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# Structures plan production

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## 08 Structures

Last updated: 2022-05-16

Total video time: 1:52:10

## Overview

Loads palette content used in the creation of structures plans, including bridges, culverts, retaining walls, sign structures, and miscellaneous structures.

## Usage

WisDOT Sheets tab > Sheet Creation panel > Structure

The palettes can also be loaded from the command line: `=WIS-SHEETS-08`.

## Templates palette

Create new drawings and layout sheets with structures title blocks from templates, or convert existing MicroStation drawings.

## Content

- Create a new drawing from template
  - The **LAYOUT & GEO** template uses base units of feet, measured in decimal format. This template should be used for the General Plans sheet and Subsurface Exploration sheet, where it is important for xrefs to be coordinate correct.
  - The **DETAILS** template uses base units of inches measured in architectural format. This template should be used in most sheets.
- Create sheet layouts with the structures sheet borders.
  - Sheet layouts are separated into two categories: Bureau of Structures layouts and Consultant layouts. BOS layouts contain language and logos specific to BOS, while consultant layouts leave blanks for consultant-specific logos.
  - Within each category, there are 3 sheet layouts, each containing different sheet borders:
    - SHEET 1
    - SHEET 2 - A generic border
    - SHEET 4 - Subsurface exploration sheet border
- Purge Non Structures Styles
  - This tool will run "Purge All," but keeps the layers, text styles, dimension styles, and multileader styles that are standard for structures drawings.
- Fix Annotation Scales
  - This tool will remove all annotation scales except the currently active scale from selected annotative elements.
- Convert MicroStation drawings to use the Structures Civil 3D styles

## Structures templates & title blocks

[sht-creatn-struct-tmp.mp4](#) 13:50

## MicroStation conversion

[sht-creatn-struct-cnv.mp4](#) 9:21

## Blocks Palettes

The remaining palettes mainly contain blocks for detailing structures plans. A list of each block along with tutorial videos are provided within each palette heading below.

**Warning:** The structures blocks use layers and fonts stored in the structures templates. They work best when used as intended in the **struct-decimal-start.dwt** or **struct-inch-start.dwt** template drawings. These templates can be quickly accessed from the **Templates** palette.

[sht-creatn-struct-blks-01.mp4](#) 9:49

[sht-creatn-struct-blks-02.mp4](#) 1:57

## Annotations

Quickly create annotations according to the standard structures styles, and place annotation symbols.

### Quick Annotations

Quick annotations can be used to quickly apply layers and styles according to the standard structures styles.

**Warning:** The quick annotation tools will only work while in a **struct-decimal-start.dwt** or **struct-inch-start.dwt** template drawing. These templates can be quickly accessed from the **Templates** palette.

- Dimension
- General Text
- Subtitle Text
- Title Text
- Multileader
- Keynote Multileader

## Symbols

- Symbols

[sht-creatn-struct-anno-sym.mp4](#) 0:31

- Numbered Symbols

[sht-creatn-struct-anno-sym-no.mp4](#) 0:48

- Swirl
- Breakline

[sht-creatn-struct-anno-brk.mp4](#) 0:59

- Masked Arrow

[sht-creatn-struct-anno-arr.mp4](#) 0:42

- Note Callout

[sht-creatn-struct-anno-note.mp4](#) 0:47

- Section Mark

[sht-creatn-struct-anno-sect.mp4](#) 0:55

## General plans

- Station Mark

[sht-creatn-struct-anno-sta.mp4](#) 0:40

- Caution Symbol

[sht-creatn-struct-anno-cau.mp4](#) 0:16

## General plans

This palette contains blocks that help detail bridge general plan sheets, as well as general plan sheets for other structures.

### Sheet Layout



**Tip:** The *Sheet Layout* blocks are intended to be placed directly on the sheet layout at a scale of 1.0. Many of these blocks will snap directly to the title block. If you want, you can place the blocks in model space instead, but you will need to scale the blocks up by 12 before applying your viewport scale factor.

- Design Data
- Design Contacts

[sht-creatn-struct-gen-cont.mp4](#) 0:26

- Sheet List
- Revision Symbol

### Plan

- North Arrow
- Waterway Flow

[sht-creatn-struct-gen-wtwy.mp4](#) 0:35

- Lane Arrows

[sht-creatn-struct-gen-lane.mp4](#) 1:24

- Wing Note

[sht-creatn-struct-gen-wing.mp4](#) 0:30

- Station Mark

[sht-creatn-struct-anno-sta.mp4](#) 0:40

- Riprap
- Bench Mark

## Elevation

- Cross Slope
- Waterline Symbol

[sht-creatn-struct-gen-wtln.mp4](#) 0:21

- Fill Detail at Wings

[sht-creatn-struct-gen-fill.mp4](#) 0:59

- Riprap Toe Detail

[sht-creatn-struct-gen-riprap.mp4](#) 0:29

- Elevation Scale

[sht-creatn-struct-gen-el.mp4](#) 1:38

## Cross Section and Quantities

This palette contains blocks that help detail bridge cross section views, as well as bid item and quantities tables, bridge general notes, and typical details.



**Tip:** The *Bid Items and Quantities*, *General Notes*, and *Typical Details* blocks are intended to be placed directly on the sheet layout at a scale of 1.0. Some of these blocks will snap directly to the title block. If you want, you can place the blocks in model space instead, but you will need to scale the blocks up by 12 before applying your viewport scale factor.

[sht-creatn-struct-quant.mp4](#) 11:34

## Cross Section

- Cross Slope

## Bid Items and Quantities

- Table

## General Notes

- New Bridges

[sht-creatn-struct-quant-gen.mp4](#) 1:47

- Overlays

## Typical Details

- Profile Grade Line
- Substructure Callout for Profile Grade Line

[sht-creatn-struct-quant-pgic.mp4](#) 0:57

## Substructures

- Abutment Backfill Detail

[sht-creatn-struct-gen-abut.mp4](#) 0:23

- Backfill Details for Substructures

[sht-creatn-struct-gen-bkfl.mp4](#) 0:25

- Rodent Screen Details

[sht-creatn-struct-gen-rsd.mp4](#) 0:25

- Bench Mark

## Substructures

This palette contains blocks that help detail bridge substructures.

### All Bridge Substructures

- Standard Bubble Notes
- Rocker Bearing

[sht-creatn-struct-sub-rocker.mp4](#) 0:20

- Beam Seat
- Pile Details

[sht-creatn-struct-sub-pile.mp4](#) 1:23

- Pile Elevations
- Batter Arrow

### Abutments



**Tip:** The *A1 Abutment Section* and *Slope Paving* blocks are drawn at a scale of 2.0. They are intended to be used together along with the *Pile Elevations* block to create a complete abutment section detail, and should be used in a viewport with an annotation scale of 2.0 (1 paper inch = 24 drawing feet).

- A1 Abutment Section

[sht-creatn-struct-sub-a1.mp4](#) 4:44

- Slope Paving
- Rodent Screen Detail

[sht-creatn-struct-gen-rsd.mp4](#) 0:25

- 6in Drain

[sht-creatn-struct-sub-drain.mp4](#) 0:51

- Eyebolt

[sht-creatn-struct-sub-eyebolt.mp4](#) 0:20

## Piers

- Pier Column
- Rustication Detail
- Bevel

[sht-creatn-struct-sub-pbev.mp4](#) 0:21

- Precast Option

## Rebar

This palette contains blocks that help detail rebar, bar callouts, and bill of bar tables.

### Bar Detailing

- Rebar Section

[sht-creatn-struct-rebar-sect.mp4](#) 0:48

- Deck Bar Callout
- Stirrup
- Rotated Stirrup
- U-Bar

[sht-creatn-struct-rebar-ubar.mp4](#) 1:36

- L-Bar
- Equally Spaced Bars

[sht-creatn-struct-rebar-spaced.mp4](#) 3:01

- Hooked Bar
- Parapet Bars

### Bill of Bars

- Bill of Bars Table

[sht-creatn-struct-rebar-bob.mp4](#) 3:14

[sht-creatn-struct-rebar-bob2.mp4](#) 19:12

- Bundling Detail
- All Bar Bends

[sht-creatn-struct-rebar-bend.mp4](#) 1:24

- L Bar
- Stirrups
- U Bar
- Spiral
- Z Bar
- Hook
- Double Hook
- Hairpin

## Superstructures

- Hooked Hairpin
- 135° Bend
- Hat
- Abutment Diaphragm
- 32SS Bars
- 36SS Bars
- 42SS Bars
- 56SS Bars

## **Superstructures**

This palette contains blocks that help detail bridge superstructures.

### **Girder**

- Prestressed Shapes

[sht-creatn-struct-super-ps.mp4](#) 0:34

- Haunch Details
- Shear Connection Detail
- Transportation Note

### **Deck**

- Deck Section

[sht-creatn-struct-super-sect.mp4](#) 1:23

- Joint Details

[sht-creatn-struct-super-joint.mp4](#) 0:17

- Median Details
- Floor Drain
- Strip Seal Elevation

### **Annotation**

- V Groove Note
- Deck Bar Callout
- Top of Deck Elevation Table
- Deflection Diagram
- Tangent Offset Table

## **Barriers**

This palette contains blocks that help detail barriers, rails, and lighting.

### **Parapets and Barriers**

- Barriers

[sht-creatn-struct-bar-bar.mp4](#) 1:02



- Parapet Transition

[sht-creatn-struct-bar-trans.mp4](#) 1:02

- Beamguard Anchor Assembly

[sht-creatn-struct-bar-bg.mp4](#) 0:25

## Fence and Railings

- Fence and Railings

[sht-creatn-struct-bar-fen.mp4](#) 0:53

## Lights

- Light

[sht-creatn-struct-bar-light.mp4](#) 0:36

## Steel

This palette contains common steel shapes and details.

## Piles

- Cast in Place Piles

[sht-creatn-struct-steel-cip.mp4](#) 0:29

- HP Piles

[sht-creatn-struct-steel-hp.mp4](#) 0:22

- Sheet Pile
- Elevations

## Steel Shapes

- Angle

[sht-creatn-struct-steel-angle.mp4](#) 0:21

- Channel

[sht-creatn-struct-steel-channel.mp4](#) 0:20

- HSS

[sht-creatn-struct-steel-hss.mp4](#) 0:24

- MC Channel

[sht-creatn-struct-steel-mc.mp4](#) 0:24

## Culverts

- Pipe

[sht-creatn-struct-steel-pipe.mp4](#) 0:38

- WF Beam

[sht-creatn-struct-steel-wf.mp4](#) 0:25

## Bolts

- Bolt Plan
- Bolt Section
- Anchor Rod
- Washer

## Other

- Girder Stud
- Rocker Bearing
- Strip Seal Joint

## Culverts

This palette contains blocks that help detail culverts.

### General Plan

- Design Data and General Notes



**Tip:** The *Design Data and General Notes* block is intended to be placed directly on the sheet layout at a scale of 1.0. This block will snap directly to the title block. If you want, you can place the block in model space instead, but you will need to scale the block up by 12 before applying your viewport scale factor.

- Backfill Note
- Misc. Notes

### Box Details

- Header Bars
- Header Detail
- Joint Detail

### Apron Details

- Cut Off Wall Detail
- Inlet Nose Details
- Joint Detail
- Name Plate Detail

## Miscellaneous


This palette contains miscellaneous blocks that don't fit with other palettes.

## Structural Approach Slab

- Typical Section

## Retaining Wall

- Design Data

 **Tip:** The *Design Data* block is intended to be placed directly on the sheet layout at a scale of 1.0. This block will snap directly to the title block. If you want, you can place the block in model space instead, but you will need to scale the block up by 12 before applying your viewport scale factor.

- Elevation Detail
- Joint Detail
- Name Plate

## Subsurface Exploration

- Grid

## Viewport

- Outline

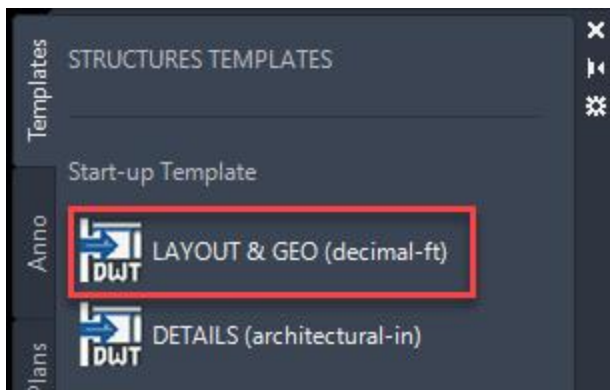
[sht-creatn-struct-misc-vp.mp4](#) 2:22

# Setting up a Structures drawing with a rotated model space

Last updated: 2022-08-30

## Create a new drawing in the correct template

1. Open the [Structures Palettes](#)  
**WisDOT Sheets tab > Sheet Creation panel > Structure**  
The palettes can also be loaded from the command line: `WIS-SHEETS-08`.
2. Create a new Layout and Geo template from the [Template Palette](#).  
**Templates Palette > LAYOUT & GEO (decimal-ft)**



3. Save the file.

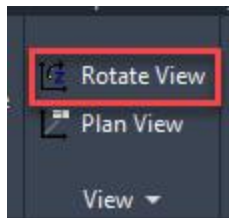
Add external references to the drawing

## Add external references to the drawing

1. Xref all needed files into the plan details sheet file using the WisDOT Xref tools - Load Xref on Layer tool.
  - A. **Ribbon > WisDOT Sheets tab > Manage panel > Load Xref on Layer**
  - B. Browse to the file > **Open**
2. Repeat for any other files.
3. Zoom extents (**ZE**) to see the drawing data.

## Rotate View

1. Rotate view to make structure layout line horizontal
  - A. **Ribbon > WisDOT Sheets tab > View panel > Rotate View**



- B. This tool requires 2 points to rotate. The first should be left of the second (i.e. 1st = “origin” and 2nd = “point on x-axis”).

## Create UCS for Structure

1. Type **UCS** at the command line.
  - A. Alternatively,
    - I. Below the **View Cube** click the **down arrow** next to **WCS**



II. Choose "New UCS"



2. Create new UCS using the **View** option.

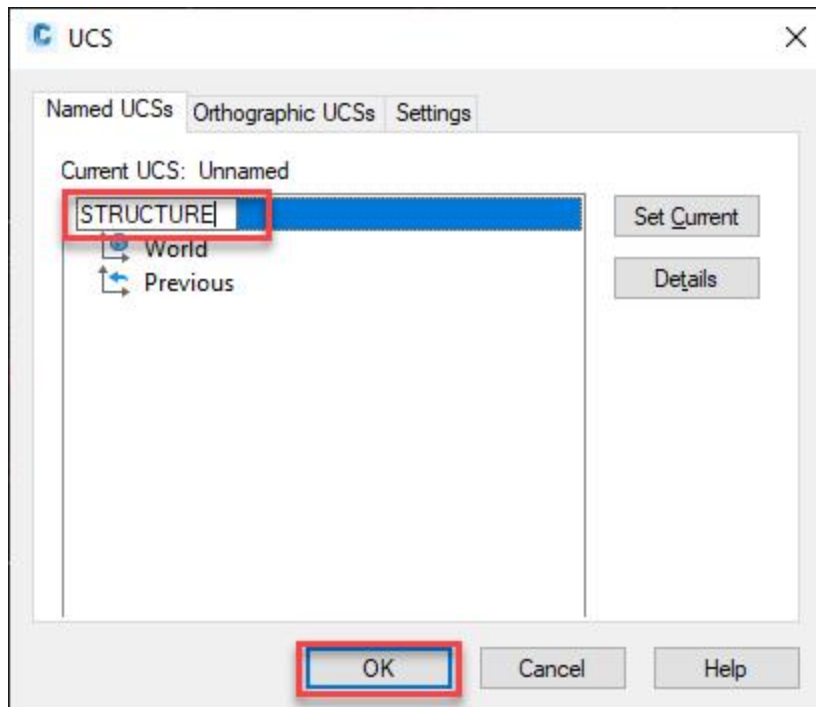
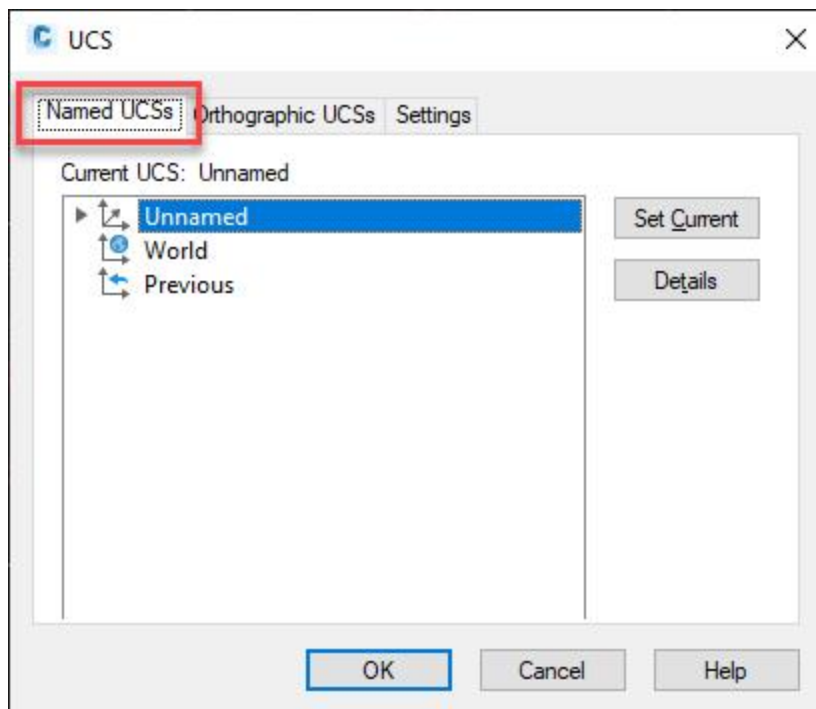


3. Open the UCS Manager with **Ribbon > View Tab > Coordinates panel > bottom right arrow** (or **UCSMAN**):



4. In the **Named UCSs** tab, click on "Unnamed" and rename it to "STRUCTURE".

## Reset Crosshairs Orthogonal to View



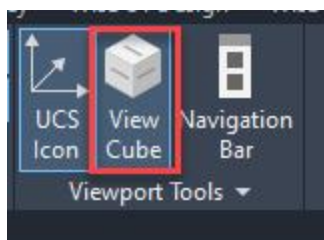
5. 

## Reset Crosshairs Orthogonal to View

1. Type the command `SNAPANG`
2. Type `0`

## Toggle UCSs


1. If it is not currently displayed, turn on the **View Cube**.
  - A. **Ribbon > View tab > Viewport Tools panel > View Cube**




2. UCS can be toggled at any point in time using the drop-down below the **View Cube**.



### Notes:

 **Requirement:** All dimensioning and annotating should be completed with the **“STRUCTURE”** UCS active.

 **Warning:** Changing the UCS also changes the location of coordinate 0,0 with respect to the World Coordinate System (WCS). All XREFs should occur when UCS is set to “WCS”

 **Info:** Rotation of view will not impact the proper insertion of the reference.

## Creating structures layout sheets with rotated viewports

Last updated: 2022-05-16

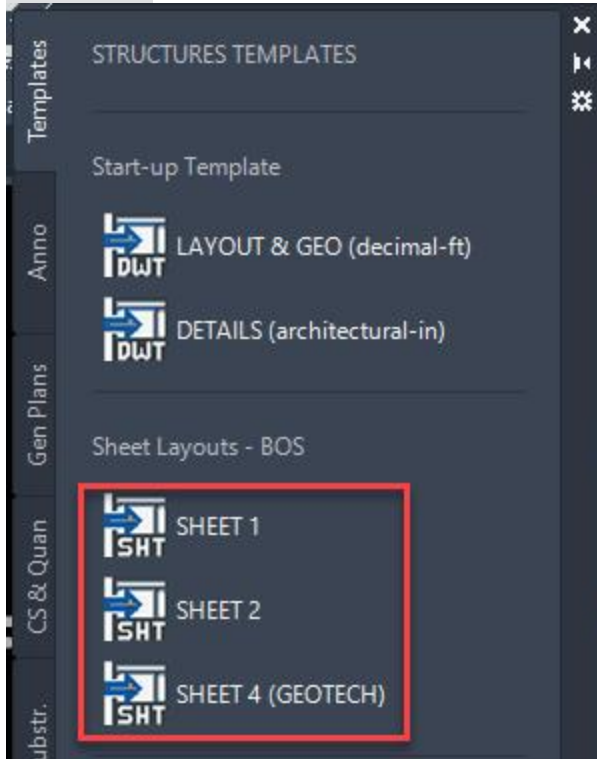
### Setting up a Structures drawing with a rotated modelspace #setup

1. Begin with a structures drawing from the Structure template.
2. Follow steps in "Setting up a Structures drawing with a rotated modelspace" on page 11


### Create a Layout Sheet

1. Open the Structures Tool Palette: **WisDOT Sheets tab > Sheet Creation panel > 08 Structure Tool Palette**

2. In the **Template Palette** choose a Sheet option under **Sheet Layouts - BOS** or **Sheet Layouts - Consultants**




3. In model space, be sure change UCS to WCS (not "STRUCTURE" or "Unnamed")

 **Info:** The view doesn't have to be physically rotated, but it is important that the View Cube is aligned with North



4. Follow the instructions given on [Sheet Tools - Align Viewport](#)
  - For structures templates, the Scale mode functions the same, but the values to enter are dependent on the structures template currently being used.
    - For a LAYOUT & GEO file, type the desired scale in the command line. For example, for a scale of "10.0", type **10**
    - For a DETAILS file, type the desired scale x 12 in the command line. For example, for a scale of "2.00", type **24**

 **Tip:** If the "Scale" is set incorrectly while running the Align Viewport tool, the viewport can easily be unlocked and changed to the appropriate Annotation Scale



5. Reset Crosshairs Orthogonal to View
  - A. Unlock the viewport
  - B. Activate the viewport and change the UCS to "STRUCTURE" (previously created in "Setting up a Structures drawing with a rotated model space #setup" on page 15)
  - C. Type **PLAN** in the command line
  - D. Choose the **Current ucs** option in the command line



- E. Lock the viewport

## Structures insert sheets

Last updated: 2022-02-15

Total video time: 13:29

### Download and modify insert sheets

[pln-prod-struct-ins-01.mp4](#) 5:07

[Bridge Manual Insert Sheets](#)

### Import insert sheet to existing drawing

[pln-prod-struct-ins-02.mp4](#) 8:21