AASHTOWare BrDR 7.5.0

Feature Tutorial

TMP1 – Use of Templates

TMP11 – Use of Templates

This example describes using BrDR to create a template for prestress bridges for a fictitious agency.

Topics Covered

- What are templates?
- Creating a template prestress bridge
- Creating a folder to organize templates
- Using a template to create a new bridge

What are templates?

Templates are bridges that are used as starting points for developing new bridges. Template bridges contain a basic framework for a specific type of bridge. The basic framework can consist of items such as standard materials, beam shapes and appurtenances that are used frequently on bridges for a given state. Use a template bridge to jump-start the data entry of a bridge or bridges.

Creating a template prestress bridge

From the Bridge Explorer create a new bridge by clicking on the **New** button in the **Bridge** group of the **BRIDGE** ribbon as shown below.
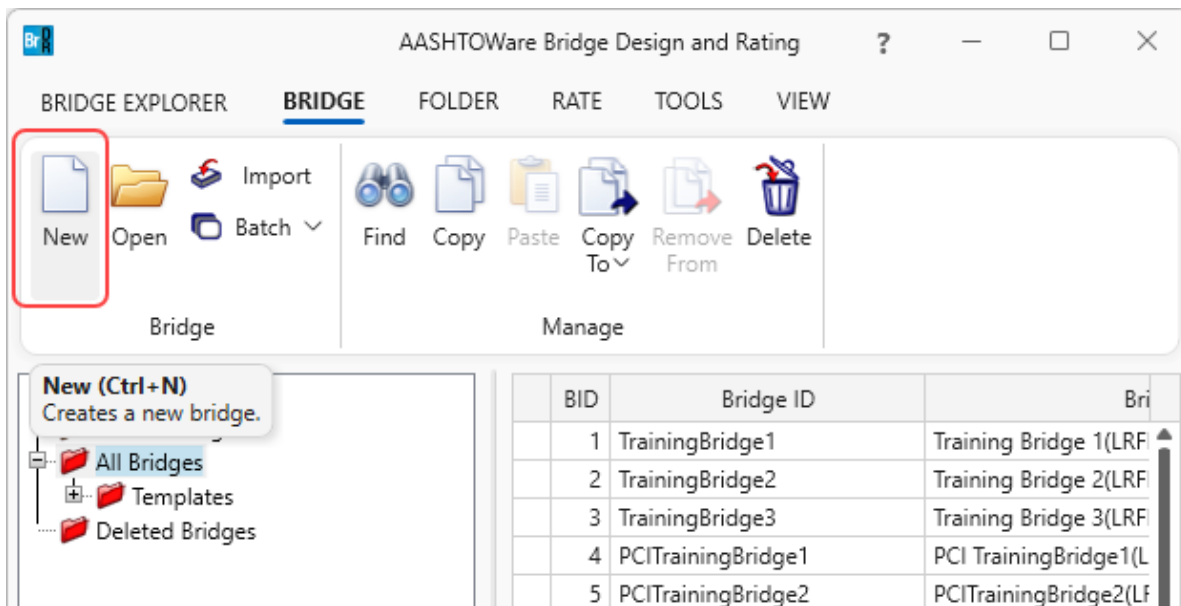
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Then enter the following data in the **New Bridge** window. Be sure to check the **Template** box to indicate this is a template bridge. Checking this box ensures that this bridge will not be rated when a batch rating is initiated from the Bridge Explorer. Click **OK** to continue.
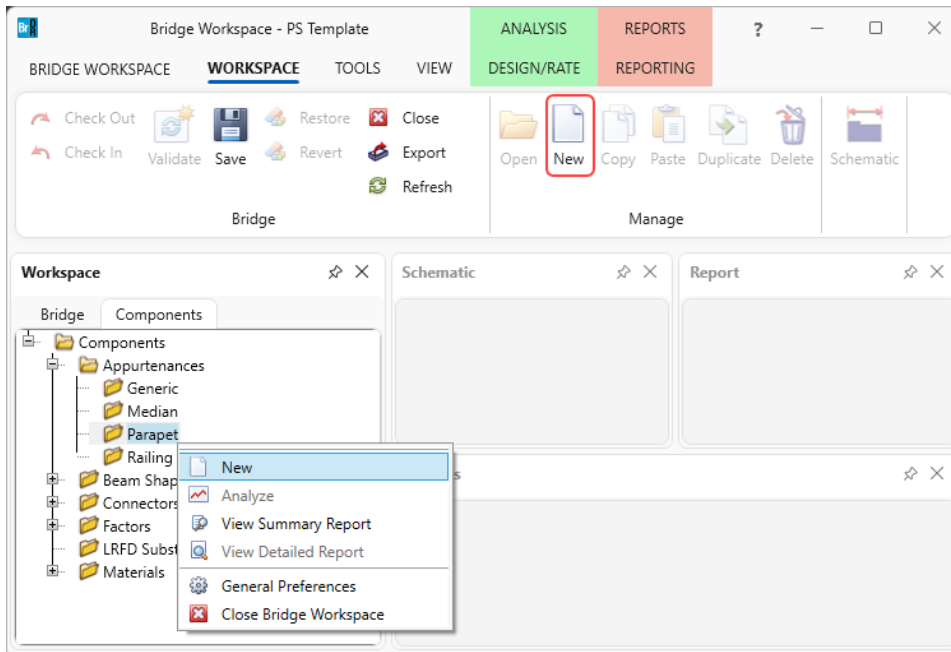
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The **Components** tab of the **Bridge Workspace** opens the gateway to entering items to be used in the template bridge.
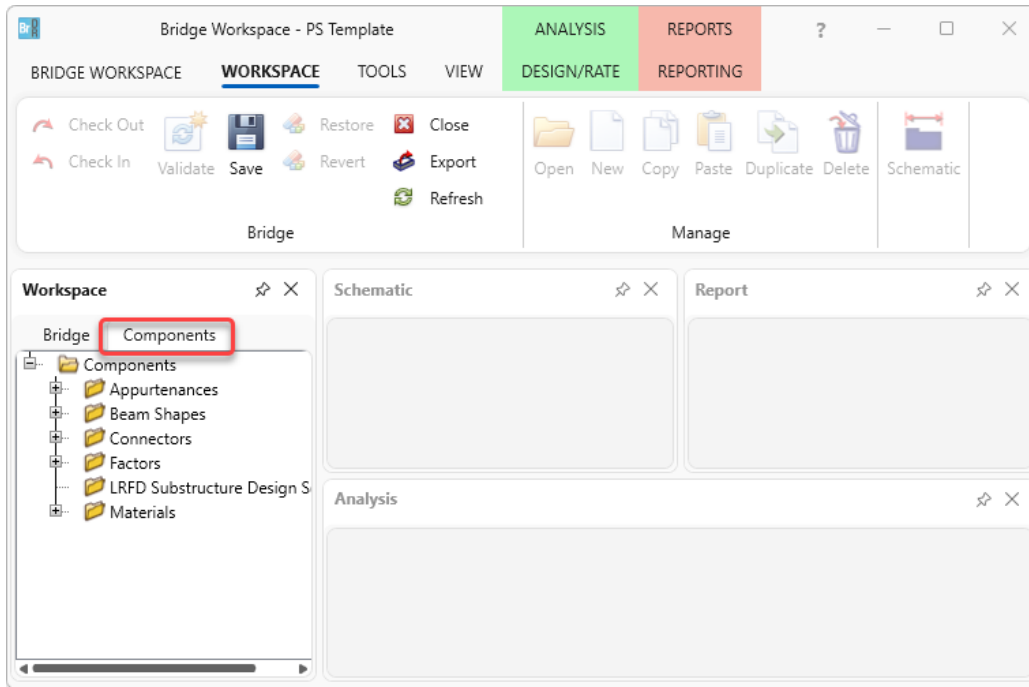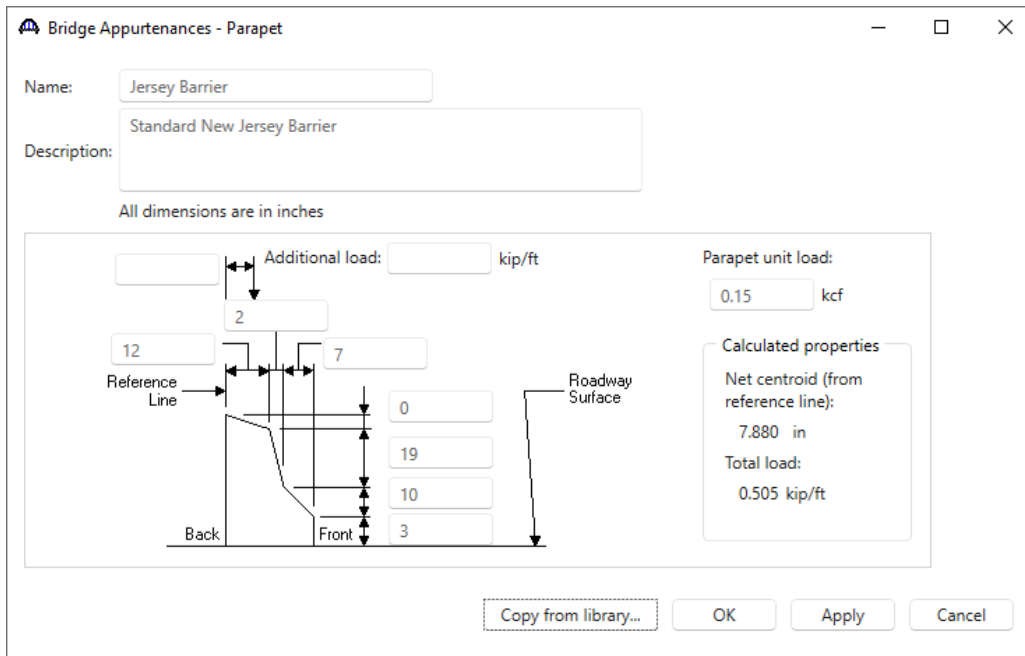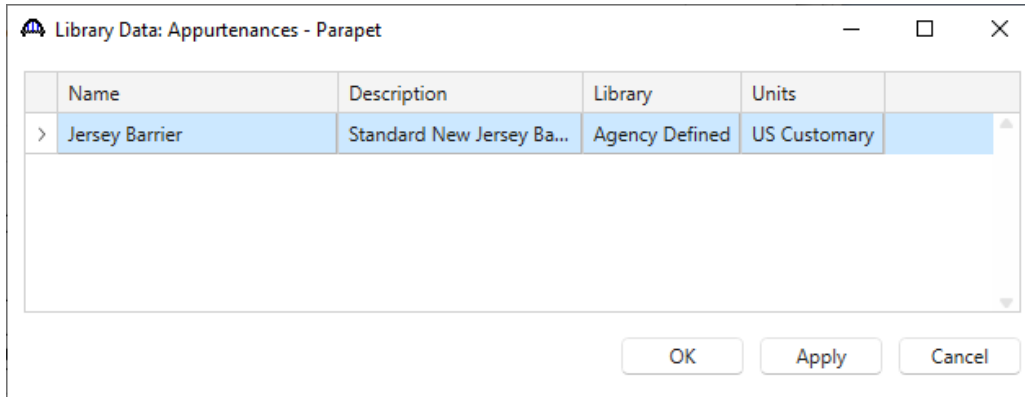

Bridge Appurtenances – Parapet

Expand the **Appurtenances** folder and double click on **Parapet** (or select **Parapet** and click **New** from the **Manage** group of the **WORKSPACE** ribbon, or right click and select **New**) to add a new parapet.

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Click on the **Copy from library…** button and select the **Jersey Barrier** Parapet from the library to the bridge.

Click **OK** to add this parapet and close the window.

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Similarly, add the following **Prestress Beam Shapes** to this template bridge by copying the beam shapes from the library. The following shows the **Components** tab after all the prestress box beams with rectangular voids have been copied from the library.
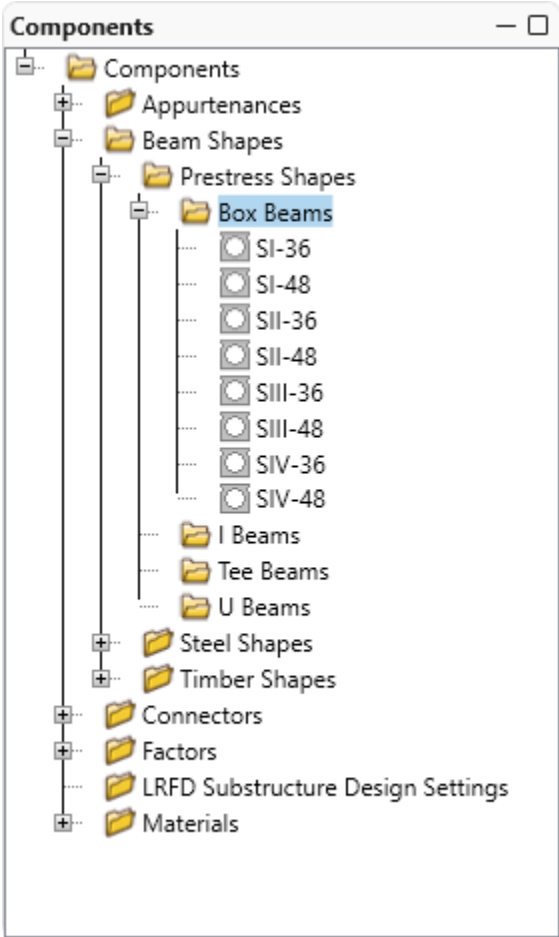
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Similarly, copy the **Class A (US)** concrete material from the **library** to the bridge. Also create a **5 ksi concrete** since it is often used for prestress beams.

Bridge Materials - Concrete

Name:	Class A (US)	
Description:	Class A cement concrete	
Compressive strength at 28 days (f'c):	4.0000006	ksi
Initial compressive strength (f'ci):		ksi
Composition of concrete:	Normal	
Density (for dead loads):	0.15	kcf
Density (for modulus of elasticity):	0.145	kcf
Poisson's ratio:	0.2	
Coefficient of thermal expansion (α):	0.000006	1/F
Splitting tensile strength (fct):		ksi
LRFD Maximum aggregate size:		in

Compute

Std modulus of elasticity (Ec):	3644.149254	ksi
LRFD modulus of elasticity (Ec):	3986.548657	ksi
Std initial modulus of elasticity:		ksi
LRFD initial modulus of elasticity:		ksi
Std modulus of rupture:		ksi
LRFD modulus of rupture:	0.479857	ksi
Shear factor:	1	

Copy to library...   Copy from library...   OK   Apply   Cancel

Bridge Materials - Concrete

Name: 5 ksi

Description:

Field	Value	Unit
Compressive strength at 28 days (f'c):	5	ksi
Initial compressive strength (f'ci):	4	ksi
Composition of concrete:	Normal	
Density (for dead loads):	0.15	kcf
Density (for modulus of elasticity):	0.145	kcf
Poisson's ratio:	0.2	
Coefficient of thermal expansion (α):	0.000006	1/F
Splitting tensile strength (fct):		ksi
LRFD Maximum aggregate size:		in

Compute

Field	Value	Unit
Std modulus of elasticity (Ec):	4074.280688	ksi
LRFD modulus of elasticity (Ec):	4291.186125	ksi
Std initial modulus of elasticity:	3644.147431	ksi
LRFD initial modulus of elasticity:	3986.54846	ksi
Std modulus of rupture:	0.53033	ksi
LRFD modulus of rupture:	0.536656	ksi
Shear factor:	1	

Copy to library...   Copy from library...   OK   Apply   Cancel

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Using the **Copy from library…** option, copy the following **prestress strand** from the **library** to the bridge.

Bridge Materials - PS Strand

Name: 1/2" (7W-270) LR

Description: Low relaxation 1/2"/Seven Wire/fpu = 270

Strand diameter: 0.5 in

Strand area: 0.153 in^2

Strand type: Low Relaxation

Ultimate tensile strength (Fu): 270 ksi

Yield strength (fy): 243 ksi

Modulus of elasticity (E): 28500 ksi

Compute

Transfer length (Std): 25 in

Transfer length (LRFD): 30 in

Unit load per length: 0.52 lb/ft

☐ Epoxy coated

Copy to library…   Copy from library…   OK   Apply   Cancel

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Bridge Materials – Reinforcing Steel

Using the **Copy from library…** option, copy the **Grade 60** reinforcing steel. Now add **Epoxy** to the **name** and change its **Type** to **Epoxy**.

The **Components** tab now appears as follows:
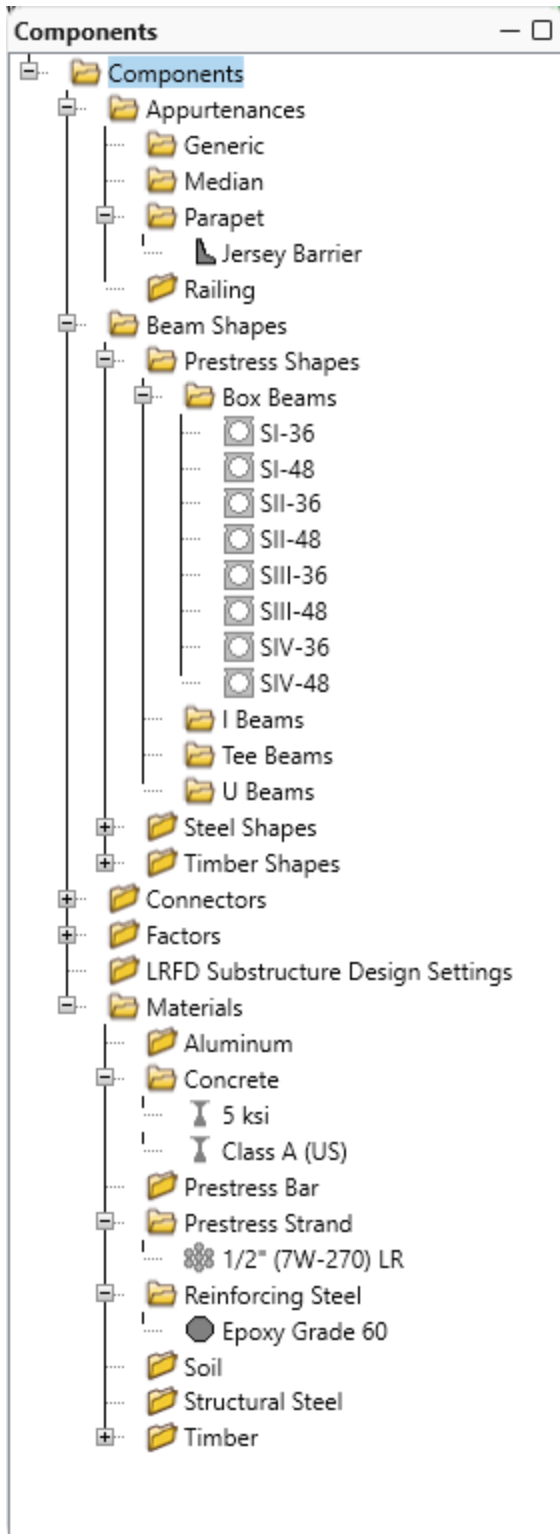
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The partially expanded **Bridge** tab is shown below.
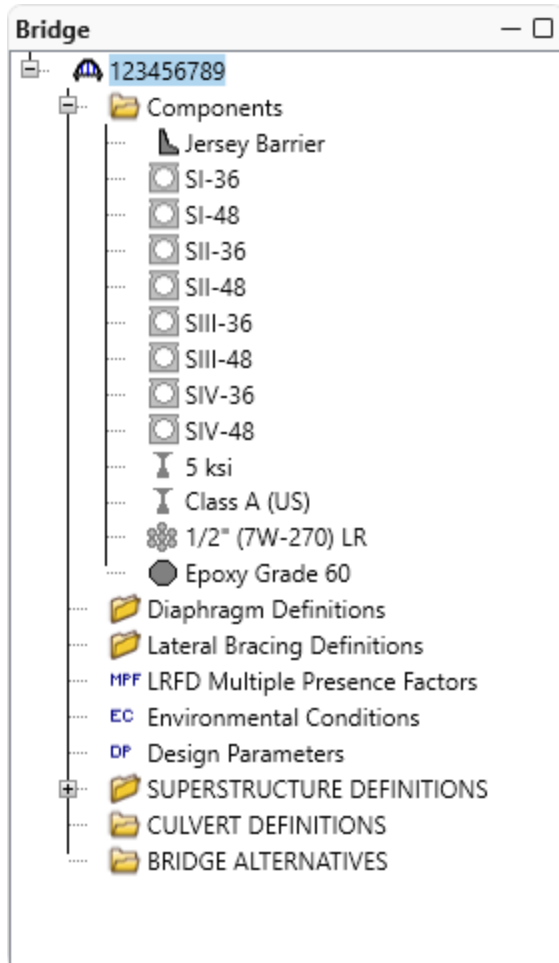
Superstructure Definition

Create a **Girder System Superstructure Definition** with 1 span and 2 members. The span length can be any value but use 100' here. This template can be used to create a real bridge, by simply changing the number of spans, members and entering the correct span lengths in the real bridge. Double click on the **SUPERSTRUCTURE DEFINTIONS** node in the **Bridge Workspace (BWS)** tree. Select **Girder system superstructure** and click on the **OK** button to create a new girder system superstructure definition as shown below.
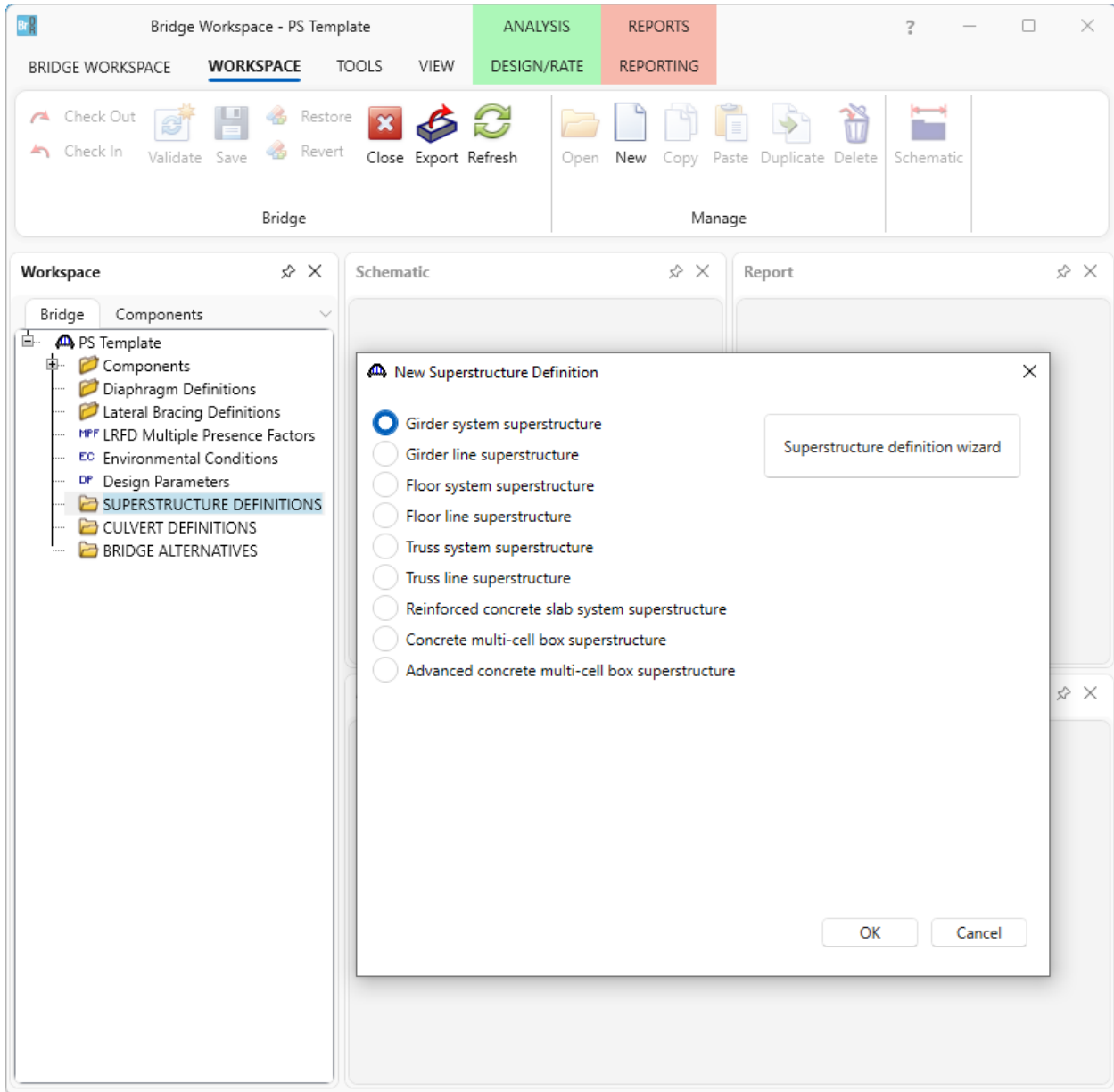
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Enter details as shown below.

Click **OK** to create the new superstructure definition and close the window.

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Load Case Description

Double click on the **Load Case Description** node under the newly created superstructure definition. Create default load cases using the **Add default load case descriptions** button.

Click **OK** to apply the data and close the window.

Structure Typical Section

Double click on the **Structure Typical Section** window and select the **deck concrete material** on the **Deck (cont'd)** tab as shown below.

Navigate to the **Parapet** tab of this window and locate the **Jersey Barrier** as shown below.

Click **OK** to apply the data and close the window.

Concrete Stress Limits - Stress Limit Sets - Concrete

Double click on the **Concrete Stress Limits** node in the **BWS** tree. After selecting the concrete material press the **Compute** button.
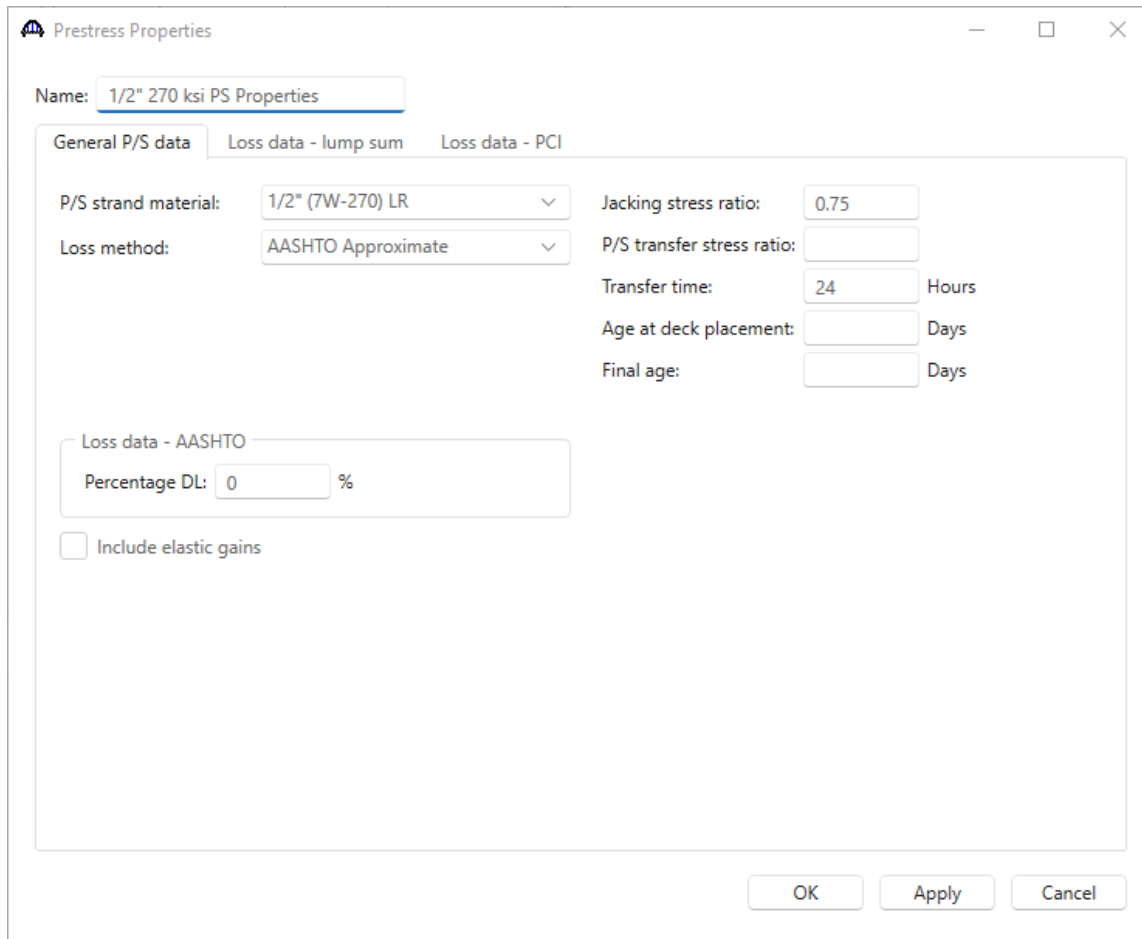
Click **OK** to apply the data and close the window.

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Prestress Properties

Double click on the **Prestress Properties** node in the **BWS** tree to create the following prestress properties. The only additional input needed here is the **Name**.

Click **OK** to apply the data and close the window.

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Double click on the **Vertical** node under **Shear Reinforcement Definitions** folder in the **BWS** and create the following **Vertical Shear Reinforcement** Definition.
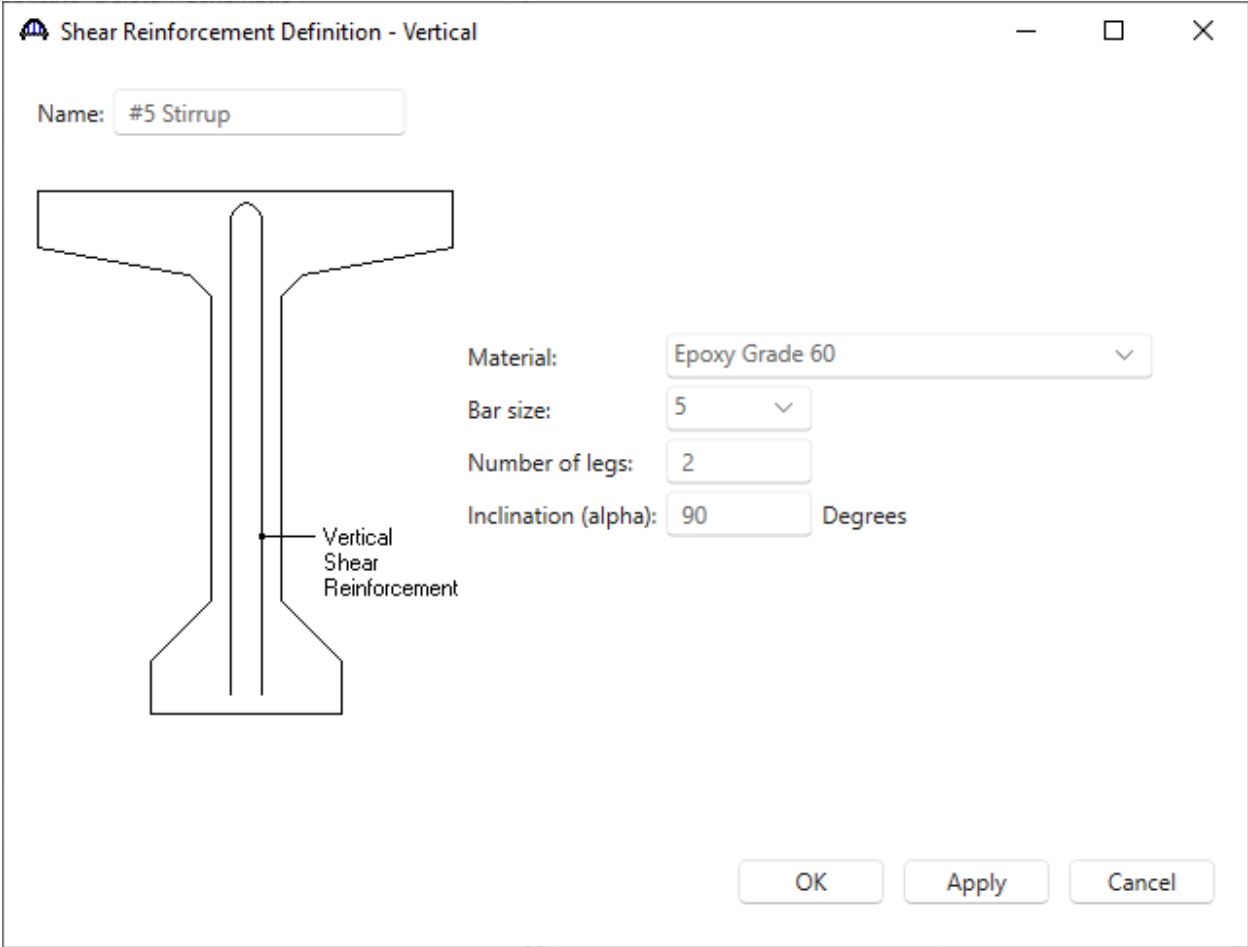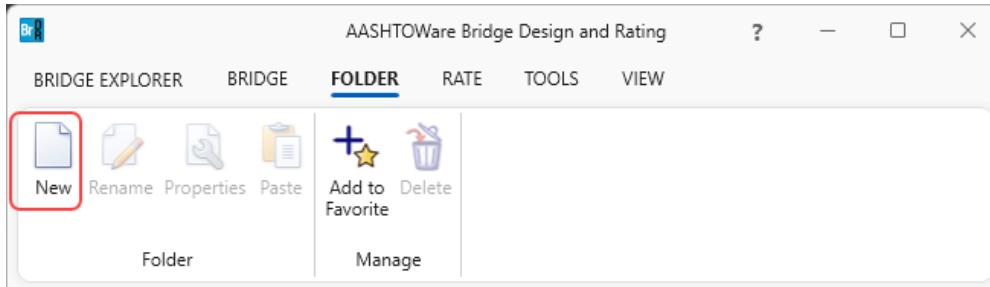
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The template prestress bridge is now ready. The **Bridge** tab of the **Bridge Workspace** is shown below. Press the **Save** button from the **Bridge** group of the **WORKSPACE** ribbon and **Close** the window.
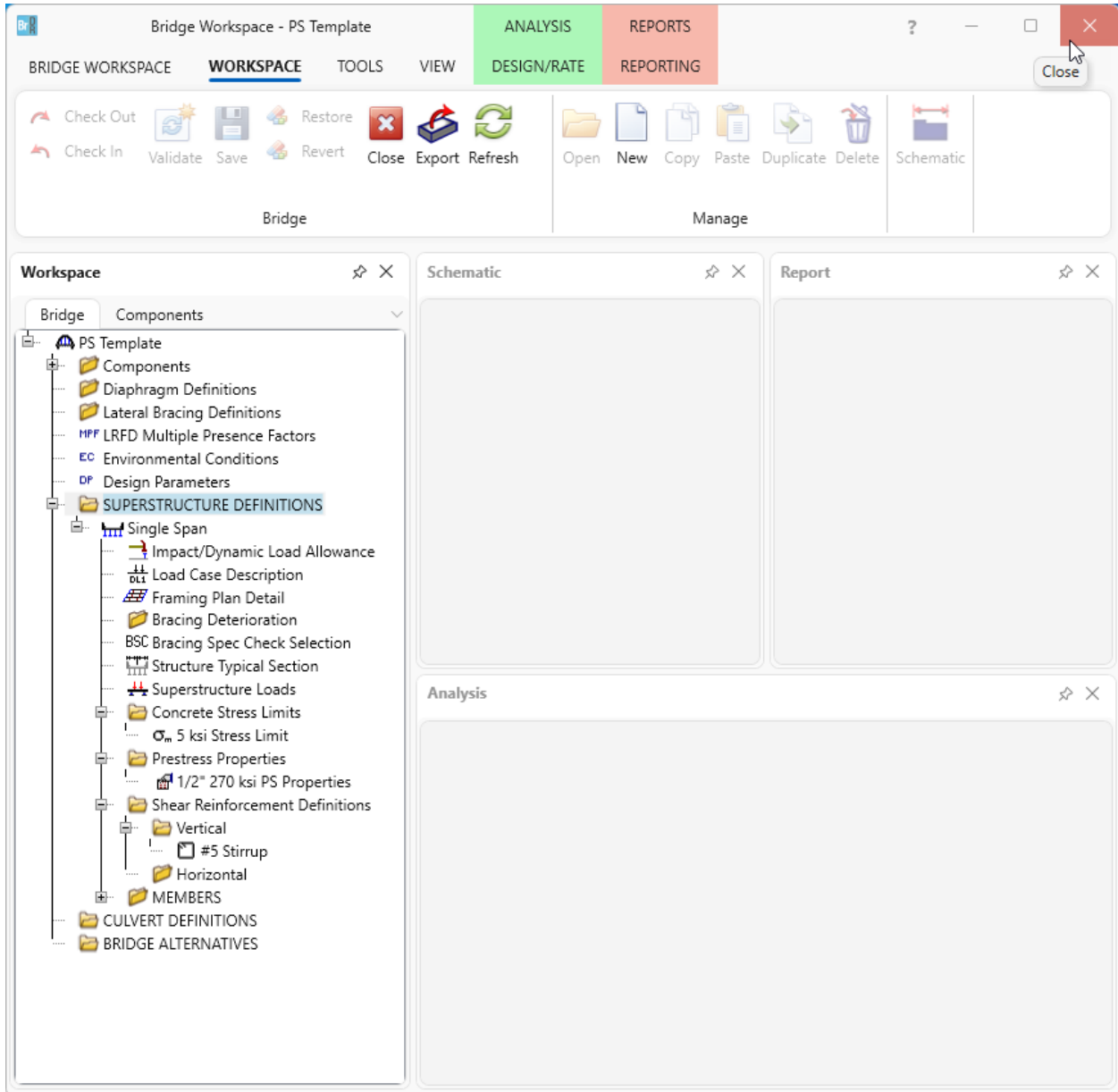
Creating a Folder to Organize Templates

From **Bridge Explorer**, select **New** from the **Folder** group on the **FOLDER** ribbon to open the following window.
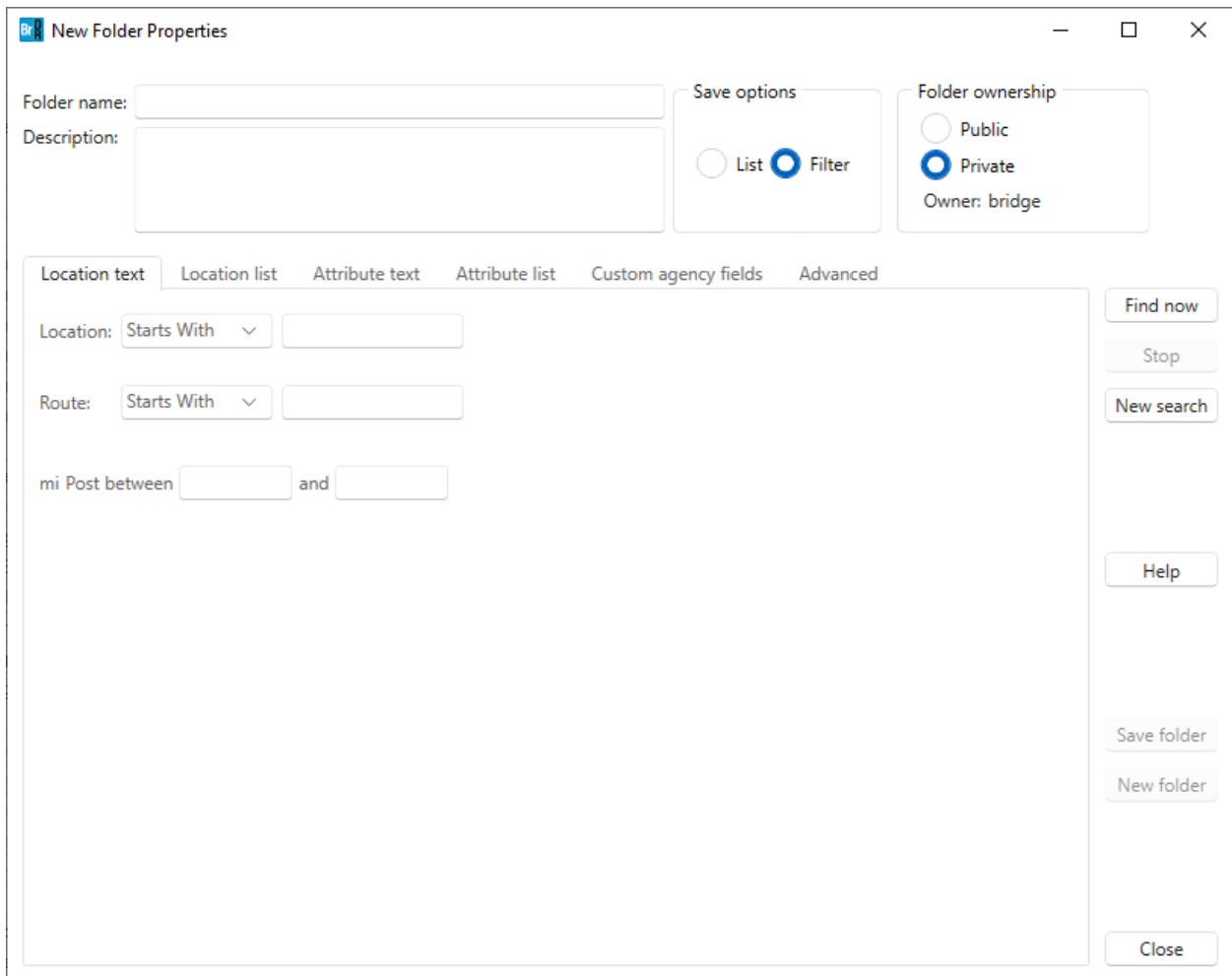
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Enter a folder name and select **Template Bridges** as shown on the **Attribute Text** tab.

Select **Find Now** and the template bridge just created will be listed. Select **Save Folder**.

Select **Save Folder** button above and the following folder is created in the **Bridge Explorer**.

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Using a Template to Create a New Bridge

The created template will be used to create a new 2 span prestress box beam bridge. Right-click on the **PS Template** bridge in the Bridge Explorer and select **Copy** from the menu.
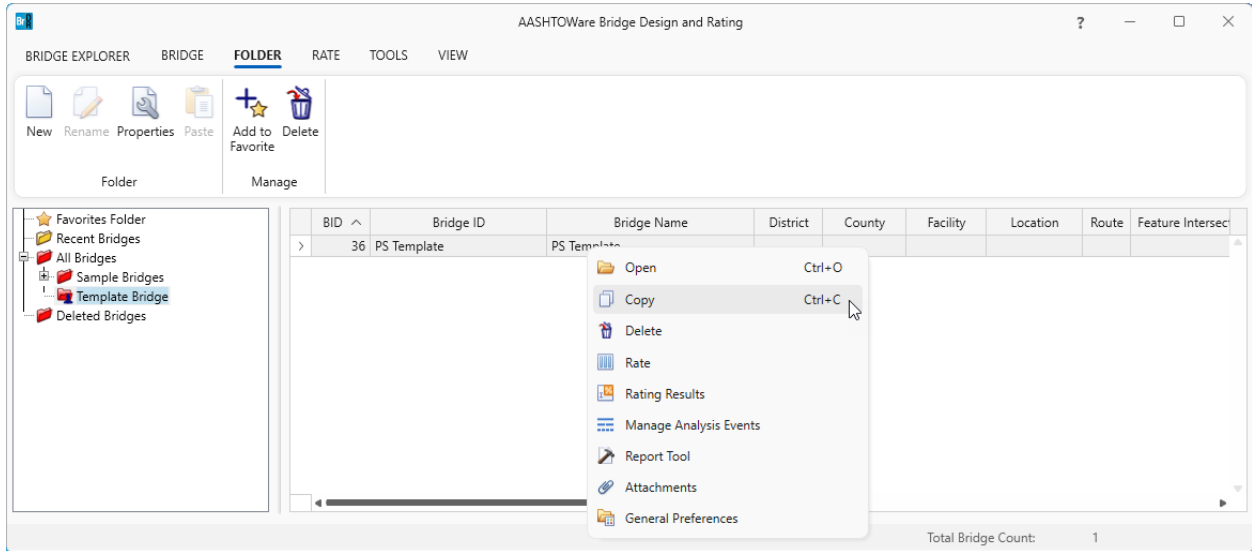
Right-click on the **PS Template** bridge again and select **Paste**. The following window appears. Revise the data to reflect the actual bridge being created using this template and click **OK**. This creates the new bridge and is added to the Bridge Explorer.

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Open the **Bridge** window for this new bridge just created. Uncheck the **Template** box and enter data to reflect this bridge.

Now adjust the data in this new bridge to reflect the actual bridge. Items that must be adjusted include:

- Superstructure Definition – number of spans, number of girders, span lengths
- Framing Plan Details – girder spacing, support skews, diaphragms
- Structure Typical Section – deck width, lane positions
- Member Alternatives - must be created