

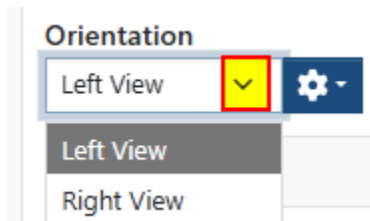
## Hydraulic Cross Sections in BrM

All bridges over waterways will have field measured cross sections taken at the intervals described in Section 4.5.7.3 of the NDOT BIP Manual. Every bridge over water must have at least one cross section. As channel or channel protection systems deteriorate and scour vulnerability increases, the frequency of cross sections for monitoring will increase.

### Creating a Hydraulic Cross Section

In an open inspection record in BrM, navigate to Bridges > Inspection > Cross Sections.

1. Input the structure number and select it
2. Select the Orientation



The orientation is relative to the direction of increasing reference post (see NE Item 217).

Measurements are to be taken on the downstream side of the bridge at each support and change in topography. A cross section field template form is available on the Bridge Division website.

There are four primary types of cross sections.

- a. Streambed Cross Sections (from field measurements taken by inspector at the required intervals)
- b. Structure Detail (shows depth of structural components from as-builts or field sketches)
- c. Calculated Scour Elevation at each support (from hydraulic analysis – See chapter 6 of BIP Manual)
- d. Allowable Scour Elevation at each support (from structural analysis when warranted - See chapter 6 of BIP Manual)

There are also two additional types of cross sections displayed in BrM.

- e. Original Streambed Elevation (rarely used, instead cross sections are compared by date).
- f. Scour Resistant Layer (used if applicable)

### To input Structural Details

There is only one set of structural details per bridge, so this only has to be done once. The source is plans or field measurements. General Information input examples are shown in the screenshot below.

Bridges > Inspection > Cross Sections

Streambed Cross Sections   Scour Potential Evaluation   **Structure Detail**   Original Streambed Elevation   Scour Resistant Layer

The highlighted fields are important. Others are not used except Graph Line Settings, which are up to the users preferences.

Copy to Right View   Delete Structure Detail

### Graph Line Settings

Name \*  
Structure Detail

Style \*  
ShortDot

Color \*  
#00FF00

### General Information

High Water Elevation  
1200 ft

High Water Year  
2019

Upstream Side  
Right

Downstream Side  
Left

Station Equation  
0 Stations  
+ 0 ft  
= 0 Stations  
+ 0 ft

### Elevation Equation

0 ft  
=  
0 ft

Station Direction  
Increasing

Location of Base Measurement  
top of rail

Bent Direction  
Increasing

Elevation Basis  
Assumption

Source  
cell phone

These are always set to the direction of increasing stationing.

If plans or survey data are not available one option is to use a cell phone app as a source, but the accuracy is not great, so it should be indicated as an assumption in the Elevation Basis

These are the other Elevation Basis options. Plans or Survey are preferred, but an assumption is workable and can later be refined if warranted.

### Elevation Basis

Assumption

- Assumption
- Plans
- US Geodetic Survey

Then scroll down to the Details section to input structural components.

Bridges > Inspection > Cross Sections

### Graph Line Settings

Name \*  
Structure Detail

Style \*  
ShortDot

Color \*  
#00FF00

### Create Structure Detail Detail

Orientation  
Left View

Station \*  
0 Stations  
+ 100 ft

Reference Curb/Rail Elevation  
1223 ft

Deck Elevation  
1220 ft

Bottom Footing Elevation  
0 ft

Critical Pier Scour Depth  
ft

Pile Tip Elevation  
1125 ft

Footing Type  
Pile Bent

Superstructure Thickness  
1.5 ft

Remarks  
Pier 2

Save   Cancel

### Elevation Equation

0 ft  
=  
0 ft

Station Direction  
Increasing

Location of Base Measurement  
top of rail

Bent Direction  
Increasing

Elevation Basis  
US Geodetic Survey

Source  
cell phone

Add New

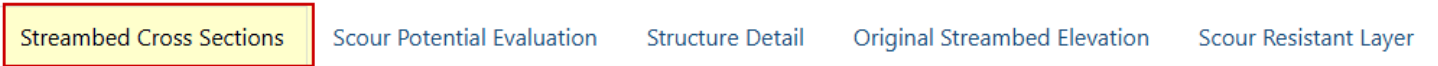
This is showing sample input for creating a support for Pier 2 100ft from Abut 1, using known elevations and 95 ft pile length

Station	Reference Curb/Rail Elevation (ft)	Deck Elevation (ft)	Pile Tip Elevation (ft)	Footing Type	Superstructure Thickness (ft)	Remarks
0 + 0	1,223	1,220	1,130	Pile Bent	1.5	Abut 1
0 + 50	1,223	1,220	1,125	Pile Bent	1.5	Pier 1
1 + 50	1,223	1,220	1,130	Pile Bent	1.5	Abut 2

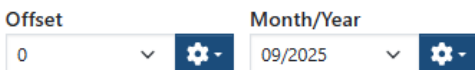
## To input a new Streambed Cross Section.

Start with the Cross Section input form **BR 15 Bridge Hydraulic Cross Section Field Inspection Form**. The measurements gathered in the field can be recorded on this form and entered into the cross sections part of the inspection record.

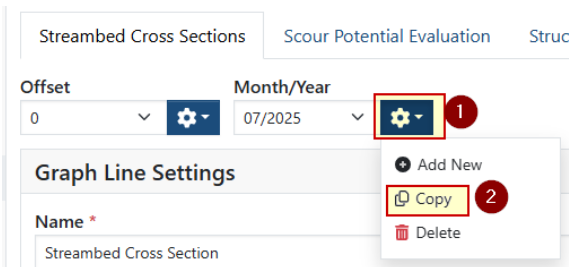
To input field measured elevations and distances, select the Streambed Cross Sections tab from the input options shown in the screenshot below.



1. Input the Offset (use 0 for the edge of the bridge)
2. Input a unique month and year.

Two input fields are shown. The first is labeled 'Offset' and contains the value '0'. The second is labeled 'Month/Year' and contains the value '09/2025'. Both fields have a dropdown arrow and a gear icon to their right.

Pro tip: If there is an existing cross section you can **speed up input by copying it**. You will be prompted to provide a unique month and year. This screenshot shows where to click.

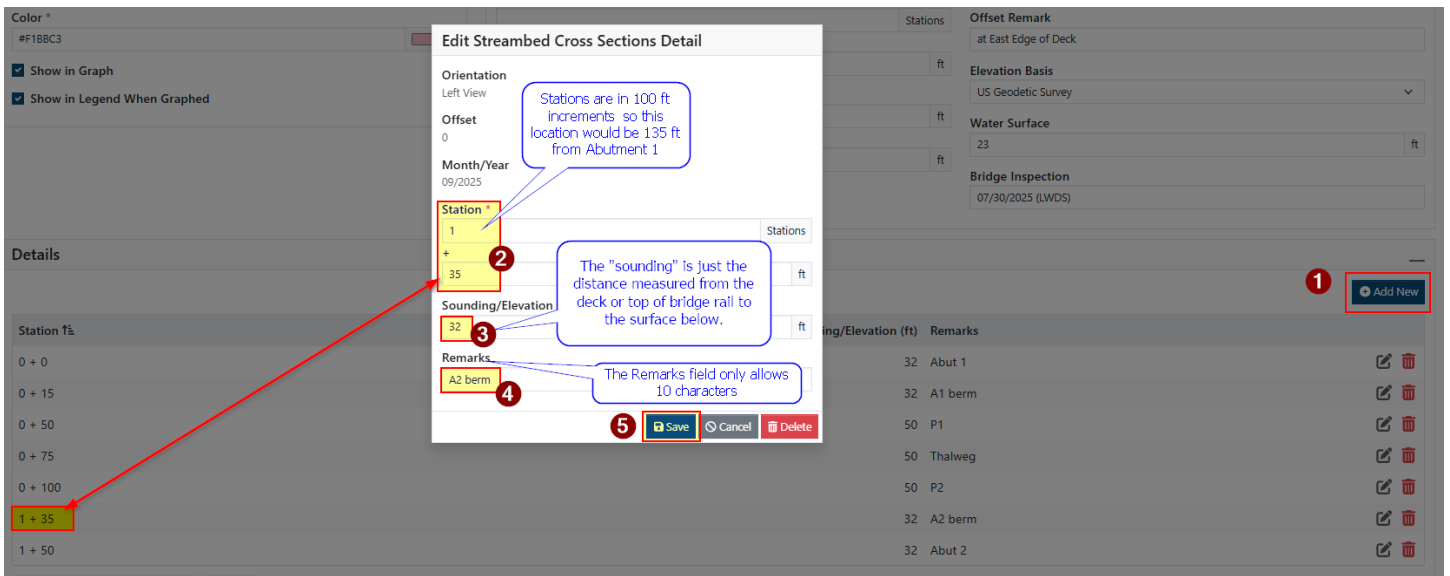


Or if there are no existing cross sections, Click the +Add New button



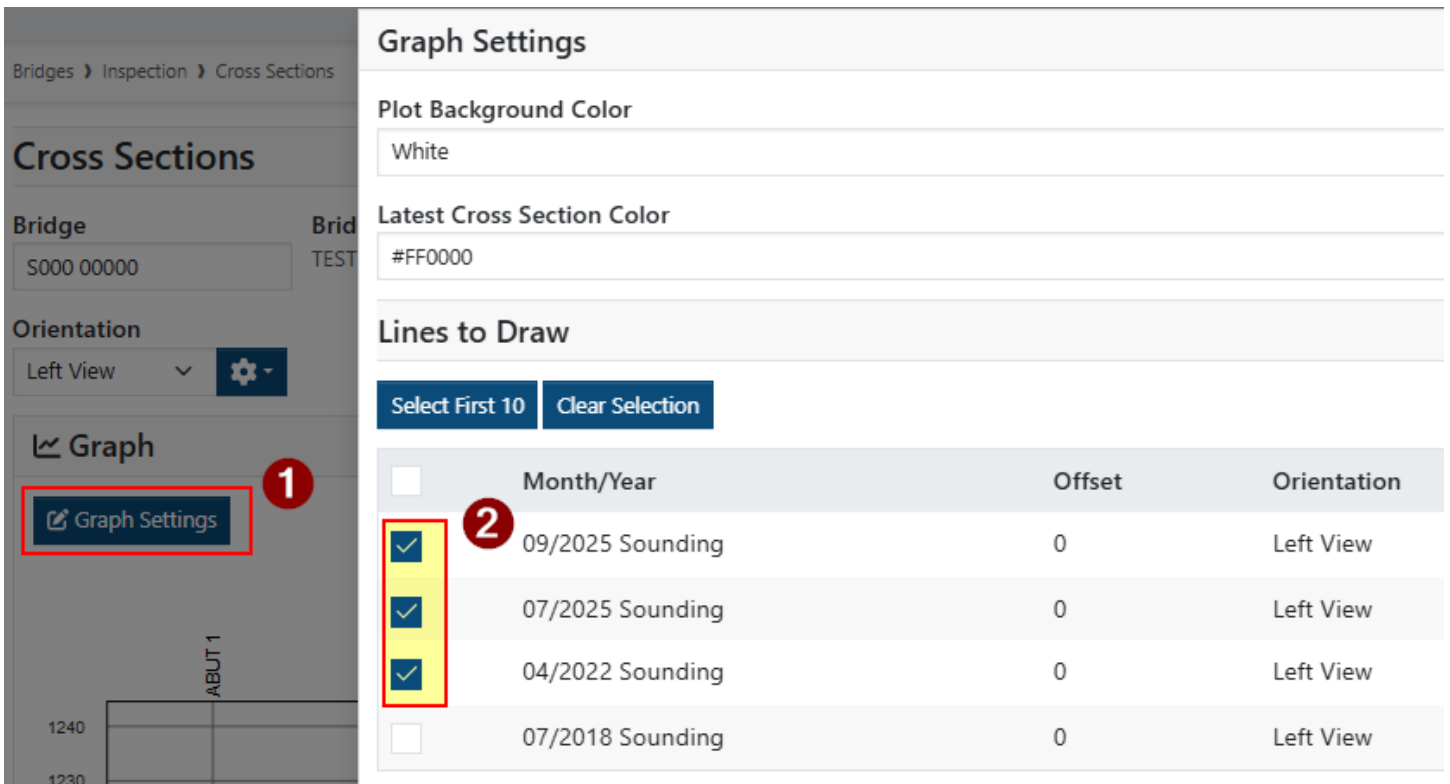
(scroll down... it's there on the right)

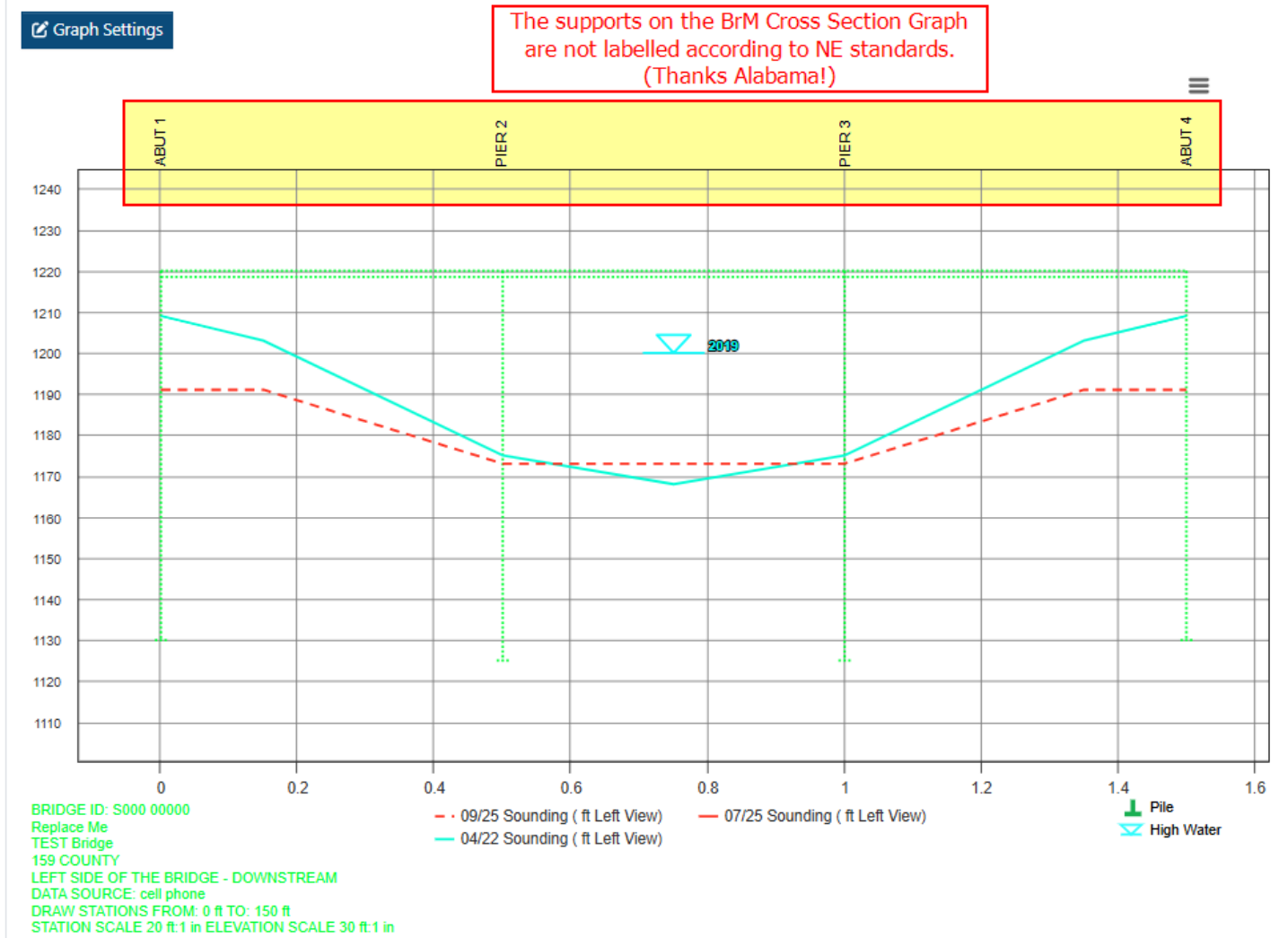
The screenshot below shows the Add or Edit Cross Section Detail dialog window.



To view cross section on the graph

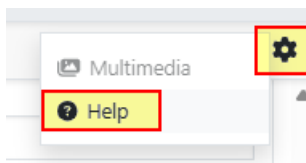
Click on the Graph Settings Icon, then select any cross sections of interest as shown in the screenshot below.





For additional instructions to input the cross section data

Just click on the icon in the upper right corner and select help or see the link in the next section.



### Acknowledgement

The BrM Hydraulic Cross Section module was developed by Alabama DOT and donated to AASHTO for inclusion in the core BrM product. For more information about entering cross sections and using this feature, see the AL DOT guidance here:

<https://www.dot.state.al.us/publications/Maintenance/pdf/Bridge/StructureScourHydrologyModuleUserGuide.pdf>