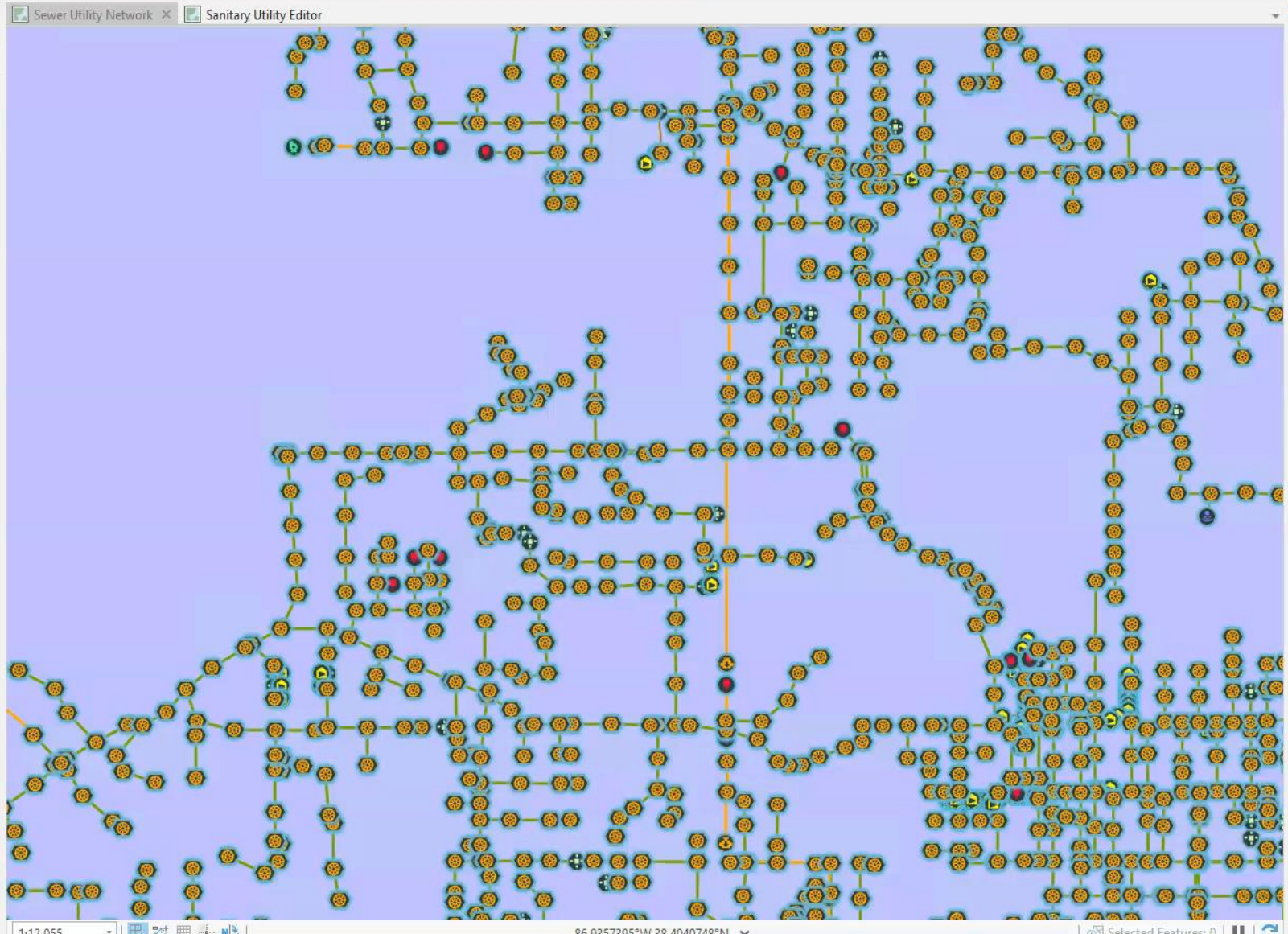
Implementing the Utility Network

Contents

Search

Drawing Order

- Other
- SewerDevice
- Sewer Assembly
- Sewer Junction
- Sewer Line
 - Asset group
 - Unknown
 - Sewer Gravity Main
 - Sewer Force Main
 - Lateral
 - Bonding Line
 - Test Lead Wire
 - Rectifier Cable
 - Other
- Structure Line
- Sewer Networks
- Structure Boundary
- Service Territory
- San_Net Utility Network
 - Dirty Areas
 - Disabled
 - Dirty
 - Error
 - Dirty and Error
 - Subnetwork Error
- Standalone Tables
 - Validation Object Errors
 - Sewer Edge Object
 - Sewer Junction Object
 - Sewer Edge Object



Geoprocessing

Disable Network Topology

Parameters Environments

Input Utility Network
sanitary_network.un_owner.San_Net

Run

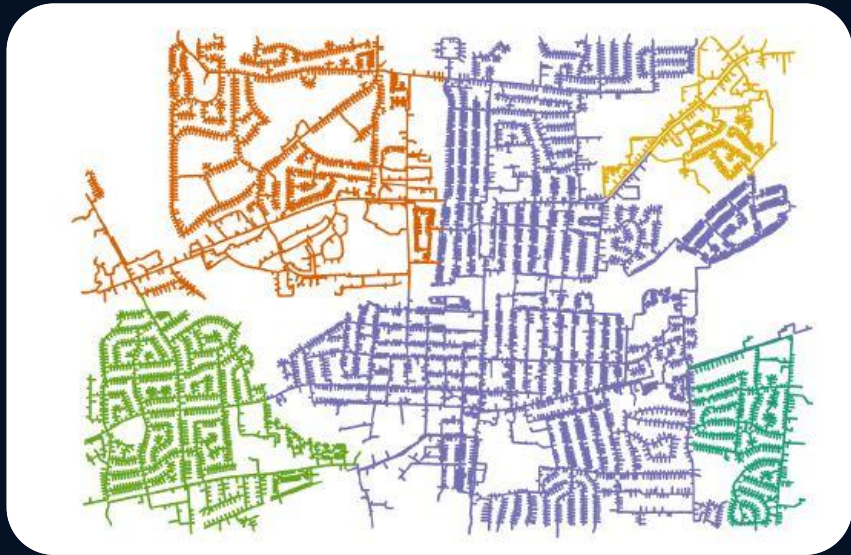
Disable Network Topology completed.
View Details Open History



Working with the Utility Network

SUBNETWORKS

Subnetworks represent systems like pressure zones or sewersheds that have resources that run through them. Subnetworks are the backbone of tracing and network diagrams and allow you to visualize your network



- Visualization
- Labeling and map production
- Tracing
- Exporting a subset of a network to external systems
- Business reports

Clipboard Manage Edits

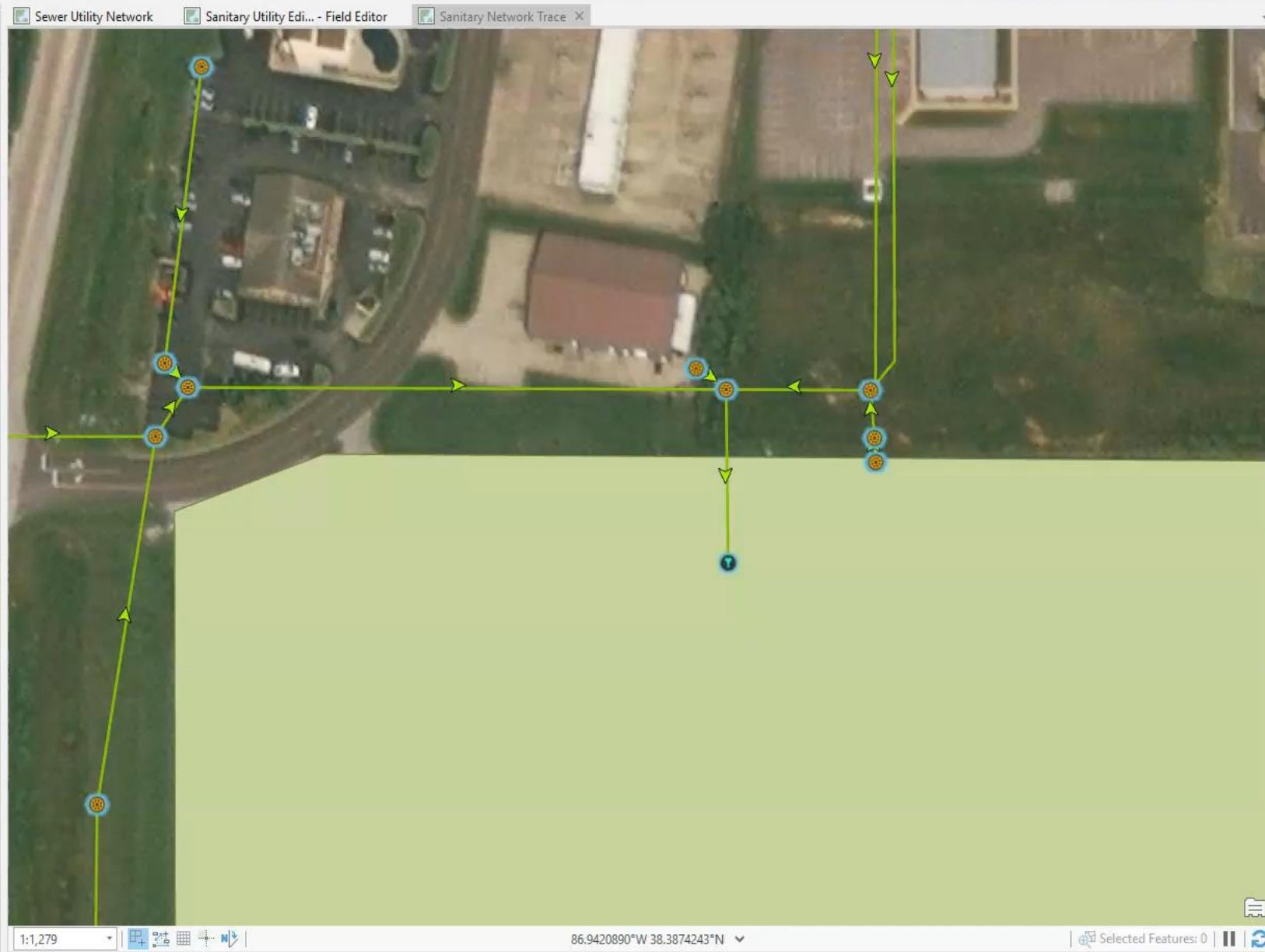
Contents

Search

Drawing Order

- Sanitary Network Trace
- Sanitary Utility Network
- San_Net Utility Network
- World Imagery
- Standalone Tables
 - Sewer Edge Object
 - Sewer Junction Object
 - Structure Edge Object
 - Structure Junction Object

RECORDED WITH SCREENCAST MATIC



Geoprocessing

Find Tools

Favorites Toolboxes Portal

- Add Domain Network
- Add Network Attribute
- Add Network Category
- Add Rule
- Add Terminal Configuration
- Add Tier
- Add Tier Group
- Create Utility Network
- Delete Network Category
- Delete Rule
- Delete Terminal Configuration
- Disable Network Topology
- Enable Network Topology
- Export Associations
- Export Rules
- Export Subnetwork Controllers
- Import Associations
- Import Rules
- Import Subnetwork Controllers
- Set Association Role
- Set Edge Connectivity
- Set Network Attribute
- Set Network Category
- Set Subnetwork Definition**
- Set Terminal Configuration
- Trace Configuration
 - Add Trace Locations
 - Export Subnetwork

ASSOCIATIONS

Associations are logical connections that maintain network connectivity in the absence of the geometric coincidence of features.

CONNECTIVITY

Connectivity between two features that are not necessarily coincident, such as junction to junction

Example

Transformer to distribution line or pipe connection to manhole channel

CONTAINMENT

Allow for a collection of features to be represented as a single point. Used to model the association between content and container features. Can be polygon, point, or line

Example

Sewer main and casing or lift station and pump

STRUCTURAL

Models association between the structural and domain network. The domain feature is attached to the structural feature

Example

Transformer bank to power pole



CONTAINMENT ASSOCIATIONS

Project | Map | Insert | Analysis | View | Edit | Imagery | Share | Appearance | Labeling | Data | Data | Data

Clipboard | Manage Edits | Snapping | Features | Selection | Tools | Elevation | Corrections | Data Reviewer

Clipboard: Paste, Copy, Copy Path, Save, Discard, Error Inspector

Snapping: No Topology, Status, Error Inspector

Features: Create, Modify, Delete

Selection: Attributes, Clear

Tools: Move, Annotation, Edit Vertices, Reshape, Merge, Split

Elevation: Mode, No surfaces

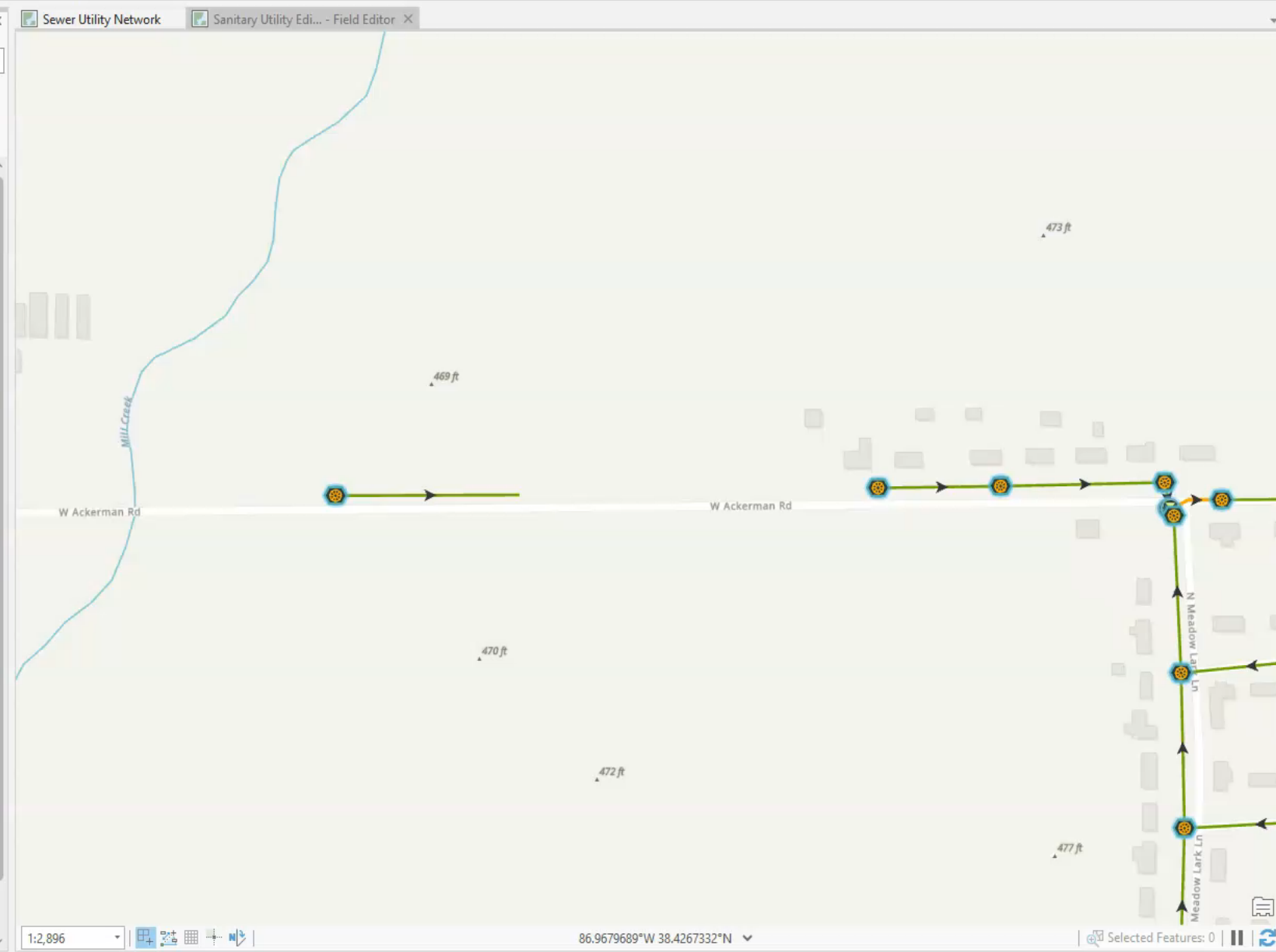
Corrections: Ground To Grid

Data Reviewer: Manage Quality

Contents

Sanitary Utility Editor - Field Editor

- Structure Junction
- Sewer Device
- Errors
- Sewer Junction
- Structure Line
- Sewer Line
- Sewer Networks
- Structure Boundary
 - Unknown
 - Sewer Storm Vault Boundary
 - Sewer Lift Station Boundary
 - Sewer Treatment Plant Boundary
- Service Territory
- L921San_UN_UTILITY_NETWORK Utility Network
 - Dirty Areas
 - Disabled
 - Dirty
 - Error
 - Dirty and Error
 - Subnetwork Error
 - World Topographic Map
 - Standalone Tables
 - Sewer Edge Object



Create Features

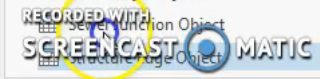
Create Sewer Lift Station Boundary completed

Templates Favorites

Click here to see templates not listed.

- Sewer Device : Anode
 - Galvanic
 - ICCP
 - Unknown
- Sewer Device : Backflow Preventer
 - Backflow Preventer
 - Unknown
- Sewer Device : Cleanout
 - Cleanout
 - Lamp Hole
 - Terminal
 - Unknown
- Sewer Device : Connection
 - Pipe Connection
 - Unknown
- Sewer Device : Controllable Valve
 - System
 - Unknown
 - Vault
- Sewer Device : Flow Valve
 - Air Gap
 - Altitude
 - Check
 - Unknown
- Sewer Device : Gate
 - Gate
 - Stop Log
 - Unknown
- Sewer Device : Grease Trap

Catalog | Geopro... | Modify... | Attribu... | Create... | Manag...



1:2,896

86.9679689°W 38.4267332°N

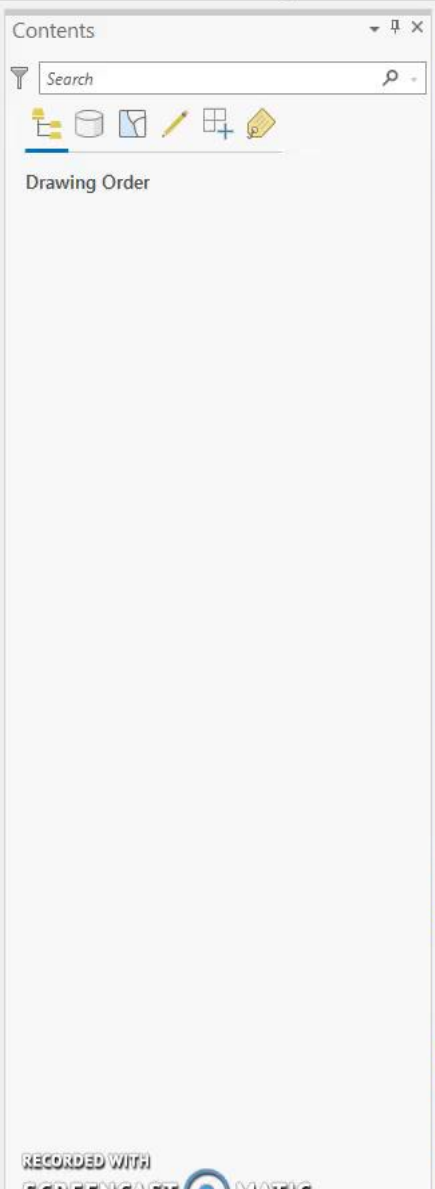
Selected Features: 0

ASSOCIATION ROLES

Contents

Search

Drawing Order



Geoprocessing

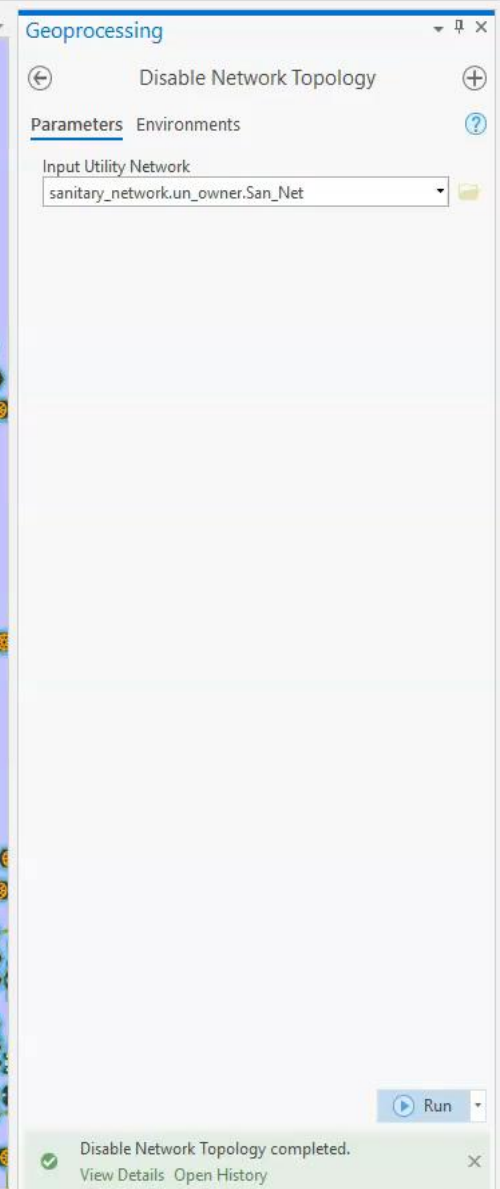
Disable Network Topology

Parameters Environments

Input Utility Network
sanitary_network.un_owner.San_Net

Run

Disable Network Topology completed.
View Details Open History





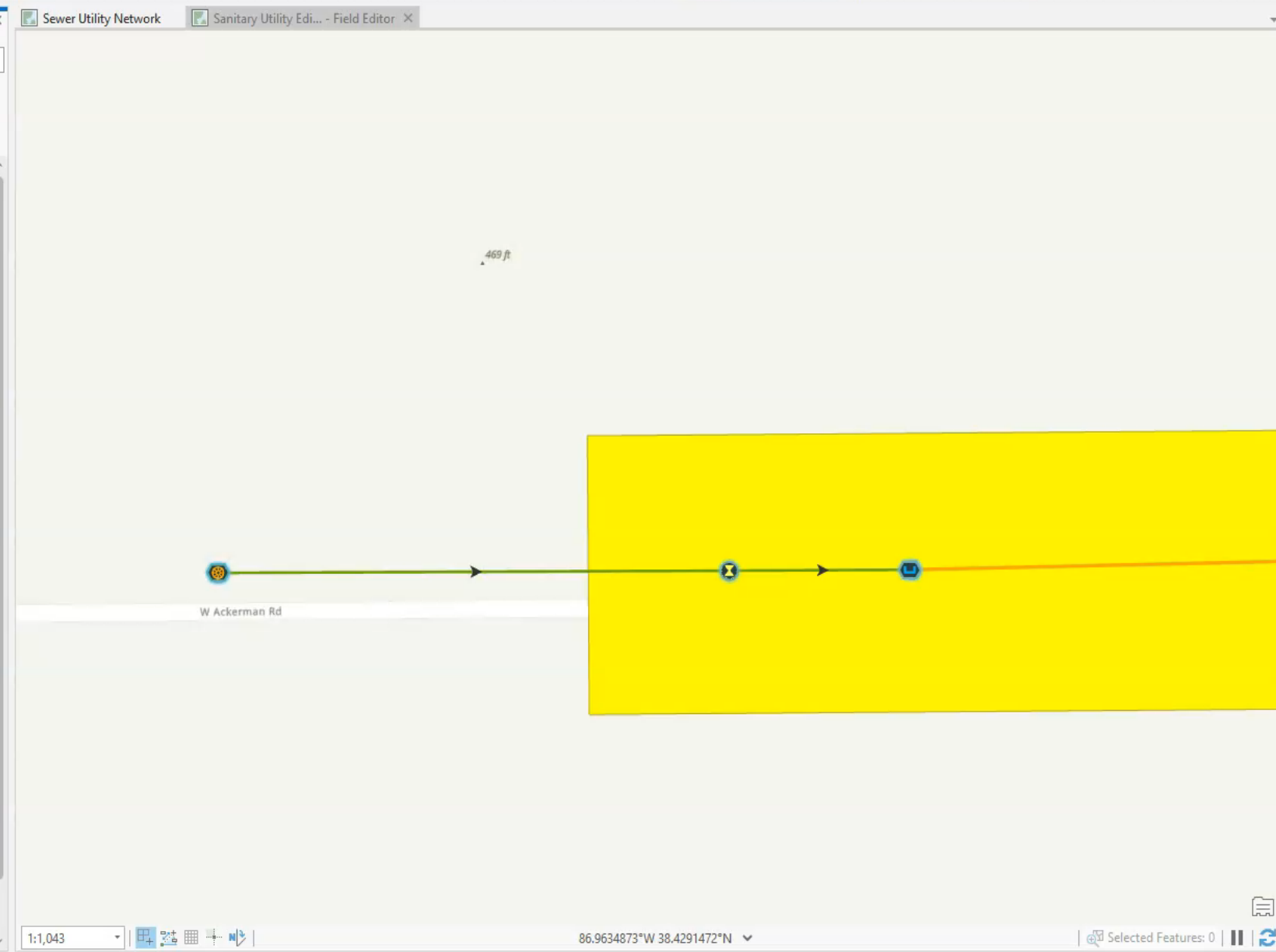
CONNECTIVITY ASSOCIATIONS

Contents

Search

Drawing Order

- Sanitary Utility Editor - Field Editor
 - Structure Junction
 - Sewer Device
 - Errors
 - Sewer Junction
 - Structure Line
 - Sewer Line
 - Sewer Networks
 - Structure Boundary
 - Unknown
 - Sewer Storm Vault Boundary
 - Sewer Lift Station Boundary
 - Sewer Treatment Plant Boundary
 - Service Territory
 - L921San_UN_UTILITY_Network Utility Network
 - Dirty Areas
 - Disabled
 - Dirty
 - Error
 - Dirty and Error
 - Subnetwork Error
 - World Topographic Map
 - Standalone Tables
 - Sewer Edge Object
 - Sewer Junction Object
 - Structure Edge Object



Modify Associations

Add features Load selected

Active Item: Sewer Device : Controllable Valve - Controllabl

Connectivity (1) Containment (0) Attachment (0)

Junction - Junction (1)

Layer Name	Terminal	Delete
Sewer Device : Connection Connection	Single Terminal	X

Junction - Edge (0)

Apply Cancel



TRACE AND BRANCH VERSIONING WIDGET

Insert widget

New Pending

Map centric

- Map Legend
- Map Layers Floor Filter (beta)
- Utility Network Trace (beta) Bookmark
- Draw Directions
- Fly Controller Coordinate Conversion
- Oriented Imagery Elevation Profile
- Suitability Modeler BA Infographic (beta)

Data centric

Or drag a widget here

Page

Open with Window

None

Animation

None

Change

Body

Fill

Header

Footer

Thank You

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- <https://www.cloudpointgeo.com/>



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QUESTIONS?

Resources

Asset Package Change Log Version 4

<https://doc.arcgis.com/en/arcgis-solutions/latest/reference/pdf/SewerManagementChangelogV4.pdf>

Compatibility Matrix

https://pro.arcgis.com/en/pro-app/latest/help/data/utility-network/utility-network-dataset-administration.htm#ESRI_SECTION2_D2C5FA67C0AD46F6A893CF18F9493181

Migrating Data into the utility Network

<https://www.youtube.com/watch?v=vSaFnT4VVuY>

Management Release Plan

<https://www.esri.com/arcgis-blog/products/utility-network/announcements/announcing-the-network-management-release-plan/>