Good Practices: How to ensure successful sync, two ways, all the time

General · https://mes100.com/docs/good-practices-how-to-ensure-successful-sync-two-ways-all-the-time/

We have provided **user manuals and tutorials**, but it might still result in a frustrating, unsuccessful sync. Whether dealing with incorrect **network catalogs** or **part lists** or mapping entities incorrectly, unsuccessful syncs can lead to wasted time, as the intention of using MCIntegrator was to reduce design time in the first place.

This article serves as a guide for accurate and efficient synchronizations, covering tips and best practices that will help set up drawings and synchronize the utility models.

A well-defined canonical flow

To ensure a smooth and error-free synchronization, it is best to follow a well-defined workflow. A structured approach will help maintain data integrity and prevent data loss.

The synchronization process should begin with **setting the Network catalogs with the required Part Lists** based on the utility networks modeled. **The drawing *must* be saved before we can bind with the MiTS file** and **do the network and parts mapping** under the Project Settings.

Correct Network and Parts Mapping is crucial for synchronization, as it provides instructions for the algorithm to sync back and forth the models accurately and consistently between MiTS and Civil 3D.

Finally, it is a good practice to resolve any verification errors or warnings thrown immediately. This ensures the models are reflected similarly between the two programs. Users may refer to the troubleshooting guidelines available, *Synchronization Verifications or Warnings* for further assistance.

Network Catalog and Part Lists Employed

Network catalogs (gravity and pressure) can be imagined as a warehouse that contains all the structures and pipes, which can be utilized to build a utility network in Civil 3D. A part list is governed by the network catalog, in which it acts like a basket for selected pipes and structures from the specific catalog.

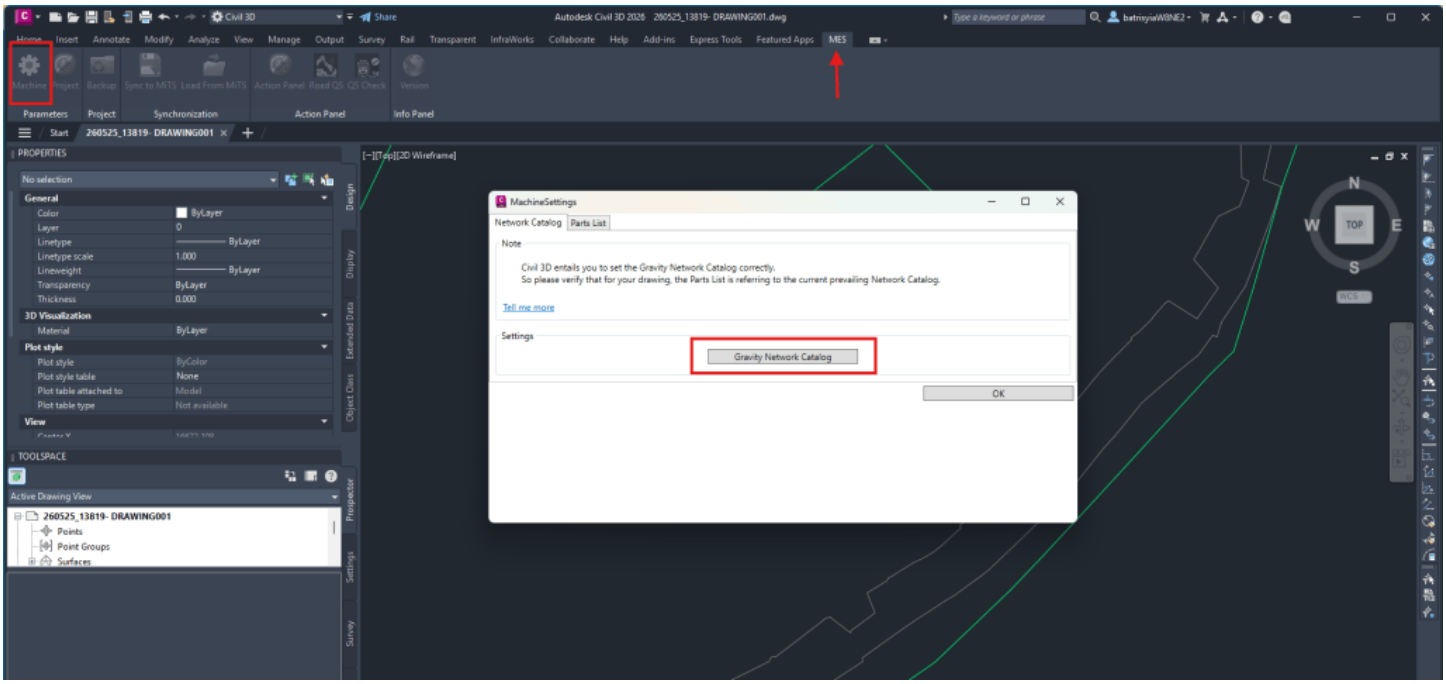
The practices below can prevent headaches down the line, as they ensure that the correct catalog and part sizes have been employed in the drawing.

Setting up Network Catalog

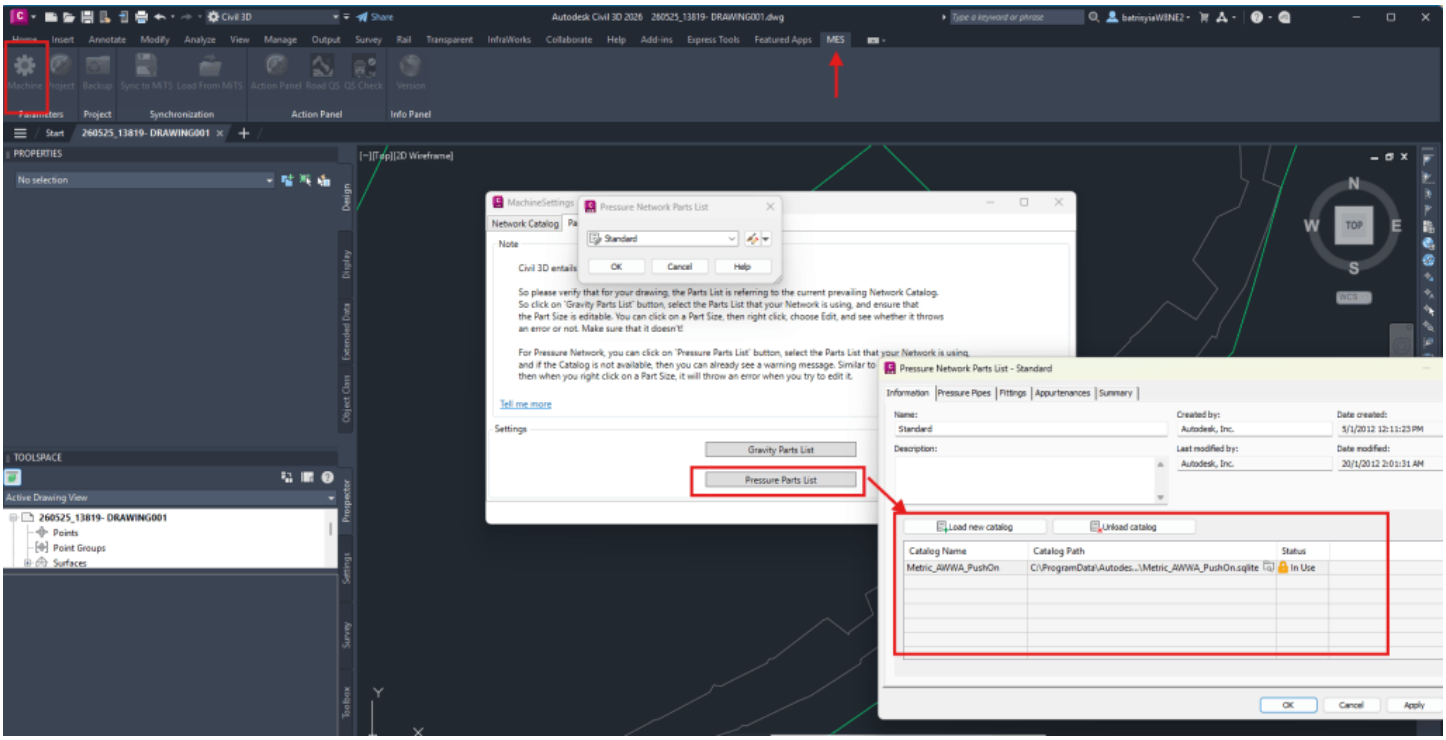
It is a **MUST** for designers to **ensure that a *correct network catalog* has been set** for a drawing, or else you can't swap the part size. **We can't emphasize this point enough**.

Nothing can be done, involving gravity and pressure networks, without a catalog; The networks in the drawing will be *read-only objects*. We can't create a part list, nor can we build a network. A simple network editing task, such as adding part sizes to the part list or swapping the parts, will also not be possible. For the synchronization between MiTS and Civil 3D, it is *definitely impossible* without a correct catalog, as the algorithm won't be able to find the mapped parts; It is basically searching in the wrong warehouse, and will only trigger errors during the process.

To ease the process of setting up the network catalogs, we have implemented a feature, **Machine Settings**, which has a more direct interface for users to navigate. You can just click on the button below to correctly set/verify the gravity network catalog, which is machine-based, and also ensure that the correct pressure network catalogs are set in the Parts List that your water network is using.



Setting up Gravity Network Catalog



Setting up Pressure Network Catalog

Users may follow the steps provided in the link below to set the correct catalogs.

- **Gravity Network Catalogs**

- **Pressure Network Catalogs**

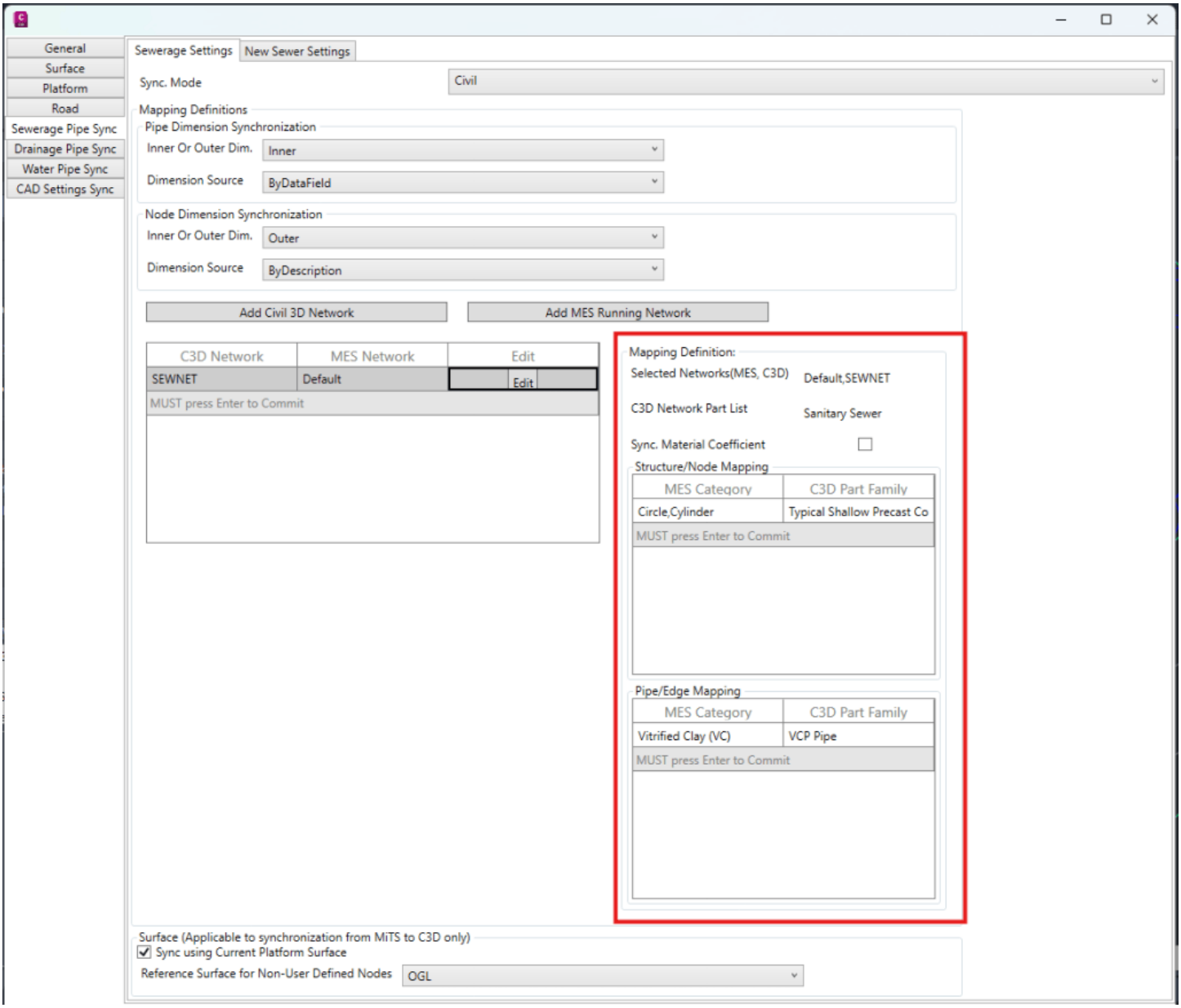
Managing Parts List

For both gravity and pressure networks, they rely on the Parts List (essentially just pointers to the part size) to obtain the correct part size for synchronization. The Parts List must be managed properly by designers before trying to sync the models between the two programs. Or else, you may encounter a common error, such as *Unable to Swap Part Size* which needs to be resolved before the sync can be properly carried out.

Step 1: Defining the correct Part Lists

Users have the option to edit default Part Lists in Civil 3D or create a new one, whichever is convenient, as long as the pipes and structures required are available in the lists. The correct steps of adding Part Families to a Part List in Civil 3D can be done under the **Machine Settings** as well, as per the guide here.

The **Part Families in Civil 3D** will then be mapped to the equivalent MES Category. These steps are required by the algorithm in every sync, MiTS to Civil 3D or the other way round, as it provides “instruction” for the algorithm to search for the equivalent sizes from which families in the part lists.



It is a *good practice* to ensure the part lists **only contain the part families that we need** by deleting those families that are not prevalent in the Network Catalog, avoiding data conflicts in the long run.

Step 2: Verifying the Part Families

To ensure that the Part Families exist within the current pipe catalog, they should be verified before attempting to sync the models, especially when using default Civil 3D Part Lists for the gravity or pressure networks.

We can do the checking by trying to edit the parts in the Civil 3D Gravity Part Families or edit the Pressure Part Lists. If the Part Families listed are not from the active network catalog, an error message will be thrown by Civil 3D.

Step 3: User-Defined catalogs (Only if required)

For the MiTS utility models to be reflected similarly in Civil 3D, we need to ensure equivalent parts are available in the catalog.

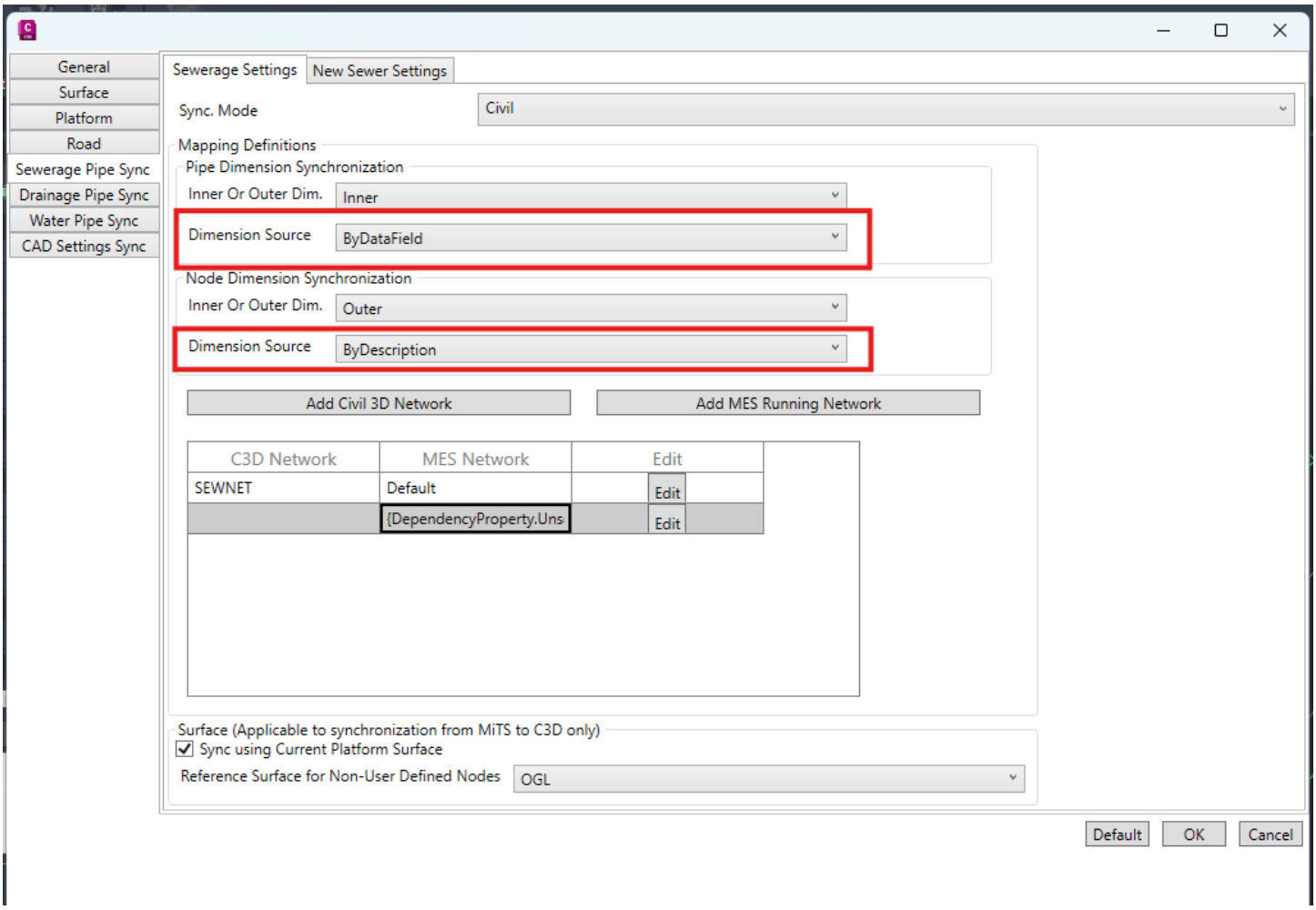
The parts utilized for the models may not be available in the default catalogs of Civil 3D, and in this situation, designers will need to **create personalized catalogs by building a new Part Family**. To do so, we need to navigate through the Part Builder to create our own 2D or 3D model of the parts.

To prevent any issues with the catalog, especially during synchronization mapping, it is a must for **every single Part Size to have a unique name**. Without a unique name, it will just confuse the algorithm when it tries to search for the equivalent parts.

Nodes & Pipes Dimension Synchronization

The nodes and pipes dimensions will be referred to by the algorithm to find equivalent sizes during the synchronization. Equivalent dimensions are highly encouraged to preserve the vertical coordinates, though data preservation can be ensured even with mismatched sizes (Further explanation on the algorithm for utility sync can be read here).

Dimension comparison behavior of the algorithm depends on the *Dimension Synchronization Source* - **ByDataField** or **ByDescription**.



ByDataField

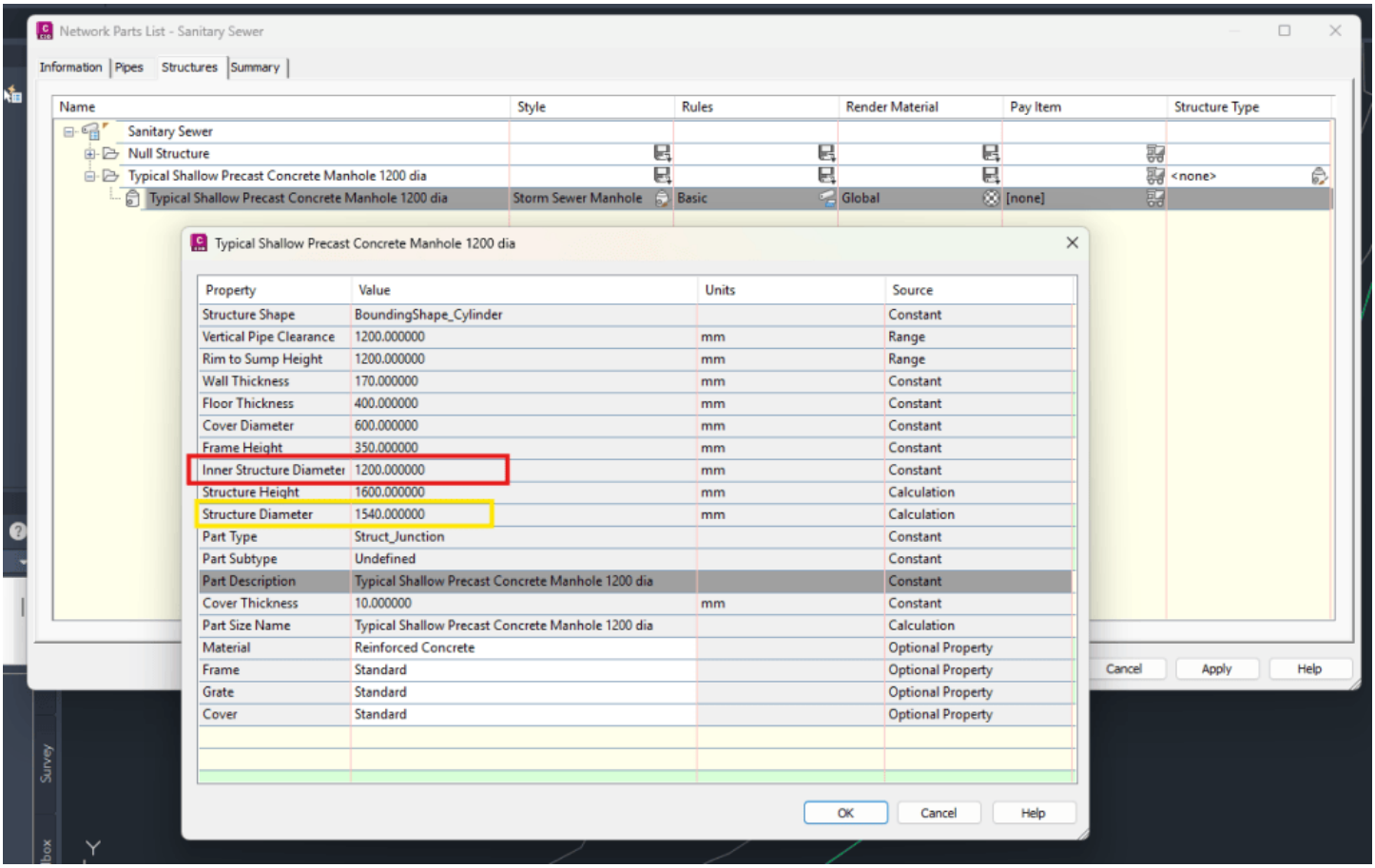
This is a more precise and standardized method where the algorithm will compare for equivalent dimensions by referring to a specific value provided in the part's data field. It is a must for designers to ensure that the following data fields exist, or else, accurate comparison cannot be done, and a verification error will be thrown to notify users.

Gravity Pipe Networks

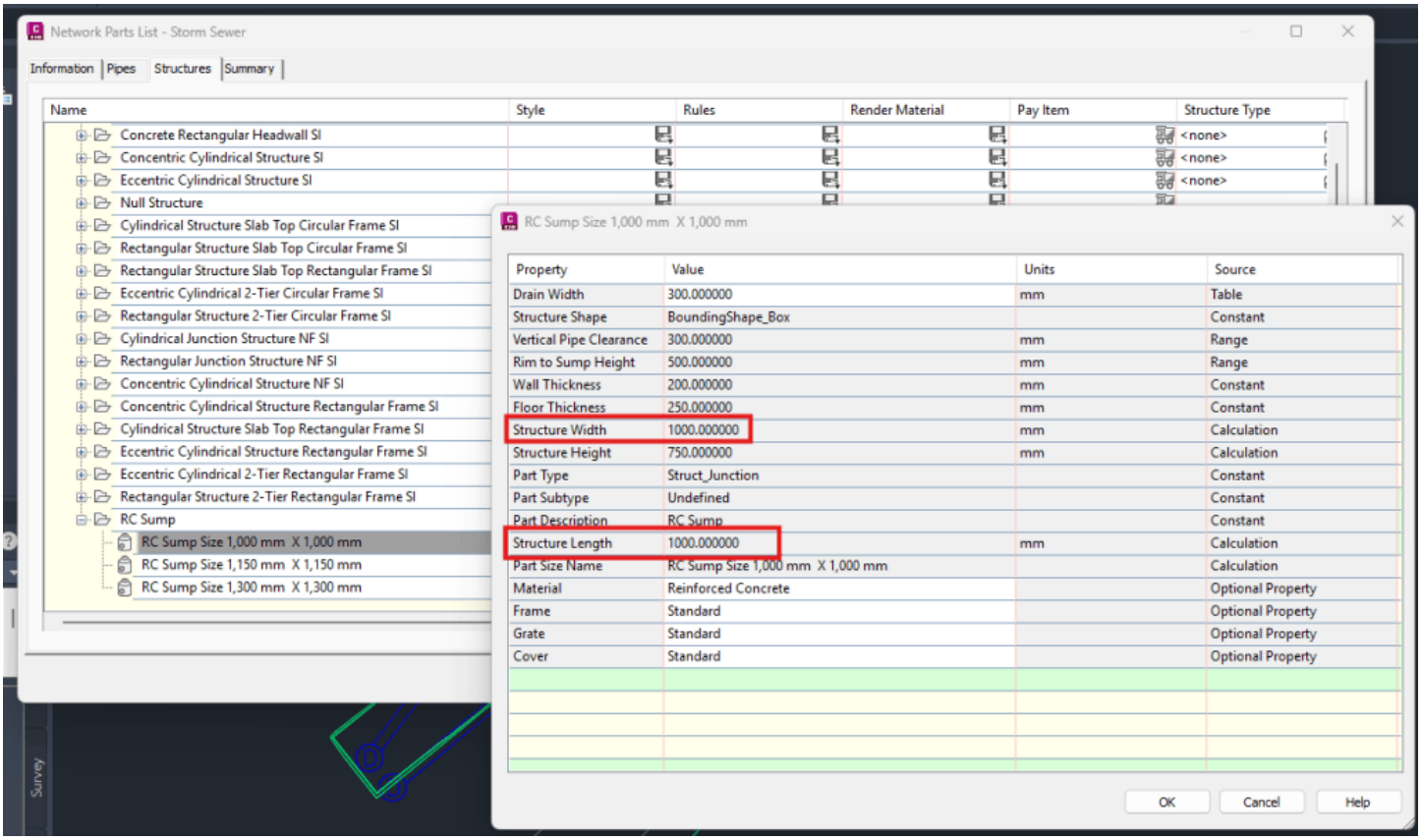
Structures

- Outer Diameter - Structure Diameter (Cylinder-shaped structure) or Structure Length and Structure Width (Box-shaped structure)

- Inner Diameter - Inner Structure Diameter (Cylinder-shaped structure) or Inner Structure Length and Inner Structure Width (Box-shaped structure)



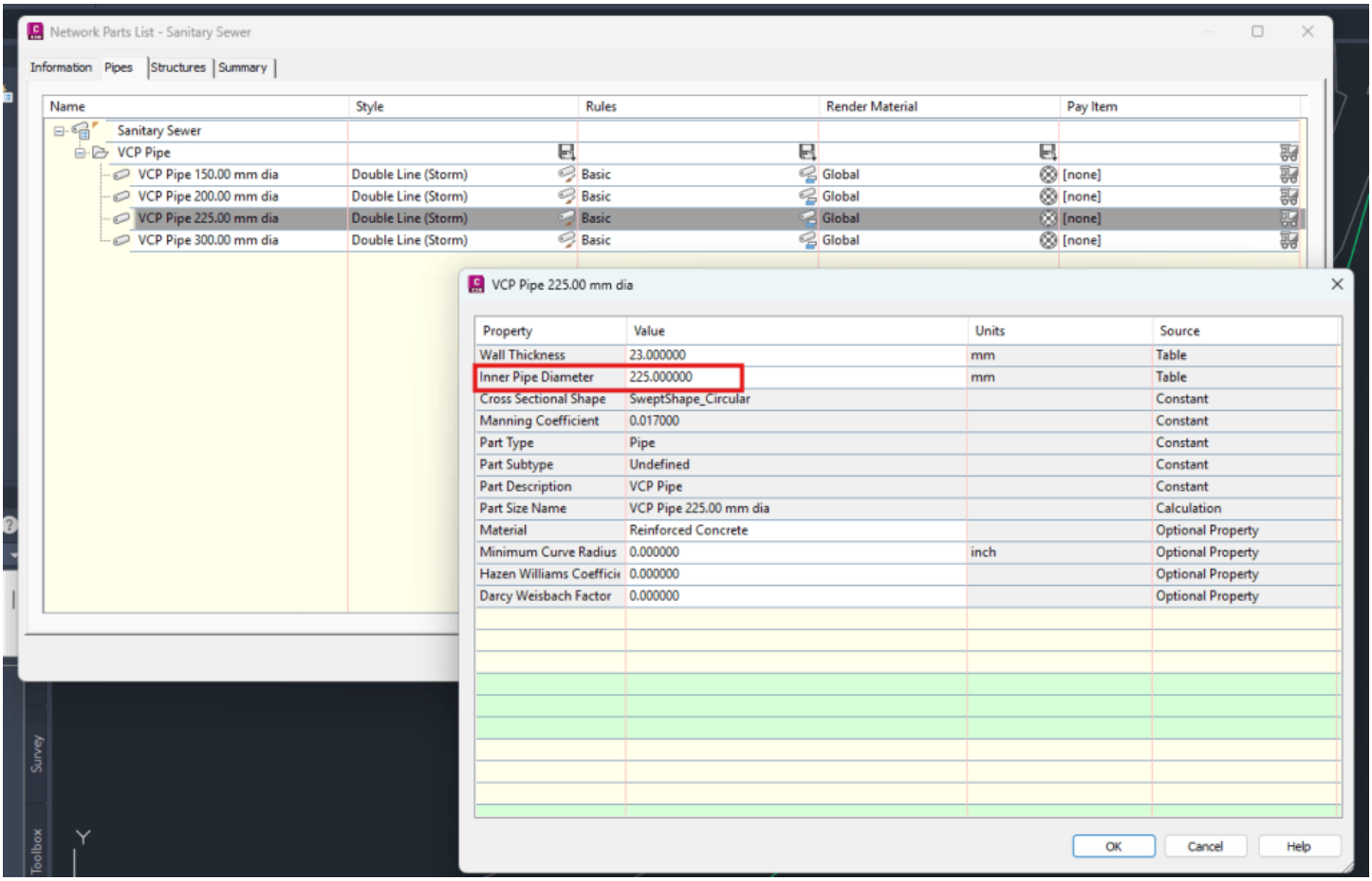
Cylindrical structure dimensions



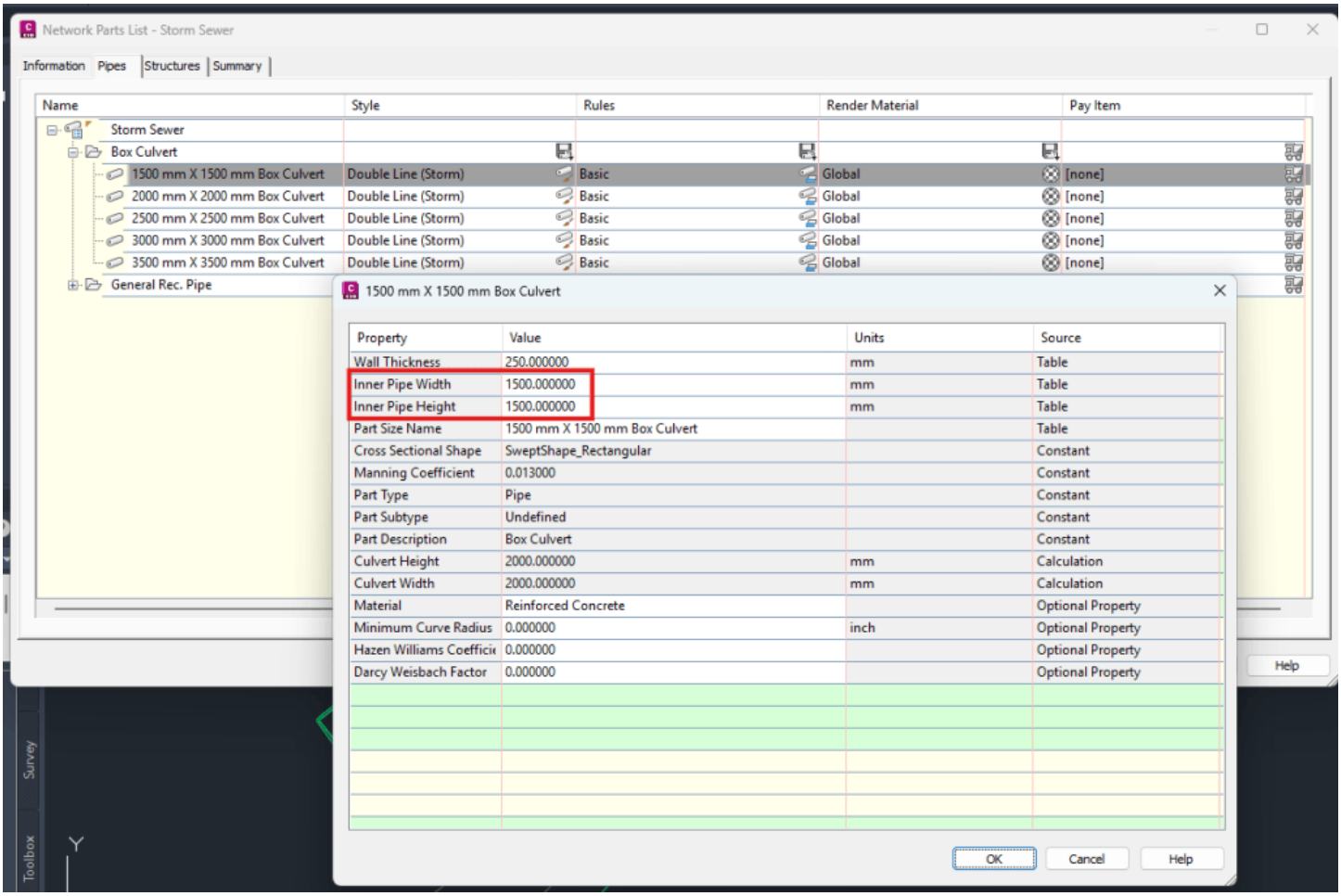
Box structure dimensions

Pipes

- Inner Diameter - Inner Pipe Diameter (Cylinder pipes) or Inner Pipe Width and Inner Pipe Height (Box pipes)



Cylindrical pipe dimensions

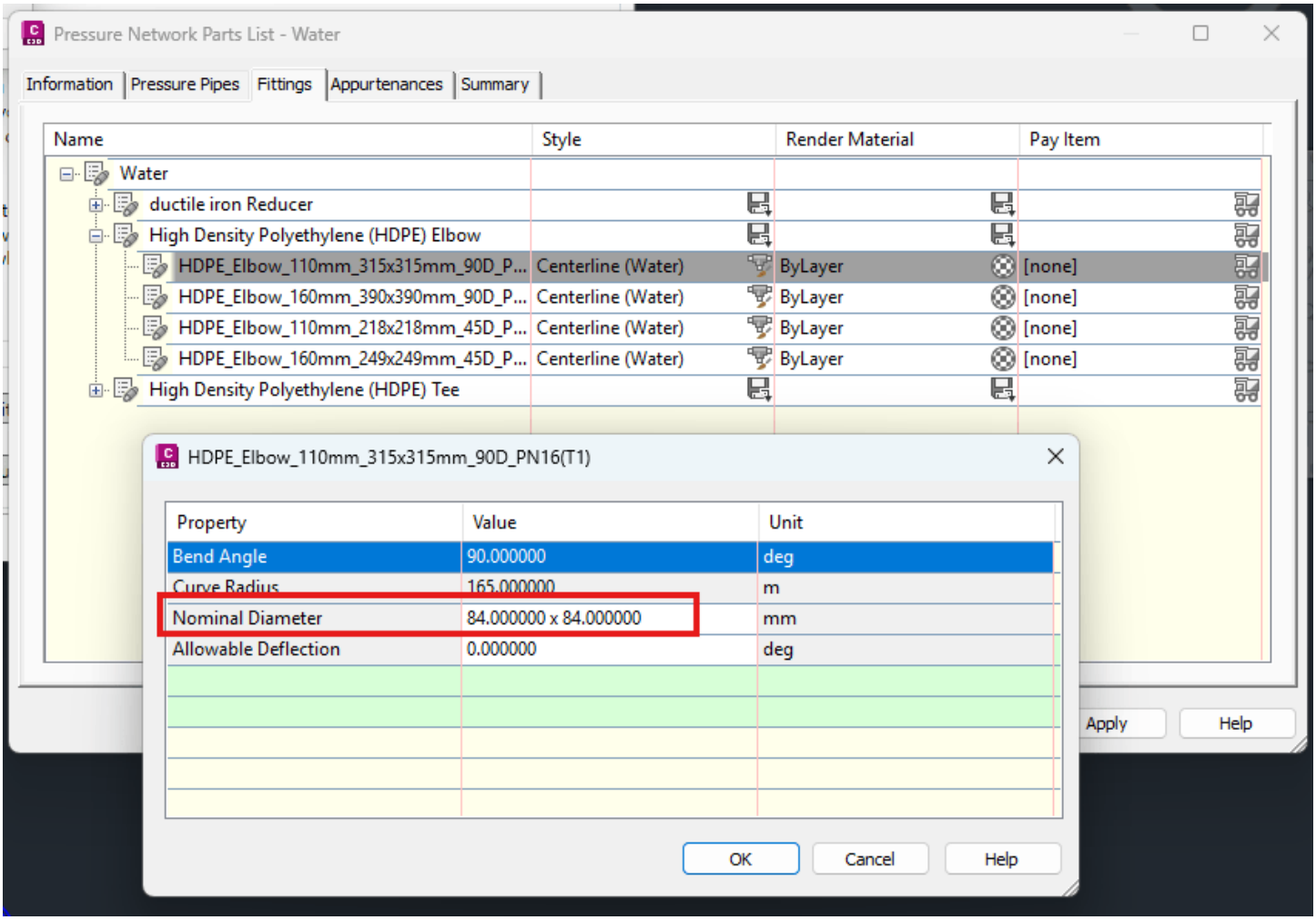


Box pipe dimensions

Pressure Pipe Networks

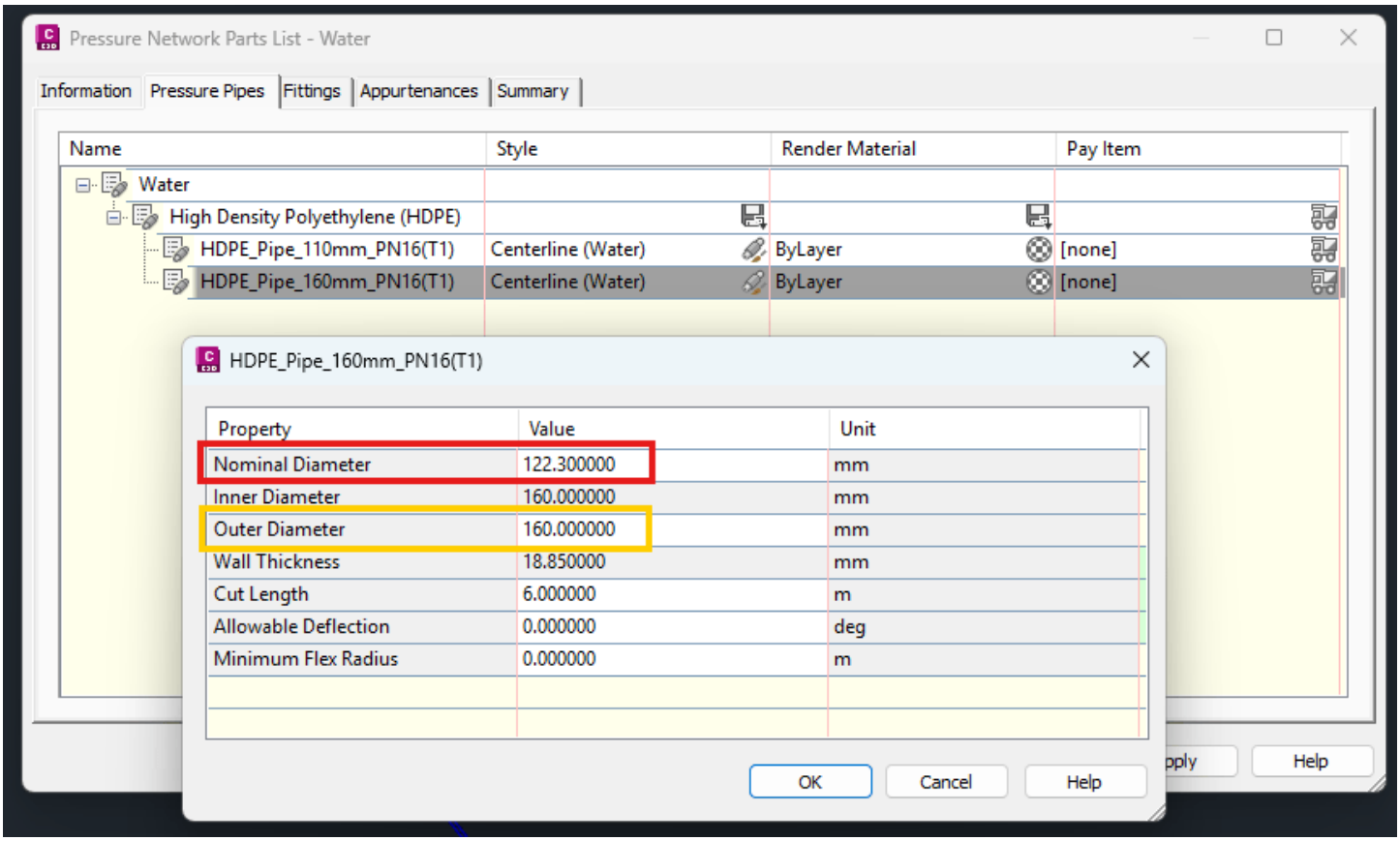
Fittings and Appurtenances

- Refers to the nominal diameter



Pipes

- Inner Diameter - refers to the Diameter inside or Nominal Diameter
- Outer Diameter - refers to the Diameter Outside

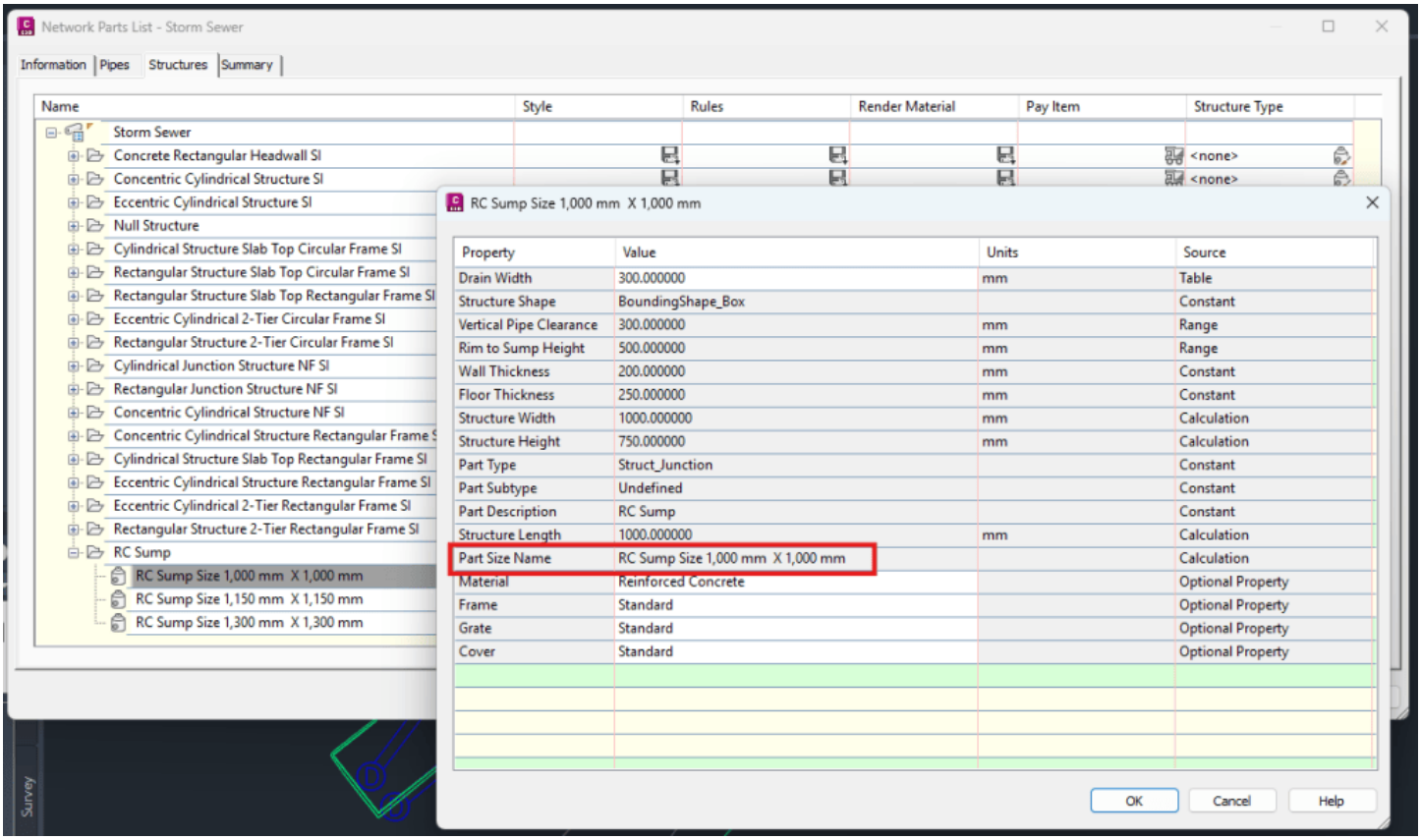


ByDescription

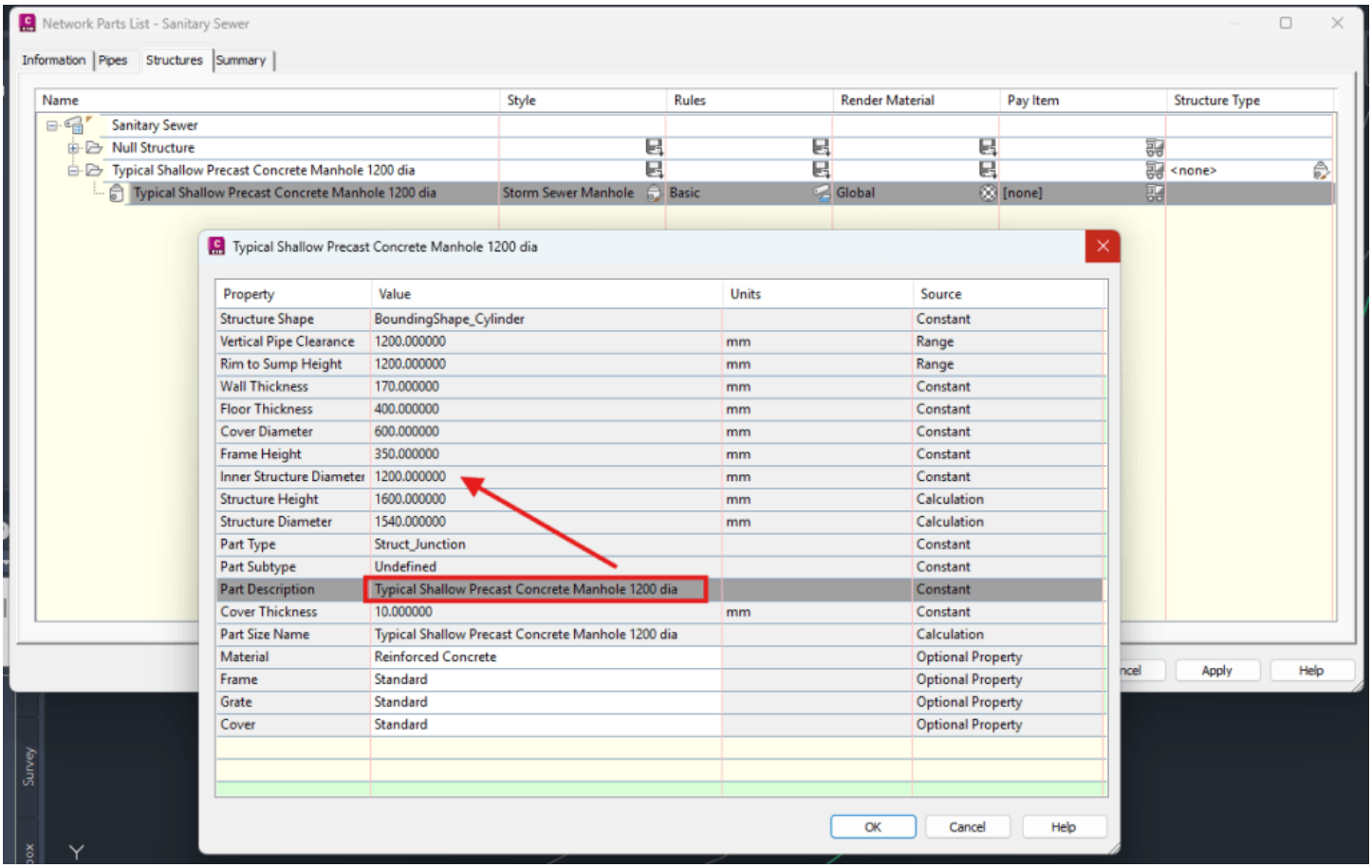
This parameter was implemented to ensure that even a poorly defined part catalog can still be utilized during the synchronization process. Without the above data fields, users can opt for this method, which is less structured as the **algorithm relies on the part's description or name for the dimension comparison**.

This is just a backup solution, in case the essential data is missing in the Part Size.

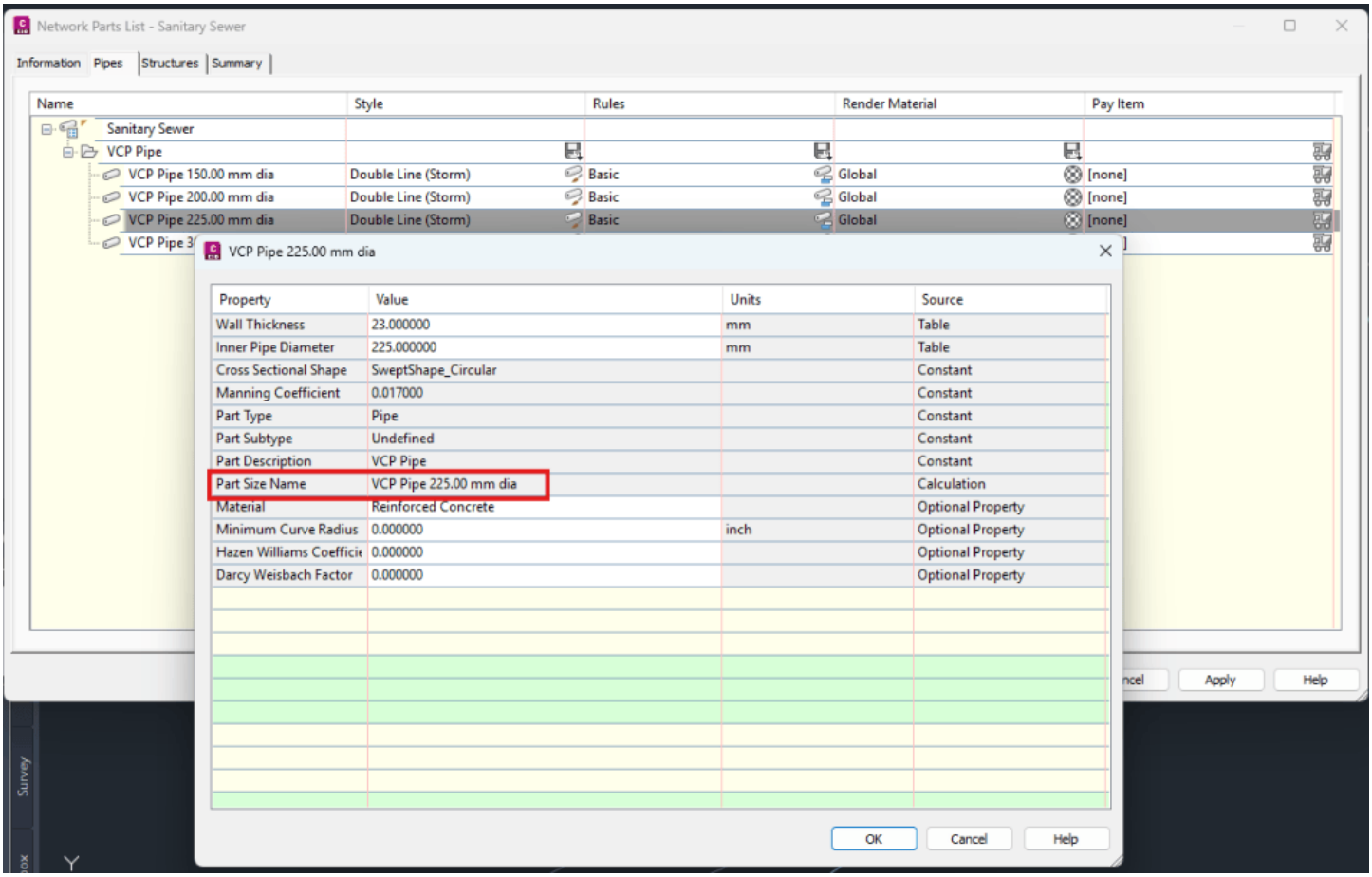
The data parsing method is illustrated in the examples below.



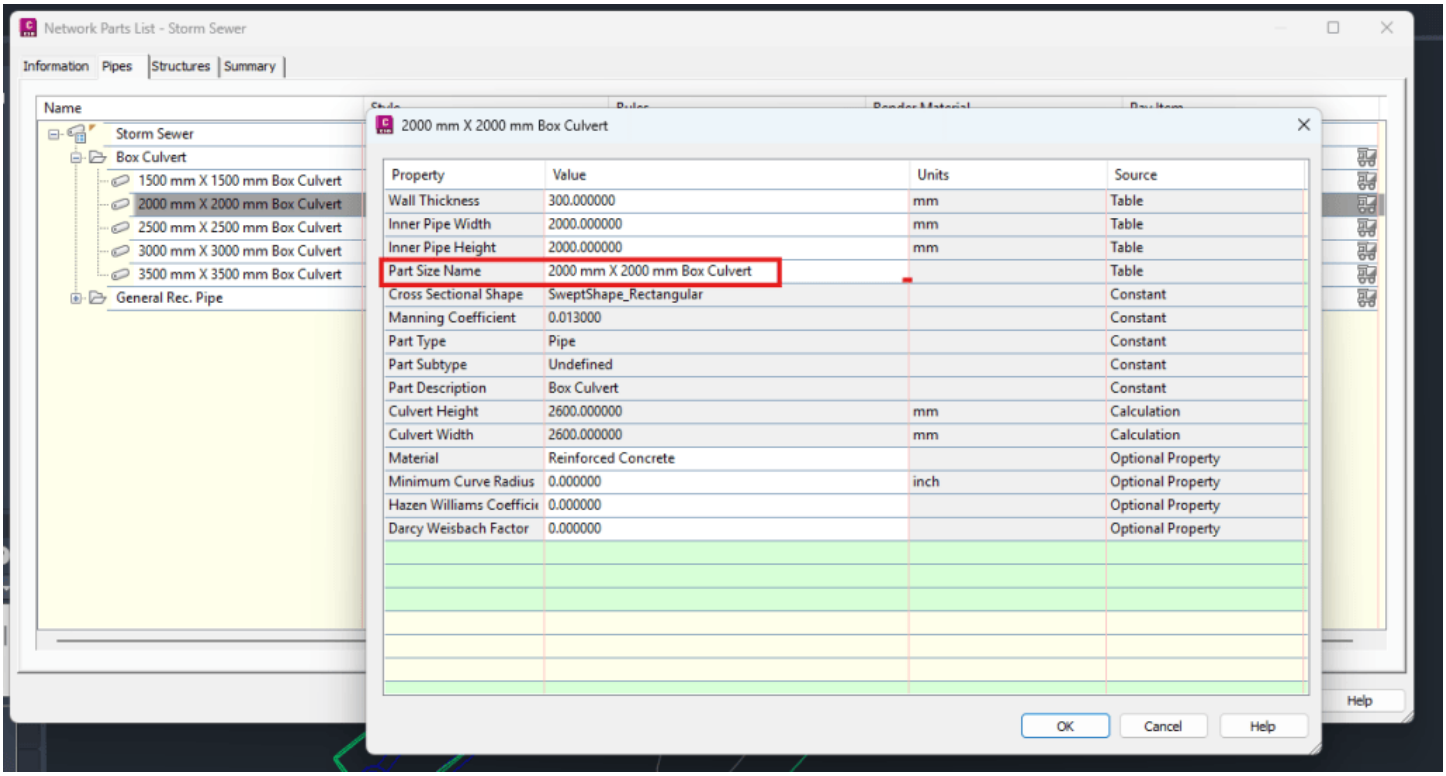
Box Structure: RC Sump, by 1000mm x 1000mm, will be interpreted as a rectangular structure with a Structure Length of 1000mm and a Structure Width of 1000mm



Cylinder Structure: Typical Shallow Precast Concrete Manhole 1200 dia, which will be interpreted as a cylinder structure with a diameter of 1200mm



Cylinder pipes: VCP Pipe 225.00 mm dia will be interpreted as a cylindrical pipe with an inner diameter of 225mm



Box pipes: 2000 x 2000mm Box Culvert will be interpreted as box pipes with Inner Pipe Width of 2000mm and Inner Pipe Height of 2000mm

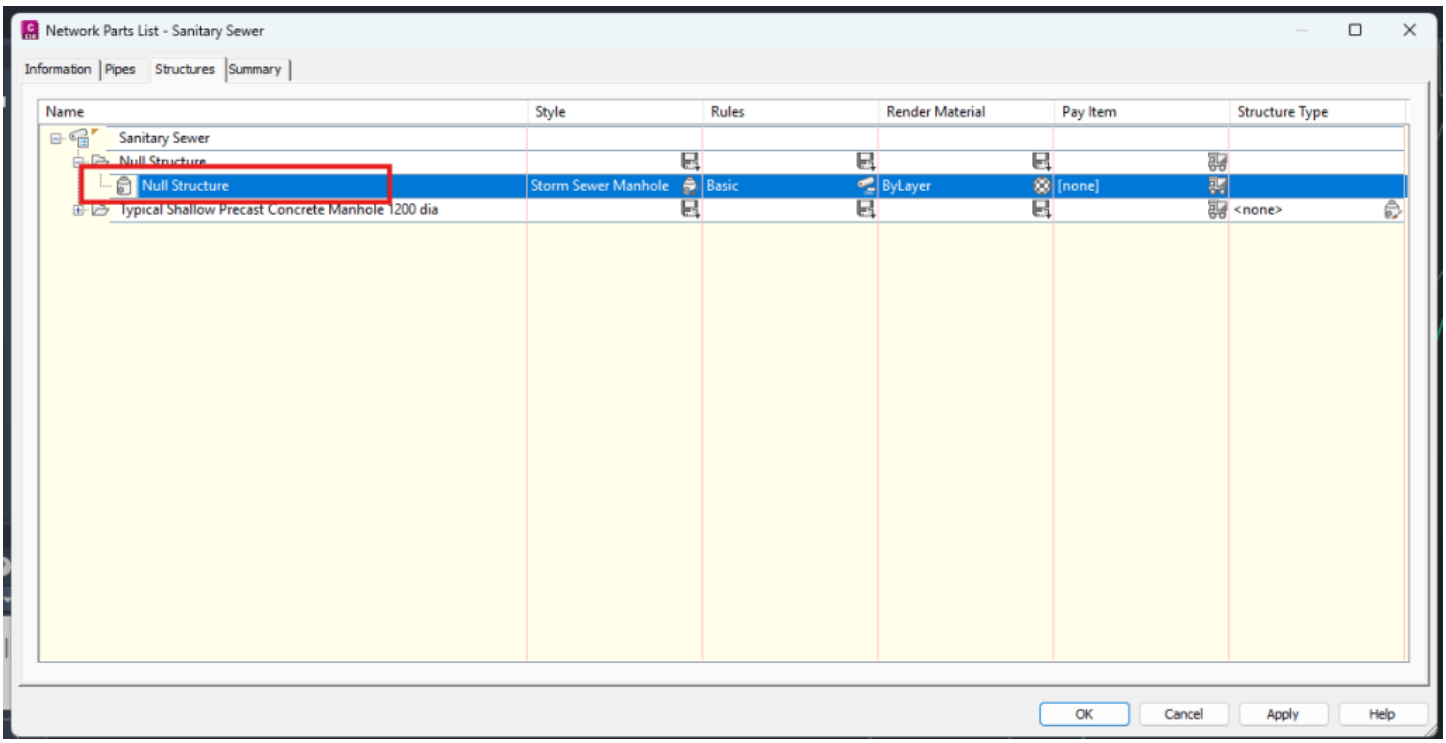
Note: The parts can also be described with no units to the sizes, and in this case, the unit will be assumed to be *equivalent* to the drawing's unit -- parts sizes in mm if the drawing unit is in meters or inches if the drawing unit is in feet

Civil 3D Part Family: Null Structure

Null Structure is a special part type available in Civil 3D that does not have any physical parameters, such as dimensions, material, etc. It is automatically included by Civil 3D in every part list, even a newly created part list, as a fundamental, non-physical connecting structure.

Applying a Null Structure in a network tells Civil 3D to assume that at that particular point of the network, **there are no physical structures, such as manholes, sumps, or fittings,** and it is only an **invisible connection point for the pipes**.

To prevent a structure from being synchronized, in cases where the structures are not required to be designed in detail, designers may map Null Structures as the Civil 3D Part Family during the nodes definition under the Project Settings. In addition, Null Structures are also useful for creating curved pipes, as Civil 3D requires connecting structures at each bend point to create a polyline curve.



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