

# 2024

Structures Management Unit OpenBridge Designer Manual



# CONTENTS

Chapte	er 1		1–1
1.1	NCDC	OT Structures Management OpenBridge Manual	1–1
1.2	NCDC	OT Migration Plan	1–1
1.3	Struct	tures Management Unit Migration Plan	1–2
		nyms And Abbreviations	
		itions	
1.6	Drafti	ing/Model Requirements	1–4
		2D Drawings	
	1.6.2	3D Models	1–4
1.7	Detail	ling Requirements	1–4
	1.7.1	Scales	1–5
	1.7.2	Line Styles and Line Weights	1–5
	1.7.3	Dimensioning	1–5
		1.7.3.1 Dimensioning Precision	1–5

# CHAPTER 1 GENERAL

## 1.1 NCDOT STRUCTURES MANAGEMENT OPENBRIDGE MANUAL

This manual is intended to be a guidance manual, providing Engineers and Technicians guidance in current Structures Management Unit (SMU) practice using OpenBridge software. To preserve the autonomy of Engineers and Technicians and encourage the application of new ideas and advancements in the technology, this manual does not attempt to address all possible scenarios that may arise in the use of OpenBridge software in the design and of modeling highway structures. It is assumed that many of these guidelines contained within will necessarily continue to evolve as the software continues to evolve.

The users of this manual are encouraged to present ideas that may vary from those contained herein. These suggestions will be considered and implemented as deemed appropriate.

This manual does not attempt to reproduce information that is adequately addressed in the Bentley training documents and/or their other publications.

# **1.2 NCDOT MIGRATION PLAN**

In July of 2021, North Carolina Department of Transportation (NCDOT) started the process of migrating its computer-aided design and drafting (CADD) software from Bentley MicroStation V8i and Geopak to Bentley OpenX. OpenX is a comprehensive multidiscipline three-dimensional (3D) modeling application that can be used in the delivery of projects from concept through construction.

To transition to ORD, NCDOT has developed a Migration Plan with milestone activities and associated targets for each Unit within NCDOT to utilize OpenX in the production of designs and plans for new projects. In July of 2021, SMU converted projects that were less than 75% complete in v8 to OpenX. In January of 2022, SMU transitioned all projects to OpenBridge.

## **1.3** STRUCTURES MANAGEMENT UNIT MIGRATION PLAN

Under NCDOT's Migration Plan, each Unit has unique activities and associated targets as part of their migration plan. SMU has a three-phase migration plan for transitioning to the use of Bentley OpenBridge Designer (OBD), the transportation structural component of ORD.

SMU's three-phase migration plan is as follows:

- **Phase 1** Transition Staff and Consultants to the use of OBD for 2D plan production.
- **Phase 2** Transition Staff and Consultants to producing 3D models to be used in reference with other Unit's models and to create 2D plans.
- Phase 3 Transition Staff and Consultants to producing 3D models for complete digital delivery.

#### **1.4** ACRONYMS AND ABBREVIATIONS

2D	Two dimensional
3D	Three dimensional
4D	Four dimensional
ALG	NCDOT Roadway Alignment File
BrIM	Bridge Information Modeling
CADD	Computer-aided design and drafting
ETM	Electronic terrain model
LOD	Level of Detail
NCDOT	North Carolina Department of Transporation
ORD	OpenRoads Designer
OBD	OpenBridge Designer
OBM	OpenBridge Modeler
PGD	Preliminary General Drawing
PW	ProjectWise
SMU	Structures Management Unit

#### **1.5 DEFINITIONS**

#### **Two-Dimensional (2D) Drawing**

A geometric representation containing only two axes (typically X and Y) drawn on one plane, or lacking depth.

#### **Three-Dimensional (3D) Model**

A geometric representation containing 3 axes (X, Y and Z) containing width, depth and height.

#### Four-Dimensional (4D) Model

The addition of time to a three-dimensional model, often used for modeling the construction process/workflow.

#### **Bridge Information Modeling (BrIM)**

A process supported by various tools, technologies for generation and management of a digital representation of a highway structure from concept, planning, design, and construction to evaluation and maintenance operations.

#### **Digital Twin**

A three-dimensional representation created to match the design intent of a proposed structure.

#### Level of Detail (LOD)

A term first used by the American Institute of Architects (AIA) as part of the BIM process to define the amount of detailing/precision required to match the design intent with respect to Digital Twin creation (3D modeling).

LOD 100 = Concept Design

A concept model with parameters like area, height, volume, location, orientation.

LOD 200 = General Modeling with Schematic Design

A general model with elements modeled as approximate quantities, size, shape, location, and orientation.

LOD 300 = Accurate Modeling and Detailed Design

Accurate modeling and shop drawings where element shells are defined with specific assemblies, quantities, size, shape, location, and orientation.

LOD 350 = Greater Detail and Construction Documentation

Modeling providing more detail to the element shells, such as interface connections and reinforcement.

LOD 400 = Fabrication and Assembly Documentation

Modeling providing element shells with fabrication details in addition to LOD 350, such as reinforcement and prestressing strands.

LOD 500 = As-Built Models

Elements are modeled as constructed for future evaluation and maintenance operations.

## **1.6 DRAFTING/MODEL REQUIREMENTS**

All elements shall be drawn/modeled full scale (1:1) in their geospatially correct location for both 2D and 3D DGNs to ensure plans accurately depict the intended design. Drawing and modeling full scale will avoid design errors and capture potential construction conflicts.

#### 1.6.1 2D Drawings

Each plan sheet in a plan set should be its own DGN file. 2D drawing DGNs shall include Design, Drawing and Sheet Models (see Chapter 4 for more details about DGN models). Use of the correct element templates is important to ensure elements can be easily identified within the DGN.

All final plan sheets should be in the Sheet Model.

Draw details 1:1 in the design model and scale views on sheet model as needed to provide clarity.

#### 1.6.2 3D Models

Create 3D models in the Design Model (see Chapter 4 for more details about DGN models). Each structure model shall be its own DGN file.

Use and modify the 3D element templates in the libraries as needed. Copy and save the element templates to the project Bridge Templates folder to modify.

In order to share information in the 3D model with Construction and Asset Management, Item Types should be attached to each element on the structure.

2D drawings created from the 3D model will be created by referencing the 3D model into the appropriately named DGN file's design model and use the Drawing Creation tools to send saved views of the selected element to the drawing and sheet models to create the final plan sheet.

#### **1.7 DETAILING REQUIREMENTS**

Before starting the plans, determine which details should be included in the plans and present them in a logically grouped order. Avoid scattering details throughout the plans and overcrowding a sheet with details and notes. Use standard line styles, line weights, lettering, reference notes, etc., to produce plans that are consistent from project to project.

Arrange drawings and details by determining what information needs to be placed on each plan sheet, the scales of the details shown, the number of sheets and sequence of sheets based on information found in Chapters 1, 4 and 5 of the *NCDOT Structures Management Design Manual*.

#### 1.7.1 Scales

Drafting scales information found in Chapters 1, 4 and 5 of the NCDOT Structures Management Design Manual.

#### 1.7.2 Line Styles and Line Weights

Use the appropriate Element Templates for the structure element being drawn. The Element Templates will set the line level, style, weights and feature definitions.

When the correct Element Templates are used, the SMU pentable will plot the "Existing" element line styles at a reduced intensity and "Proposed" element line styles bold intensity to display importance.

#### 1.7.3 Dimensioning

Show dimensions less than 1-inch in fractions of an inch without a leading zero (e.g. <sup>1</sup>/<sub>2</sub>")

Show dimensions in units of inches and fractions of an inch for dimensions less than 12-inches (e.g.  $1\frac{1}{2}$ ").

For dimensions 12-inches or greater, show dimension units as feet and inches with fractions of an inch (e.g.  $1'-1\frac{1}{2}"$ ).

Place horizontal dimension lines so they can be read from the bottom of the plan sheet.

Place vertical dimension lines so they can be read from the right side of the plan sheet.

Place inclined dimension lines so they can be read horizontally by rotating the plan sheet through the smallest angle possible.

#### **1.7.3.1 Dimensioning Precision**

For dimensioning precision, see Figure 1-02 of the *NCDOT Structures Management Design Manual*.

# CONTENTS

Chapte	er 2		2-1
2.1	Projec	t Management Considerations	2-1
	2.1.1	Project Scoping (PDN 2ST1)	2-1
	2.1.2	Project Workflow	2-1
	2.1.3	Project Deliverables	2–1
2.2	File St	torage	2–3
	2.2.1	ProjectWise Explorer Guidance	2–3
	2.2.2	Structures ProjectWise Folder Structure	2–3
	2.2.3	Structures Folder Naming Convention	2–4
	2.2.4	Storing Files within the Structure Folder	
2.3	File N	aming Conventions	2–6
2.4	v8 File	e Conversions and Expectations	2–8
	2.4.1	DGN Plan Conversion	2–8
	2.4.2	GEOPAK File Incorporation	2–8
		2.4.2.1 Set Feature Definition Tool	-10
	2.4.3	Adding the Terrain	-11
	2.4.4	DGN Migration Expectations	-14
		Modifying Converted v8 Drawings2	-14
		Adding Drawings to a Plan Set2	
		Standard Drawings and Standard Plans2	-14

# CHAPTER 2 PROJECT MANGEMENT

#### 2.1 **PROJECT MANAGEMENT CONSIDERATIONS**

#### 2.1.1 **Project Scoping (PDN 2ST1)**

As NCDOT and SMU continue to advance use of the OpenX software, it is important the project team is aware of what the project expectations are for the project task during the project scoping meeting. Some projects will be selected as pilot projects with 3D models as part of the deliverables during the phase 2 migration period.

#### 2.1.2 **Project Workflow**

Each project scoping meeting should include project team members for all disciplines of work involved with the design to determine the following:

- The stage in the design process where the structure model/PGD is required.
- How ProjectWise will be used to share live DGN files between disciplines.
- How culverts will be modeled and who is responsible for creating the stream alignment.
- How the bridge slopes and slope protection will be created by either Roadway or Hydraulics.
- If there are retaining walls in-front of and/or beside the structure, who (Roadway or Geotechnical) will create models for them based on Structures provided cap/wing wall elevations and offsets.

#### 2.1.3 **Project Deliverables**

The NCDOT Project Manager responsible for the entire project should make the project team members aware of what project deliverables are, and if a 3D Structural Model is required and what level of detail (LOD) for the 3D model is required for each structure. Project Teams should leave scoping meetings knowing what types of the following deliverables are required (note: all PDFs are submitted via SharePoint and all DGNs should be submitted in ProjectWise):

#### PDN 2ST2 Preliminary General Drawings Submittal

First Submittal

- 2D PGD (PDF).
- Preliminary 3D Structural Digital Twin (DGN) (if applicable).
- Preliminary Header Elevations (if applicable).
- Vertical Abutment Wall Envelopes (if applicable).

#### **Final Submittal**

- 2D PGD (PDF & DGN).
- Preliminary 3D Structural Digital Twin (DGN) (if applicable).
- Preliminary Header Elevations (if applicable).
- Vertical Abutment Wall Envelopes (if applicable).

#### PDN 3ST1 Complete Structures Design

- Geotechnical Foundation Loads.
- Access Drawings.
- Coast Guard Permit Sketches (if applicable).
- Railroad Easement Sketches (if applicable).
- Permit Impacts.

#### 90% Structures Design Submittal

- Final 2D Structure Plans (PDF).
- Final 3D Structural Digital Twin (DGN) (if applicable)
- Project Special Provisions Package (PDF).
- Working Day Calculations (PDF).

#### PDN 4ST1 Finalize Structure Design PS&E

#### 100% Structure Design

First Submittal

- 2D Structure Plan Sheets Combined (PDF).
- 3D Structural Digital Twin (DNG) (if applicable).
- Structures Project Special Provisions Package (PDF).
- Structure Pay Items & Quantities (PIQ).

#### **Final Submittal**

- PE Sealed and E-Signatures, 2D Individual Structure Plan Sheets (PDF).
- 2D Structure Plan Files without PE Seals (DGN).
- Final 3D Structural Digital Twin (DNG) (if applicable).
- PE Sealed and E-Signatures Structure Design Calculations (PDF).
- PE Sealed and E-Signatures Structures Project Special Provisions Package (PDF).
- Bridge Construction Elevations (PDF).

#### PDN 5ST1 Structure Construction Support

• Perform construction revisions to address identified 3D model (if applicable)/2D plan errors or field changes initiated by NCDOT or the Contractor.

## **2.2** FILE STORAGE

Moving forward all project files, other than confidential documents, should be stored within the "Structures" folder under its respective project folder within NCDOT's ProjectWise Explorer. Files should be created using the SMU naming convention and include the appropriate metadata to make the file searchable in the future.

https://connect.ncdot.gov/site/preconstruction/Preconstruction%20Help/NCDOT\_Use\_of\_P rojectWise.pdf

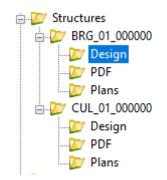
#### 2.2.1 **ProjectWise Explorer Guidance**

ProjectWise guidance documents for creating, saving, searching and exporting documents can be found here <u>https://connect.ncdot.gov/resources/CADD/Pages/ProjectWise.aspx</u>.

All ProjectWise project folders will be set up by the NCDOT Project Manager through SharePoint. Adding structures on the project in SharePoint will generate a folder for each structure under the "Structures" main folder overnight. If a project does not have the correct structure folders in ProjectWise, contact the NCDOT Project Manager.

#### 2.2.2 Structures ProjectWise Folder Structure

The folder structure for the "Structures" project work has been predetermined and set to allow the Department of Information Technology (DIT) to manage and maintain it from an administrative level. When the project folder is created the template will create a "Structures" folder which will have the structures folders listed (such as "BRG" and "CUL" folders) with three subfolders; "Design," "PDF," and "Plans."



The structure folders, such as "BRG" and "CUL," may not be copied to create additional structure folders for a project, this must be done using SharePoint. If edits need to be made to a project folder, such as adding or removing structures from a project, this should be done in SharePoint and the corresponding updates will be made overnight within ProjectWise. Project Engineers should make sure that the correct structure type ID's are being used within SharePoint and ProjectWise to ensure correct workflow when the project is moved from PreConstruction to Construction within SharePoint. Also, the "Design" "PDF" and "Plans" subfolders should not have their names edited, nor should other subfolders be added.

#### 2.2.3 Structures Folder Naming Convention

When the project is created in SharePoint, the ProjectWise structure folders will be automatically generated the following day. If the folder naming convention does not match the following, contact <u>dot.pwsupport@ncdot.gov</u>

Naming convention:

Structure Type ID ## SMU 6-digit NBI ID

Structure Type ID =	Bridge	BRG
	Culvert	CUL
	High Mast Lighting	HML
	Noise Wall	NW
	Other	OT
	Overhead Sign	OS
	Penstock	PS
	Retaining Wall	RW
	Temporary Structure	TMP

## = the structure numbering used on the plans for multiple structures on a project (i.e. STR#01, STR#02, etc.). Construction uses these to identify the structures in the field and our folders will now roll over to the Construction side of SharePoint.

**SMU 6-digit NBI ID** = the structure ID SI&A gives a structure that is inspected and reported to FHWA for NBIS compliance

# 2.2.4 Storing Files within the Structure Folder

Files should be stored within the Structure project folder structure as follows:

- Structures Folder
Overall Project Correspondence
Correspondence Documents involving all/more than one structure on the project
<sup>1</sup> - Structure Type Folder (BRG/CUL_00_00000)
Structure Related Correspondence
• Misc. Structure Related Documents that don't fit under the "Design," "PDF," or "Plans" folders.
<ul> <li>Reference Materials (ie. Clipped AASHTO sections for special designs, BSR, Foundation Recs)</li> </ul>
SMU
• Design program Input & Output files (NCBDS, RCPier, Descus, etc.)
• Excel design files (includes Quantity Estimates, Working Days)
Design DGN files
Checked PDF design output files
Scanned design documents of handwritten materials
Draft Project Special Provisions (PSPs) documents
• Design Criteria/Notes (a document with notes as to why a design decision was made)
PEF & SMU
PE Sealed and E-Signature Final Design Calculations (PDF)
Final Electronically Sealed PDF Plan Sheets
Final Electronically Sealed PDF PSPs
Final PDF'd Construction Elevations
Final Quantity Estimates
• PDF'd Plan Sheets for Review (25%, etc.)
Reviewed PDF Plan Sheets with comments
All final structure DGN files

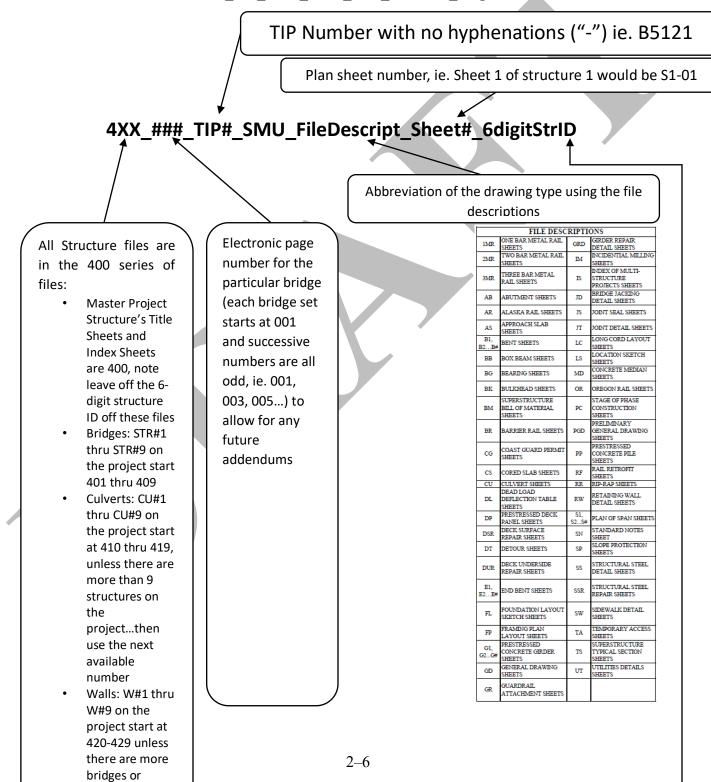
• Documents related to plan production (ie. Quantity calculations, Excel files or scanned documents)

## 2.3 FILE NAMING CONVENTIONS

culverts

Each plan sheet shall be its own DGN and PDF file and follow this naming convention:

Models shall be named 4XX\_000\_TIP#\_SMU\_BR#\_MODEL\_6digitStrID



		•
	6-digit structure ID's XX####	
XX =C	ວunty Number + #### Structure Nເ	umber
		)
	XX - County Numbers	
00 - ALAMANCE	34 - FRANKLIN	68 - PAMLICO
01 - ALEXANDER	35 - GASTON	69 - PASQUOTANK
02 - ALLEGHANY	36 - GATES	70 - PENDER
03 - ANSON	37 - GRAHAM	71 - PERQUIMANS
04 - ASHE	38 - GRANVILLE	72 - PERSON
05 - AVERY	39 - GREENE	73 - PITT
06 - BEAUFORT	40 - GUILFORD	74 - POLK
07 - BERTIE	41 - HALIFAX	75 - RANDOLPH
08 - BLADEN	42 - HARNETT	76 - RICHMOND
09 - BRUNSWICK	43 - HAYWOOD	77 - ROBESON
10 - BUNCOMBE	44 - HENDERSON	78 - ROCKINGGHAM
11 - BURKE	45 - HERTFORD	79 - ROWAN
12 - CABARRUS	46 - HOKE	80 - RUTHERFORD
13 - CALDWELL	47 - HYDE	81 - SAMPSON
14 - CAMDEN	48- IREDELL	82 - SCOTLAND
15 - CARTERET	49 - JACKSON	83 - STANLY
16 - CASWELL	50 - JOHNSTON	84 - STOKES
17 - CATAWBA	51 - JONES	85 - SURRY
18 - CHATHAM	52 - LEE	86 - SWAIN
19 - CHEROKEE	53 - LENOIR	87 - TRANSYLVANIA
20 - CHOWAN	54 - LINCOLN	88 - TYRRELL
21 - CLAY	55 - MACON	89 - UNION
22 - CLEVELAND	56 - MADISON	90 - VANCE
23 - COLUMBUS	57 - MARTIN	91 - WAKE
24 - CRAVEN	58 - MCDOWELL	92 - WARREN
25 - CUMBERLAND	59 - MECKLENBURG	93 - WASHINGTON
26 - CURRITUCK	60 - MITCHELL	94 - WATAUGA
27 - DARE	61 - MONTGOMERY	95 - WAYNE
28 - DAVIDSON	62 - MOORE	96 - WILKES
29 - DAVIE	63 - NASH	97 - WILSON
30 - DUPLIN	64 – NEW HANOVER	98 - YADKIN
31 - DURHAM	65 - NORTHHAMPTON	99 - YANCEY
32 - EDGECOMBE	66 - ONSLOW	
33 - FORSYTH	67- ORANGE	

#### 2.4 **V8** FILE CONVERSIONS AND EXPECTATIONS

During the migration period, there will be project files that need to be converted from the v8 format to OpenBridge format. This section is intended to provide guidance and expectations for those project files.

#### 2.4.1 DGN Plan Conversion

V8 files can be opened in the OpenBridge software without loss of data. When a V8 file is opened in OpenBridge, the following message will appear:

			*	
	no WorkSet Alert	$\times$		
	This file is not part of a WorkSet. Do you want to open this file in the active WorkSpace "DOT-US North Carolina", WorkSet "SMU Workset"?			
	Open Cancel			
1				

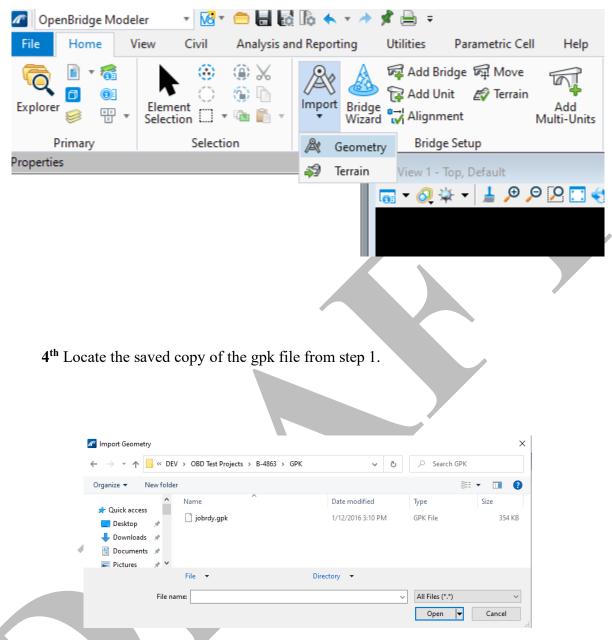
Click "Open" and the file will be migrated to the current SMU workspace. The file will now be in the SMU OpenBridge workspace with the old v8 line styles, text styles, borders, and features.

#### 2.4.2 GEOPAK File Incorporation

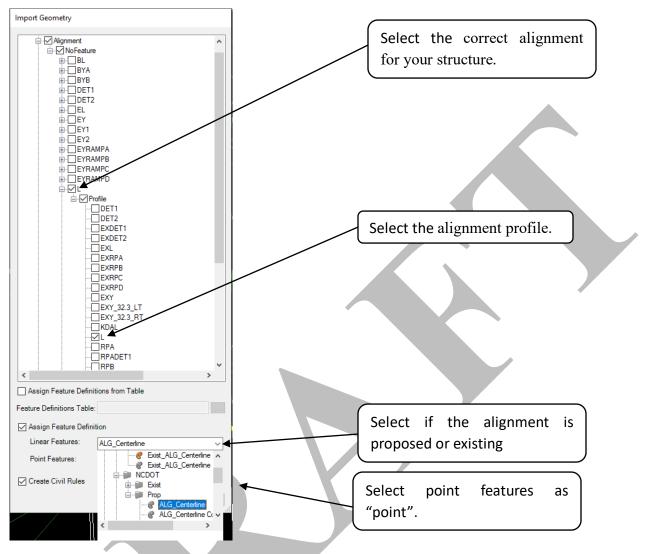
Projects that originated in V8i and Geopak can be incorporated into OpenBridge Designer files by importing the geometry (.gdk files) and terrain (.tin files).

To incorporate an alignment from projects that used older versions of MicroStation and Geopak, take the following steps:

- 1<sup>st</sup> Locate the gpk file from the previous project and make a copy. Save the copy in your OBD project folder.
- 2<sup>nd</sup> Create an OBD "Model" file in your project folder.
- **3**<sup>rd</sup> In the "Model" file, click on the "Import" icon and drop down to "Geometry".

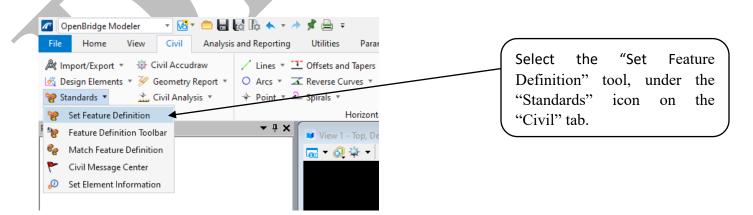


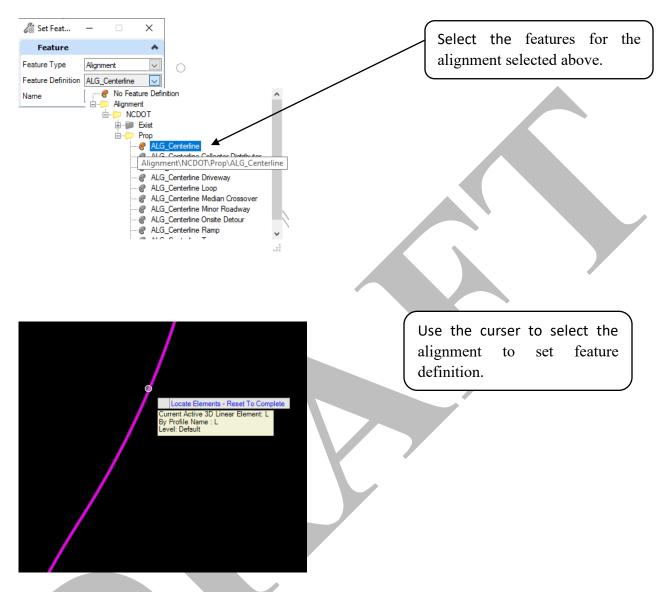
5<sup>th</sup> Select the alignment and feature definitions for the alignment. Select each alignment and its profile one at a time and assign the correct features for each one. This will require repeating this step for each alignment needed for your project.



# 2.4.2.1 Set Feature Definition Tool

If you didn't check the "Assign Feature Definition" box, take the following steps:





## 2.4.3 Adding the Terrain

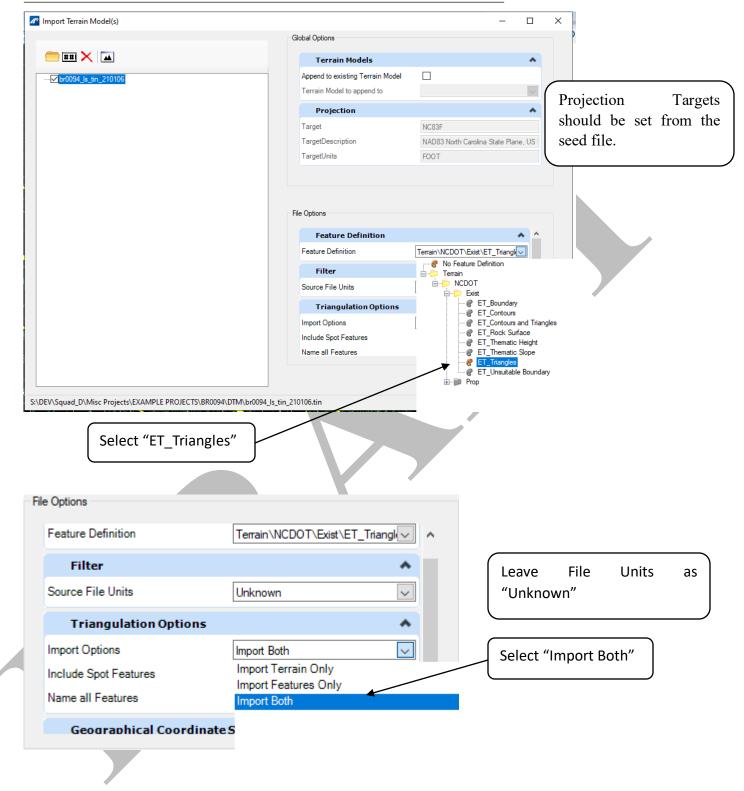
To incorporate a terrain from projects that used older versions of MicroStation and Geopak, take the following steps:

- 1<sup>st</sup> Locate the .tin file from the previous project and make a copy. Save the copy in your OBD project folder.
- 2<sup>nd</sup> Click on the "Import" icon and drop down to "Terrain".

OpenBridge Mo	deler	• 🐼 • 🛑		6	- *	1	Ŧ		
File Home	Civil	Utilities	Reports a	and Dra	wings	View	Coll	aborate	Help
Explorer 6	Eleme Selecti	. (2) 	×	Import	t Bridg Wizar	Add	Unit	☞ Move ☞ Terrain ☞ Add N	
Primary		Selection		A	Geome	try Brid	ge Setuj	0	
No Feature Defin	nition			-	Terrain	A	1	2 2	
							<u> </u>		
Г <u> </u>	o Import - S:\DEV\	red .tin file		DJECTS\BROO	•	2 P			×
*	Name br0094_ls_tin	_210106.tin		ate modified 4/2021 1:23 F		Type TIN File			
Quick access Desktop Libraries This PC									
	<					>			
	File name:	br0094_ls_tin_210106	tin		~	Done			
	Files of type:	All Files			$\sim$	Cancel			

Options

CHAPTER 2 PROJECT MANAGEMENT



4<sup>Th</sup> Click on "Import"

#### 2.4.4 DGN Migration Expectations

V8 files can be opened in the OpenBridge software without loss of data. When a V8 file is opened in OpenBridge, a message will appear asking if the user would like to update the file. Accept the update to convert the drawing to the OpenBridge format. When a drawing is converted, the V8 levels, attributes, and format will be brought forward in the updated file, however these attributes will not be converted to match the Structure Management Unit's (SMU) OpenBridge workspace. Once updated to OpenBridge, there is no need to change the text and line styles to the new OpenBridge format or move to the use of sheet models. Note, because the V8 attributes have not been updated to the OpenBridge workspace, text fonts will appear different from the text displayed in the OpenBridge drawings. If no modifications to the drawing content are required, the drawing may be printed (on paper or PDF) as usual.

#### **Modifying Converted v8 Drawings**

When V8 drawings are converted to OpenBridge and a note or dimension needs to be added, copy and paste existing text then edit the new note or dimension. If a drawing detail needs modification, the user should proceed as usual. Note if new lines are placed in the drawing, their naming convention will utilize the OpenBridge workspace and will appear the same as the existing lines when printed.

#### Adding Drawings to a Plan Set

When additional drawings are needed for an existing plan set, use OpenBridge to develop the new drawings and save them as separate files using SMU's file naming convention. These drawings will utilize the OpenBridge workspace and the text will appear different from the converted or modified drawings. During the OpenBridge transition period, SMU plan sets with differing text fonts will be acceptable.

#### **Standard Drawings and Standard Plans**

SMU's Standard Drawings and Plans have been converted to the OpenBridge format using the procedures described above. The Standards will not be updated for consistency with the OpenBridge workspace until revisions to the content are required. During plan development, always use standard drawings and plans available on SMU website.

# CONTENTS

Chapte	er 3		-1
3.1	Gener	ıl	-1
3.2	Consu	ltants	-1
3.3	SMU	Workspace	-1
	3.3.1	2D Element Templates	-2
	3.3.2	Level Names	-3
		Feature Definitions	
	3.3.4	SMU Tools	-4
		3.3.4.1 Placing Typical Section From NCBDS	-5
		3.3.4.2 Placing LRFR Summary Table From NCBDS	-6
		3.3.4.3 Placing Bolted Field Splice From NCBDS	
	3.3.5	3D Element Templates	-8

# CHAPTER 3 WORKSPACE

# **3.1 GENERAL**

NCDOT is in the process of transitioning its computer-aided draft and design (CADD) software to the comprehensive multi-disciplinary three-dimensional (3D) modeling application Bentley OpenX. In this process, Structures Management has chosen to transition to Bentley's structural operating system OpenBridge Designer (OBD). OBD is compatible with OpenX allowing for structures to be built on top of referenced OpenX files and includes Bentley's LEAP design software package.

# **3.2 CONSULTANTS**

As part of NCDOT's transition to project file storage on ProjectWise, Structures Management's OBD workspace is incorporated into a managed workspace in ProjectWise. Consultants will need to use ProjectWise to work in Structures Management's OBD workspace.

Consultants can find ProjectWise guidance documents for creating, saving, searching and exporting documents can be found here:

https://connect.ncdot.gov/resources/CADD/Pages/ProjectWise.aspx.

Consultants can find the latest software version of OpenBridge being used by the Department here:

https://connect.ncdot.gov/resources/CADD/CADD Documents/NCDOT CADD Software Versions.pdf

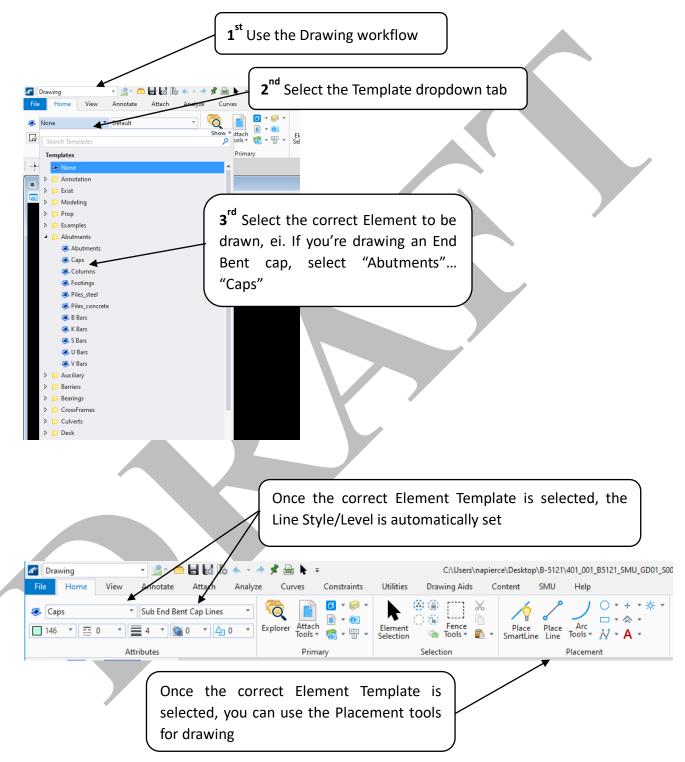
# **3.3 SMU WORKSPACE**

Similar to previous versions of MicroStation, in an effort to maintain consistency amongst contract plans and now 3D models Structures Management will continue to produce and maintain a custom workspace for OBD.

OpenBridge uses element templates, level names, feature symbology and feature definitions. The current workspace has incorporated all of SMU's previous workspace properties and continues to evolve with 3D templates and libraries.

#### **3.3.1 2D Element Templates**

Line styles are now assigned to Element Templates, which must be selected before use. Using the correct Drawing Line Styles is important in OBD to capture accurate quantities.



Note: Do not place dimensions and text in the Design Model.

#### 3.3.2 Level Names

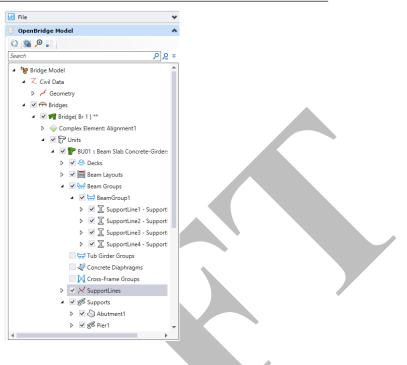
Level names in the SMU OBD workspace have been updated to reflect the NCDOT policy of "E\_" for existing elements and "P\_" for proposed elements.

ls <u>F</u> ilter <u>E</u> dit				
Symbology: ByLevel 🔹 🌱 (none) 🕶 😁	2 🔀			
10.12_Test_File.dgn	△ Name	8		
All Levels	E_SMU_Steel_Pipe_Drains	SMU_Bridge_Features_Levels_Elem Temp Imperial.dgnlib	99	
Filters	E SMU Steel Plate Girder	SMU Bridge Features Levels Elem Temp Imperial.dgnlib	138	
	E_SMU_Steel_Sheet_Piles	SMU_Bridge_Features_Levels_Elem Temp Imperial.dgnlib	119	
	E_SMU_Stiffeners	SMU_Bridge_Features_Levels_Elem Temp Imperial.dgnlib	6	
	E_SMU_Structural_Steel	SMU_Bridge_Features_Levels_Elem Temp Imperial.dgnlib	138	
	E_SMU_Structural_Steel_Hidden	SMU_Bridge_Features_Levels_Elem Temp Imperial.dgnlib	103	
	E_SMU_Sub_U_Bar	SMU_Bridge_Features_Levels_Elem Temp Imperial.dgnlib	35	
	E_SMU_Substructure_Grout	SMU_Bridge_Features_Levels_Elem Temp Imperial.dgnlib	238	
	E_SMU_Superstructure_Grout	SMU_Bridge_Features_Levels_Elem Temp Imperial.dgnlib	238	
	E_SMU_Tendon	SMU_Bridge_Features_Levels_Elem Temp Imperial.dgnlib	3	
	E_SMU_Tendon_Centerline	SMU_Bridge_Features_Levels_Elem Temp Imperial.dgnlib		
	E_SMU_Three_Bar_Rail	SMU_Bridge_Features_Levels_Elem Temp Imperial.dgnlib	136	
	E_SMU_Timber	SMU_Bridge_Features_Levels_Elem Temp Imperial.dgnlib	253	
	E_SMU_Timber_Rail	SMU_Bridge_Features_Levels_Elem Temp Imperial.dgnlib	252	
	E_SMU_Two_Bar_Rail	SMU_Bridge_Features_Levels_Elem Temp Imperial.dgnlib	136	
	E_SMU_Water_Elevation	SMU_Bridge_Features_Levels_Elem Temp Imperial.dgnlib	168	
	E_SMU_Wingwalls	SMU_Bridge_Features_Levels_Elem Temp Imperial.dgnlib	153	
	Enter Data Field Text	SMU_Bridge_Features_Levels_Elem Temp Imperial.dgnlib	14	
	P_SMU_Abutments	SMU_Bridge_Features_Levels_Elem Temp Imperial.dgnlib	2	
	P_SMU_Alaska_Rail	SMU_Bridge_Features_Levels_Elem Temp Imperial.dgnlib	136	
	P_SMU_Anchor_Bolt	SMU_Bridge_Features_Levels_Elem Temp Imperial.dgnlib	139	÷
	P_SMU_Approach_Slab	SMU_Bridge_Features_Levels_Elem Temp Imperial.dgnlib	9	
	P_SMU_Asphalt_Wearing_Surface	SMU_Bridge_Features_Levels_Elem Temp Imperial.dgnlib	238	
	P_SMU_Barrier_Rail	SMU_Bridge_Features_Levels_Elem Temp Imperial.dgnlib	9	
	P_SMU_Beam Bolsters CELL	SMU_Bridge_Features_Levels_Elem Temp Imperial.dgnlib	136	
	P_SMU_Bearing_Seats	SMU_Bridge_Features_Levels_Elem Temp Imperial.dgnlib	152	
	P_SMU_Bearings	SMU_Bridge_Features_Levels_Elem Temp Imperial.dgnlib	100	
	P_SMU_Bearings_Lines	SMU_Bridge_Features_Levels_Elem Temp Imperial.dgnlib	6	
	P_SMU_Bent_Cap	SMU_Bridge_Features_Levels_Elem Temp Imperial.dgnlib	162	
	P_SMU_Bent_Control_Line	SMU_Bridge_Features_Levels_Elem Temp Imperial.dgnlib	5	
	P_SMU_Box_Beam_Unit	SMU_Bridge_Features_Levels_Elem Temp Imperial.dgnlib	9	
	P_SMU_Box_Beam_Void	SMU_Bridge_Features_Levels_Elem Temp Imperial.dgnlib	9	
	P_SMU_Bridge_Joint_Demo	SMU_Bridge_Features_Levels_Elem Temp Imperial.dgnlib	70	
	P_SMU_Bulb_Tee_Girder	SMU_Bridge_Features_Levels_Elem Temp Imperial.dgnlib	9	
	P_SMU_Bulb_Tee_Girder_Broken	SMU_Bridge_Features_Levels_Elem Temp Imperial.dgnlib	9	
	P_SMU_Centerline_Joint	SMU_Bridge_Features_Levels_Elem Temp Imperial.dgnlib	130	
	P_SMU_Chainlink_Fence	SMU_Bridge_Features_Levels_Elem Temp Imperial.dgnlib	234	
	P_SMU_Civil_Cell_Lane_Taper_Locator	SMU_Roadway_Geometry_Features_Levels_Elem Temp.dgnlib	6	
	P_SMU_Classic_Concrete_Barrier_Rail	SMU_Bridge_Features_Levels_Elem Temp Imperial.dgnlib	7	
	P_SMU_ClassII_Surface_Prep	SMU_Bridge_Features_Levels_Elem Temp Imperial.dgnlib	55	
	P_SMU_ClassIII_Surface_Prep	SMU_Bridge_Features_Levels_Elem Temp Imperial.dgnlib	80	
	P SMIL Column	SMIL Rridne Features Levels Flem Temn Imnerial donlik	162	

# **3.3.3 Feature Definitions**

SMU OBD workspace has feature definitions defined for many of the commonly used proposed bridge elements.





#### 3.3.4 SMU Tools

The SMU OBD workspace has a "SMU" tab under the Drawing workflow, where the inhouse SMU NCBDS tools are located.

C Draw	ving		- M- 🖨	- 6	• • * ;	🖈 🚔 👳			
File	Home	View	Annotate	Attach	Analyze	Utilities	Drawing Aids	Mesh	SMU
NOTES		BOLTED	FIELD SPLICE						
TYPICAL	SECTION	CAMBER	t						
LRFR TAI	BLE								
	SMU P	rograms							

The SMU Program tools are for SMU Staff use with NCBDS design software. These tools can be used in the Sheet Model and used like the SMU Standard Plans.

3.3.4.1 Placing Typical Section From NCBDS
To place Typical Section Drawing, follow these steps.
1 <sup>st</sup> Use the SMU tab
Drawing     T     Orawing     Orawing
File Home View Annotate Attach Analyze Utilities Drawing Aids Mesh SMU
NOTES BOLTED FIELD SPLICE
LRFR TABLE SMU Pro <b>2<sup>nd</sup></b> use the SMU Typical Section for placing Typical Section

Select p	project	Refresh User Filter: ated: 5/5/2021 11:06:50 A	All Users	U			
		here to group by that col					<u> </u>
DB ID	Bridge No	TIP	Owner Name	Last Update Date			
1000	300016	B-5981	Paul Bryant	5/3/2021 11:35:59 AM			
999	420053	B-3654_02	Mohammed Ahmed	4/29/2021 2:33:09 PM			
998	8900	B-4455	Ahmad Ighwair	4/28/2021 3:46:30 PM			
997	0	00003333	Ahmad Ighwair	4/28/2021 3:19:22 PM	R		
996	90065	B-5642	Korey Newton	4/27/2021 4:18:54 PM	$\mathbf{A}$		
995	420053	B-3654	Mohammed Ahmed	4/28/2021 3:23:42 PM			
993	9104	17BP.3.R.80	Jeremy McCartha	4/27/2021 10:07:22 AM	$\setminus$		
992	90065	B-5642	Doug Shackelford	4/26/2021 2:39:24 PM			
991	0		Doug Shackelford	4/26/2021 2:29:12 PM			
990	300016	B-5981 (63" MBT PCG)	Paul Bryant	5/3/2021 3:09:51 PM			-
989	300016	B-5981 (63" MBT PCG)	Paul Bryant	5/3/2021 3:07:35 PM			
88	300016	B-5981	Paul Bryant	4/22/2021 5:22:32 PM		$\mathbf{\Lambda}$	
987	770036	I-4413	Ashvin Patel	5/3/2021 7:43:29 AM		$\setminus$	
986	770036	I-4413	Ahmad Ighwair	4/22/2021 2:20:48 PM			

**4**<sup>th</sup> Use the "Draw Typ. Section Select Project" button to place the selected typical section in your dgn. **3**<sup>rd</sup> select the desired project from the table.

# 3.3.4.2 Placing LRFR Summary Table From NCBDS

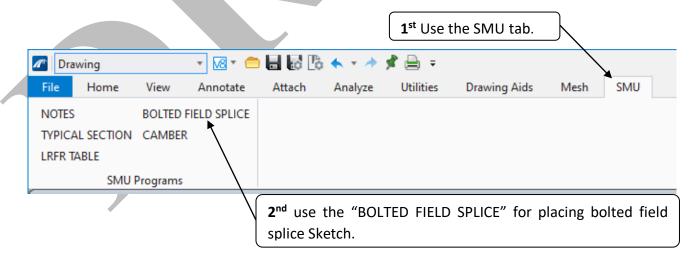
To place LRFR Table Drawing, follow these steps.

							1 <sup>st</sup> Use	the SMU tab.	$\sum$	
	🖉 Dra	wing		• 🛯 • 😑	66	<b>*</b> - <b>*</b> ;	🖈 🚔 =			
Ĭ	File	Home	View	Annotate	Attach	Analyze	Utilities	Drawing Aids	Mesh	SMU
		AL SECTION		IELD SPLICE						
		SMU	Programs							
				2 <sup>nd</sup> use the	e "LRFR TA	BLE" for pla	acing LRFR	summary		

	Created from Layout		Place Table	Refresh Database		
			Available data is hig	hlighted in Red		
Drag a colur	nn header here to group by	that column.		$\mathbf{A}$		
CMPNT_ID	TIPNo	BridgelD	Created By	Description	LastUpdate	
)76	17BP	22	Ahmad Ighwair		4/16/2021 9:48:2 🔺	
				NC 87 over Batarora Branch	4/20/2021 11:33:	
					4/20/2021 12:24:	
					4/20/2021 12:32:	
					4/20/2021 12:51:	
981	B-5642	90065	Korey Newton	NC 87 over Batalora Branch	4/21/2021 10:2	
982	I-4413	770036	Mohammed Ahmed		4/26/2021 1:50:	
				11 Box beams	4/20/2021 12:59:	
				END BENT 2	4/20/2021 4:16:3	
985	B-5642	90065	Korey Newton	NC 87 over Batarora Blanch	4/22/2021 1:59:	
986	I-4413	770036	Ahmad Ighwair		4/22/2021 2:20:	
987	1-4413	770036	Ashvin Patel	Rating <1 for Mohammad Robeson County	5/3/2021 7:43:29	
	B-5981			US117(NBL) over CRS RR#1	4/22/2021 5:22:3	
Layout Record	ds: 770				<b>~</b>	
4		\			►	
		$\mathbf{N}$		$\backslash$		
		<u> </u>				
		8 <sup>rd</sup> sele	ect the c	desired <b>Ath</b>	Use the "PLA	
				4	Use the PLA	CE TADL
	l r	project f	rom the table	e bu	tton to place the	latost I RI
	r	bi oject i		u bu		
				tal	ble created for tl	he selecte
						ic sciecti

## 3.3.4.3 Placing Bolted Field Splice From NCBDS

To place Bolted Field Splice Drawing, follow these steps.



#### NCDOT STRUCTURES MANAGEMENT OPENBRIDGE MANUAL

1	DB ID: 64 ase display last up	Refresh User Filter: Al pdated: 5/10/2021 3:42:18 PM					
Drag	g a column head	er here to group by that column.					
D	Bridge No	TIP	Owner Name	Last Update Date	,		
	120392	R-2246B	Doug Cantrell	9/29/2020 3:38 PM			
Þ	U0209B	U0209B	Ahmad Ighwair	5/10/2021 2:49 PM			
_	750136	B-5114	Alan Chan	4/26/2019 3:30 PM			
	120389	R-2246B	Hearbert Locklear	4/26/2019 3:26 PM			
	090250	R-2633BA (STR 1)	John Lazarovich	4/26/2019 3:26 PM			
	120392	R-2246B	Hearbert Locklear	4/26/2019 3:26 PM			
	252519	U-2519CB	Amph Sorsenginh	4/26/2019 3:26 PM			
	090249	R-2633BA (STR 2)	John Lazarovich	4/26/2019 3:26 PM			
	220468	R-2707C STR #3	Tierre Peterson	4/26/2019 3:26 PM			
	250194	U-2810B	Korey Newton	4/26/2019 3:26 PM			
	550172	B-3868	Steve Champion	4/26/2019 3:26 PM			
	750136	B-5114	Amph Sorsenginh	4/26/2019 3:26 PM			
	250116	B-4490	Amph Sorsenginh	4/26/2019 3:26 PM			
	250001	U-4444B	F Guzman	4/26/2019 3:26 PM			· · · · · ·
	400004	R-2413A	Hyeri Kim	4/26/2019 3:26 PM			
	990035	R-2519B	Amph Sorsenginh	4/26/2019 3:26 PM	-		
		DEC" button to al		3 <sup>rd</sup>	coloct	the de	sized
ise tr	ie Draw	BFS" button to pl	ace	5"	select	the de	sirea
	tod bolto	ed field splice in y	our	nroid	ect from	the tabl	

## 3.3.5 3D Element Templates

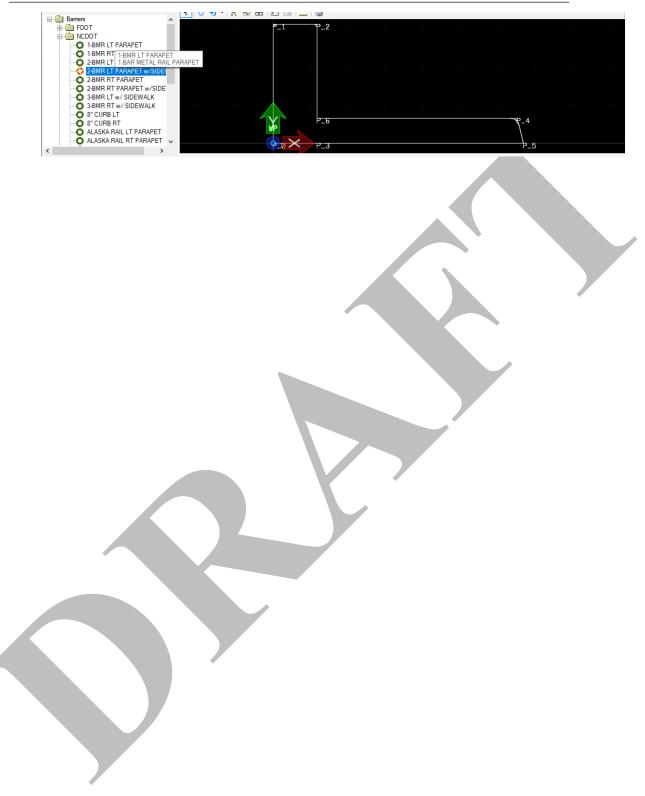
SMU OBD workspace includes 3D Element Templates for many of the commonly used bridge elements.

Deck

			+ • •	 		 8														
NCDO I Deck Templates		_			_															
Aws remplates																				
NC AWS w/constrair																				
Deck Templates								-/												
O LT Super Deck w/cc								L												
								ì												
RT Super Deck w/cc																				
O Slab- Copy					هم					$\sim$										
General Standard Templates		061206301							ULIBU							T_08	i de la	002(ED	ECK	
	LT_EC	odeorbi	i de stat							2					H	T-864	HE QT	6£6FD	ECKBO	Ш

Barriers

#### NCDOT STRUCTURES MANAGEMENT OPENBRIDGE MANUAL



# CONTENTS

Chapte	er 4	4–1
4.1	Opening Openbridge Designer	4–1
4.2	OBD File Creation In ProjectWise	4–1
	4.2.1 Connecting OBD to ProjectWise	4–1
	4.2.2 Creating a New OBDX File	4–2
	4.2.3 DGN Creation In ProjectWise	4–5
	4.2.3.1 BIM Project Workflow (2D Plans)	
	4.2.3.2 Creating a DGN in BIM Workflow	4–6
	4.2.3.3 Standalone Project Workflow (2D Drawings & 3D Model)	4–7
	4.2.3.4 Creating a DGN in Standalone Workflow	4–8
	4.2.4 DGN Creation in ProjectWise	4–9
4.3	Opening an Existing DGN in BIM Workflow	4–16
	4.3.1 Open OBD file Browser	4–16
	4.3.2 Select the Project .obdx file	
	4.3.3 Select and Open Existing DGN	4–17
4.4	Creating a New DGN in an Existing Project in BIM Workflow	4–17
4.5	Opening Leap Design Software	4–19
4.6		
4.7	DGN Models	
	4.7.1 Setting Up the DGN	4–21
	4.7.1.1 Design Models	4–22
	4.7.1.2 Drawing Models	
	4.7.1.3 Sheet Models	4–25
4.8	PRINTING PDF's	4–27
	4.8.1 Creating a PDF Document from a Single DGN Converted from a V8i DGN	4–27
	4.8.2 Creating a PDF Document from a Single DGN	4–32
	4.8.3 Using Print Organizer for PDF Creation of Multiple Converted V8i DGN's	4–35
	4.8.4 Using Print Organizer for PDF Creation of Multiple DGN's	4–44
4.9	Civil Tools	4–53
	4.9.1 Civil Analysis Point Tool	4–53
	4.9.1.1 Finding Stations, Elevations and Offsets along an Alignment	4–53
	4.9.1.2 Finding Elevations along the Terrain	4–54
	4.9.2 Horizontal Offsets and Tapers Tool	4–55
4.10	) Place Named Boundary Tool	4–56
4.11	Spacebar	4–57
4.12	2 Background Map	4–57
4.13	3 Custom Line Styles	4–58
4.14	Drawing Scales	4–59

# CHAPTER 4 OPENBRIDGE DESIGNER

# 4.1 **OPENING OPENBRIDGE DESIGNER**

To use OpenBridge Designer (OBD), the desktop icon must be clicked to open the software



# 4.2 **OBD FILE CREATION IN PROJECTWISE**

Prior to creating a dgn file, a project folder must be created in ProjectWise for storage.

# 4.2.1 Connecting OBD to ProjectWise

		OpenB CONNECT E	ridge Desi	gner		To create a new file in ProjectWise, click on "ProjectWise"	
			-	~			
		Browse	New File	ProjectWise			
	Recently (	Opened					
I							

## A prompt for ProjectWise will open at this step

🌆 ProjectWise Log In	×	
Datasource: NCDOT Production  Authentication: Bentley IMS  User Name:	Log in Cancel	Make sure the Datasource is set to "NCDOT Production" and Authentication is
Password: Remember me (use auto-login next	time)	"Bentley IMS", then click on "Log in"

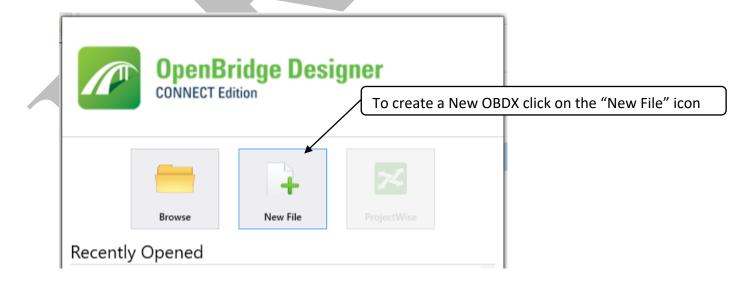
For how to create files and use ProjectWise, look at CADD Services' website

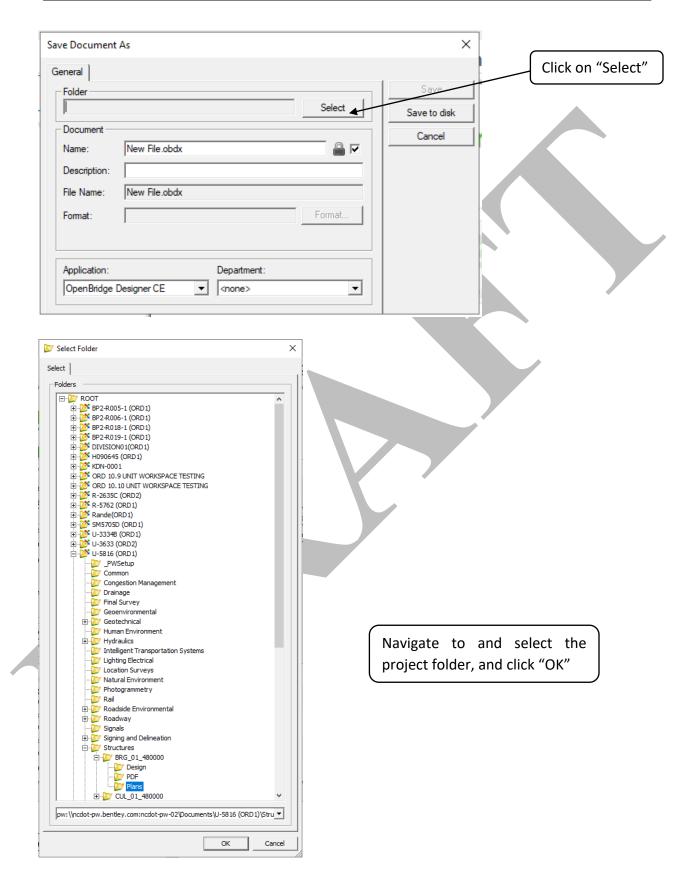
https://connect.ncdot.gov/resources/CADD/Pages/ProjectWise.aspx

To continue creating a file outside of ProjectWise click on the "Cancel" button and move to the next section.

#### 4.2.2 Creating a New OBDX File

Once OBD is logged into ProjectWise you will see the following window.





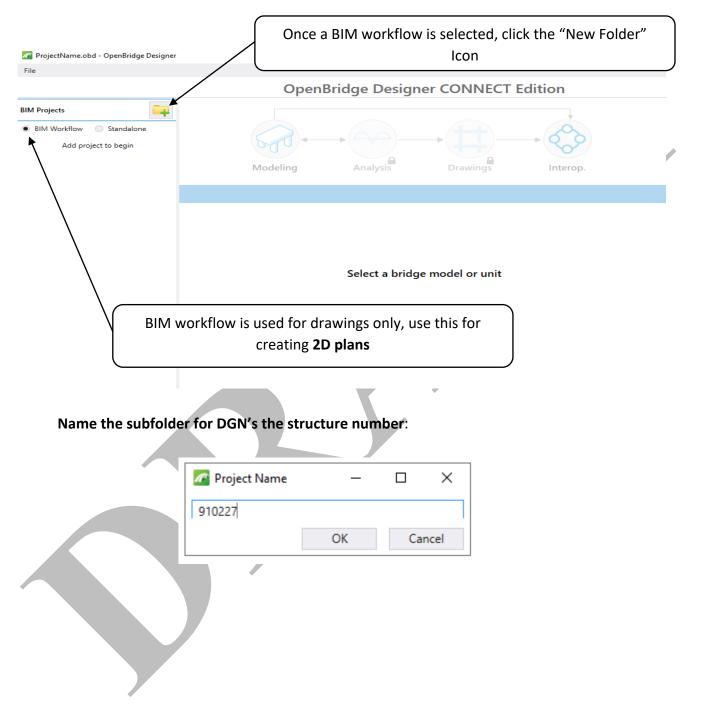
ve Document	As	Name this file	e the project TIP r	number, ie. B-5121
- Folder	B-5121.obdx	Select	Save Save to disk Cancel	
Description: File Name:	B-5121.obdx	Des		ovide more metadata for searches.
Format:		Format		
Application: OpenBridge [	Department:			
	Select "C	OBD 2023" from	the drop down.	
	Once all fields are entered, cli	ck "Save" to crea	ate the OBDX	

Note: Each structure on the project will have a OBDX file for both the design and the plans that will need to be created.

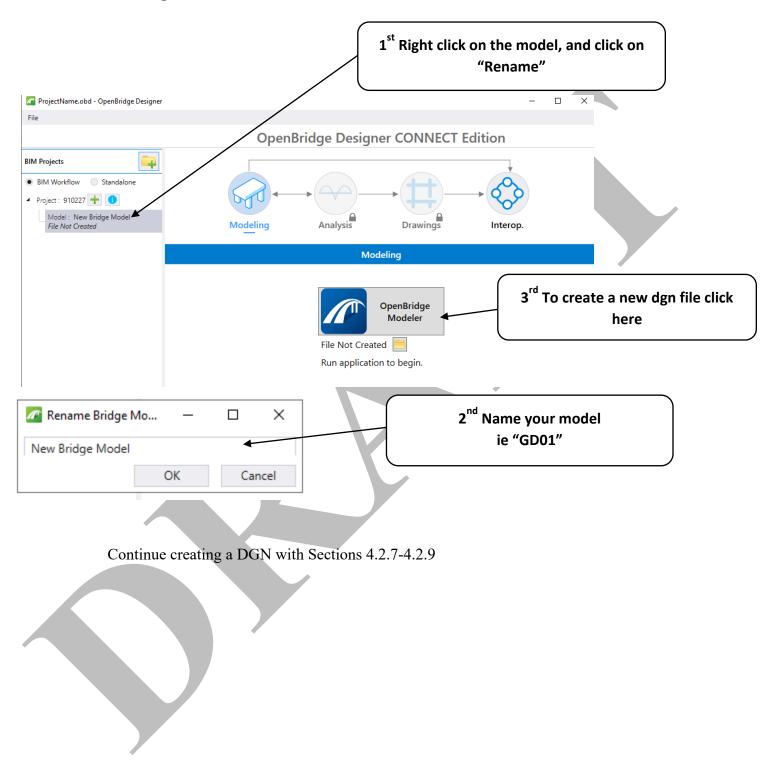


#### 4.2.3 DGN Creation In ProjectWise

## 4.2.3.1 BIM Project Workflow (2D Plans)



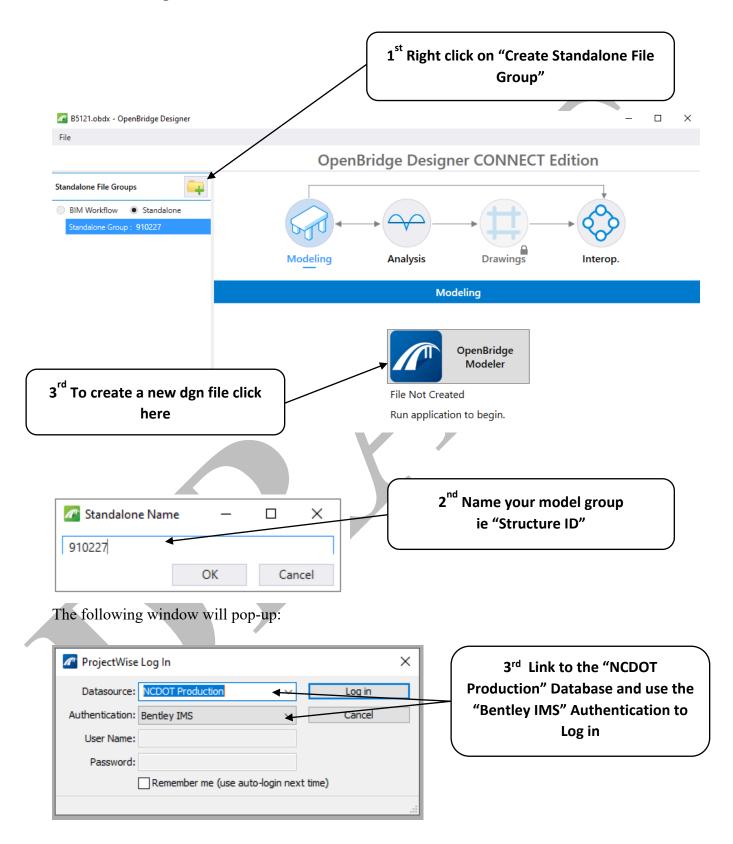
#### 4.2.3.2 Creating a DGN in BIM Workflow



# 4.2.3.3 Standalone Project Workflow (2D Drawings & 3D Model)

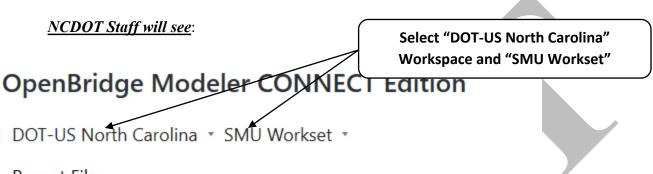
🌆 B5121.obdx - OpenBridge Designer	>
File	
	OpenBridge Designer CONNECT Edition
Standalone File Groups	Modeling Analysis Drawings Interop.
$\backslash$	Modeling
	OpenBridge Modeler         File Not Created         Run application to begin.
	Standalone workflow is used for creating digital twin models capable of exchanging model data with design software, <b>3D model creation</b> and using Leap Design Products.

#### 4.2.3.4 Creating a DGN in Standalone Workflow



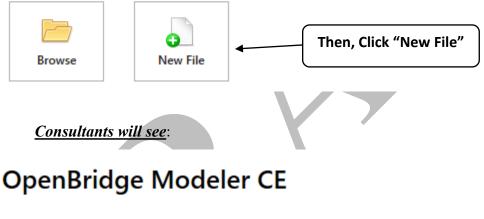
Continue creating a DGN with Sections 4.2.8-4.2.10.

#### 4.2.4 **DGN Creation in ProjectWise**



## Recent Files

You haven't opened any files recently. To browse for a file, start by clicking on Browse.



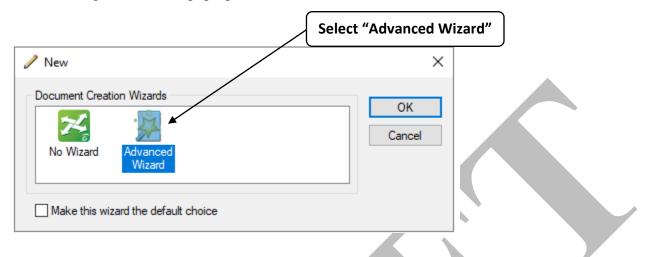
WorkSpace WorkSet Imperial Standards \* Tutorial 1 \*

Recent Files

You haven't opened any files recently. To browse for a file, start by clicking on Browse.

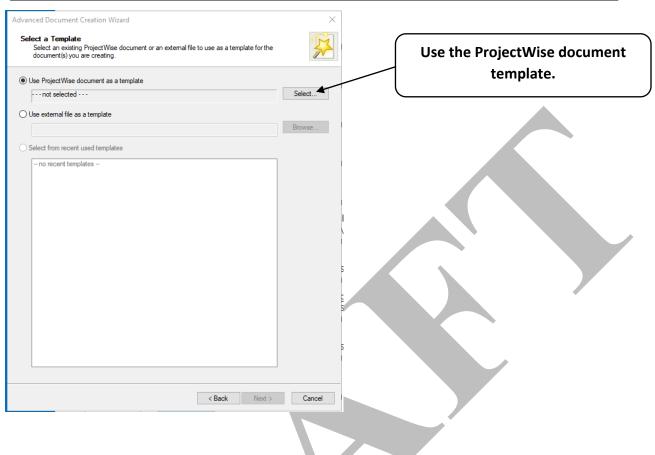


#### The following window will pop-up:



## Note: The Advanced Wizard has replaced the NCDOT Design File Generator

ate to the project folder and wn to the correct structure folder, before advancing



The SMU seed file is located here with ProjectWise:

NCDOTProduction/Documents/Administration/WorkspaceGroups/NCDOTWorkspaces/Configurat ion\_2023/Workspaces/DOT-US North Carolina/Roles/NCDOT\_Structures/Standards/Seed

Note: The user only needs to select this one time, after that the seed file path will show up in the bottom "Select from recent used templates" box. To use it, just select the button next to "Select from recent used templates" and highlight the seed file.

Select Folder	ument		Navigate to th "NCDOT_Structures" W folder and select the S seed3d file	/orkspa
Seed				
Document				
Name Enter text here		Description	State	
Sheets			Stds - Published	<b>X</b> /
SMU Model	Seed.dgn	SMU ModelSeed.dgn	Stds - Published	v,
🖉 🕥 smu obm-se		smu obm-seed2d.dgn	Stds - Published	
MU OBM-s	eed3d.dgn	SMU OBM-seed3d.dgn	Stds - Published	
<	nuullacedat aus bastlass and	nuncelat pur 02/Dag unceta (A duri-i-ti	>tion\Bentley\Configuration 10_10\Organization-Civil\	Discipline
Address: Description:	SMU OBM-seed3d.dgn	n n cuot-pw-oz (pocuments (Administrat	nou bennes (coundrianou to To (oldanizariou-civii)	usupine: \
File Name:	SMU OBM-seed3d.dgn			
Application:	All Applications			
			Open	Cano
				Canc
			Open For now, leave as "All Applications"	
			For now, leave as "All	

#### NCDOT STRUCTURES MANAGEMENT OPENBRIDGE MANUAL

	o <b>de</b> generate) unique document code.		
	ntfier 5816 MU		
Drawing Type - G	D	~	
Optional - 0			
County_Code - 4		~	Fill out the metadata
Bridge Number D	00		fields for the file being
U-5816-SMU-GD-01-4	0000		
Show Advanced Ge			
	ierate options		
	< Back	Next > Cancel	
			Complete the file name followin
			Complete the file name following
Advanced Document	o	×	
Advanced Document	Creation Wizard		the guidelines in Chapter 2, note
Document Proper	ies		
Document Proper Define required			the metadata entered earlier wil
Document Proper Define required Optionally, you o	ies locument properties - the name and the file name. an also define document description and version s		
Document Proper Define required Optionally, you o New document	ies locument properties - the name and the file name. an also define document description and version s		the metadata entered earlier wil
Document Proper Define required Optionally, you of New document 401_001_B-512	ies locument properties - the name and the file name. an also define document description and version s ame	string.	the metadata entered earlier wil
Document Proper Define required Optionally, you of New document 401_001_B-512	ies iecoument properties - the name and the file name, an also define document description and version s ame 1_SMU_GD01_S01-00_480123.dgn e new document	string.	the guidelines in Chapter 2, note the metadata entered earlier wil partially create file name.
Document Proper Define required Optionally, you of New document i 401_001_B-512 Description for th	ies locument properties - the name and the file name. an also define document description and version s name 1_SMU_GD01_S01-00_480123.dgn e new document j Sheet 1	string.	the metadata entered earlier wil partially create file name.
Document Proper Define required Optionally, you of New document 401_001_8-512 Description for th General Drawin New document f	ies locument properties - the name and the file name. an also define document description and version s name 1_SMU_GD01_S01-00_480123.dgn e new document j Sheet 1	string.	the metadata entered earlier will partially create file name. Update the Description to
Document Proper Define required Optionally, you of New document 401_001_8-512 Description for th General Drawin New document f	ies locument properties - the name and the file name. an also define document description and version s name 1_SMU_GD01_S01-00_480123.dgn e new document g Sheet 1  le name	string.	the metadata entered earlier wil partially create file name.
Document Proper Define required Optionally, you of New document 401_001_B-512 Description for th General Drawin New document th 401_001_B-512	ies locument properties - the name and the file name. an also define document description and version s name 1_SMU_GD01_S01-00_480123.dgn e new document g Sheet 1  le name	string.	the metadata entered earlier wil partially create file name. Update the Description to
Document Proper Define required Optionally, you of New document. 401_001_B-512 Description for th General Drawin New document if 401_001_B-512 Version Application:	ies locument properties - the name and the file name. an also define document description and version s name e new document Sheet 1  le name 1_SMU_GD01_S01-00_480123.dgn		the metadata entered earlier will partially create file name. Update the Description to
Document Proper Define required Optionally, you of New document I 401_001_B-512 Description for tt General Drawin New document 401_001_B-512 Version	ies locument properties - the name and the file name. an also define document description and version s name e new document Sheet 1  le name 1_SMU_GD01_S01-00_480123.dgn	string.	the metadata entered earlier wi partially create file name. Update the Description to
Document Proper Define required Optionally, you of New document document General Drawin New document dot_oot_B-512 Version Description for th General Drawin Application: OpenBridge Mo Save as type:	ies locument properties - the name and the file name. an also define document description and version s name e new document Sheet 1  le name 1_SMU_GD01_S01-00_480123.dgn		the metadata entered earlier will partially create file name. Update the Description to
Document Proper Define required Optionally, you of 401_001_B-512 Description for ti General Drawin New document i 401_001_B-512 Version 	ies locument properties - the name and the file name. an also define document description and version s name e new document Sheet 1  le name 1_SMU_GD01_S01-00_480123.dgn		the metadata entered earlier will partially create file name. Update the Description to match dgn
Document Proper Define required Optionally, you of New document document General Drawin New document dot_oot_B-512 Version Description for th General Drawin Application: OpenBridge Mo Save as type:	ies locument properties - the name and the file name. an also define document description and version s name e new document Sheet 1  le name 1_SMU_GD01_S01-00_480123.dgn		the metadata entered earlier will partially create file name. Update the Description to
Document Proper Define required Optionally, you of New document document General Drawin New document dot_oot_B-512 Version Description for th General Drawin Application: OpenBridge Mo Save as type:	ies locument properties - the name and the file name. an also define document description and version s name e new document Sheet 1  le name 1_SMU_GD01_S01-00_480123.dgn		the metadata entered earlier will partially create file name. Update the Description to match dgn Select "OBM 2023" as the
Document Proper Define required Optionally, you of New document document General Drawin New document dot_oot_B-512 Version Description for th General Drawin Application: OpenBridge Mo Save as type:	ies locument properties - the name and the file name. an also define document description and version s name e new document Sheet 1  le name 1_SMU_GD01_S01-00_480123.dgn		the metadata entered earlier will partially create file name. Update the Description to match dgn
Document Proper Define required Optionally, you of New document document General Drawin New document dot_oot_B-512 Version Description for th General Drawin Application: OpenBridge Mo Save as type:	ies locument properties - the name and the file name. an also define document description and version s name e new document Sheet 1  le name 1_SMU_GD01_S01-00_480123.dgn		the metadata entered earlier will partially create file name. Update the Description to match dgn Select "OBM 2023" as the
Document Proper Define required Optionally, you of New document document General Drawin New document dot_oot_B-512 Version Description for th General Drawin Application: OpenBridge Mo Save as type:	ies locument properties - the name and the file name. an also define document description and version s name e new document Sheet 1  le name 1_SMU_GD01_S01-00_480123.dgn		the metadata entered earlier will partially create file name. Update the Description to match dgn Select "OBM 2023" as the
Document Proper Define required Optionally, you of New document document General Drawin New document dot_oot_B-512 Version Description for th General Drawin Application: OpenBridge Mo Save as type:	ies locument properties - the name and the file name. an also define document description and version s name e new document Sheet 1  le name 1_SMU_GD01_S01-00_480123.dgn		the metadata entered earlier will partially create file name. Update the Description to match dgn Select "OBM 2023" as the
Document Proper Define required Optionally, you of New document document General Drawin New document dot_oot_B-512 Version Description for th General Drawin Application: OpenBridge Mo Save as type:	ies locument properties - the name and the file name. an also define document description and version s name e new document Sheet 1  le name 1_SMU_GD01_S01-00_480123.dgn		the metadata entered earlier will partially create file name. Update the Description to match dgn Select "OBM 2023" as the
Document Proper Define required Optionally, you of New document document General Drawin New document dot_oot_B-512 Version Description for th General Drawin Application: OpenBridge Mo Save as type:	ies locument properties - the name and the file name. an also define document description and version s name e new document Sheet 1  le name 1_SMU_GD01_S01-00_480123.dgn		the metadata entered earlier wi partially create file name. Update the Description to match dgn Select "OBM 2023" as the
Document Proper Define required Optionally, you of New document document General Drawin New document dot_oot_B-512 Version Description for th General Drawin Application: OpenBridge Mo Save as type:	ies locument properties - the name and the file name. anme 1_SMU_GD01_S01-00_480123.dgn e new document j Sheet 1  le name 1_SMU_GD01_S01-00_480123.dgn deler CE 10.12	string.	the metadata entered earlier wi partially create file name. Update the Description to match dgn Select "OBM 2023" as the
Document Proper Define required Optionally, you of New document dot_001_B-512 Description for th General Drawin New document th 401_001_B-512 Version Compending Mo Save as type:	ies locument properties - the name and the file name. anme 1_SMU_GD01_S01-00_480123.dgn e new document j Sheet 1  le name 1_SMU_GD01_S01-00_480123.dgn deler CE 10.12		the metadata entered earlier wight partially create file name. Update the Description to match dgn Select "OBM 2023" as the

#### NCDOT STRUCTURES MANAGEMENT OPENBRIDGE MANUAL

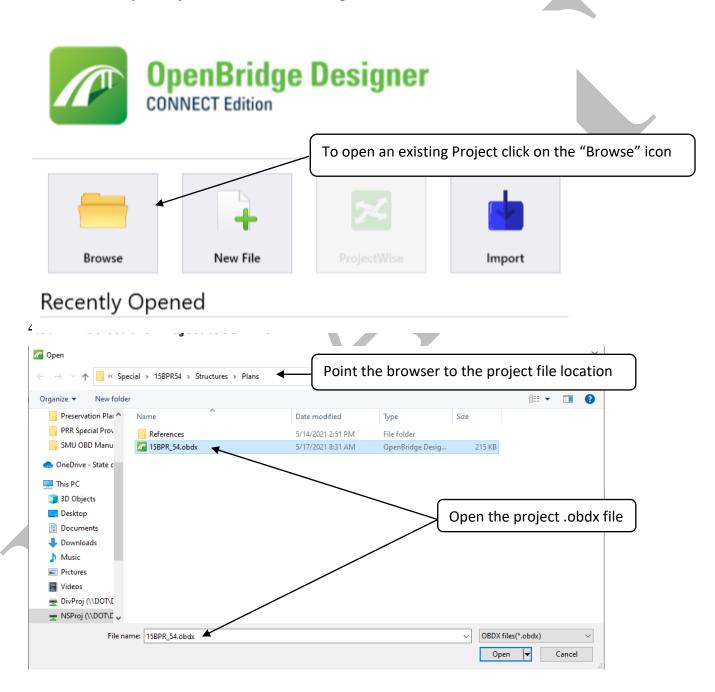
Modified attributes may	rironment specific docume y apply to remaining docu	ent attributes. ments.					
Unit Name		SharePoint Export SharePoint Export D					
SMU Drawing Type	×						
GD	~	Submitted By	~	(	Coloct	the metadat	a faytha
County_Code 48 ~		Submitted By Email					
Bridge Number					remainin	g fields, if o	ne or mor
0000 Optional					does n	ot apply lea	ve blank
01						,	
File Name	100						
U-5816-SMU-GD-01-4800	00	Kau Structures					
Structures Task(*) Drafting	~	Key Structures	~				
Bridge Element(*)			,				
General Drawing	~						
Structures Submittal Phase Final Plans DGN	e(*)						
<u></u>							
		< Back	Next > Cancel				
Advanced Document Cr	eation Wizard			×			
				×			
Define Secondary D		ributes.		×			
Define Secondary D	ocument Attributes	ributes.		×			
Define Secondary D	ocument Attributes	nbutes.		×			
Define Secondary D You should define s	ocument Attributes econdary document attr	ńbutes.		×			
Define Secondary D You should define s Tip or Non-Tip Number	ocument Attributes econdary document attr	nbutes.		×			
Define Secondary D You should define s Tip or Non-Tip Number Project Manager	ocument Attributes econdary document att 15BPR.62	ributes.		×			
Define Secondary D You should define s Tip or Non-Tip Number Project Manager Division_Number	ocument Attributes econdary document att 15BPR.62	ributes.		×			
Define Secondary D You should define s Tip or Non-Tip Number Project Manager Division_Number FA_Number	ocument Attributes econdary document attr 15BPR.62 05	nbutes.				the metadat	-
Define Secondary D You should define s Tip or Non-Tip Number Project Manager Division_Number FA_Number WBS_Number	ocument Attributes econdary document attr 158PR.62 05 158PR.62	ńbutes.				the metadata	-
Define Secondary D You should define s Tip or Non-Tip Number Project Manager Division_Number FA_Number WBS_Number County Contract Number	ocument Attributes econdary document attr 158PR.62 05 158PR.62	ributes.			fields that	are blank th	nat
Define Secondary D You should define s Tip or Non-Tip Number Project Manager Division_Number FA_Number WBS_Number County Contract Number Project Location	ocument Attributes econdary document attr 158PR.62 05 158PR.62	nbutes.			fields that you can, o	are blank th otherwise lea	nat
Define Secondary D You should define s Tip or Non-Tip Number Project Manager Division_Number FA_Number WBS_Number County Contract Number Project Location Type_of_work	ocument Attributes econdary document attri 158PR.62 05 158PR.62 WAKE	nbutes.			fields that you can, o	are blank th	nat
Define Secondary D You should define s Tip or Non-Tip Number Project Manager Division_Number FA_Number WBS_Number County Contract Number Project Location Type_of_work Length_in_Miles	ocument Attributes econdary document attr 158PR.62 05 158PR.62	nbutes.			fields that you can, o	are blank th otherwise lea	nat
Define Secondary D You should define s Project Manager Division_Number FA_Number WBS_Number County Contract Number Project Location Type_of_work Length_in_Miles ROW_Date	ocument Attributes econdary document attri 158PR.62 05 158PR.62 WAKE	nbutes.			fields that you can, o	are blank th otherwise lea	nat
Define Secondary D You should define s Project Manager Division_Number FA_Number WBS_Number County Contract Number Project Location Type_of_work Length_in_Miles ROW_Date Let_Date	ocument Attributes econdary document attri 158PR.62 05 158PR.62 WAKE	ńbutes.			fields that you can, o	are blank th therwise lea	nat
Define Secondary D You should define s Tip or Non-Tip Number Project Manager Division_Number FA_Number WBS_Number County Contract Number Project Location Type_of_work Length_in_Miles ROW_Date Let_Date Municipality	ocument Attributes econdary document attri 158PR.62 05 158PR.62 WAKE	nbutes.			fields that you can, o	are blank th therwise lea	nat
Define Secondary D You should define s Project Manager Division_Number FA_Number WBS_Number County Contract Number Project Location Type_of_work Length_in_Miles ROW_Date Let_Date Municipality Route	ocument Attributes           15BPR.62           05           15BPR.62           WAKE           0.000           0.000	nbutes.			fields that you can, o	are blank th therwise lea	nat
Define Secondary D You should define s Project Manager Division_Number FA_Number VBS_Number County Contract Number Project Location Type_of_work Length_in_Miles ROW_Date Let_Date Municipality Route Status	ocument Attributes econdary document attri 158PR.62 05 158PR.62 WAKE	nbutes.			fields that you can, o	are blank th therwise lea	nat
Define Secondary D You should define s Project Manager Division_Number FA_Number WBS_Number County Contract Number Project Location Type_of_work Length_in_Miles ROW_Date Let_Date Municipality Route	ocument Attributes           econdary document attributes           15BPR.62           05           15BPR.62           WAKE           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000	nbutes.			fields that you can, o	are blank th therwise lea	nat
Define Secondary D You should define s Project Manager Division_Number FA_Number VBS_Number County Contract Number Project Location Type_of_work Length_in_Miles ROW_Date Let_Date Municipality Route Status	ocument Attributes           15BPR.62           05           15BPR.62           WAKE           0.000           0.000	nbutes.			fields that you can, o	are blank th therwise lea	nat

Advanced Document Co		×
Verify entered docu		
Wizard will create a new	v document with the following specifications:	
Target Folder + Name + Description	: Structures	^
Target Document + Creation mode + Document name + File name	: New document : 401_001_U-5816_SMU_GD-01_S01-00_480000 : 401_001_U-5816_SMU_GD-01_S01-00_480000.dgn	
+ Description + Version	General Drawing Speet 1	Verify metadata fields are
Template + Name	:401_001_PROJECT_SMU_GD01_S01-00_STRUCTURE.dgn	correct, otherwise use
+ Description + Folder Name + Folder Description	: 401_001_PROJECT_SMU_GD01_S01-00_STRUCTURE.dgn : NCDOT Structures Management	the "Back" button to
Document Attributes + Label	: Length_in_Miles : 0.000	revise as needed
+ Value + Label	: 0.000 : Key Structures	
+ Value + Label	: : Route	
+ Value + Label	: : Optional	
+ Value + Label	:01 :Let_Date	
+ Value		
+ Label + Value	: Project_Name :	
+ Label + Value	Project Manager	
dvanced Document Crea		Cancel
	Completing the Advanced Document Creation Wizard You have successfully completed the Advanced Document Creation Wizar	ard
	The document(s) you have defined were successfully created.	
	To close this wizard, click Finish.	
		Use the "Finish" button to
		create the DGN
	/	/
	▶	

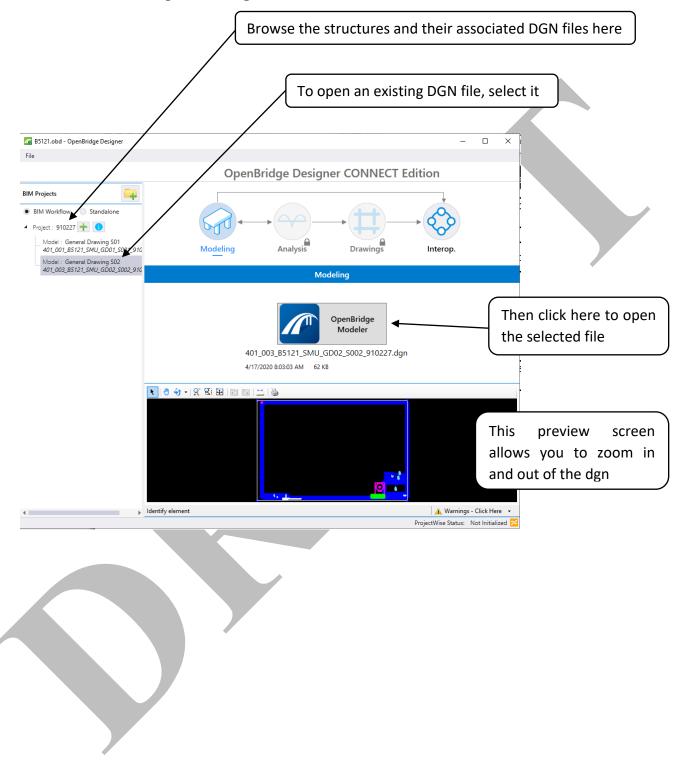
## 4.3 **OPENING AN EXISTING DGN IN BIM WORKFLOW**

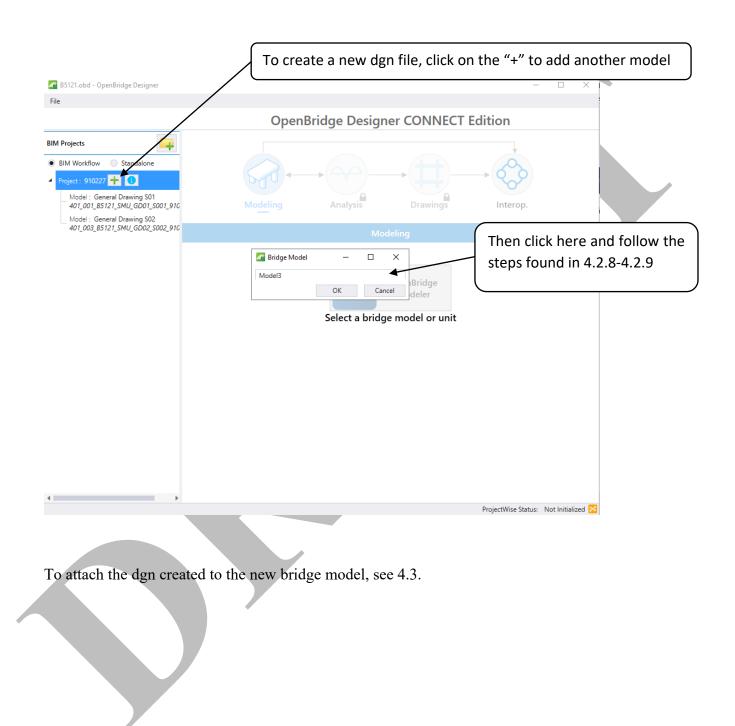
#### 4.3.1 **Open OBD file Browser**

Once OBD is opened you will see the following window:



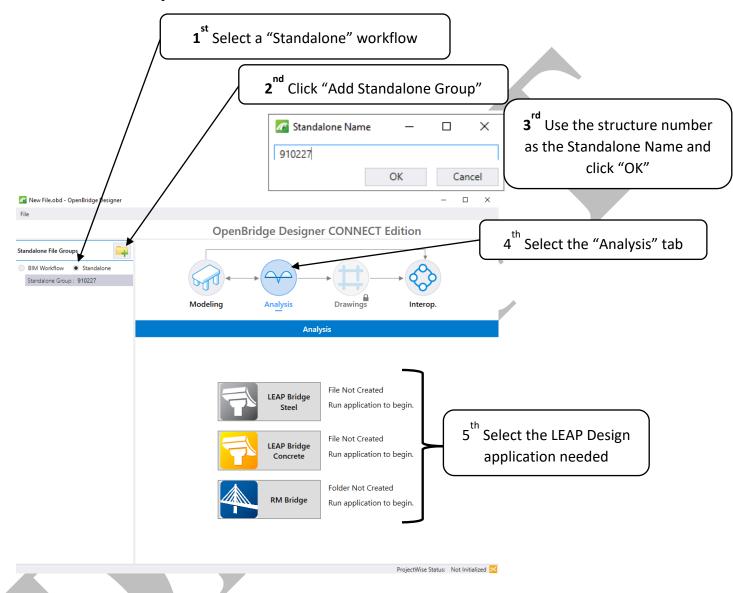
#### 4.3.3 Select and Open Existing DGN





#### 4.5 **OPENING LEAP DESIGN SOFTWARE**

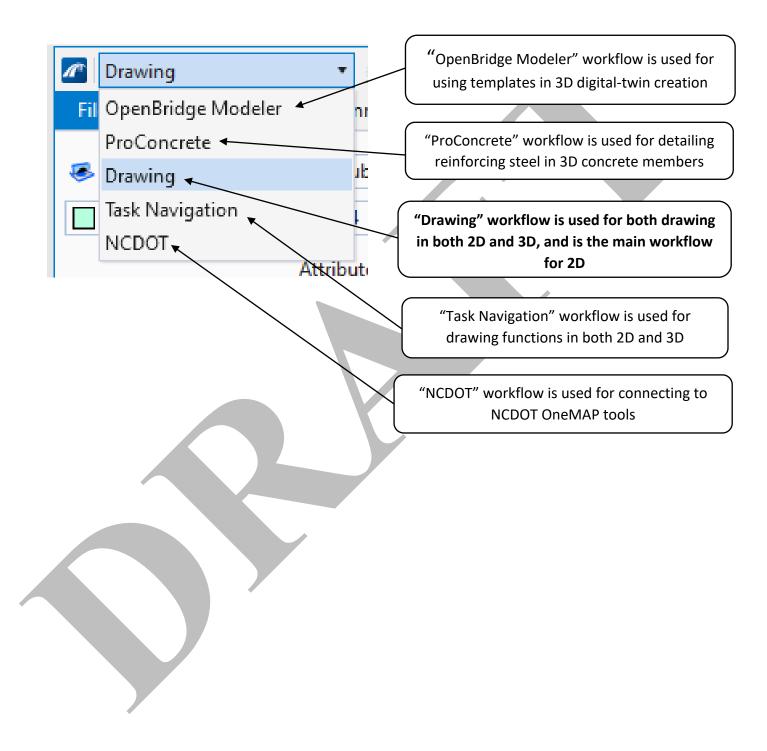
Follow the steps outlined in 4.2.8-4.2.9, then



Be sure to name and save Leap Design files to their appropriate project folders.

## 4.6 **OBD DGN WORKFLOW**

Once in OBD, selecting the correct workflow for the file is important.



#### 4.7 **DGN MODELS**

Once the DGN file is created following the SMU Naming Convention and saved to the correct project folder, the file will need to be set up for plan production. The following sections will cover the three model types and what they are used for. For further use of the models, see Chapters 5 and 6.

#### 4.7.1 Setting Up the DGN

Once the DGN is created and saved in the correct folder, open the DGN and open the "Models" dialog box.

		dels Dialog Icon
🖉 Drawing 🔹 🔀 🕶 🖬 🛃 🎼 🛧 🔹 🖈 🖈	<b>□</b> - /	
	Curves Constraints	
None * Default *		
	er Attach Tools • 縃 • 🗄 •	
Attributes	Primary	_

The default Models Dialog Box will look like this:

_				
	🗇 Models		_	
	📭 🖻 🚰 🗔 🍸 🗙			
	Type 2D/3D Name	Description	*	Design File
	👣 🗊 Default	Master Model	~	S:\DEV\Open.
	<			>

There are three different types of models that can be created within a DGN; a Design Model, a Drawing Model, and a Sheet Model.

Type

Type

#### 4.7.1.1 Design Models

Design Models have default black backgrounds and can be either 2D  $\mathcal{P}$  or 3D The default design model in SMU's seed file is 3D and will remain as a 3D model, the user can close the view 2 window and save settings to remove the isometric view and make the model feel like a 2D model. A Design Model is meant to contain the following information:

- 3D digital twin that represents what is to be built or an existing structure, drawn full size (1:1) or,
- 2D elements that represent what is to be built or is existing, drawn full scale (1:1)
- Not intended for publication, only for editing
- Can be a part of a complex design, where multiple design models can be referenced to each other to form a design composition.

	To remain a the defer	ult Degion Model		
	To rename the defau	uit Design Model:	Select the Defa	ult Design Model
	D Models			×
	📮 🗅 💷 🚰 🗔 🌱 🗙			
	Type 2D/3D Name 🗡	Description		*
	👘 🧊 Default	Master Model		<b>A</b>
	<			>
ļ		Click on the "Properties" icon		
		ener on the Troperties from	J	
1	Models		– 🗆 X	
	Type 2D/3D Name ~	Description	*	
	👘 🧊 Default	Master Model	4	
	<		>	

rties		<b>-</b> ₽ ×
Models (1)		
🏠 Default		
General		<b>^</b> ^
Is Active	True	_
Name	Default	
Description	Master Model	
Ref Logical	Design	
Type Design Dimension	3D	
Is Markup	False	
Annotation Scale	Full Size 1 = 1	
Design Scale	1.0000	
Paper Scale	1.0000	
Propagate Annotation	On	
Line Style Scale	Annotation Scale	
Update Fields Automa	True	
Angle Readout		•
		^
Direction Base	East	
Direction Mode	Azimuth	
Format	~DD.DDDD	
Accuracy Direction	0.1234 AntiClockwise	
Direction	AntiClockwise	
Isometric		~
Isometric Plane	Тор	
Isometric Lock	False	
Bometre Lock	T diac	
Locks		~
ACS Plane	False	
Acoriale	Taise	
Working Units		~
Format	MU:SU	
Master Unit	US Survey Feet	
	' Sulvey leet	
Maeter Unit Label	US Survey Inches	
	se carrey menee	
Sub Unit		
Master Unit Label Sub Unit Sub Unit Label Accuracy	" 1/16	
Sub Unit Sub Unit Label	" 1/16 10000 per Distance US Surve	ey
Sub Unit Sub Unit Label Accuracy Resolution Working Area	10000 per Distance US Surve 1.70591E+08 Miles	rey
ub Unit ub Unit Label ccuracy esolution	10000 per Distance US Surve	

Once the Properties are updated as needed, save the file and close the Properties dialog box.

To create a new Design Model

	Click on "Create New Model"		
		_	• ×
Type 2D/3D Name	Description Master Model	*	Design File S:\DEV\Open.
<			>

4.7.1.2

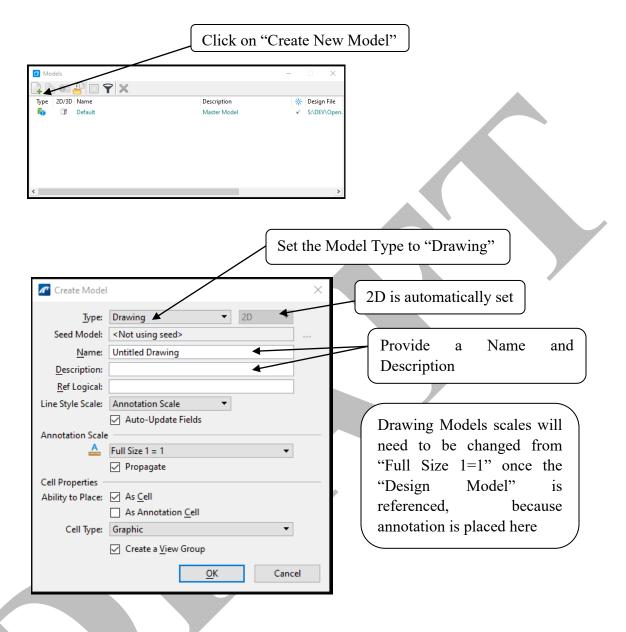
	Set the Model Type	e to "Design"
🕂 Create Model	×	
<u>T</u> ype: Seed Model:	Design JD <not seed="" using=""></not>	Select 2D or 3D
<u>N</u> ame:	Untitled Design	Provide a Name and
<u>D</u> escription:	+	Description
<u>R</u> ef Logical:		
Line Style Scale:	Annotation Scale 🔹	
	Auto-Update Fields	
Annotation Scale —	Full Size 1 = 1	Design Models should be "Full Size 1=1"
Cell Properties		
Ability to Place:	As <u>C</u> ell As Annotation <u>C</u> ell	
Cell Type:	Graphic 🔻	
	Create a <u>V</u> iew Group	
	<u>O</u> K Cancel	
Drawing Models		

Туре

Drawing Models have a default grey background and are always 2D  $\square$  . A Drawing Model is meant to contain the following information:

- An area for attaching Design Models 1:1 as references (typically done with the drawing tools cutting views of the 3D digital twin)
- Used as the location where non-sheet specific annotation is applied (dimensions, callouts, etc.)

To create a new Drawing Model, without using a drawing tool (such as the Place Named Boundary tool).

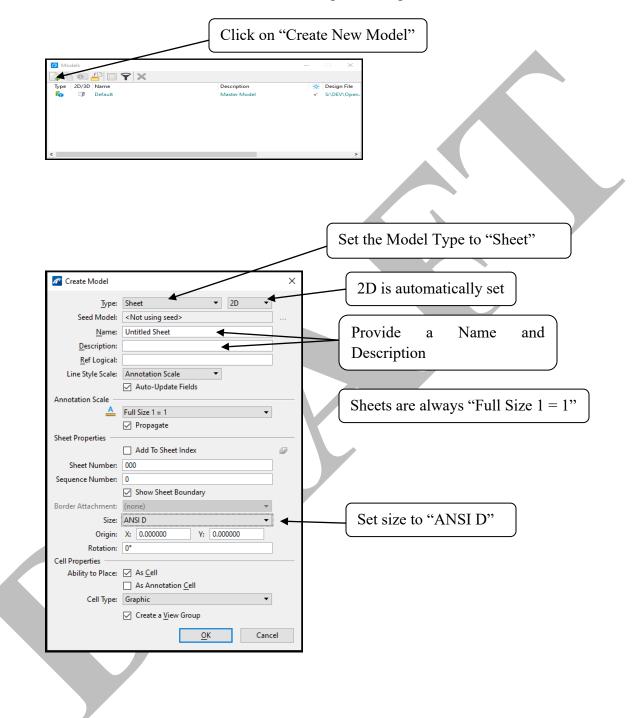


4.7.1.3 Sheet Models

Туре

Sheet Models have a default white background and are always 2D  $\square$  . A Sheet Model is meant to contain the following information:

- Used to define the ready for printing document
- An area where the Drawing Models are referenced and attached at their own scale to create a final plan sheet
- Has defined printing output settings (like ANSI D paper size)
- Includes a sheet boundary which defines the printing area



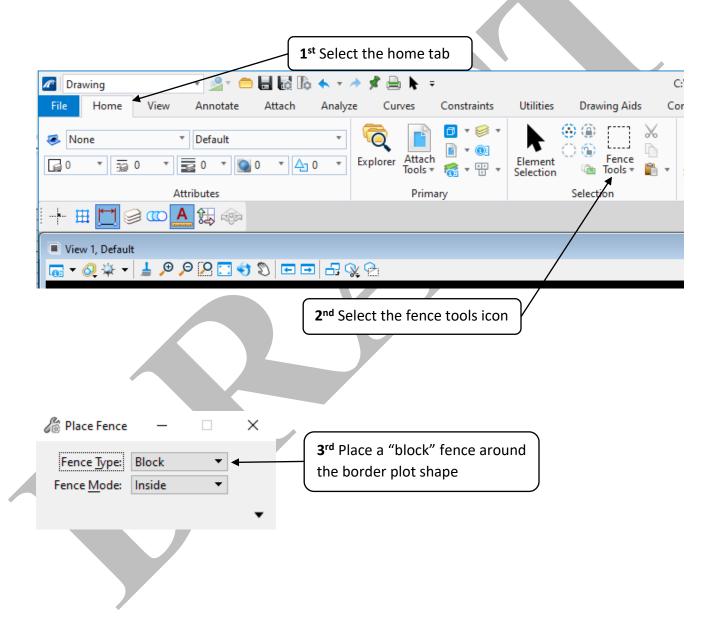
To create a new Sheet Model, without using a drawing tool

## 4.8 **PRINTING PDF's**

All printing should be generating full scale (ANSI D, 34x22) PDFs, which can be physically printed to any size paper when printing from your PDF viewing software.

#### 4.8.1 Creating a PDF Document from a Single DGN Converted from a V8i DGN

To PDF a single plan sheet file, follow these steps:



	<b>4</b> <sup>th</sup> Select File
Tile Hon	<ul> <li>✓ Constant</li> <li>✓ View Annotate Attach Analyze Curves</li> </ul>
Sone 0 ▼	The fault     The fault
🔳 View 1, De	
New Open	S <sup>th</sup> Select Print Print Displays IPLOT dialog
Save Save As Save Settings Send Mail	InterPlot Organizer       Displays InterPlot Organizer         Print       Print to a printer or to a file
Close Tools Settings	Print Preview Open the resizable print preview window <b>6<sup>th</sup> Select Print to PDF</b>
Properties Print	Print to PDF     Print to a PDF document       Image: Print Styles     Create, edit, and delete print styles
Import Export Publish i-model	Print Organizer Print multiple files using Print Organizer

🚈 Print (pdf.pltcfg)		– 🗆 X	
File Settings Resymbolization			
📙 🗣 🕀 🖽 🏹	٠		
Printer and Paper Size			<b>7</b> <sup>th</sup> Select the "…"
PDF	· •		
Bentley PDF printer driver			
ANSI A	•		
Usable area is 11 x 8.5 in.			
Landscape 🔻			
Area: View 🔻	Rasterized		
View: View 2 🔻	Print to 3D		
Color: True Color 🔹	Copies: 1 Show design in preview	<u>_</u>	
Scal <u>e</u> : 1:2	<u>R</u> otation:	None 🔻	
Size: 11.000 8.294	in. 🕂 Maximize		
<u>O</u> rigin: 0.000 0.103	in. 🗹 Auto- <u>c</u> enter		
Pen table:		/ X	
Design script:		/ X	
		Print to File	

Direct the Select Printer Driver Configuration File tool to the following path:

NCDOTProduction/Documents/Administration/WorkspaceGroups/NCDOTWorkspaces/Configurati on\_2023/Workspaces/DOT-US North Carolina/Roles/NCDOT\_Structures/Standards/plot

CHAPTER 4 OBD

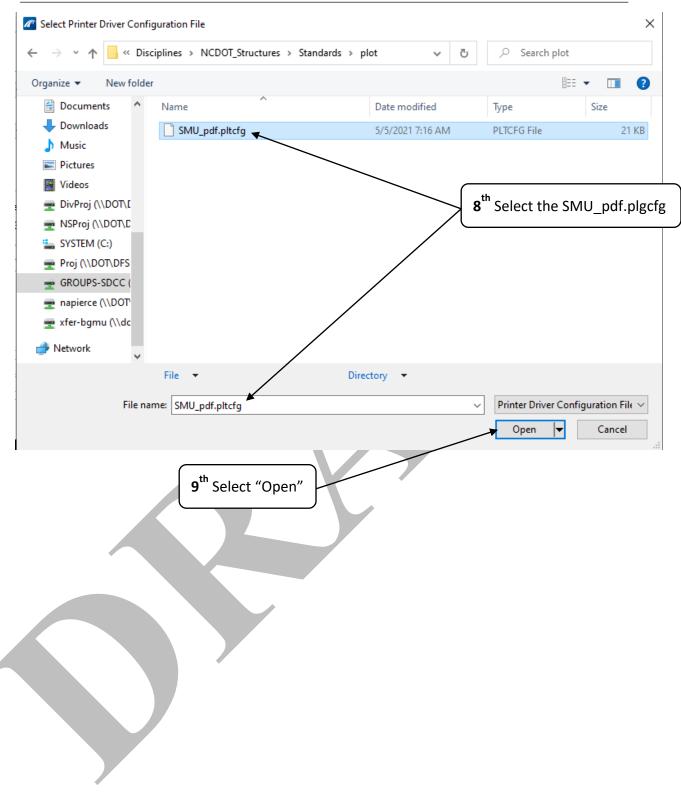


Image: Constraint of the second se	Rasterized Print to 3D Copies: 1 Show design in				
Scale:         20:0 9/16           Size:         33.013         22.000           Origin:         0.494         0.000		Rotation: None			
Pen table: smu.tbl Design script:		···· d			
	<b>10<sup>th</sup> Print to File</b>	Print to File.			
✓ Save Print As ← → × ↑ → This	<b>10<sup>th</sup> Print to File</b> PC > Desktop > B-5121 > B-5121	Print to File.	Search B-5121	×	
$\leftarrow$ $\rightarrow$ $\checkmark$ $\uparrow$ $\square$ $\rightarrow$ This					
← → × ↑ → This Organize ▼ New folder	PC > Desktop > B-5121 > B-5121 Name	↓ Č Date modified	Search B-5121       Type		
← → ~ ↑ □ → This Organize ▼ New folder ↓ Downloads ★ ^	PC > Desktop > B-5121 > B-5121 Name	✓ Č      Date modified 5/5/2021 11:47 AM	Search B-5121       Type       File folder	BEE	
← → ∽ ↑ □ → This Organize ▼ New folder ↓ Downloads ★ ^ Documents ★	PC > Desktop > B-5121 > B-5121 Name old	↓ Č Date modified	Search B-5121       Type		
<ul> <li>← → · ↑ ▲ &gt; This</li> <li>Organize · New folder</li> <li>↓ Downloads * ^</li> <li>▲ Documents *</li> <li>■ Pictures *</li> <li>▲ B-5121</li> </ul>	PC > Desktop > B-5121 > B-5121 Name	✓      Č      Date modified      5/5/2021 11:47 AM      5/5/2021 11:48 AM	Search B-5121       Type       File folder       DGN File	BEE ▼ ? Size ^ 122 KB	
<ul> <li>← → ~ ↑</li> <li>← → This</li> <li>Organize ▼</li> <li>New folder</li> <li>↓ Downloads *</li> <li>↑</li> <li>⊕ Documents *</li> <li>⊕ Pictures *</li> <li>⊕ B-5121</li> <li>⊕ Plans</li> </ul>	PC > Desktop > B-5121 > B-5121 Name old 401_001_B5121_SMU_GD01_S001_910227 401_001_B5121_SMU_GD01_S001_910227	✓	<ul> <li>Search B-5121</li> <li>Type</li> <li>File folder</li> <li>DGN File</li> <li>Adobe Acrobat D</li> </ul>	BEE ▼ ? Size ^ 122 KB 36 KB	
<ul> <li>← → · ↑</li> <li>← → rhis</li> <li>Organize · New folder</li> <li>↓ Downloads * ^</li> <li>↓ Downloads * ^</li> <li>↓ Documents *</li> <li>↓ Documents *</li> <li>↓ Pictures *</li> <li>↓ Plans</li> <li>↓ plot</li> </ul>	PC > Desktop > B-5121 > B-5121 Name old 401_001_B5121_SMU_GD01_S001_910227 401_001_B5121_SMU_GD01_S001_910227 401_001_B5121_SMU_GD01_S01_910227pdf	✓ <b>Č</b> Date modified 5/5/2021 11:47 AM 5/5/2021 11:48 AM 4/28/2020 2:35 PM 4/28/2020 2:35 PM	<ul> <li>Search B-5121</li> <li>Type</li> <li>File folder</li> <li>DGN File</li> <li>Adobe Acrobat D</li> <li>Adobe Acrobat D</li> </ul>	EE ▼ ? Size ^ 122 KB 36 KB 179 KB	
<ul> <li>← → ~ ↑</li> <li>← → This</li> <li>Organize ▼</li> <li>New folder</li> <li>↓ Downloads *</li> <li>↑</li> <li>⊕ Documents *</li> <li>⊕ Pictures *</li> <li>⊕ B-5121</li> <li>⊕ Plans</li> </ul>	PC > Desktop > B-5121 > B-5121 Name old 401_001_B5121_SMU_GD01_S001_910227 401_001_B5121_SMU_GD01_S001_910227 401_001_B5121_SMU_GD01_S01_910227pdf 401_003_B5121_SMU_GD02_S002_910227	✓ Č Date modified 5/5/2021 11:47 AM 5/5/2021 11:48 AM 4/28/2020 2:35 PM 4/28/2020 2:35 PM 5/5/2021 12:34 PM 4/28/2020 2:35 PM	<ul> <li>Search B-5121</li> <li>Type</li> <li>File folder</li> <li>DGN File</li> <li>Adobe Acrobat D</li> <li>Adobe Acrobat D</li> <li>DGN File</li> </ul>	BEE ▼ 2 Size ↑ 122 KB 36 KB 179 KB 123 KB	
<ul> <li>← → · ↑</li> <li>← → rhis</li> <li>Organize · New folder</li> <li>↓ Downloads * ^</li> <li>↓ Downloads * ^</li> <li>↓ Documents *</li> <li>↓ Documents *</li> <li>↓ Pictures *</li> <li>↓ Plans</li> <li>↓ plot</li> </ul>	PC > Desktop > B-5121 > B-5121 Name old \$ 401_001_B5121_SMU_GD01_S001_910227 A 401_001_B5121_SMU_GD01_S001_910227 A 401_003_B5121_SMU_GD02_S002_910227 A 401_003_B5121_SMU_GD02_S002_910227 A 401_003_B5121_SMU_GD02_S003_910227 A 401_003_B5121_SMU_TS01_S003_910227 A 401_003_B5121_SMU_TS01_S003_910227 A 401_003_B5121_SMU_TS01_S003_910227 A 401_003_B5121_SMU_TS01_S003_910227	✓ Č Date modified 5/5/2021 11:47 AM 5/5/2021 11:48 AM 4/28/2020 2:35 PM 4/28/2020 2:35 PM 5/5/2021 12:34 PM 4/28/2020 2:35 PM	<ul> <li>Search B-5121</li> <li>Type</li> <li>File folder</li> <li>DGN File</li> <li>Adobe Acrobat D</li> <li>DGN File</li> <li>Adobe Acrobat D</li> </ul>	BEE ▼ 2 Size 122 KB 36 KB 179 KB 123 KB 61 KB	
<ul> <li>← → · ↑ ▲ &gt; This</li> <li>Organize · New folder</li> <li>▲ Downloads * ^</li> <li>▲ Documents *</li> <li>▲ Pictures *</li> <li>▲ B-5121</li> <li>▲ Plans</li> <li>▲ plot</li> <li>▲ SMU OBD Manu</li> <li>▲ OneDrive - State c · </li> </ul>	PC → Desktop → B-5121 → B-5121 Name old 401_001_B5121_SMU_GD01_S001_910227 401_001_B5121_SMU_GD01_S001_910227 401_001_B5121_SMU_GD01_S01_910227d 401_003_B5121_SMU_GD02_S002_910227 401_003_B5121_SMU_GD02_S003_910227d 5	✓ Č Date modified 5/5/2021 11:47 AM 5/5/2021 11:48 AM 4/28/2020 2:35 PM 4/28/2020 2:35 PM 5/5/2021 12:34 PM 4/28/2020 2:35 PM	<ul> <li>Search B-5121</li> <li>Type</li> <li>File folder</li> <li>DGN File</li> <li>Adobe Acrobat D</li> <li>DGN File</li> <li>Adobe Acrobat D</li> </ul>	BIE ▼ ? Size 122 KB 36 KB 179 KB 123 KB 61 KB 123 KB	
<ul> <li>← → · ↑ ▲ &gt; This</li> <li>Organize · New folder</li> <li>↓ Downloads * ^</li> <li>▲ Documents *</li> <li>④ Documents *</li> <li>■ Pictures *</li> <li>■ B-5121</li> <li>■ Plans</li> <li>■ plot</li> <li>■ SMU OBD Manu</li> <li>● OneDrive - State c v</li> <li>✓ File name: Workspress</li> </ul>	PC > Desktop > B-5121 > B-5121 Name old 401_001_B5121_SMU_GD01_S001_910227 A 401_001_B5121_SMU_GD01_S001_910227 401_001_B5121_SMU_GD01_S01_910227 401_003_B5121_SMU_GD02_S002_910227 401_003_B5121_SMU_GD02_S003_910227.d acce_Test-Default-000.pdf	✓ Č Date modified 5/5/2021 11:47 AM 5/5/2021 11:48 AM 4/28/2020 2:35 PM 4/28/2020 2:35 PM 5/5/2021 12:34 PM 4/28/2020 2:35 PM	<ul> <li>Search B-5121</li> <li>Type</li> <li>File folder</li> <li>DGN File</li> <li>Adobe Acrobat D</li> <li>DGN File</li> <li>Adobe Acrobat D</li> </ul>	BEE ▼ 2 Size 122 KB 36 KB 179 KB 123 KB 61 KB 123 KB 61 KB 123 KB	
<ul> <li>← → · ↑ ▲ &gt; This</li> <li>Organize · New folder</li> <li>▲ Downloads * ^</li> <li>▲ Documents *</li> <li>▲ Pictures *</li> <li>▲ B-5121</li> <li>▲ Plans</li> <li>▲ plot</li> <li>▲ SMU OBD Manu</li> <li>▲ OneDrive - State c · </li> </ul>	PC → Desktop → B-5121 → B-5121 Name old 401_001_B5121_SMU_GD01_S001_910227 401_001_B5121_SMU_GD01_S001_910227 401_003_B5121_SMU_GD02_S002_910227 401_003_B5121_SMU_GD02_S002_910227 401_003_B5121_SMU_GD02_S003_910227 401_003_B5121_SMU_TS01_S003_910227d ace_Test-Default-000.pdf atput Files (*.*)	✓ Č          Date modified         5/5/2021 11:47 AM         5/5/2021 11:48 AM         4/28/2020 2:35 PM         4/28/2020 2:35 PM         5/5/2021 12:34 PM         4/28/2020 2:35 PM         5/5/2021 12:34 PM         4/28/2020 2:35 PM         5/5/2021 1:07 PM	<ul> <li>Search B-5121</li> <li>Type</li> <li>File folder</li> <li>DGN File</li> <li>Adobe Acrobat D</li> <li>DGN File</li> <li>Adobe Acrobat D</li> </ul>	B = ▼ 2 Size 122 KB 36 KB 179 KB 123 KB 61 KB 123 KB 123 KB ↓	
<ul> <li>← → · ↑ ▲ &gt; This</li> <li>Organize · New folder</li> <li>▲ Downloads * ^</li> <li>▲ Documents * ^</li> <li>④ Documents * ^</li> <li>④ Pictures * </li> <li>▲ B-5121</li> <li>④ Plans</li> <li>④ plot</li> <li>⑤ SMU OBD Manu</li> <li>▲ OneDrive - State c </li> <li>✓ File name: Worksp Save as type: Print Out</li> </ul>	PC → Desktop → B-5121 → B-5121 Name old 401_001_B5121_SMU_GD01_S001_910227 401_001_B5121_SMU_GD01_S001_910227 401_003_B5121_SMU_GD02_S002_910227 401_003_B5121_SMU_GD02_S002_910227 401_003_B5121_SMU_GD02_S003_910227 401_003_B5121_SMU_TS01_S003_910227d ace_Test-Default-000.pdf atput Files (*.*)	✓ Č          Date modified         5/5/2021 11:47 AM         5/5/2021 11:48 AM         4/28/2020 2:35 PM         4/28/2020 2:35 PM         5/5/2021 12:34 PM         4/28/2020 2:35 PM         5/5/2021 12:34 PM         4/28/2020 2:35 PM         5/5/2021 1:07 PM	<ul> <li>Search B-5121</li> <li>Type</li> <li>File folder</li> <li>DGN File</li> <li>Adobe Acrobat D</li> <li>DGN File</li> <li>Adobe Acrobat D</li> </ul>	B = ▼ 2 Size 122 KB 36 KB 179 KB 123 KB 61 KB 123 KB 123 KB ↓	
<ul> <li>← → · ↑ ▲ &gt; This</li> <li>Organize · New folder</li> <li>▲ Downloads * ^</li> <li>▲ Documents * ^</li> <li>④ Documents * ^</li> <li>④ Pictures * </li> <li>▲ B-5121</li> <li>④ Plans</li> <li>④ plot</li> <li>⑤ SMU OBD Manu</li> <li>▲ OneDrive - State c </li> <li>✓ File name: Worksp Save as type: Print Out</li> </ul>	PC → Desktop → B-5121 → B-5121 Name old 401_001_B5121_SMU_GD01_S001_910227 401_001_B5121_SMU_GD01_S001_910227 401_003_B5121_SMU_GD02_S002_910227 401_003_B5121_SMU_GD02_S002_910227 401_003_B5121_SMU_GD02_S003_910227 401_003_B5121_SMU_TS01_S003_910227d ace_Test-Default-000.pdf atput Files (*.*)	✓ Č          Date modified         5/5/2021 11:47 AM         5/5/2021 11:48 AM         4/28/2020 2:35 PM         4/28/2020 2:35 PM         5/5/2021 12:34 PM         4/28/2020 2:35 PM         5/5/2021 12:34 PM         4/28/2020 2:35 PM         5/5/2021 1:07 PM	<ul> <li>Search B-5121</li> <li>Type</li> <li>File folder</li> <li>DGN File</li> <li>Adobe Acrobat D</li> <li>DGN File</li> <li>Adobe Acrobat D</li> </ul>	B = ▼ 2 Size 122 KB 36 KB 179 KB 123 KB 61 KB 123 KB 123 KB ↓	

To print to paper, open the file in Adobe or BlueBeam and print from there.

## 4.8.2 Creating a PDF Document from a Single DGN

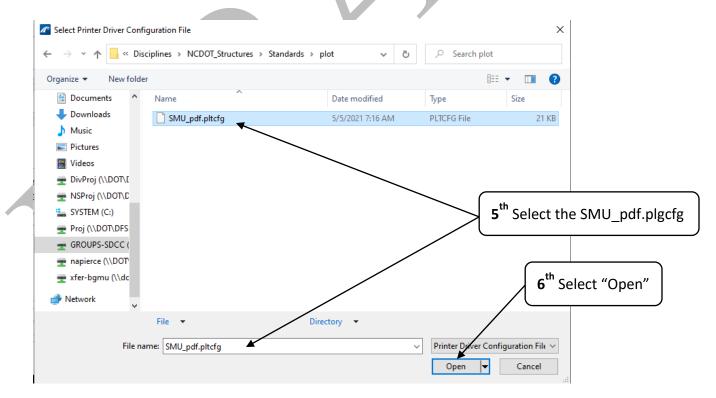
To PDF a single plan sheet file, from the Sheet Model follow these steps:

<b>1</b> <sup>st</sup> Select File	
Image: Image	
None     Default       Image: 0 to the state of	
Attributes Pri	
C:\Users\napierce\Des	
Open Save	
Save As Displays InterPlot Organizer	
Save Settings Send Mail Close Print Print to a printer or to a file	
Tools Open the resizable print preview window <b>3<sup>rd</sup> Sele</b>	ect Print to PDF
Settings       Properties   Print to PDF Print to a PDF document	
Print Print Print Styles Create, edit, and delete print styles	
Import       Export       Publish i-model   Print Organizer	

Print (pdf.pltcfg)		– 🗆 X	
File Settings Resymbolization			
	[		
Printer and Paper Size			<b>4</b> <sup>th</sup> Select the "…"
📸 PDF 👻	<b></b>		
Bentley PDF printer driver			
ANSI A 👻			
Usable area is 11 x 8.5 in.			
Landscape 🔻			
Area: View 💌 🔽 Rasterized			
View: View 2   Print to 3D			
Color: True Color 🔻 Copi <u>e</u> s: 1	Show <u>d</u> esign in preview	<u>+</u>	
Scal <u>e</u> : 1:2	<u>R</u> otation:	None 🔻	
Size: 11.000 8.294 in. +++ Maximiz	ze		
<u>O</u> rigin: 0.000 0.103 in. ∠ Auto- <u>c</u> er	nter		
Pen table: Design script:		··· / ×	
		Print to File	

Direct the Select Printer Driver Configuration File tool to the following path:

NCDOTProduction/Documents/Administration/WorkspaceGroups/NCDOTWorkspaces/Configuration\_2023/Workspaces/DOT-US North Carolina/Roles/NCDOT\_Structures/Standards/plot



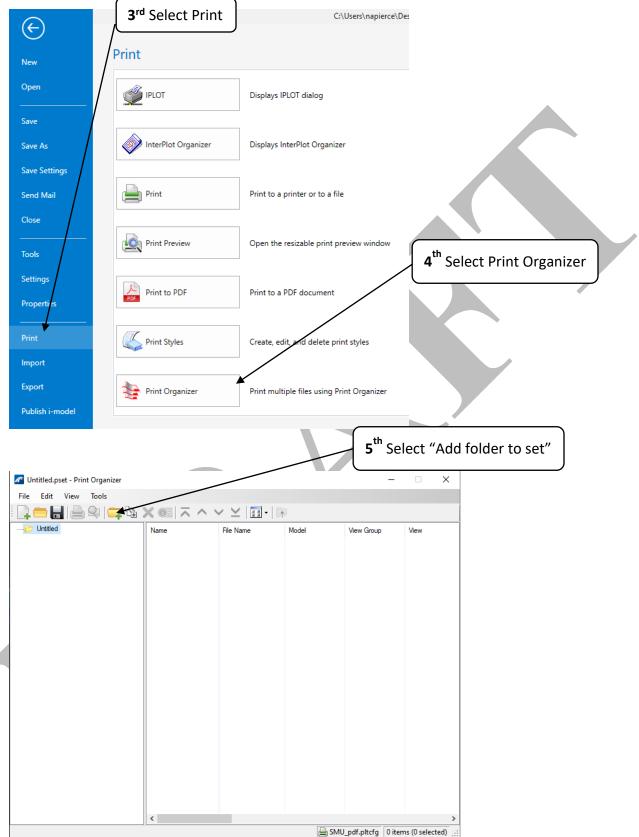
SMU_BlackWhite_PDF         Bentley PDF printer driver         ANSI D         Usable area is 34 x 22 in.         Landscape         Area:         Fence         View:         View 1         Color:         Grayscale	Rasterized     Print to 3D Copies: 1    Show design in				
Scale:         20:0 9/16           Size:         33.013         22.00           Origin:         0.494         0.000		Rotation: None			
Pen table: smu.tbl Design script:		6			
	<b>7</b> <sup>th</sup> Print to File	Print to File.			
✓ Save Print As ← → × ↑ □ > This	<b>7<sup>th</sup> Print to File</b> PC > Desktop > B-5121 > B-5121	v Č		×	
$\leftrightarrow$ $\rightarrow$ $\checkmark$ $\uparrow$ $\blacksquare$ $\rightarrow$ This					
← → × ↑ → This Organize ▼ New folder			Search B-5121	I	
$\leftrightarrow$ $\rightarrow$ $\checkmark$ $\uparrow$ $\square$ $\rightarrow$ This	PC > Desktop > B-5121 > B-5121 Name	✓ C Date modified	Search B-5121 Type	≣≕ ▼ (?)	
← → ~ ↑ □ → This Organize ▼ New folder ↓ Downloads オ ^	PC > Desktop > B-5121 > B-5121 Name	ر بر المحالي محالي محا محالي محالي محالي محالي محالي	Search B-5121       Type       File folder	BEE V 😮	
← → · ↑ → This Organize • New folder ◆ Downloads * ^ ☆ Documents *	PC > Desktop > B-5121 > B-5121 Name old \$ 401_001_B5121_SMU_GD01_S001_910227	✓ C Date modified	Search B-5121 Type	≣≕ ▼ (?)	
<ul> <li>← → · ↑ → This</li> <li>Organize · New folder</li> <li>↓ Downloads * ^</li> <li>☆ Documents *</li> <li>≅ Pictures *</li> <li>B-5121</li> </ul>	PC > Desktop > B-5121 > B-5121 Name old 401_001_B5121_SMU_GD01_S001_910227 401_001_B5121_SMU_GD01_S001_910227	• Č Date modified 5/5/2021 11:47 AM 5/5/2021 11:48 AM	<ul> <li>Search B-5121</li> <li>Type</li> <li>File folder</li> <li>DGN File</li> </ul>	E≡ ▼ 3 Size ^ 122 KB	
<ul> <li>← → · ↑ → This</li> <li>Organize • New folder</li> <li>↓ Downloads * ↑</li> <li>⊕ Documents *</li> <li>⊕ Pictures *</li> <li>⊕ B-5121</li> <li>⊕ Plans</li> </ul>	PC > Desktop > B-5121 > B-5121 Name old \$ 401_001_B5121_SMU_GD01_S001_910227	• <b>č</b> Date modified 5/5/2021 11:47 AM 5/5/2021 11:48 AM 4/28/2020 2:35 PM	<ul> <li>Search B-5121</li> <li>Type</li> <li>File folder</li> <li>DGN File</li> <li>Adobe Acrobat D</li> </ul>	EIII ▼ 3 Size ↑ 122 KB 36 KB	
<ul> <li>← → · ↑ → This</li> <li>Organize • New folder</li> <li>→ Downloads * ^</li> <li>→ Documents *</li> <li>→ Pictures *</li> <li>→ B-5121</li> <li>→ Plans</li> <li>→ plot</li> </ul>	PC > Desktop > B-5121 > B-5121 Name old 401_001_B5121_SMU_GD01_S001_910227 401_001_B5121_SMU_GD01_S001_910227 401_001_B5121_SMU_GD01_S01_910227d	✓ Č Date modified 5/5/2021 11:47 AM 5/5/2021 11:48 AM 4/28/2020 2:35 PM 4/28/2020 2:35 PM	<ul> <li>Search B-5121</li> <li>Type</li> <li>File folder</li> <li>DGN File</li> <li>Adobe Acrobat D,</li> <li>Adobe Acrobat D,</li> </ul>	EE ▼ 2 Size ↑ 122 KB 36 KB 179 KB	
<ul> <li>← → ~ ↑  → This</li> <li>Organize ▼ New folder</li> <li>↓ Downloads  * ^</li> <li>⊕ Documents  *</li> <li>⊕ Pictures  *</li> <li>⊕ B-5121</li> <li>⊕ Plans</li> <li>⊕ plot</li> <li>⊕ SMU OBD Manu</li> </ul>	PC > Desktop > B-5121 > B-5121 Name old 401_001_B5121_SMU_GD01_S001_910227 A 401_001_B5121_SMU_GD01_S01_910227 401_001_B5121_SMU_GD01_S01_910227d 401_003_B5121_SMU_GD02_S002_910227 A 401_003_B5121_SMU_GD02_S002_910227 401_003_B5121_SMU_TS01_S003_910227.d	Date modified           5/5/2021 11:47 AM           5/5/2021 11:48 AM           4/28/2020 2:35 PM	<ul> <li>Search B-5121</li> <li>Type</li> <li>File folder</li> <li>DGN File</li> <li>Adobe Acrobat D</li> <li>Adobe Acrobat D</li> <li>DGN File</li> </ul>	BEE ▼ 2 Size ^ 122 KB 36 KB 179 KB 123 KB	
<ul> <li>← → · ↑ → This</li> <li>Organize • New folder</li> <li>→ Downloads * ^</li> <li>→ Documents *</li> <li>→ Pictures *</li> <li>→ B-5121</li> <li>→ Plans</li> <li>→ plot</li> </ul>	PC > Desktop > B-5121 > B-5121 Name old 401_001_B5121_SMU_GD01_S001_910227 A 401_001_B5121_SMU_GD01_S01_910227 401_001_B5121_SMU_GD01_S01_910227d 401_003_B5121_SMU_GD02_S002_910227 A 401_003_B5121_SMU_GD02_S002_910227 401_003_B5121_SMU_TS01_S003_910227.d	Date modified           5/5/2021 11:47 AM           5/5/2021 11:48 AM           4/28/2020 2:35 PM	<ul> <li>Search B-5121</li> <li>Type</li> <li>File folder</li> <li>DGN File</li> <li>Adobe Acrobat D</li> <li>DGN File</li> <li>Adobe Acrobat D</li> </ul>	BEE ▼ 2 Size ↑ 122 KB 36 KB 179 KB 123 KB 61 KB	
<ul> <li>← → · ↑ ▲ &gt; This</li> <li>Organize · New folder</li> <li>▲ Downloads * ^</li> <li>▲ Documents * </li> <li>▲ Pictures *</li> <li>▲ B-5121</li> <li>▲ Plans</li> <li>▲ plot</li> <li>▲ SMU OBD Manu</li> <li>▲ OneDrive - State c · · · · ·</li> </ul>	PC > Desktop > B-5121 > B-5121 Name old 401_001_B5121_SMU_GD01_S001_910227 A 401_001_B5121_SMU_GD01_S01_910227 401_001_B5121_SMU_GD01_S01_910227d 401_003_B5121_SMU_GD02_S002_910227 A 401_003_B5121_SMU_GD02_S002_910227 401_003_B5121_SMU_TS01_S003_910227.d	Date modified           5/5/2021 11:47 AM           5/5/2021 11:48 AM           4/28/2020 2:35 PM	<ul> <li>Search B-5121</li> <li>Type</li> <li>File folder</li> <li>DGN File</li> <li>Adobe Acrobat D</li> <li>DGN File</li> <li>Adobe Acrobat D</li> </ul>	BEE ▼ 2 Size ↑ 122 KB 36 KB 179 KB 123 KB 61 KB 123 KB	
<ul> <li>← → · ↑ ▲ &gt; This</li> <li>Organize · New folder</li> <li>↓ Downloads * ^</li> <li>▲ Documents *</li> <li>④ Documents *</li> <li>■ Pictures *</li> <li>■ B-5121</li> <li>■ Plans</li> <li>■ plot</li> <li>■ SMU OBD Manu</li> <li>● OneDrive - State c v</li> <li>■ File name: Workspress</li> </ul>	PC > Desktop > B-5121 > B-5121 Name old 401_001_B5121_SMU_GD01_S001_910227 A 401_001_B5121_SMU_GD01_S001_910227 401_001_B5121_SMU_GD01_S01_910227 401_003_B5121_SMU_GD02_S002_910227 401_003_B5121_SMU_GD02_S003_910227.d ace_Test-Default-000.pdf	Date modified           5/5/2021 11:47 AM           5/5/2021 11:48 AM           4/28/2020 2:35 PM	<ul> <li>Search B-5121</li> <li>Type</li> <li>File folder</li> <li>DGN File</li> <li>Adobe Acrobat D</li> <li>DGN File</li> <li>Adobe Acrobat D</li> </ul>	Size 122 KB 36 KB 179 KB 123 KB 61 KB 123 KB 61 KB 123 KB 61 KB	
<ul> <li>← → · ↑ ▲ &gt; This</li> <li>Organize · New folder</li> <li>▲ Downloads * ^</li> <li>▲ Documents * </li> <li>▲ Pictures *</li> <li>▲ B-5121</li> <li>▲ Plans</li> <li>▲ plot</li> <li>▲ SMU OBD Manu</li> <li>▲ OneDrive - State c · · · · ·</li> </ul>	PC → Desktop → B-5121 → B-5121 Name old 401_001_B5121_SMU_GD01_S001_910227 401_001_B5121_SMU_GD01_S001_910227 401_003_B5121_SMU_GD02_S002_910227 401_003_B5121_SMU_GD02_S002_910227 401_003_B5121_SMU_GD02_S003_910227 401_003_B5121_SMU_TS01_S003_910227d ace_Test-Default-000.pdf atput Files (*.*)	► ℃ Date modified 5/5/2021 11:47 AM 5/5/2021 11:48 AM 4/28/2020 2:35 PM 4/28/2020 2:35 PM 5/5/2021 12:34 PM 4/28/2020 2:35 PM 5/5/2021 1:07 PM	<ul> <li>Search B-5121</li> <li>Type</li> <li>File folder</li> <li>DGN File</li> <li>Adobe Acrobat D</li> <li>DGN File</li> <li>Adobe Acrobat D</li> </ul>	BEE ▼ 2 Size ▲ 122 KB 36 KB 179 KB 123 KB 61 KB 123 KB 123 KB	
<ul> <li>← → · · ↑ → This</li> <li>Organize · New folder</li> <li>→ Downloads · • •</li> <li>⊕ Documents · •</li> <li>⊕ Pictures · •</li> <li>⊕ Pictu</li></ul>	PC → Desktop → B-5121 → B-5121 Name old 401_001_B5121_SMU_GD01_S001_910227 401_001_B5121_SMU_GD01_S001_910227 401_003_B5121_SMU_GD02_S002_910227 401_003_B5121_SMU_GD02_S002_910227 401_003_B5121_SMU_GD02_S003_910227 401_003_B5121_SMU_TS01_S003_910227d ace_Test-Default-000.pdf atput Files (*.*)	► ℃ Date modified 5/5/2021 11:47 AM 5/5/2021 11:48 AM 4/28/2020 2:35 PM 4/28/2020 2:35 PM 5/5/2021 12:34 PM 4/28/2020 2:35 PM 5/5/2021 1:07 PM	<ul> <li>Search B-5121</li> <li>Type</li> <li>File folder</li> <li>DGN File</li> <li>Adobe Acrobat D</li> <li>DGN File</li> <li>Adobe Acrobat D</li> </ul>	BEE ▼ 2 Size ▲ 122 KB 36 KB 179 KB 123 KB 61 KB 123 KB 123 KB	

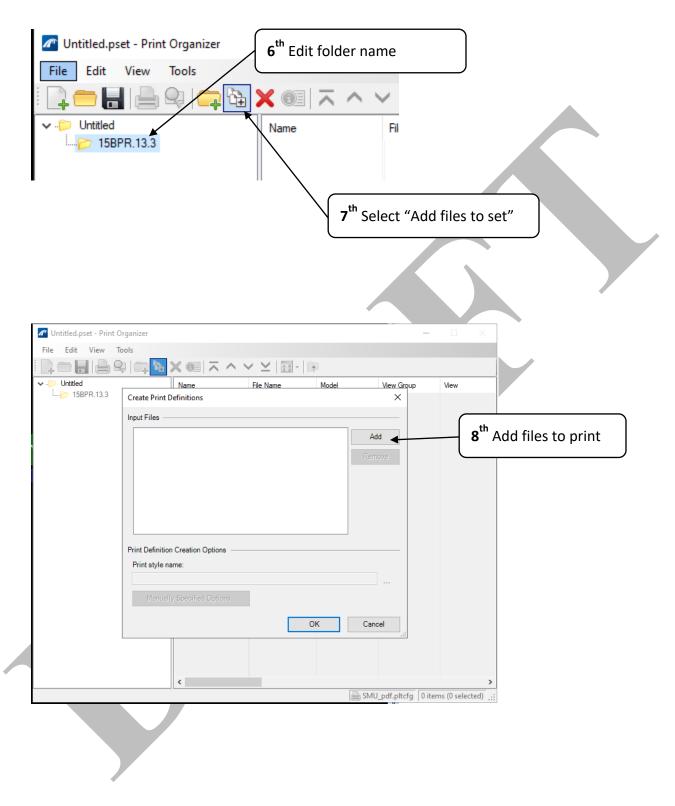
To print to paper, open the file in Adobe or BlueBeam and print from there.

## 4.8.3 Using Print Organizer for PDF Creation of Multiple Converted V8i DGN's

To PDF your plan sheet set DGN files, follow these steps:

					<sup>st</sup> Select	the h	ome ta	ab			
	Drawing		• <u>}</u> • e	- 🖶 🛃 🖟	5 🛧 = A	🖌 🖈 🗎	h 🕨 =				C:
Fi	le Home	View	Annotate	Attach	Analyze	Cu	rves	Constraints	Utilities	Drawing Aids	Cor
			▼ Default	0 • <u>A</u> -	•	C Explorer	Attach Tools •	□ •	Element Selection	<ul> <li>③</li> <li>③</li> <li>④</li> <li>Fence</li> <li>□</li> <li>□<!--</th--><th></th></li></ul>	
		A	ttributes				Prima	iry		Selection	
	- 🆽 🛄 🗑	<b></b> 00 €	🗛 😥 🐵								
	View 1, Defaul	t									
	- 🖉 🔆 -		P 🛛 🗔 📢	) I) 🖉	•	( 🔁					
	Drawing le Home	Viev	v Annot			Analyze		Inves			
	None	ā 0 ,	• Defaul		· 👌 0	• •	Explore	Atta Tools			
			Attributes					Pri			
	- 🆽 🔛	<mark></mark>	A 拱 🕯								
	View 1, Defa	ult									
le	- 🔗 🔆	- 1	€ 9 €	3 🔁 🕄	← →	-7: Q	2				

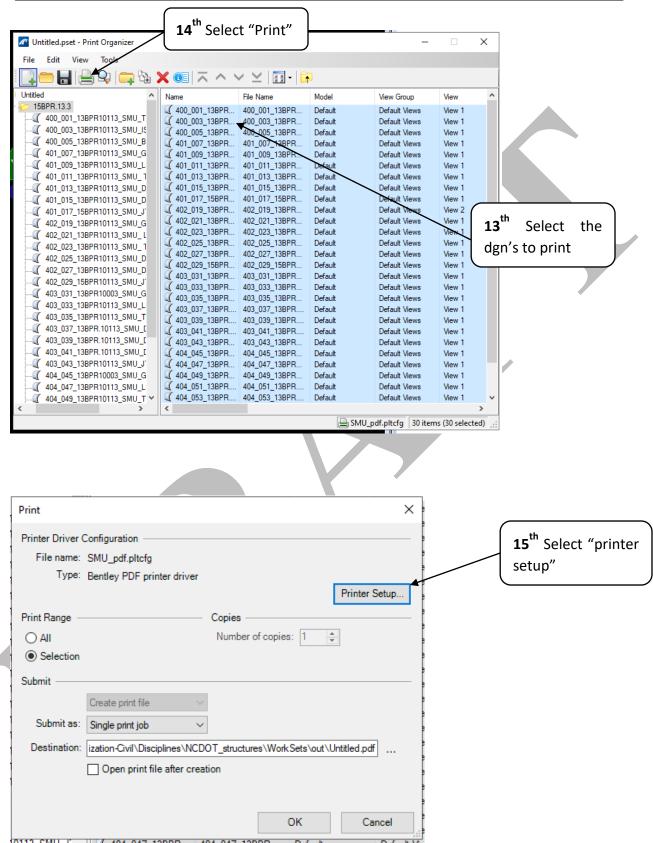




#### NCDOT STRUCTURES MANAGEMENT OPENBRIDGE MANUAL

Create Print Definitions	×	]
Input Files		
S:\DPG1\Division_13\buncombe_final\400_001_13BPR10113_SMI		-
S:\DPG1\Division_13\buncombe_final\400_003_13BPR10113_SMI S:\DPG1\Division_13\buncombe final\400_005_13BPR10113_SMI	Add	
S:\DPG1\Division 13\buncombe final\401 007 13BPR10113 SMI	Remove	
S:\DPG1\Division_13\buncombe_final\401_009_13BPR10113_SM S:\DPG1\Division_13\buncombe_final\401_011_13BPR10113_SM		
S:\DPG1\Division_13\buncombe_final\401_013_13BPR10113_SMI S:\DPG1\Division_13\buncombe_final\401_015_13BPR10113_SMI		
S:\DPG1\Division_13\buncombe_final\401_017_15BPR10113_SMI S:\DPG1\Division_13\buncombe_final\402_019_13BPR10113_SMI		
S:\DPG1\Division_13\buncombe_final\402_021_13BPR10113_SMI S\\DPG1\Division_13\buncombe_final\402_023_13BPR10113_SMI		
StoPlaTulivision_Ttybuncombe_tinal/402_023_TtRPR10113_SML		
Print Definition Counting Options	(	9 <sup>th</sup> Select "Manually Specified Options"
Print Definition Creation Options		Select Manually Specified Options
Print style name:		
Manually Specified Options		
01	Constal	
ОК	Cancel	
Dist Deficities Constant Outland		×
Print Definition Creation Options		^
Main Advanced Fence Display Levels References		
Model Options		
Use these models to create print definitions:		
~		
		· · · · · · · · · · · · · · · · · · ·
Fence Creation Methods		
None	10 <sup>th</sup> <	Select "Define from shape"
Define from shape		
Define from cell		
Eit to master model		
Fit to element range		
Enter fence points		
ОК	Cancel	
ОК	Cancel	
ОК	Cancel	

Fence - Define from shape	2	×	]
Search	Shape properties		
Master model	Levels:		th
Reference files	plot shape		<b>11<sup>th</sup></b> Add "plot shape" ar
	plot shape cell		"plot shape cell"
\$			
	Colors: (0-255)		
	Weights: (0-31)		
	Styles: (0-7)		
Create one print definition			
Create one print definitio	on for each matching shape		
\$	ОК	Cancel	
Create Print Definitions		×	
Input Files			
-	ombe_final\400_001_13BPR10113_SMI		
S:\DPG1\Division_13\bunc	ombe_final\400_003_13BPR10113_SMI ombe_final\400_005_13BPR10113_SMI	Add	
S:\DPG1\Division_13\bunc	ombe_final\401_007_13BPR10113_SMI ombe_final\401_009_13BPR10113_SMI	Remove	
S:\DPG1\Division_13\bunc	ombe_final\401_011_13BPR10113_SMI ombe_final\401_013_13BPR10113_SMI		
S:\DPG1\Division_13\bunc	ombe_final\401_015_13BPR10113_SMI		
S:\DPG1\Division_13\bunce	ombe_final\401_017_15BPR10113_SMI ombe_final\402_019_13BPR10113_SMI		
	ombe_final\402_021_13BPR10113_SMI ombe_final\402_023_13BPR10113_SMI		
<			
Print Definition Creation Optio	ns		
Print Definition Creation Optio Print style name:	ins		
	ins		
			<b>12<sup>th</sup></b> Select "OK"
Print style name:			<b>12<sup>th</sup> Select "OK"</b>
Print style name:		 Cancel	<b>12<sup>th</sup> Select "OK"</b>



NCDOT STRUCTURES MANAGEMENT OPENBRIDGE MANUAL

Printer Setup	
Printer Driver Configuration File File name: uration\Organization-Civil\Disciplines\NCDOT_Structures\Standards\plot\SMU_pdf.pltcfg*/	16 <sup>th</sup> Click on the "dots" to set your printer driver config file using
Type: Bentley PDF printer driver	the path below
OK Cancel	

NCDOTProduction/Documents/Administration/WorkspaceGroups/NCDOTWorkspaces/Configurati on\_2023/Workspaces/DOT-US North Carolina/Roles/NCDOT\_Structures/Standards/plot

$\leftrightarrow \rightarrow \checkmark \uparrow \square ``$	Disciplines > NCDOT_Structures >	Standards > plot 🗸 진		t
Organize 🔻 New f	folder		-	II 🕶 🔳 🕐
👌 Music	^ Name	Date modified	Туре	Size
📄 Pictures 📑 Videos 🛖 DivProj (\\DOT\I	SMU_pdf.pltcfg	5/5/2021 7:16 AM	PLTCFG File	21 KB
<ul> <li>NSProj (\\DOT\E</li> <li>SYSTEM (C:)</li> <li>Proj (\\DOT\DFS</li> <li>GROUPS-SDCC</li> </ul>			<b>17</b> <sup>th</sup> "SMU	Select _pdf.pltcfg" file
<ul> <li>napierce (\\DOT</li> <li>Network</li> </ul>	~			
F	File 🔻	Directory 👻	Printer Configur	ration Files (*.pl $ \smallsetminus $
			Open 🚽	Cancel .:i

Print			×		
Printer Driver (	Configuration -				
	- SMU_pdf.pltcfg	q	•		
	Bentley PDF p		1		
			nter Setup		
Print Range -		Copies			
		Number of copies: 1	ļ		
Selection			2		
Submit					
	Create print file	• ~			
Submit as:	Single print job	· · · ·	1	8 <sup>th</sup> Set	your
Destination:	ization-Civil\Dis	sciplines\NCDOT_structures\WorkSets\out\Untitle	d.pdf	destination" to	save
	Open print	file after creation	, tł	ne files to your pi	roject
				older	
🥂 Save Outpu	t File				
✓ Save Output ← → ✓ ✓		1 → Division_13 → pdf's_final	ٽ ۲	,○ Search pdf's_fi	inal
✓ Save Output ← → * ✓ Organize ▼		1 → Division_13 → pdf's_final	ٽ ~		inal
$\leftrightarrow$ $\rightarrow$ $\checkmark$ $\checkmark$	↑ 🔤 « DPG	1 → Division_13 → pdf's_final Name	マ ひ Date modified		
← → ✓ ✓ Organize ▼	New folder	^	Date modified		Size
← → ✓ ✓ Organize ▼ ♪ Music	New folder	Name	Date modified	Туре	8000 ▼ Size 2,494
← → • • • Organize ▼ ♪ Music ■ Picture ♥ Videos	New folder	Name	Date modified 5/11/2021 2:19 PM	Type Adobe Acrobat D	BIE ▼ Size 2,494 122
<ul> <li>← → · · ·</li> <li>Organize •</li> <li>Music</li> <li>Picture</li> <li>Videos</li> <li>DivProj</li> </ul>	New folder	Name I5BPR.3.3 Plans TMS_NAP Comments 05 400_001_13BPR10113_SMU_TSH.pdf buncombe_final.pdf Test.pdf	Date modified 5/11/2021 2:19 PM 5/12/2021 10:18 AM 5/10/2021 4:07 PM 5/12/2021 11:29 AM	Type Adobe Acrobat D Adobe Acrobat D Adobe Acrobat D Adobe Acrobat D	EEE ▼ Size 2,494 122 2,350 4,016
<ul> <li>← → · · ·</li> <li>Organize •</li> <li>Music</li> <li>Picture</li> <li>Videos</li> <li>DivProj</li> </ul>	New folder s (\\DOT\C	Name Name 15BPR.3.3 Plans TMS_NAP Comments 05 400_001_13BPR10113_SMU_TSH.pdf buncombe_final.pdf	Date modified 5/11/2021 2:19 PM 5/12/2021 10:18 AM 5/10/2021 4:07 PM	Type Adobe Acrobat D Adobe Acrobat D Adobe Acrobat D	EEE ▼ Size 2,494 122 2,350 4,016
<ul> <li>Corganize </li> <li>Music</li> <li>Picture</li> <li>Videos</li> <li>DivProj</li> <li>NSProj</li> <li>SYSTEM</li> </ul>	New folder s (\\DOT\C	Name I5BPR.3.3 Plans TMS_NAP Comments 05 400_001_13BPR10113_SMU_TSH.pdf buncombe_final.pdf Test.pdf	Date modified 5/11/2021 2:19 PM 5/12/2021 10:18 AM 5/10/2021 4:07 PM 5/12/2021 11:29 AM	Type Adobe Acrobat D Adobe Acrobat D Adobe Acrobat D Adobe Acrobat D	EEE ▼ Size 2,494 122 2,350 4,016
<ul> <li>Corganize </li> <li>Music</li> <li>Picture</li> <li>Videos</li> <li>DivProj</li> <li>NSProj</li> <li>SYSTEM</li> </ul>	New folder s (\\DOT\C (\\DOT\C (\\DOT\C ((\DOT\C (\\DOT\C <p< td=""><td>Name I5BPR.3.3 Plans TMS_NAP Comments 05 400_001_13BPR10113_SMU_TSH.pdf buncombe_final.pdf Test.pdf</td><td>Date modified 5/11/2021 2:19 PM 5/12/2021 10:18 AM 5/10/2021 4:07 PM 5/12/2021 11:29 AM</td><td>Type Adobe Acrobat D Adobe Acrobat D Adobe Acrobat D Adobe Acrobat D</td><td>EEE ▼ Size 2,494 122 2,350 4,016</td></p<>	Name I5BPR.3.3 Plans TMS_NAP Comments 05 400_001_13BPR10113_SMU_TSH.pdf buncombe_final.pdf Test.pdf	Date modified 5/11/2021 2:19 PM 5/12/2021 10:18 AM 5/10/2021 4:07 PM 5/12/2021 11:29 AM	Type Adobe Acrobat D Adobe Acrobat D Adobe Acrobat D Adobe Acrobat D	EEE ▼ Size 2,494 122 2,350 4,016
<ul> <li>Corganize </li> <li>Music</li> <li>Picture</li> <li>Videos</li> <li>DivProj</li> <li>NSProj</li> <li>SYSTEN</li> <li>Proj (\\</li> <li>GROUP</li> </ul>	New folder New folder s (\\DOT\C (\\DOT\C (\\DOT\C (\\DOT\C S-SDCC (	Name ISBPR.3.3 Plans TMS_NAP Comments 05 400_001_13BPR10113_SMU_TSH.pdf buncombe_final.pdf Test.pdf Untitled.pdf	Date modified 5/11/2021 2:19 PM 5/12/2021 10:18 AM 5/10/2021 4:07 PM 5/12/2021 11:29 AM	Type Adobe Acrobat D Adobe Acrobat D Adobe Acrobat D Adobe Acrobat D	EEE ▼ Size 2,494 122 2,350 4,016
<ul> <li>Crganize </li> <li>Music</li> <li>Picture</li> <li>Videos</li> <li>DivProj</li> <li>NSProj</li> <li>SYSTEM</li> <li>Proj (\\</li> <li>GROUP</li> <li>File r</li> </ul>	New folder New folder s (\\DOT\L (\\DOT\L (\\DOT\L (\\DOT\DFS SSDCC ( name: Untitled	Name A 15BPR.3.3 Plans TMS_NAP Comments 05 A 400_001_13BPR10113_SMU_TSH.pdf buncombe_final.pdf Test.pdf Untitled.pdf	Date modified 5/11/2021 2:19 PM 5/12/2021 10:18 AM 5/10/2021 4:07 PM 5/12/2021 11:29 AM	Type Adobe Acrobat D Adobe Acrobat D Adobe Acrobat D Adobe Acrobat D	EEE ▼ Size 2,494 122 2,350 4,016
<ul> <li>Crganize </li> <li>Music</li> <li>Picture</li> <li>Videos</li> <li>DivProj</li> <li>NSProj</li> <li>SYSTEM</li> <li>Proj (\\</li> <li>GROUP</li> <li>File r</li> </ul>	New folder New folder s (\\DOT\L (\\DOT\L (\\DOT\L (\\DOT\DFS SSDCC ( name: Untitled	Name ISBPR.3.3 Plans TMS_NAP Comments 05 400_001_13BPR10113_SMU_TSH.pdf buncombe_final.pdf Test.pdf Untitled.pdf	Date modified 5/11/2021 2:19 PM 5/12/2021 10:18 AM 5/10/2021 4:07 PM 5/12/2021 11:29 AM	Type Adobe Acrobat D Adobe Acrobat D Adobe Acrobat D Adobe Acrobat D	EEE ▼ Size 2,494 122 2,350 4,016
<ul> <li>Crganize </li> <li>Music</li> <li>Picture</li> <li>Videos</li> <li>DivProj</li> <li>NSProj</li> <li>SYSTEM</li> <li>Proj (\\</li> <li>GROUP</li> <li>File r</li> </ul>	New folder New folder s (\\DOT\L (\\DOT\L (\\DOT\L (\\DOT\DFS SSDCC ( name: Untitled	Name A 15BPR.3.3 Plans TMS_NAP Comments 05 A 400_001_13BPR10113_SMU_TSH.pdf buncombe_final.pdf Test.pdf Untitled.pdf d.pdf e Document Format Files(*.pdf)	Date modified 5/11/2021 2:19 PM 5/12/2021 10:18 AM 5/10/2021 4:07 PM 5/12/2021 11:29 AM 5/12/2021 10:47 AM	Type Adobe Acrobat D Adobe Acrobat D Adobe Acrobat D Adobe Acrobat D	EEE ▼ Size 2,494 122 2,350 4,016
<ul> <li>Corganize </li> <li>Music</li> <li>Picture</li> <li>Videos</li> <li>DivProj</li> <li>NSProj</li> <li>SYSTEN</li> <li>SYSTEN</li> <li>GROUP</li> <li>File r</li> <li>Save as</li> </ul>	New folder New folder s i (\\DOT\L (\\DOT\L (\\DOT\L ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) )	Name A 15BPR.3.3 Plans TMS_NAP Comments 05 A 400_001_13BPR10113_SMU_TSH.pdf buncombe_final.pdf Test.pdf Untitled.pdf d.pdf e Document Format Files(*.pdf)	Date modified 5/11/2021 2:19 PM 5/12/2021 10:18 AM 5/10/2021 4:07 PM 5/12/2021 11:29 AM 5/12/2021 10:47 AM	Type Adobe Acrobat D Adobe Acrobat D Adobe Acrobat D Adobe Acrobat D Adobe Acrobat D	EEE ▼ Size 2,494 122 2,350 4,016 120
<ul> <li>Crganize </li> <li>Music</li> <li>Picture</li> <li>Videos</li> <li>DivProj</li> <li>NSProj</li> <li>SYSTEM</li> <li>Proj (\\</li> <li>GROUP</li> <li>File r</li> </ul>	New folder New folder s i (\\DOT\L (\\DOT\L (\\DOT\L ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) )	Name  A 15BPR.3.3 Plans TMS_NAP Comments 05 A 400_001_13BPR10113_SMU_TSH.pdf buncombe_final.pdf Test.pdf Juntitled.pdf d.pdf Directory	Date modified 5/11/2021 2:19 PM 5/12/2021 10:18 AM 5/10/2021 4:07 PM 5/12/2021 11:29 AM 5/12/2021 10:47 AM	Type Adobe Acrobat D Adobe Acrobat D Adobe Acrobat D Adobe Acrobat D	
<ul> <li>Corganize </li> <li>Music</li> <li>Picture</li> <li>Videos</li> <li>DivProj</li> <li>NSProj</li> <li>SYSTEN</li> <li>SYSTEN</li> <li>GROUP</li> <li>File r</li> <li>Save as</li> </ul>	New folder New folder s i (\\DOT\L (\\DOT\L (\\DOT\L ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) )	Name  IsBPR.3.3 Plans TMS_NAP Comments 05 400_001_13BPR10113_SMU_TSH.pdf buncombe_final.pdf Test.pdf Untitled.pdf  d.pdf Directory  Igst After pathing to	Date modified 5/11/2021 2:19 PM 5/12/2021 10:18 AM 5/10/2021 4:07 PM 5/12/2021 11:29 AM 5/12/2021 10:47 AM	Type Adobe Acrobat D Adobe Acrobat D Adobe Acrobat D Adobe Acrobat D Adobe Acrobat D	EEE ▼ Size 2,494 122 2,350 4,016 120
<ul> <li>Corganize </li> <li>Music</li> <li>Picture</li> <li>Videos</li> <li>DivProj</li> <li>NSProj</li> <li>SYSTEN</li> <li>SYSTEN</li> <li>GROUP</li> <li>File r</li> <li>Save as</li> </ul>	New folder New folder s i (\\DOT\L (\\DOT\L (\\DOT\L ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) )	Name  A 15BPR.3.3 Plans TMS_NAP Comments 05 A 400_001_13BPR10113_SMU_TSH.pdf buncombe_final.pdf Test.pdf Juntitled.pdf d.pdf Directory	Date modified 5/11/2021 2:19 PM 5/12/2021 10:18 AM 5/10/2021 4:07 PM 5/12/2021 11:29 AM 5/12/2021 10:47 AM	Type Adobe Acrobat D Adobe Acrobat D Adobe Acrobat D Adobe Acrobat D Adobe Acrobat D	EEE ▼ Size 2,494 122 2,350 4,016 120

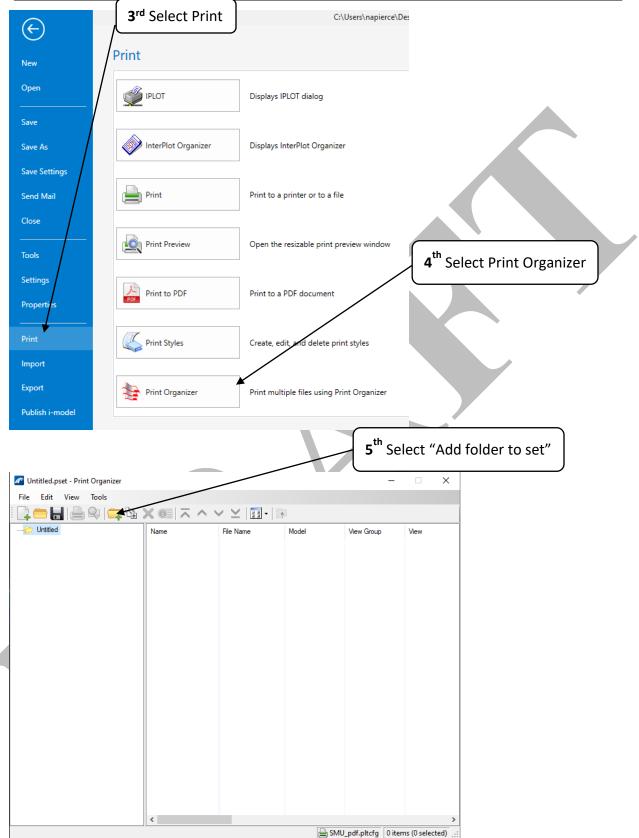
NCDOT STRUCTURES MANAGEMENT OPENBRIDGE MANUAL

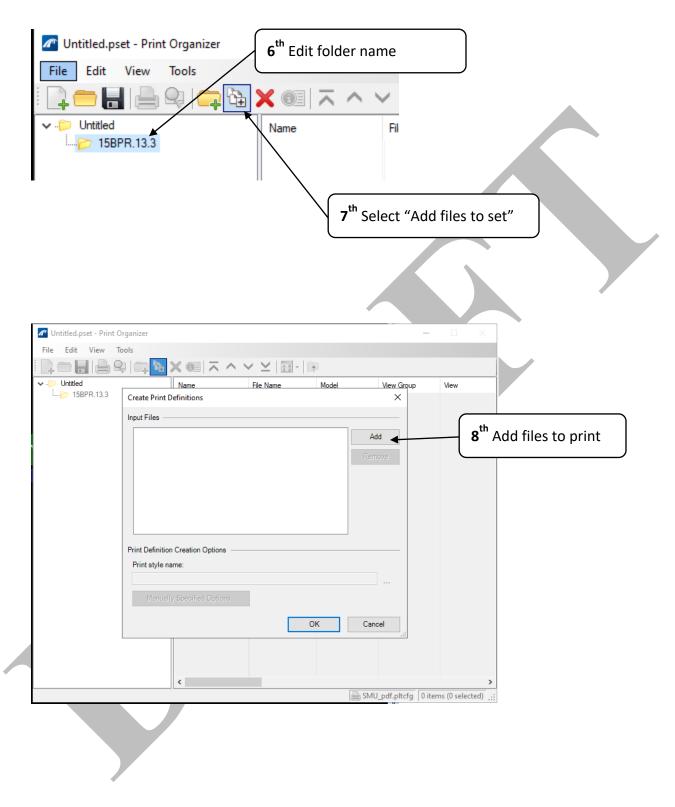
Print							×	
Printer Driver (	Configurat	tion ———						
File name:								
	_							
Type:	Bentley H	PDF printer driv	/er					
						Printer Setu	IP	
Print Range -			— Copies					~
			Numb	er of copi	ies: 1 📫		I.	
Selection								
C Sciccion								
Submit								
	Create pr	rint file	$\sim$					
Submit as:	Single pr	int job	$\sim$				20 <sup>th</sup>	Click "OK" to
Destination:	ization-Ci	ivil\Disciplines\I	NCDOT struc	tures\Wo	ork Sets\out\Un	titled.pdf	create	e the PDF in the
							locati	on you pointed it
		print file after (	creation				to fo	the destination
					/			
				_				
					ОК	Cance		
112 CHU P	11 (7 10)	017 10000	101.017	10000	2.6	-		
							21 <sup>st</sup> Save	your PSet file
							with your	·
_						*		projecti
C Untitled.pset - Print O	-				-			
File Edit View To		X 0⊒ ⊼ ^ \	∕⊻⊡-[	•				
Untitled	<u> </u>	Name	File Name	Model	View Group	View ^	2	
15BPR.13.3 	113_SMU_T	400_001_13BPR 400_003_13BPR		Default Default	Default Views Default Views	View 1 View 1		
400_003_13BPR10	113_SMU_IS	400_005_13BPR	400_005_13BPR	Default	Default Views	View 1		
		( 401_007_13BPR ( 401_009_13BPR		Default Default	Default Views Default Views	View 1 View 1		
	)113_SMU_L	401_011_13BPR	401_011_13BPR	Default	Default Views	View 1		
		( 401_013_13BPR ( 401_015_13BPR		Default Default	Default Views Default Views	View 1 View 1		
		401_017_15BPR		Default	Default Views	View 1		
401_015_13BPR10		402_019_13BPR	402_019_13BPR	Default Default	Default Views	View 2		
401_017_15BPR10			400 001 10DDD			Manu 1		
	)113_SMU_G	402_021_13BPR			Default Views	View 1 View 1		
401_017_15BPR10 402_019_13BPR10 402_021_13BPR10	)113_SMU_G )113_SMU_L	402_021_13BPR 402_023_13BPR 402_025_13BPR	402_023_13BPR 402_025_13BPR	Default Default	Default Views Default Views Default Views	View 1 View 1		
	0113_SMU_G 0113_SMU_L 0113_SMU_1	402_021_13BPR 402_023_13BPR 402_025_13BPR 402_027_13BPR	402_023_13BPR 402_025_13BPR 402_027_13BPR	Default Default Default	Default Views Default Views Default Views Default Views	View 1 View 1 View 1		
401_017_15BPR10 402_019_13BPR10 402_021_13BPR10 402_021_13BPR10 402_023_13BPR10 402_025_13BPR10 402_027_13BPR10	)113_SMU_G )113_SMU_ L )113_SMU_ 1 )113_SMU_D )113_SMU_D )113_SMU_D	402_021_13BPR 402_023_13BPR 402_025_13BPR 402_027_13BPR 402_027_13BPR 402_029_15BPR	402_023_13BPR 402_025_13BPR 402_027_13BPR	Default Default	Default Views Default Views Default Views	View 1 View 1		
401_017_15BPR10 402_019_13BPR10 402_021_13BPR10 402_022_13BPR10 402_022_13BPR10 402_022_13BPR10 402_027_13BPR10 402_029_15BPR10	)113_SMU_G )113_SMU_ L )113_SMU_ 1 )113_SMU_D )113_SMU_D )113_SMU_J	<ul> <li>✓ 402_021_13BPR</li> <li>✓ 402_023_13BPR</li> <li>✓ 402_025_13BPR</li> <li>✓ 402_027_13BPR</li> <li>✓ 402_029_15BPR</li> <li>✓ 403_031_13BPR</li> <li>✓ 403_033_13BPR</li> </ul>	402_023_13BPR 402_025_13BPR 402_027_13BPR 402_029_15BPR 403_031_13BPR 403_033_13BPR	Default Default Default Default Default Default	Default Views Default Views Default Views Default Views Default Views Default Views Default Views	View 1 View 1 View 1 View 1 View 1 View 1		
401_017_15BPR10           402_019_13BPR10           402_021_13BPR10           402_023_13BPR10           402_025_13BPR10           402_027_13BPR10           402_027_13BPR10           402_027_13BPR10           402_027_13BPR10           402_027_13BPR10           402_027_13BPR10           402_027_13BPR10           402_027_13BPR10           403_031_13BPR10	)113_SMU_G )113_SMU_ L )113_SMU_ 1 )113_SMU_D )113_SMU_D )113_SMU_J' )003_SMU_G	<ul> <li>✓ 402_021_13BPR</li> <li>✓ 402_023_13BPR</li> <li>✓ 402_025_13BPR</li> <li>✓ 402_027_13BPR</li> <li>✓ 402_027_13BPR</li> <li>✓ 403_031_13BPR</li> <li>✓ 403_033_13BPR</li> <li>✓ 403_035_13BPR</li> </ul>	402_023_13BPR 402_025_13BPR 402_027_13BPR 402_029_15BPR 403_031_13BPR 403_033_13BPR 403_035_13BPR	Default Default Default Default Default Default Default	Default Views Default Views Default Views Default Views Default Views Default Views Default Views Default Views	View 1 View 1 View 1 View 1 View 1 View 1 View 1		
- 401_017_15BPR10 - 402_019_13BPR10 - 402_021_13BPR10 - 402_023_13BPR10 - 402_025_13BPR10 - 402_027_13BPR10 - 402_029_15BPR10 - 403_031_13BPR10	)113_SMU_G )113_SMU_ L )113_SMU_ 1 )113_SMU_D )113_SMU_D )113_SMU_J )003_SMU_G )113_SMU_L	402_021_13BPR           402_023_13BPR           402_025_13BPR           402_025_13BPR           402_027_13BPR           403_031_13BPR           403_031_13BPR           403_035_13BPR           403_037_13BPR	402_023_13BPR 402_025_13BPR 402_027_13BPR 402_029_15BPR 403_031_13BPR 403_033_13BPR 403_035_13BPR 403_037_13BPR	Default Default Default Default Default Default Default Default	Default Views Default Views Default Views Default Views Default Views Default Views Default Views Default Views Default Views	View 1 View 1 View 1 View 1 View 1 View 1 View 1 View 1		
401_017_15BPR10           402_019_13BPR10           402_021_13BPR10           402_025_13BPR10           402_025_13BPR10           402_025_13BPR10           402_025_13BPR10           402_025_13BPR10           403_031_13BPR10           403_033_13BPR10           403_035_13BPR10           403_037_13BPR11	)113_SMU_G )113_SMU_L )113_SMU_L )113_SMU_D )113_SMU_D )113_SMU_D )113_SMU_U )113_SMU_L )113_SMU_L )113_SMU_L )113_SMU_L	<pre>402_021_13BPR (402_023_13BPR (402_025_13BPR (402_027_13BPR (403_021_13BPR (403_031_13BPR (403_033_13BPR (403_037_13BPR (403_037_13BPR (403_037_13BPR (403_037_13BPR</pre>	402_023_13BPR 402_025_13BPR 402_027_13BPR 402_029_15BPR 403_031_13BPR 403_033_13BPR 403_035_13BPR	Default Default Default Default Default Default Default Default	Default Views Default Views Default Views Default Views Default Views Default Views Default Views Default Views	View 1 View 1 View 1 View 1 View 1 View 1 View 1		
401_017_15BPR10           402_019_13BPR10           402_021_13BPR10           402_022_13BPR10           402_025_13BPR10           402_025_13BPR10           402_025_13BPR10           402_025_13BPR10           402_025_13BPR10           403_031_13BPR10           403_035_13BPR10           403_037_13BPR11           403_037_13BPR11           403_037_13BPR11	1113_SMU_G 1113_SMU_L 1113_SMU_D 1113_SMU_D 1113_SMU_U 1113_SMU_U 1113_SMU_U 1113_SMU_L 1113_SMU_L 1113_SMU_L 1113_SMU_L 0113_SMU_L	<pre>402_021_13BPR (402_023_13BPR (402_025_13BPR (402_027_13BPR (403_031_13BPR (403_031_13BPR (403_035_13BPR (403_035_13BPR (403_039_13BPR (403_039_13BPR (403_039_13BPR (403_034_13BPR (403_043_13BPR</pre>	402_023_138PR 402_025_138PR 402_027_138PR 403_021_138PR 403_031_138PR 403_035_138PR 403_037_138PR 403_039_138PR 403_041_138PR 403_043_138PR	Default Default Default Default Default Default Default Default Default Default	Default Views Default Views	View 1 View 1		
401_017_15BPR10           402_019_13BPR10           402_021_13BPR10           402_025_13BPR10           402_025_13BPR10           402_027_13BPR10           402_027_13BPR10           402_027_13BPR10           403_031_13BPR10           403_031_13BPR10           403_037_13BPR10           403_037_13BPR11           403_037_13BPR11           403_037_13BPR11           403_037_13BPR11           403_037_13BPR11           403_030_31_3BPR11           403_030_31_3BPR11	1113_SMU_G 1113_SMU_1 1113_SMU_1 1113_SMU_D 1113_SMU_D 1113_SMU_U 1113_SMU_L 1113_SMU_L 1113_SMU_T 1113_SMU_C 1113_SMU_C 1113_SMU_C	402_021_13BPR           402_023_13BPR           402_025_13BPR           402_025_13BPR           402_027_13BPR           403_031_13BPR           403_035_13BPR           403_037_13BPR           403_037_13BPR           403_037_13BPR           403_037_13BPR           403_034_13BPR           403_034_13BPR           403_043_13BPR	402_023_138PR 402_025_138PR 402_025_138PR 403_031_138PR 403_031_138PR 403_035_138PR 403_035_138PR 403_039_138PR 403_041_138PR 403_044_138PR 404_045_138PR	Default Default Default Default Default Default Default Default Default Default Default Default	Default Views Default Views	View 1 View 1		
401_017_15BPR10           402_019_13BPR10           402_021_13BPR10           402_022_13BPR10           402_025_13BPR10           402_025_13BPR10           402_025_13BPR10           402_025_13BPR10           402_025_13BPR10           403_031_13BPR10           403_035_13BPR10           403_037_13BPR11           403_037_13BPR11           403_037_13BPR11	1113_SMU_G 1113_SMU_1 1113_SMU_D 1113_SMU_D 1113_SMU_D 1113_SMU_D 1113_SMU_U 1113_SMU_L 1113_SMU_L 0113_SMU_L 0113_SMU_L 0113_SMU_L 1113_SMU_U	402_021_13BPR           402_023_13BPR           402_025_13BPR           402_025_13BPR           402_027_13BPR           403_031_13BPR           403_035_13BPR           403_037_13BPR           403_037_13BPR           403_037_13BPR           403_037_13BPR           403_034_13BPR           403_034_13BPR           403_043_13BPR	402_023_138PR 402_025_138PR 402_027_138PR 403_031_138PR 403_033_138PR 403_035_138PR 403_035_138PR 403_041_138PR 403_041_138PR 403_043_138PR 404_045_138PR 404_045_138PR	Default Default Default Default Default Default Default Default Default Default	Default Views Default Views	View 1 View 1		
<ul> <li>401_017_15BPR10</li> <li>402_019_13BPR10</li> <li>402_021_13BPR10</li> <li>402_022_13BPR10</li> <li>402_025_13BPR10</li> <li>402_025_13BPR10</li> <li>402_025_13BPR10</li> <li>403_031_13BPR10</li> <li>403_035_13BPR10</li> <li>403_037_13BPR11</li> <li>403_037_13BPR11</li> <li>403_037_13BPR11</li> <li>403_031_13BPR11</li> <li>403_031_13BPR11</li> <li>403_031_13BPR11</li> <li>403_031_13BPR11</li> <li>403_031_13BPR11</li> <li>403_041_13BPR11</li> <li>403_045_13BPR10</li> <li>404_045_13BPR10</li> <li>404_047_13BPR11</li> </ul>	1113_SMU_G 1113_SMU_L 1113_SMU_D 1113_SMU_D 1113_SMU_D 1113_SMU_U 1113_SMU_U 1113_SMU_L 1113_SMU_T 1113_SMU_T 1113_SMU_C 1113_SMU_U 1113_SMU_G 1113_SMU_L	<pre>402_021_13BPR (402_023_13BPR (402_025_13BPR (402_027_13BPR (403_031_13BPR (403_031_13BPR (403_035_13BPR (403_035_13BPR (403_037_13BPR (403_041_13BPR (403_043_13BPR (404_045_13BPR (404_045_13BPR (404_045_13BPR (404_045_13BPR (404_045_13BPR (404_045_13BPR (404_045_13BPR (404_045_13BPR (404_045_13BPR (404_045_13BPR (404_045_13BPR (404_045_13BPR</pre>	402_023_138PR 402_025_138PR 402_025_138PR 403_031_138PR 403_033_138PR 403_035_138PR 403_037_138PR 403_039_138PR 403_041_138PR 404_045_138PR 404_045_138PR 404_045_138PR 404_045_138PR 404_045_138PR	Default Default Default Default Default Default Default Default Default Default Default Default Default Default Default	Default Views Default Views	View 1 View 1		
401_017_15BPR10           402_019_13BPR10           402_021_13BPR10           402_022_13BPR10           402_022_13BPR10           402_022_13BPR10           402_027_13BPR10           402_012_13BPR10           402_027_13BPR10           403_03_13BPR10           403_037_13BPR10           403_037_13BPR11           403_043_13BPR11           403_043_13BPR10           404_045_13BPR10           404_045_13BPR10           404_04_13BPR10	1113_SMU_G 1113_SMU_L 1113_SMU_D 1113_SMU_D 1113_SMU_D 1113_SMU_U 1113_SMU_U 1113_SMU_L 1113_SMU_T 1113_SMU_T 1113_SMU_C 1113_SMU_U 1113_SMU_G 1113_SMU_L	<pre>402_021_13BPR (402_023_13BPR (402_027_13BPR (402_027_13BPR (403_031_13BPR (403_031_13BPR (403_035_13BPR (403_035_13BPR (403_039_13BPR (403_043_13BPR (403_043_13BPR (404_045_13BPR (404_051_13BPR) (404_051_13BPR (404_051_13BPR) (404_051</pre>	402_023_138PR 402_025_138PR 402_025_138PR 403_031_138PR 403_033_138PR 403_035_138PR 403_037_138PR 403_039_138PR 403_041_138PR 404_045_138PR 404_045_138PR 404_045_138PR 404_045_138PR 404_045_138PR	Default Default Default Default Default Default Default Default Default Default Default Default Default Default	Default Views Default Views	View 1 View 1		
401_017_15BPR10           402_019_13BPR10           402_021_13BPR10           402_022_13BPR10           402_025_13BPR10           402_025_13BPR10           402_025_13BPR10           403_031_13BPR10           403_033_13BPR10           403_033_13BPR10           403_035_13BPR10           403_037_13BPR11           403_037_13BPR11           403_037_13BPR11           403_037_13BPR11           403_041_13BPR10           404_045_13BPR10           404_045_13BPR10	1113_SMU_G 1113_SMU_L 1113_SMU_D 1113_SMU_D 1113_SMU_D 1113_SMU_U 1113_SMU_U 1113_SMU_L 1113_SMU_T 1113_SMU_T 1113_SMU_C 1113_SMU_U 1113_SMU_G 1113_SMU_L	<pre>402_021_13BPR (402_023_13BPR (402_025_13BPR (402_027_13BPR (403_031_13BPR (403_031_13BPR (403_035_13BPR (403_035_13BPR (403_037_13BPR (403_041_13BPR (403_043_13BPR (404_045_13BPR (404_045_13BPR (404_045_13BPR (404_045_13BPR (404_045_13BPR (404_045_13BPR (404_045_13BPR (404_045_13BPR (404_045_13BPR (404_045_13BPR (404_045_13BPR (404_045_13BPR</pre>	402_023_138PR 402_025_138PR 402_025_138PR 403_031_138PR 403_033_138PR 403_035_138PR 403_037_138PR 403_039_138PR 403_041_138PR 404_045_138PR 404_045_138PR 404_045_138PR 404_045_138PR 404_045_138PR	Default Default Default Default Default Default Default Default Default Default Default Default Default Default Default	Default Views Default Views	View 1 View 1 Vi		

# 4.8.4 Using Print Organizer for PDF Creation of Multiple DGN's

To PDF your plan sheet set DGN files, follow these steps:

							- <b>1</b> <sup>st</sup>	<sup>t</sup> Seleo	ct the h	ome t	ab					
1	Draw	ving			-		0	<b>•</b> •	* 🖈 🗄	<b>} </b>	;					C:
Fi	le	Home	View	Anno	otate	Atta	ich	Analy	ze Cu	irves	Constra	aints	Utilities	Drav	wing Aids	Cor
	Non	ne * 词 (	) •	• Defa	ult •	0 1	· 4	• 0 •	C Explore	Attach Tools •	<ul> <li>•</li> <li>•</li></ul>	€ • ®: ••••••	Element		Fence Tools +	
			A	Attributes	5					Prim				Select	ion	
<b>i</b>		1 🗖 🥃	<b></b>	A 🔁	1											
	View	1, Default														
	- (	🤉 🌣 🔻	≟ ,⊕	Θ	:: 숙	$\mathfrak{D}$	∓ ∓		¥ 🔁							
	Dravile No	Home	Vie	w A	2 <sup>nd</sup> So Annota	te			Analyze		urves					
Ť	0		0	•			0 *	<u> ර</u> ු (	) •	Explore	er Atta Tools					
	H	1	<b>∭</b>	Attrib		- 					Pri					
	Viev	v 1, Defau	lt													
		<b>∂</b> .≱ -		⊕_⊖	P 🖸	•	0	₽₽	63	ç 🔁						





Input Files				
S:\DPG1\Division_13\buncombe_final\400_001_13BPR10113_SMI S:\DPG1\Division_13\buncombe_final\400_003_13BPR10113_SMI S:\DPG1\Division_13\buncombe_final\400_005_13BPR10113_SMI S:\DPG1\Division_13\buncombe_final\401_007_13BPR10113_SMI S:\DPG1\Division_13\buncombe_final\401_013_13BPR10113_SMI S:\DPG1\Division_13\buncombe_final\401_013_13BPR10113_SMI S:\DPG1\Division_13\buncombe_final\401_015_13BPR10113_SMI S:\DPG1\Division_13\buncombe_final\401_017_15BPR10113_SMI S:\DPG1\Division_13\buncombe_final\401_017_15BPR10113_SMI S:\DPG1\Division_13\buncombe_final\402_019_13BPR10113_SMI S:\DPG1\Division_13\buncombe_final\402_019_13BPR10113_SMI S:\DPG1\Division_13\buncombe_final\402_019_13BPR10113_SMI S:\DPG1\Division_13\buncombe_final\402_021_13BPR10113_SMI S:\DPG1\Division_13\buncombe_final\402_021_3BPR10113_SMI S:\DPG1\Division_13\buncombe_final\402_023_13BPR10113_SMI	Add			
Print Definition Creation Options		<b>9<sup>th</sup> Select</b>	"Manually S	pecified Options
Print style name:				
Manually Specified Options OK	Cancel			
Print Definition Creation Options		×		
Main Advanced Fence Display Levels References				1
Model Options				
Use these models to create print definitions:		÷		
All sheet models				
Fence Creation Methods	10 <sup>th</sup>	Select "	All Sheet	Models" fro
- None		Juicu	, in Sheet	
Define from shape				
Define from cell				
Define from cell      Fit to master model				
Define from cell         Fit to master model         Fit to master model and all reference files				
Define from cell      Fit to master model				
Define from cell         Fit to master model         Fit to master model and all reference files				
Define from cell         Pit to master model         Pit to master model and all reference files         Pit to element range         Enter fence points	ОК	"Ot	<u>~"</u>	
Define from cell         Fit to master model         Fit to master model and all reference files         Fit to element range         Enter fence points	OK C		<b>~"</b>	

NCDOT STRUCTURES MANAGEMENT OPENBRIDGE MANUAL

Create Print Definitions					×	
Input Files					-	
S:\DPG1\Division_13\bunc S:\DPG1\Division_13\bunc S:\DPG1\Division_13\bunc S:\DPG1\Division_13\bunc S:\DPG1\Division_13\bunc S:\DPG1\Division_13\bunc S:\DPG1\Division_13\bunc S:\DPG1\Division_13\bunc S:\DPG1\Division_13\bunc S:\DPG1\Division_13\bunc S:\DPG1\Division_13\bunc S:\DPG1\Division_13\bunc S:\DPG1\Division_13\bunc	combe_final\400_ combe_final\400_ combe_final\401_ combe_final\401_ combe_final\401_ combe_final\401_ combe_final\401_ combe_final\402_ combe_final\402_	003_13BPR10 005_13BPR10 007_13BPR10 009_13BPR10 011_13BPR10 013_13BPR10 015_13BPR10 015_13BPR10 017_15BPR10 019_13BPR10 021_13BPR10	113_SMI 113_SMI 113_SMI 113_SMI 113_SMI 113_SMI 113_SMI 113_SMI 113_SMI 113_SMI 113_SMI 113_SMI	Add		
Print Definition Creation Optio	0.05					
Print style name:	0115					
Frint style name.						
						th calaal "OK"
Manually Specified Opt	tions				- $11$	<sup>th</sup> Select "OK"
			-			
		C	ок	Cancel		
11						
1	14 <sup>th</sup> Sele	ct "Print"				
Untitled.pset - Print Organizer	14 <sup>th</sup> Sele	ct "Print"	}	-		×
Untitled.pset - Print Organizer File Edit View Toole			}	-	. ;	×
Untitled.pset - Print Organizer File Edit View Togle	× @⊒   ⊼ ∧	✓ ⊻   📰 •   [		-		×
Untitled.pset - Print Organizer File Edit View Togle	× 0⊡   ⊼ ∧  Name	✓ ⊻   📰 •   🕻 File Name	Model	View Group	View	×
Untitled.pset - Print Organizer File Edit View Tool	X 10 X	✓ ✓   📰 ▾   🚺 File Name . 400_001_13BPR	Model Default	View Group Default Views Default Views	View View 1	×
Untitled.pset - Print Organizer File Edit View Tool Untitled 1 Untitled 1 55PR.13.3	X 102 X	✓ ✓   📰 ▾   🚺 File Name . 400_001_13BPR	Model Default Default	Default Views	View	×
Untitled.pset - Print Organizer File Edit View Tool Untitled 15BPR.13.3 400_001_13BPR10113_SMU_T 400_003_13BPR10113_SMU_IS 400_005_13BPR10113_SMU_B	X 102 X	✓      ✓	Model Default Default	Default Views Default Views	View View 1 View 1	×
Untitled.pset - Print Organizer File Edit View Tool Untitled 15BPR.13.3 400_001_13BPR10113_SMU_IT 400_005_13BPR10113_SMU_IS 400_005_13BPR10113_SMU_IS 401_007_13BPR10113_SMU_IS	X 00 X A00_001_13BPR (400_001_13BPR (400_005_13BPR (400_005_13BPR (401_007_13BPR (401_007_13BPR	✓         Image: 1           File Name         400_001_13BPR           400_003_13BPR         406_005_13BPR           401_007_13BPR         401_007_13BPR           401_007_13BPR         401_007_13BPR	Model Default Default Default Default Default	Default Views Default Views Default Views Default Views Default Views	View View 1 View 1 View 1 View 1 View 1	×
Untitled.pset - Print Organizer File Edit View Tool Edit View Tool Untitled 158PR.13.3 400_001_138PR10113_SMU_T 400_005_138PR10113_SMU_B 400_005_138PR10113_SMU_B 401_007_138PR10113_SMU_L	X 00 X 400_001_13BPR 400_001_13BPR 400_005_13BPR 401_005_13BPR 401_007_13BPR 401_001_13BPR 401_011_13BPR	✓         Image: 1           File Name         400_001_13BPR           400_003_13BPR         400_005_13BPR           400_005_13BPR         401_007_13BPR           401_007_13BPR         401_011_13BPR	Model Default Default Default Default Default	Default Views Default Views Default Views Default Views Default Views Default Views	View 1 View 1 View 1 View 1 View 1 View 1 View 1	×
Untitled.pset - Print Organizer File Edit View Tool Edit View Tool Untitled 158PR.13.3 400_001_138PR10113_SMU_T 400_005_138PR10113_SMU_B 401_007_138PR10113_SMU_B 401_007_138PR10113_SMU_L 401_011_138PR10113_SMU_L 401_011_138PR10113_SMU_L	X 0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	✓ ✓ I II → I	Model Default Default Default Default Default Default	Default Views Default Views Default Views Default Views Default Views Default Views Default Views	View           View 1           View 1           View 1           View 1           View 1           View 1	×
Untitled.pset - Print Organizer File Edit View Tool Edit View Tool Untitled 158PR.13.3 400_001_138PR10113_SMU_T 400_005_138PR10113_SMU_B 400_005_138PR10113_SMU_B 401_007_138PR10113_SMU_L 401_013_138PR10113_SMU_L 401_013_138PR10113_SMU_D	X 102	Image: Constraint of the state of	Model Default Default Default Default Default Default Default	Default Views Default Views Default Views Default Views Default Views Default Views Default Views Default Views	View 1 View 1 View 1 View 1 View 1 View 1 View 1 View 1 View 1	×
Untitled.pset - Print Organizer File Edit View Tool Edit View Tool Untitled 15BPR.13.3 400_001_13BPR10113_SMU_E 400_005_13BPR10113_SMU_E 400_005_13BPR10113_SMU_E 401_007_13BPR10113_SMU_L 401_013_13BPR10113_SMU_L 401_013_13BPR10113_SMU_D 401_015_13BPR10113_SMU_D	X 102	File Name           400_001_13BPR           400_003_13BPR           400_003_13BPR           401_007_13BPR           401_013_13BPR           401_111_13BPR           401_015_13BPR           401_015_13BPR	Model Default Default Default Default Default Default	Default Views Default Views Default Views Default Views Default Views Default Views Default Views	View           View 1	^
Untitled.pset - Print Organizer File Edit View Tool Edit View Tool Untitled 15BPR.13.3 400_001_13BPR10113_SMU_T 400_003_13BPR10113_SMU_B 401_007_13BPR10113_SMU_B 401_007_13BPR10113_SMU_L 401_013_13BPR10113_SMU_L 401_015_13BPR10113_SMU_D 401_017_15BPR10113_SMU_J 401_017_15BPR10113_SMU_J	X 102	✓ ▲ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■	Model Default Default Default Default Default Default Default Default	Default Views Default Views Default Views Default Views Default Views Default Views Default Views Default Views	View           View 1	^
Untitled.pset - Print Organizer File Edit View Tool Edit View Tool Untitled 15BPR.13.3 400_001_13BPR10113_SMU_E 400_005_13BPR10113_SMU_E 400_005_13BPR10113_SMU_E 401_007_13BPR10113_SMU_L 401_013_13BPR10113_SMU_L 401_013_13BPR10113_SMU_D 401_015_13BPR10113_SMU_D	X 0 1 201-138PR 400_001_138PR 400_005_138PR 401_005_138PR 401_007_138PR 401_013_138PR 401_015_138PR 401_015_138PR 401_015_138PR 401_015_138PR 401_015_138PR 401_015_138PR 401_015_138PR 401_015_138PR 401_015_138PR 401_015_138PR 401_015_138PR 401_015_138PR 401_015_138PR 401_015_138PR 402_015_138PR 402_023_138PR	✓         ✓	Model Default Default Default Default Default Default Default Default Default Default Default	Default Views Default Views	View 1 View 1 View 1 View 1 View 1 View 1 View 1 View 1 View 1 View 2 View 2 View 1 View 1	12 <sup>th</sup> Select the
Untitled.pset - Print Organizer           File         Edit         View         Togle           Untitled         Image: Second S	X 0 1 138PR 400_001_138PR 400_005_138PR 401_005_138PR 401_007_138PR 401_017_138PR 401_011_138PR 401_015_138PR 401_015_138PR 401_015_138PR 402_012_138PR 402_021_138PR 402_021_38PR 402_021_38PR 402_021_38PR 402_021_38PR 402_025_138PR	▶         ▶         ↓         ↓         ↓           File Name         400_003_138PR         401_003_138PR         401_009_138PR         401_009_138PR         401_001_138PR         401_011_138PR         401_011_138PR         401_011_138PR         401_012_138PR         401_012_138PR         401_012_138PR         401_012_138PR         401_012_138PR         401_012_138PR         402_021_138PR         402_021_318PR         402_023_138PR         402_023_138PR         402_025_138PR         402_025_13	Model Default Default Default Default Default Default Default Default Default Default Default Default	Default Views Default Views	View           View 1	12 <sup>th</sup> Select the
Untitled.pset - Print Organizer           File         Edit         View         Togle           Untitled         Image: Constraint of the second seco	X 00 01_13BPR. 400_001_13BPR. 400_005_13BPR. 401_007_13BPR. 401_007_13BPR. 401_011_13BPR. 401_011_13BPR. 401_015_13BPR. 401_015_13BPR. 402_019_13BPR 402_021_13BPR 402_021_13BPR 402_025_13BPR 402_027_13BPR 402_027_13BPR	▶         ▶         ↓         ↓         ↓           File Name         400_001_13BPR         400_003_13BPR         400_003_13BPR         401_007_13BPR         401_007_13BPR         401_011_13BPR         401_013_13BPR         401_015_13BPR         401_017_15BPR         402_019_13BPR         402_021_13BPR         402_022_13BPR         402_022_13BPR         402_022_13BPR         402_022_13BPR         402_027_13BPR         402_027_138PR         402_027_138PR         402_027_138PR         402_027_138PR         402_027_138PR         402_027_138PR         402_027_138PR         402_027_138PR         402_027_138PR         402_027_138	Model Default Default Default Default Default Default Default Default Default Default Default Default Default	Default Views Default Views	View           View 1	^
Untitled.pset - Print Organizer File Edit View Tool Edit View Tool Untitled 15BPR.13.3 400_001_13BPR10113_SMU_T 400_005_13BPR10113_SMU_B 400_005_13BPR10113_SMU_B 401_007_13BPR10113_SMU_L 401_011_13BPR10113_SMU_L 401_011_13BPR10113_SMU_D 401_017_15BPR10113_SMU_D 401_017_15BPR10113_SMU_D 402_019_13BPR10113_SMU_G 402_019_13BPR10113_SMU_L 402_013_13BPR10113_SMU_L 402_013_13BPR10113_SMU_L 402_013_13BPR10113_SMU_L 402_023_13BPR10113_SMU_L	X 00 01 138PR ( 400_001_138PR ( 400_003_138PR ( 400_005_138PR ( 401_007_138PR ( 401_017_138PR ( 401_011_138PR ( 401_015_138PR ( 401_015_138PR ( 401_017_158PR ( 402_019_138PR ( 402_021_138PR ( 402_025_138PR ( 402_025_138PR) ( 402_025_138PR ( 402_025_138PR) ( 402_025_138PR ( 402_025_138PR) ( 402_025_138PR) ( 402_025_138PR) ( 402_025_138PR) ( 402_025_138PR) ( 402_025_138PR) ( 402_05_158PR) ( 402_0558PR) ( 402_0558PR) ( 402_0558PR) ( 402_	✓ ▲ 13 - 1 File Name 400_001_13BPR 400_003_13BPR 401_005_13BPR 401_005_13BPR 401_001_13BPR 401_011_13BPR 401_011_13BPR 401_015_13BPR 401_015_13BPR 402_019_13BPR 402_021_13BPR 402_021_13BPR 402_021_13BPR 402_022_13BPR	Model Default Default Default Default Default Default Default Default Default Default Default Default Default Default	Default Views Default Views	View           View 1	12 <sup>th</sup> Select the
Untitled.pset - Print Organizer File Edit View Tool Untitled 158PR.13.3 400_001_138PR10113_SMU_T 400_005_138PR10113_SMU_K 400_005_138PR10113_SMU_K 401_007_138PR10113_SMU_L 401_007_138PR10113_SMU_L 401_011_138PR10113_SMU_L 401_015_138PR10113_SMU_D 401_017_158PR10113_SMU_D 401_017_158PR10113_SMU_L 402_019_138PR10113_SMU_L 402_019_138PR10113_SMU_L 402_019_138PR10113_SMU_L 402_023_138PR10113_SMU_L 402_023_138PR10113_SMU_L 402_025_138PR10113_SMU_L	Mame     400_001_138PR     400_005_138PR     401_005_138PR     401_007_138PR     401_007_138PR     401_011_138PR     401_011_138PR     401_011_138PR     401_011_15_138PR     401_0117_158PR     402_019_138PR     402_021_138PR     402_021_138PR     402_021_138PR     402_027_138PR     403_031_138PR	▶         ▲         ▲         ↓	Model Default Default Default Default Default Default Default Default Default Default Default Default Default Default Default Default	Default Views Default Views	View           View 1	12 <sup>th</sup> Select the
Untitled.pset - Print Organizer           File         Edit         View         Togle           Untitled         Togle         Togle         Togle           Units         Togle	Name 400_001_13BPR 400_005_13BPR 401_005_13BPR 401_005_13BPR 401_017_13BPR 401_011_13BPR 401_015_13BPR 401_015_13BPR 401_015_13BPR 401_015_13BPR 401_015_13BPR 401_015_13BPR 402_019_13BPR 402_021_13BPR 402_023_13BPR 402_025_13BPR 402_025_13BPR 402_027_13BPR 402_027_13BPR 402_029_15BPR 403_033_13BPR 403_033_13BPR	▶         ▶         ↓         ↓         ↓           File Name         400_003_138PR         400_003_138PR         400_005_138PR         400_005_138PR         401_007_138PR         401_007_138PR         401_011_138PR         401_015_138PR         401_015_138PR         401_015_138PR         401_017_158PR         402_019_138PR         402_021_138PR         402_023_138PR         402_023_138PR         402_023_138PR         402_029_158PR         402_029_158PR         403_033_138PR         403_033_13	Model Default Default Default Default Default Default Default Default Default Default Default Default Default Default Default Default Default	Default Views Default Views	View           View 1	12 <sup>th</sup> Select the
Untitled.pset - Print Organizer           File         Edit         View         Togle           Untitled         Togle         Togle         Togle           Units         SMU_D         Togle         Togle           Units         SMU_D <t< td=""><td>X 00 1138PR 400_001_138PR 400_005_138PR 401_005_138PR 401_007_138PR 401_017_138PR 401_011_138PR 401_015_138PR 401_015_138PR 401_015_138PR 402_019_138PR 402_021_138PR 402_021_38PR 402_022_138PR 402_022_138PR 402_022_138PR 402_023_138PR 402_023_138PR 402_03_138PR 403_033_138PR 403_035_138PR</td><td>▶         ▲         ▲         ↓</td><td>Model Default Default Default Default Default Default Default Default Default Default Default Default Default Default Default Default Default Default Default</td><td>Default Views Default Views</td><td>View           View 1           View 1</td><td>12<sup>th</sup> Select the</td></t<>	X 00 1138PR 400_001_138PR 400_005_138PR 401_005_138PR 401_007_138PR 401_017_138PR 401_011_138PR 401_015_138PR 401_015_138PR 401_015_138PR 402_019_138PR 402_021_138PR 402_021_38PR 402_022_138PR 402_022_138PR 402_022_138PR 402_023_138PR 402_023_138PR 402_03_138PR 403_033_138PR 403_035_138PR	▶         ▲         ▲         ↓	Model Default Default Default Default Default Default Default Default Default Default Default Default Default Default Default Default Default Default Default	Default Views Default Views	View           View 1	12 <sup>th</sup> Select the
Untitled.pset - Print Organizer           File         Edit         View         Togl           Image: State of the state of	X 00 01 138PR 400_001_138PR 400_005_138PR 401_005_138PR 401_005_138PR 401_011_138PR 401_015_138PR 401_015_138PR 401_015_138PR 402_019_138PR 402_021_138PR 402_025_138PR 402_025_138PR 402_025_138PR 402_025_138PR 402_025_138PR 402_025_138PR 402_025_138PR 402_025_138PR 403_033_138PR 403_033_138PR 403_037_138PR 403_037_138PR	▶         ▶         ↓         ↓         ↓           File Name         400_003_138PR         400_003_138PR         401_007_138PR         401_007_138PR         401_007_138PR         401_011_138PR         401_011_138PR         401_011_138PR         401_011_138PR         401_012_138PR         401_012_138PR         401_012_138PR         402_021_138PR         402_021_138PR         402_022_138PR         402_022_138PR         402_022_138PR         402_022_138PR         402_022_138PR         402_022_138PR         402_022_138PR         403_033_138PR         403_033_138PR         403_033_138PR         403_035_138PR         403_035_13	Model Default	Default Views Default Views	View           View 1	12 <sup>th</sup> Select the
Untitled.pset - Print Organizer           File         Edit         View         Togl           Image: State of the state of	<ul> <li>Control 120 (2011)</li> <li>Control 120 (2011</li></ul>	✓ ✓ 1.32 - 1 File Name 400_001_13BPR 400_003_13BPR 401_005_13BPR 401_005_13BPR 401_011_13BPR 401_011_13BPR 401_015_13BPR 401_015_13BPR 402_019_13BPR 402_023_13BPR 402_025_13BPR 402_025_13BPR 402_027_13BPR 402_027_13BPR 402_027_13BPR 402_027_13BPR 402_027_13BPR 402_027_13BPR 403_033_13BPR 403_033_13BPR 403_037_13BPR 403_037_13BPR	Model Default	Default Views Default Views	View           View 1	12 <sup>th</sup> Select the
Untitled.pset - Print Organizer           File         Edit         View         Tool           Image: State of the state of	<ul> <li>Control Control Contecontrol Control Control Control Control Control Control Cont</li></ul>	▶         ▶         ↓	Model Default	Default Views Default Views	View           View 1	12 <sup>th</sup> Select the
✓         Untitled.pset - Print Organizer           File         Edit         View         Tool           ✓         158PR.13.3         ✓         400_001_13BPR10113_SMU_T           ✓         400_003_13BPR10113_SMU_B         ✓         400_003_13BPR10113_SMU_B           ✓         400_005_13BPR10113_SMU_L         ✓         401_007_13BPR10113_SMU_L           ✓         401_013_13BPR10113_SMU_L         ✓         401_013_13BPR10113_SMU_D           ✓         401_013_13BPR10113_SMU_L         ✓         401_013_13BPR10113_SMU_L           ✓         401_013_13BPR10113_SMU_L         ✓         401_013_13BPR10113_SMU_L           ✓         401_013_13BPR10113_SMU_L         ✓         401_011_15BPR10113_SMU_L           ✓         401_013_13BPR10113_SMU_L         ✓         402_021_13BPR10113_SMU_L           ✓         402_021_3BPR10113_SMU_L         ✓         402_022_3_13BPR10113_SMU_L           ✓         402_023_13BPR10113_SMU_L         ✓         403_033_13BPR10113_SMU_L           ✓         403_037_13BPR10113_SMU_L         ✓         ✓         ✓           ✓         403_037_13BPR10113_SMU_L         ✓         ✓         ✓           ✓         403_037_13BPR10113_SMU_L         ✓         ✓         ✓         ✓           ✓	<ul> <li>X IIII IIIIIIIIIIIIIIIIIIIIIIIIIIIIIII</li></ul>	▶         ▶         ↓         ↓         ↓           File Name         400_003_138PR         400_003_138PR         400_003_138PR         401_007_138PR         401_007_138PR         401_011_138PR         401_011_138PR         401_011_138PR         401_011_138PR         401_011_138PR         401_011_138PR         401_017_158PR         402_012_138PR         402_023_138PR         402_023_138PR         402_023_138PR         402_023_138PR         402_029_158PR         403_033_138PR         403_033_138PR         403_033_138PR         403_033_138PR         403_03_138PR         403_04_138PR         403_04_138PR         403_04_138PR         403_04_138PR         404_045_138PR	Model Default	Default Views Default Views	View           View 1	12 <sup>th</sup> Select the
Untitled.pset - Print Organizer           File         Edit         View         Togle           Untitled         Togle         Togle         Togle           Untitled         ISBPR.13.3         Togle         Togle         Togle           Untitled         1000,001_13BPR10113_SMU_T         400_005_13BPR10113_SMU_S         Togle         401_007_13BPR10113_SMU_L         Togle           401_007_13BPR10113_SMU_D         401_013_13BPR10113_SMU_D         401_013_13BPR10113_SMU_D         Togle         401_011_13BPR10113_SMU_D         Togle         401_017_15BPR10113_SMU_D         Togle         401_017_15BPR10113_SMU_J         Togle         401_02_023_13BPR10113_SMU_J         Togle         402_022_13BPR10113_SMU_J         Togle         402_022_13BPR10113_SMU_J         Togle         402_022_13BPR10113_SMU_J         Togle         402_022_13BPR10113_SMU_J         Togle         402_022_13BPR10113_SMU_J         Togle         402_022_13BPR10113_SMU_J         Togle         402_023_13BPR10113_SMU_J         Togle         402_023_13BPR10113_SMU_J         Togle         403_033_13BPR10113_SMU_J         Togle         403_033_13BPR10113_SMU_L         Togle         403_033_13BPR10113_SMU_L         Togle         403_033_13BPR10113_SMU_L         Togle         403_034_13BPR10113_SMU_J         Togle         403_044_13BPR10113_SMU_J         Togle         403_044_13BPR10113_SMU_J         Togle <td>X 00 01 138PR 400_001_138PR 400_005_138PR 401_005_138PR 401_005_138PR 401_017_138PR 401_0115_138PR 401_015_138PR 401_015_138PR 402_021_138PR 402_025_138PR 402_025_138PR 402_025_138PR 402_025_138PR 402_025_138PR 402_025_138PR 402_025_138PR 403_035_138PR 403_035_138PR 403_037_138PR 403_037_138PR 403_037_138PR 403_037_138PR 403_031_138PR 403_031_138PR 403_031_138PR 403_031_138PR 403_031_138PR 403_0341_138PR 403_041_138PR 404_045_138PR 404_047_138PR</td> <td>✓         ▲         ↓</td> <td>Model Default</td> <td>Default Views Default Views</td> <td>View           View 1           View 1</td> <td>12<sup>th</sup> Select the</td>	X 00 01 138PR 400_001_138PR 400_005_138PR 401_005_138PR 401_005_138PR 401_017_138PR 401_0115_138PR 401_015_138PR 401_015_138PR 402_021_138PR 402_025_138PR 402_025_138PR 402_025_138PR 402_025_138PR 402_025_138PR 402_025_138PR 402_025_138PR 403_035_138PR 403_035_138PR 403_037_138PR 403_037_138PR 403_037_138PR 403_037_138PR 403_031_138PR 403_031_138PR 403_031_138PR 403_031_138PR 403_031_138PR 403_0341_138PR 403_041_138PR 404_045_138PR 404_047_138PR	✓         ▲         ↓	Model Default	Default Views Default Views	View           View 1	12 <sup>th</sup> Select the
Untitled.pset - Print Organizer           File         Edit         View         Togl           Untitled         Togl         Togl         Togl           Units         MU         Togl         Togl	<ul> <li>Control 120 Control 120 Contr</li></ul>	▶         ▲         ▲         ↓	Model Default	Default Views Default Views	View           View 1           View 1	12 <sup>th</sup> Select the
Untitled.pset - Print Organizer           File         Edit         View         Togle           Untitled         Togle         Togle         Togle           Untitled         ISBPR.13.3         Togle         Togle         Togle           Untitled         1000,001_13BPR10113_SMU_T         400_005_13BPR10113_SMU_S         Togle         401_007_13BPR10113_SMU_L         Togle           401_007_13BPR10113_SMU_D         401_013_13BPR10113_SMU_D         401_013_13BPR10113_SMU_D         Togle         401_011_13BPR10113_SMU_D         Togle         401_017_15BPR10113_SMU_D         Togle         401_017_15BPR10113_SMU_J         Togle         401_02_023_13BPR10113_SMU_J         Togle         402_022_13BPR10113_SMU_J         Togle         402_022_13BPR10113_SMU_J         Togle         402_022_13BPR10113_SMU_J         Togle         402_022_13BPR10113_SMU_J         Togle         402_022_13BPR10113_SMU_J         Togle         402_022_13BPR10113_SMU_J         Togle         402_023_13BPR10113_SMU_J         Togle         402_023_13BPR10113_SMU_J         Togle         403_033_13BPR10113_SMU_J         Togle         403_033_13BPR10113_SMU_L         Togle         403_033_13BPR10113_SMU_L         Togle         403_033_13BPR10113_SMU_L         Togle         403_034_13BPR10113_SMU_J         Togle         403_044_13BPR10113_SMU_J         Togle         403_044_13BPR10113_SMU_J         Togle <td><ul> <li></li></ul></td> <td>✓         ▲         ↓</td> <td>Model Default Default</td> <td>Default Views Default Views</td> <td>View           View 1           View 1</td> <td>12<sup>th</sup> Select the</td>	<ul> <li></li></ul>	✓         ▲         ↓	Model Default	Default Views Default Views	View           View 1	12 <sup>th</sup> Select the

4–48

NCDOT STRUCTURES MANAGEMENT OPENBRIDGE MANUAL

Print			×		
Printer Driver	Configuration				<b>13<sup>th</sup> Select "printer</b>
File name:	SMU_pdf.pltcfg		ł		setup"
Type:	Bentley PDF printer driver	_			setup
		L	Printer Setup		
Print Range -		Copies	]		
		Number of copies: 1	ĺ		
Selection			e		
Submit					
	Create print file 🗸 🗸		•		
Submit as:	Single print job 🗸 🗸 🗸		2		
Destination:		' OT_structures\WorkSets\out\Un	titled odf		
	Open print file after creat				
		ОК	Cancel		
A113 CMU F	10 404 047 10000	04 047 10000 D.C. H			
Printer Setu	p			(	×
Printer Drive	er Configuration File —				14 <sup>th</sup> Click on the "dots"
File name:	_				to set your printer
uration \Org	ganization-Civil\Disciplines	NCDOT_Structures\Standa	rds\plot\SMU_pdf	pltcfg 🤌	driver config file using
Tuno: Dev	atlass DDE asiatan diwaa				the path below
Type. Ber	ntley PDF printer driver				
			014		
			ок	Cancel	
nond Deet	instion: listico Civil Diaci	cliese/MCDOT_statestyrese/W	Inde Soto \out \ Linta	lad adfi	

NCDOTProduction/Documents/Administration/WorkspaceGroups/NCDOTWorkspaces/Configuration\_2023/Workspaces/DOT-US North Carolina/Roles/NCDOT\_Structures/Standards/plot

CHAPTER 4 OBD

	« Disciplines »	NCDOT_Structures > Star	ndards → plot	~ (	2 י	Search plot		
Organize 🔻 🛛 Ne	w folder					:== :==	•	?
👌 Music	↑ Name	^	Date m	odified	Туре		Size	
📰 Pictures 🎴 Videos		U_pdf.pltcfg	5/5/202	1 7:16 AM	PLTCF	G File	21	KB
<ul> <li>DivProj (\\DO'</li> <li>NSProj (\\DO'</li> <li>SYSTEM (C:)</li> <li>Proj (\\DOT\D</li> <li>GROUPS-SDC</li> <li>napierce (\\DO'</li> </ul>	FS C (					<b>15<sup>th</sup></b> "SMU_p	Select pdf.pltcf	g" fi
Network	v							
- Hetholik	File	-	Directory 🝷					
					U	pen 🔻	Cancel	
						ipen 🔽	Cancel	
Print				×		ipen V	Cancel	
Printer Driver Configu File name: SMU_ Type: Bentle Print Range O All		rer Copies Number of copies: 1	Printer Setup			ipen V	Cancel	
Printer Driver Configu File name: SMU_ Type: Bentle Print Range	pdf.pltcfg	— Copies —				pen V	Cancel	

	- « DPG	1 > Division_13 > pdf's_fi	nal	~	Q	Search pdf's_f	final
Organize 🔻	New folder						· · ·
👌 Music	^	Name		Date modified		Туре	Size
Pictures		15BPR.3.3 Plans TMS_N	IAP Comments 05	5/11/2021 2:19 PM	A	Adobe Acrobat D	2,494
📑 Videos		400_001_13BPR10113_SI		5/12/2021 10:18 A	M	Adobe Acrobat D	122
🛖 DivProj (\\	DOT\E	👃 buncombe_final.pdf		5/10/2021 4:07 PM	N	Adobe Acrobat D	2,350
🛖 NSProj (\\	DOT\C	Fest.pdf		5/12/2021 11:29 A	M	Adobe Acrobat D	4,016
🏪 SYSTEM (C	C:)	👃 Untitled.pdf		5/12/2021 10:47 A	M	Adobe Acrobat D	120
👳 Proj (\\DO	T\DFS						
🛫 GROUPS-S	SDCC (						
File nan	ne: Untitled	l.pdf					
Save as ty	pe: Portable	e Document Format Files(*.pe	df)				
	File	•	Directory	•			
∧ Hide Folders					_	Save	Cancel
		<b>17</b> <sup>st</sup> After p	bathing to		_		
		your projec					
		name the file					
D							
Print					>	<	
Print Printer Driver C	Configuratio	name the file			>		
		name the file			>		
Printer Driver C File name:	SMU_pdf.	name the file			>		
Printer Driver C File name:	SMU_pdf.	name the file		Printer Se			
Printer Driver C File name: Type:	SMU_pdf.	name the file	and save	Printer Se			
Printer Driver O File name: Type: Print Range —	SMU_pdf.	on pltcfg DF printer driver Copie	and save				
Printer Driver O File name: Type: Print Range — O All	SMU_pdf.	on pltcfg DF printer driver Copie	and save	Printer Se			
Printer Driver O File name: Type: Print Range —	SMU_pdf.	on pltcfg DF printer driver Copie	and save				
Printer Driver O File name: Type: Print Range — O All	SMU_pdf.	on pltcfg DF printer driver Copie	and save				
Printer Driver O File name: Type: Print Range — O All () Selection	SMU_pdf.	on Copie DF printer driver Copie Num	and save				
Printer Driver O File name: Type: Print Range — O All () Selection	SMU_pdf, Bentley Pl	name the file	and save			18 <sup>th</sup> Click	"ОК"
Printer Driver O File name: Type: Print Range — O All O Selection Submit — Submit as:	SMU_pdf, Bentley Pl Create prir	name the file	and save	÷.		<b>18<sup>th</sup></b> Click create the	PDF in
Printer Driver O File name: Type: Print Range — O All O Selection Submit — Submit as:	SMU_pdf, Bentley Pf Create prin Single prin ization-Civ	name the file	and save	÷.		<b>18<sup>th</sup></b> Click create the location you	PDF in J pointe
Printer Driver O File name: Type: Print Range — O All O Selection Submit — Submit as:	SMU_pdf, Bentley Pf Create prin Single prin ization-Civ	name the file	and save	÷.		<b>18<sup>th</sup></b> Click create the	PDF in J pointe

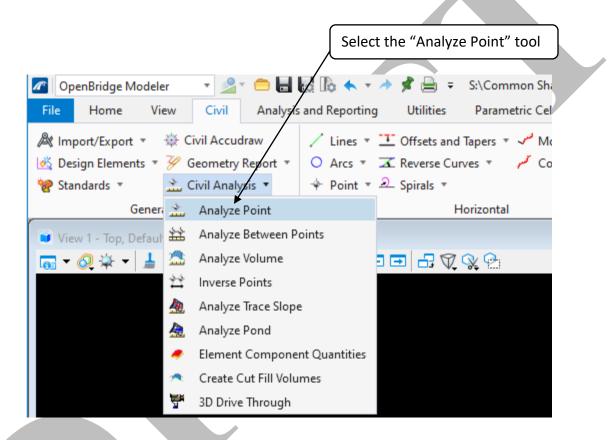
						<b>19</b> <sup>th</sup> Save your PSet file with your project.
🖉 Untitled.pset - Print Organizer				-	□ ×	
File Edit View Tools						
		· · · · · · · · · · · · · · · · · · ·	4			
Untitled	Name	File Name	Model	View Group	View ^	
> 15BPR.13.3	400_001_13BPR	400_001_13BPR	Default	Default Views	View 1	
400_001_13BPR10113_SMU_T	400_003_13BPR	400_003_13BPR	Default	Default Views	View 1	
400_003_13BPR10113_SMU_IS	400_005_13BPR	400_005_13BPR	Default	Default Views	View 1	
400_005_13BPR10113_SMU_B	401_007_13BPR	401_007_13BPR	Default	Default Views	View 1	
	401_009_13BPR	401_009_13BPR	Default	Default Views	View 1	
	401_011_13BPR	401_011_13BPR	Default	Default Views	View 1	
	401_013_13BPR	401_013_13BPR	Default	Default Views	View 1	
	401_015_13BPR	401_015_13BPR	Default	Default Views	View 1	
401_015_13BPR10113_SMU_D	401_017_15BPR	401_017_15BPR	Default	Default Views	View 1	
401_017_15BPR10113_SMU_J	402_019_13BPR	402_019_13BPR	Default	Default Views	View 2	
402 019 13BPR10113 SMU G	402_021_13BPR	402_021_13BPR	Default	Default Views	View 1	
402_021_13BPR10113_SMU_L	402_023_13BPR	402_023_13BPR	Default	Default Views	View 1	
402_023_13BPR10113_SMU_1	402_025_13BPR	402_025_13BPR	Default	Default Views	View 1	
402_025_13BPR10113_SMU_D	402_027_13BPR	402_027_13BPR	Default	Default Views	View 1	
	402_029_15BPR	402_029_15BPR	Default	Default Views	View 1	
402_027_13BPR10113_SMU_D	403_031_13BPR	403_031_13BPR	Default	Default Views	View 1	
402_029_15BPR10113_SMU_J	403_033_13BPR	403_033_13BPR	Default	Default Views	View 1	
	403_035_13BPR	403_035_13BPR	Default	Default Views	View 1	
-403_033_13BPR10113_SMU_L	403_037_13BPR	403_037_13BPR	Default	Default Views	View 1	
403_035_13BPR10113_SMU_T	403_039_13BPR	403_039_13BPR	Default	Default Views	View 1	
403_037_13BPR.10113_SMU_E	403_041_13BPR	403_041_13BPR	Default	Default Views	View 1	
	403_043_13BPR	403_043_13BPR	Default	Default Views	View 1	
	404_045_13BPR	404_045_13BPR	Default	Default Views	View 1	
	404_047_13BPR	404_047_13BPR	Default	Default Views	View 1	
404_045_13BPR10003_SMU_G	404_049_13BPR	404_049_13BPR	Default	Default Views	View 1	
404_047_13BPR10113_SMU_L	404_051_13BPR	404_051_13BPR	Default	Default Views	View 1	
404_049_13BPR10113_SMU_T ~	404_053_13BPR		Default	Default Views	View 1 🗸 🗸	
	<				>	
			🖶 SMI	J_pdf.pltcfg 30 iter	ms (30 selected)	*
						-

# 4.9 CIVIL TOOLS

The Civil tools are an application designed to provide Civil/Site functions

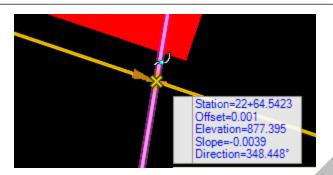
## 4.9.1 Civil Analysis Point Tool

To find stations, elevations, and offsets of locations along the -L- or other alignments, use the following tools:



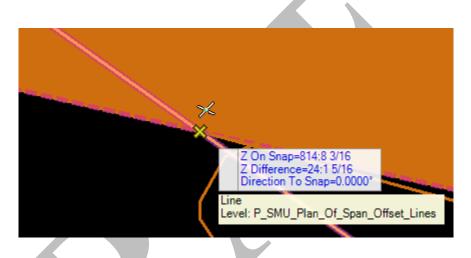
## 4.9.1.1 Finding Stations, Elevations and Offsets along an Alignment

To find the station, elevation and offsets of a location along an alignment, after selecting the Analyze Point tool, Click on the alignment to which you want to find the station, elevation and/or offset from, then click on the point which you want the info for and the information will be displayed in a box beside the curser.

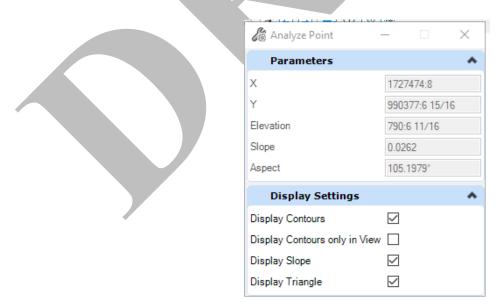


## 4.9.1.2 Finding Elevations along the Terrain

To find an elevation on the terrain, select the Analyze Point tool. Select a leg of the terrain triangle nearest to your point of interest and then click on the point of interest to get the exact elevation at that point.



The elevation will appear in a display window beside the curser as you move along the leg of the traingle, but will also be displayed in the Analyse Point toolbox window when the point is selected.



## 4.9.2 Horizontal Offsets and Tapers Tool

Copying Roadway alignments to establish horizontal clearances and offsets requires using the Offsets and Tapers tools. Copying Roadway alignments without using these tools can cause an OpenBridge file to become "read only" due to the civil data linked with the alignment.

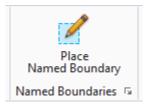
🜈 🛛 OpenBridge Modeler 🛛 🔻 🔂 🕇 🔚	🗗 📩 🔶 🗸	* \$	t 📄 =				
File Home Civil Utilities Repor	rts and Drawing	s	View	Collabor	rate H	lelp	
🙈 Import/Export 🔹 🔆 Civil Accudraw	🖊 Lines 🔻	<u> </u>	)ffsets and	Tapers 🔻	🛹 Modi	ify *	
💰 Design Elements 🔻 🚀 Geometry Report 🔻	O Arcs *	- 7-	Single Off	iset Entire	Element	lex Geometry 🔻	
😵 Standards 🔹 📩 Civil Analysis 🔹	🔶 Point 🔻	Ū	Single Off	iset Partia	I		
General Tools		Ţ	Variable C	)ffset Tape	er		
View 1 - Top, Default		4	Ratio Offs	et Taper			
	10 d	-			<u> </u>		

Once a tool is selected, provide the offset and any other necessary information.

So	Single Offset Enti	_		×	
	Parameters			*	
$\checkmark$	Offset:	-10:0			
	Use Spiral Transitions	$\checkmark$			
	Mirror				
	Remove Offset Rule				
	Feature			*	
Feat	ture Definition	No Featu	ire Def	finitior	
Nam	ie		No Fe Alignm	ature Defin ient	iition
		<b>.</b>	р Б	isting	
				CDOT	
			📁 Pr @ Al	op _G_Centerl	ine Ramp
			Linear		
			-	vil Cell	
		 	-	urb and Gui CDOT	tter
		••••••••••••••••••••••••••••••••••••••		avement	

# 4.10 PLACE NAMED BOUNDARY TOOL

The Place Named Boundary tool can be used in both 2D and 3D plan production for creating views used in plans.



Place Named Boundary tool options from left to right:



- **Civil Plan:** 3D modeling tool allows the user to select a horizontal alignment with which to associate the named boundary for a plan view by defining the boundary scale, length, left and right offsets.
- **Civil Plan by Element:** 3D modeling tool allows the user to select a horizontal alignment with which to associate the named boundary, along with an existing element as a boundary for a plan view.
- **Civil Profile:** 3D modeling tool allows the user to select an alignment's vertical profile with which to associate the named boundary by selecting the boundary limits from an existing civil plan boundary or by station definitions.
- Civil Cross Section: 3D modeling tool allows the user to select the horizontal alignment with which to associate the named boundary by defining left and right offets and the intervals at which to create the cross sections. (*not preferred for creating bridge typical sections*)
- Civil Cross Section by 2 Points: 3D modeling tool allows the user to select the horizontal alignment with which to associate the named boundary by clicking a point either side of the selected alignment to form a line crossing the alignment which creates a cross section at that location.
- From Drawing Boundary: 2D drawing tool allows the user to select one of the predefined drawing scales and fit the boundary view box around an area to create a plan view.
- By Element: 2D drawing tool allows the user to select an existing element as a boundary.
- By 2 Points: 2D drawing tool allows the user to select two points that define a rectangular boundary. *This is the most preferred method for 2D workflow*.
- **By Polygon:** 2D drawing tool allows the user to click several points to create a nonuniform multi-sided closed shape (must contain at least 3 sides) as a boundary.
- **By Length:** 2D drawing tool allows the user to select a path element along which to place a boundary by then defining the left and right offsets and boundary length.

# 4.11 SPACEBAR

A quick way to get to commonly used tools is to click on the spacebar, the following popup will appear near where your curser is at for your selection.

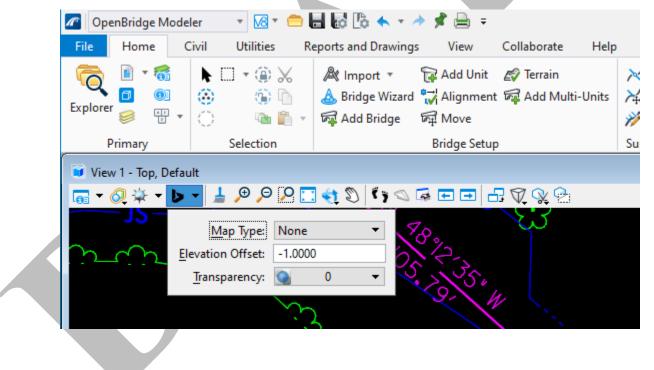


# 4.12 BACKGROUND MAP

To place a street or aerial map in your drawing background, take the following steps:

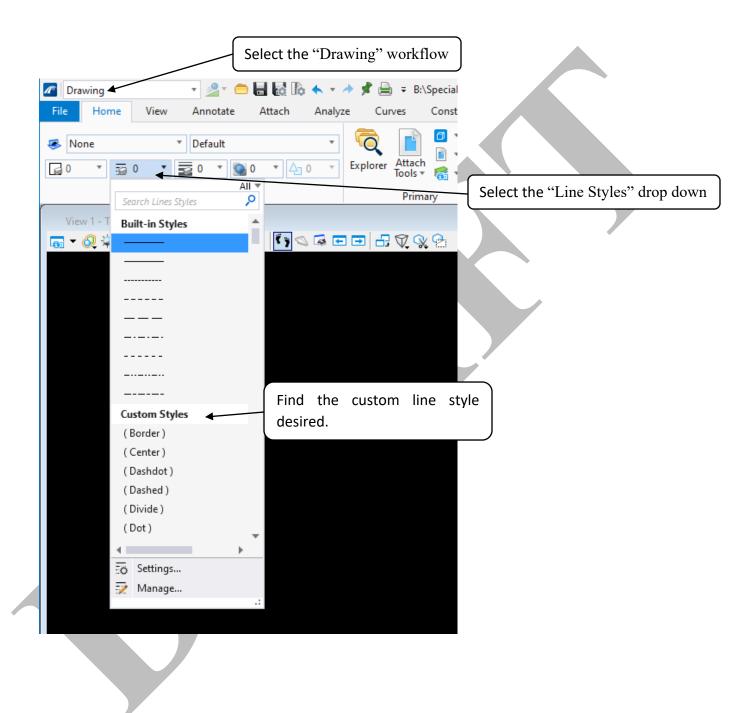
1<sup>st</sup> In the window View, click on "Select Background Map"

2<sup>nd</sup> Drop down to "Map Type" and select the map style desired.



# 4.13 CUSTOM LINE STYLES

To use the NCDOT custom line styles for both 2D and 3D, follow these steps:



# 4.14 DRAWING SCALES

SMU drawing scales and ratios

	Drawin	ig Scales		
English	Scales	Engineering Scales		
Full Size 1=1	1:1	1" = 5'	60:1	
6" = 1'-0"	2:1	1" = 10'	120:1	
3" = 1'-0"	4:1	1" = 15'	180:1	
2" = 1'-0"	6:1	1" = 20'	240:1	
1 ½" = 1'-0"	8:1	1" = 30'	360:1	
1" = 1'-0"	12:1	1' = 40'	480:1	
7/8" = 1'-0"	13.7:1	1" = 50'	600:1	
<sup>3</sup> ⁄ <sub>4</sub> " = 1'-0"	16:1	1" = 60'	720:1	
5/8" = 1'-0"	19.2:1	1" = 100'	1200:1	
1/2" = 1'-0"	24:1	1" = 200'	2400:1	
7/16" = 1'-0"	27.4:1	1" = 300'	3600:1	
3/8" = 1'-0"	32:1	1" = 400'	4800:1	
5/16" = 1'-0"	38.4:1	1" = 500'	6000:1	
1⁄4″ = 1′-0″	48:1	1" = 600'	7200:1	
3/16" = 1'-0"	64:1	1" = 1000'	12000:1	
1/8" = 1'-0"	96:1	-	-	
1/16" = 1'-0"	192:1	-	-	
1/32" = 1'-0"	384:1		-	

# CONTENTS

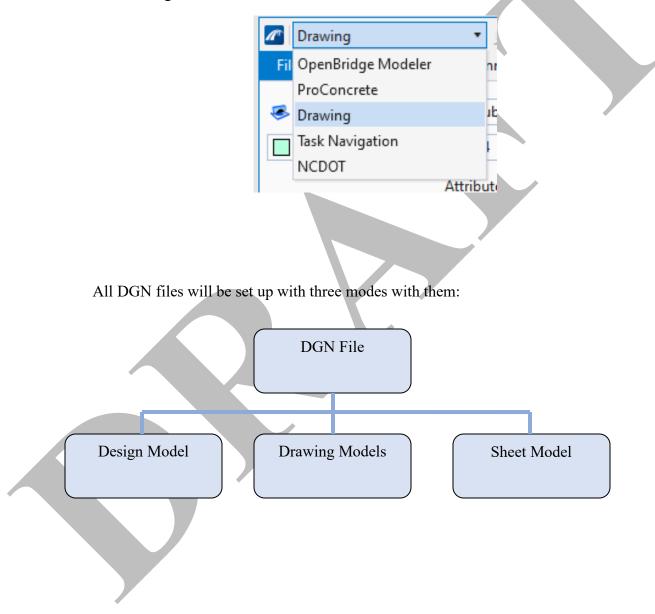
Chapte	er 5		
5.1	DRAWING	G WORKFLOW	5–1
5.2	2D DESIGN	GN MODEL	
5.3	2D DRAWI	VING MODEL	5–3
		mensioning	
	5.3.2 Drav	awing Scale	5–3
	5.3.2	5.2.1 Placing Dimensions	
	5.3.2	2.2.2 Editing Dimensions	5–5
	5.3.3 Text	xt	
	5.3.3	0	5–6
	5.3.3	3.3.2 Editing Text	
5.4		T MODEL	
	5.4.1 Indiv	lividual Plan Sheet Borders	5–7
	5.4.2 Refe	ferencing A Structure Primary Border	5–9
	5.4.2		5–9
	5.4.2	2.2.2 Referencing a Project Primary Border	
	5.4.3 Plac	cing Plan Notes With SMU Notes Tool	
5.5	Title Sheet.	t	
5.6		et	
5.7	Preliminary	ry General Drawing	
	5.7.1 DGN	GN File Set Up	
	5.7.2 Refe	ferencing Other DGN's	5–16
	5.7.3 Usin	ing the Place Named Boundary Tool	
		2.3.1 Plan View	
		2.3.2 Elevation View	
		rawing Sheets	
5.9		n Table Sheets	
		undation Tables Excel File	
		rn Off the Gridlines	
	5.9.3 Link	nk Spreadsheet Into The OBD File	
		tting Up the DGN	
		py from The Excel File	
		ste From Clipboard Into OBD	
		operties of the Linked Tables in OBD	
		Iltiple Links	
		it Link Properties	
	-	cture Sheets	
		re Sheets	
5.12		dard Plans	
	5.12.1 Plac	cing Structure Standards ncing Structure Standards	ot defined.

# CHAPTER 5

# **2D Plan Production**

# 5.1 DRAWING WORKFLOW

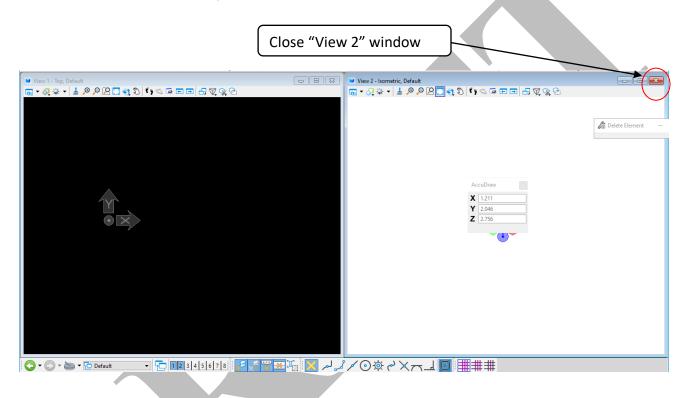
Once the DGN file is created as laid out in Chapter 4, for 2D drawing creation set OBD to the Drawing Workflow.



# 5.2 2D DESIGN MODEL

For 2D drawings the Design Model will be used to draw proposed or existing structure elements in a 2D view at full scale (1:1) in their correct geographical locations. Reference the SMU Design Manual for all required content for the plan sheet being created.

To set the DGN to look like it did in v8, in the Design Model close the "View 2" window and maximize the "View 1" window, then use the save settings tool. (Note: View 2 is utilized for 3D views.)



Leave the Drawing Scale at "Full Size 1=1" and draw all elements at their true dimensions.

## 5.3 2D DRAWING MODEL

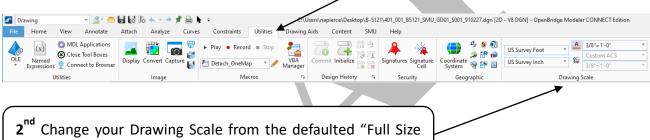
For 2D drawings, the Drawing Model is used to annotate the drawings done in the Design Model. This can be achieved by referencing the drawing done in the Design Model or using the drawing tools to place a view of the drawing in the Design Model into the Drawing Model.

#### 5.3.1 Dimensioning

After the Design Model has been referenced, it is time to set the Drawing Scale based on the reference view scale used in the Sheet Model for the drawing view.

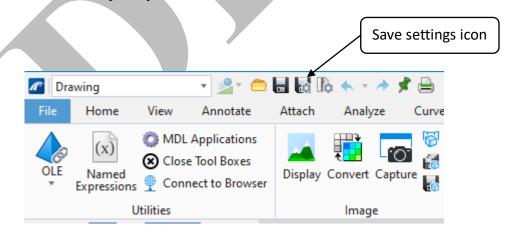
#### 5.3.2 Drawing Scale

Once the Design Model has been referenced in, it's time to select the drawing scale to annotate the drawing.



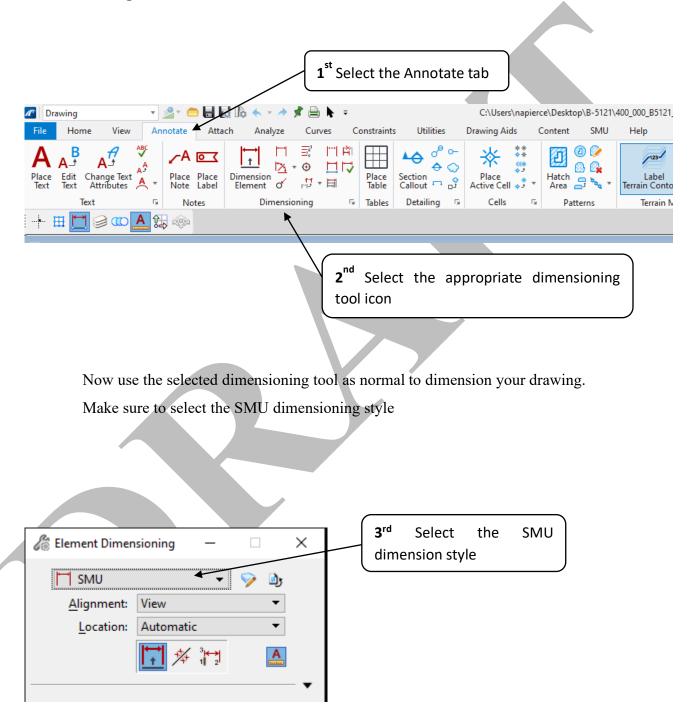
1=1" scale, until the text fits correctly on your drawing

Your scale is now set for this Drawing Model, save settings and do not change it! Now you can place your text.



Once the Drawing Scale matches the Sheet Model reference view scale, it's time to start placing dimensions. Follow these steps to place dimensions:

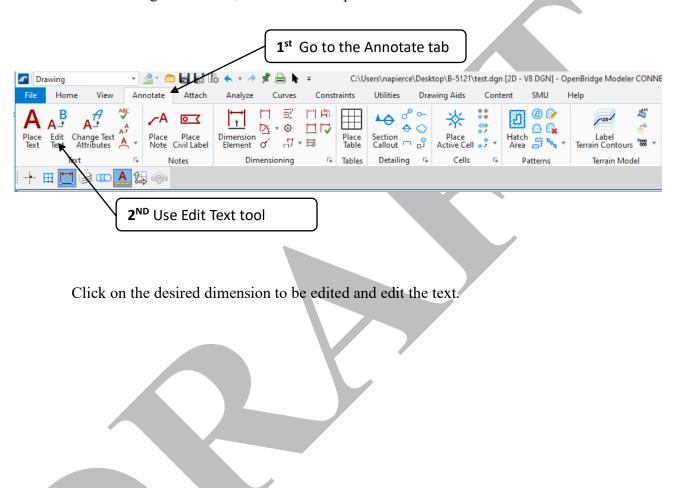
#### 5.3.2.1 Placing Dimensions



Now use the tool to dimension the item(s) in the dgn.

## 5.3.2.2 Editing Dimensions

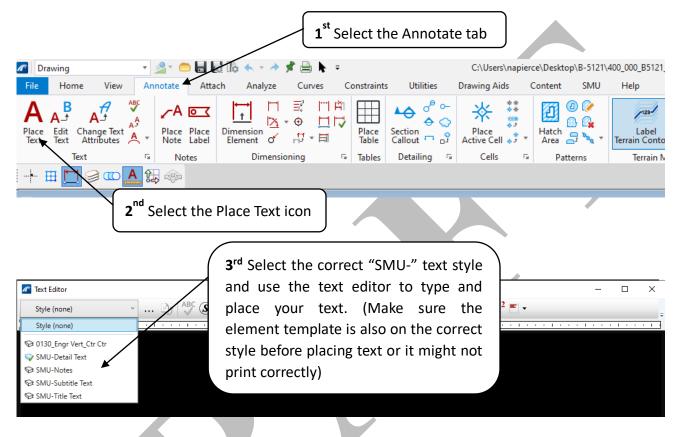
When editing dimensions, follow these steps:



#### 5.3.3 Text

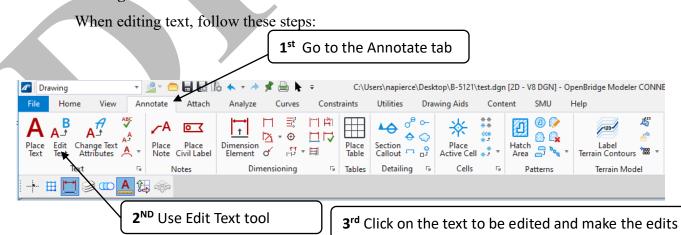
#### 5.3.3.1 Placing Text

After the drawing scale has been set for the Drawing Model, it's time to start placing text.



Note: Changing the drawing scale may be required to see the text as desired, the text will automatically scale to the drawing scale.

#### 5.3.3.2 Editing Text



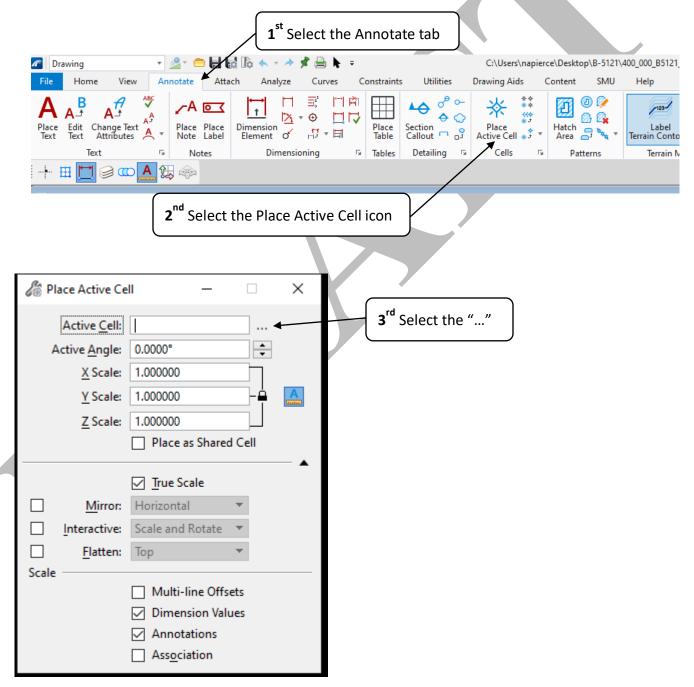
**NOTE:** When editing SMU text style, leave the style at "None" while editing. The text will remain as the SMU text style it was placed as.

# 5.4 2D SHEET MODEL

For 2D drawings, the Sheet Model is used to place the Plan Sheet Border with it's labels, plan sheet notes and bill of material tables.

#### 5.4.1 Individual Plan Sheet Borders

Once the Sheet Model is set up and ready for a border, follow these steps to place an individual sheet border in the Sheet Model:



\* Cell Library: [NONE]

			3 <sup>rd</sup>	Click on "File"
<u>N</u> ew		e		
<u>A</u> ttach File				
Attach <u>F</u> older				
Detach		_		
Compress		<b>4</b> <sup>th</sup>	Select the SI	MU Sheet Border C
			rary	
\NCDOT_Structures\Stand				
\Standards\cell\NCDOT SM				
\Standards\cell\OpenBrid	geModeler.Drawings.cel			
\NCDOT_Structures\Stand	ards\cell\qculvert.cel			
\NCDOT_Structures\Stand	ards\cell\sculvert.cel		<b>N</b>	
\Standards\cell\SMU_3D (	Cells.cel			
\Standards\cell\SMU_Abu				
\Standards\cell\SMU_Ann				
\Standards\cell\SMU_Bear				
	-			
\Standards\cell\SMU_Cros				
\NCDOT_Structures\Stand	ards\cell\SMU_Deck.cel			
\Standards\cell\SMU_Gird	ers.cel			
\Standards\cell\SMU_PE_S	eals.cel			
\NCDOT_Structures\Stand	ards\cell\SMU_Piers.cel			
\NCDOT_Structures\Stand	ards\cell\SMU_PRR.cel			
\Standards\cell\SMU_Retr	ofit.cel			
\Standards\cell\structures	ncbdsedetails.cel			
\NCDOT_Structures\Stand				
	ands(centiculvertice)			
		5 <sup>th</sup> Double cli	ick on the co	rrect border for the
		<b>5</b> <sup>th</sup> Double cli	ick on the coi	rrect border for the
☆ Cell Library: [S:\Share\\NCE	OT SMU Sheet Border.cel]	<b>5<sup>th</sup> Double cli</b>	ick on the coi	rrect border for the
☆ Cell Library: [S:\Share\\NCE	OT SMU Sheet Border.cel]	<b>5</b> <sup>th</sup> Double cli	ick on the co	rrect border for the
☆ Cell Library: [S:\Share\\NCE <u>F</u> ile		Λ	ick on the co	rrect border for the
☆ Cell Library: [S:\Share\\NCE		5 <sup>th</sup> Double cli	ick on the co	rrect border for the
☆ Cell Library: [S:\Share\\NCE <u>F</u> ile		Λ	ick on the co	Type
Cell Library: [S:\Share\\NCD         File         Image: Second state states	Description Description Plan Profile	Sheet Borders	ick on the co	Type 4
Cell Library: [S:\Share\\NCD         File         Solution         Name         Design Dual Plan Profile         Design Plan Profile	Description Dual Combination Plan Profile Design Plan Profile Sheet Borde	Sheet Borders ers	ick on the co	Type 4
<ul> <li>Cell Library: [S:\Share\\NCE</li> <li>File</li> <li>Particular State</li> <li>Design Dual Plan Profile</li> <li>Design Plan Profile</li> <li>Design Standard</li> </ul>	Description Dual Combination Plan Profile Design Plan Profile Sheet Borde Design Standard Plan Profile Sh	Sheet Borders ers heet Borders	ick on the co	Type 4
Cell Library: [S:\Share\\NCD         File         Solution         Name         Design Dual Plan Profile         Design Plan Profile	Description Dual Combination Plan Profile Design Plan Profile Sheet Borde	Sheet Borders ers heet Borders ofile Sheet Borders	ick on the co	Type 4

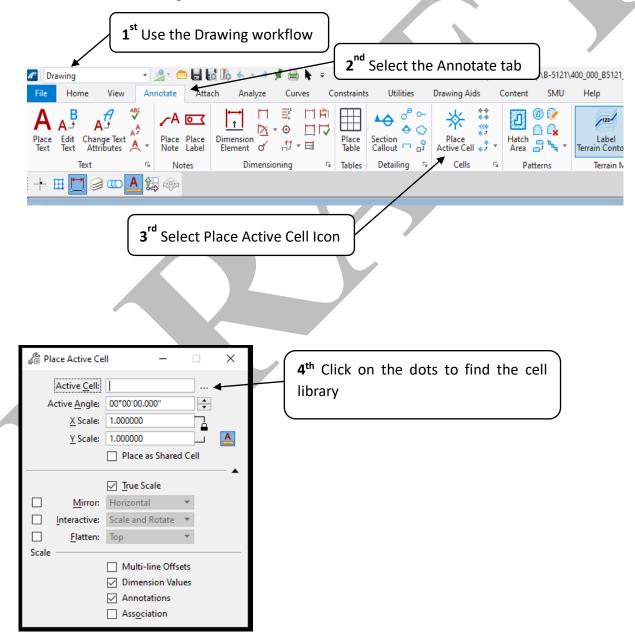
The border can now be placed as a cell in the sheet model.

#### 5.4.2 Referencing A Structure Primary Border

This method allows the user to set up a primary border for each structure on the project, so that the users only has to go into one file to fill out the project number, county, and station/bridge number as well as place a PE seal and Total Number of sheets for the entire project. To use this method, create a Master Border DGN file for each structure on a project following the steps found in Chapter 4, which will be later referenced in your plan sheets.

#### 5.4.2.1 Creating a Primary Border DGN File

Create a new DGN file without adding Drawing and Sheet Models, in the Design Model follow these steps:

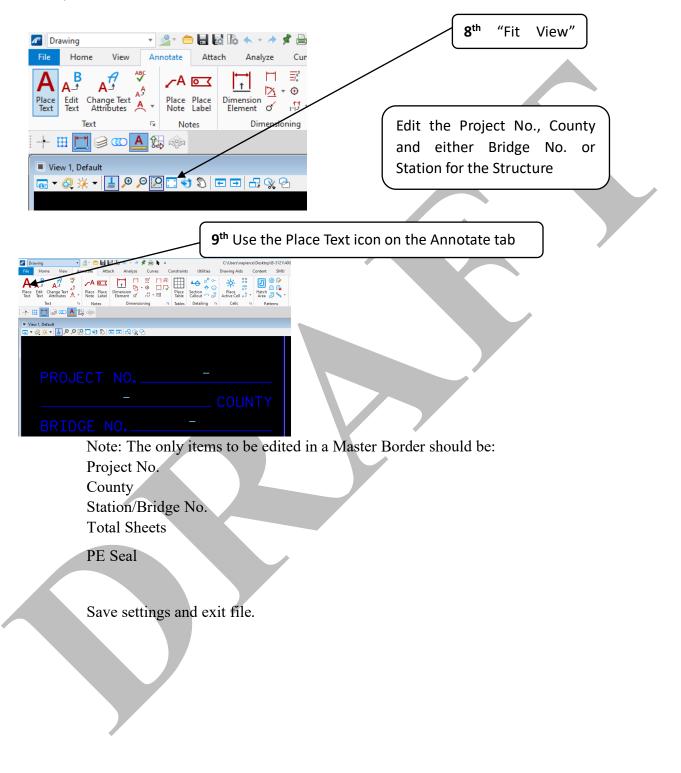


#### NCDOT STRUCTURE MANAGEMENT OPENBRIDGE MANUAL

<u>File</u>	
New	
<u>A</u> ttach File	
Attach <u>F</u> older	
<u>D</u> etach	6 <sup>th</sup> Select "SMU
<u>C</u> ompress	Sheet Border.cel"
\NCDOT_Structures\Standards\cell\dculvert.cel	
\Standards\cell\NCDOT SMU Sheet Border.cel	
\Standards\cell\OpenBridgeModeler.Drawings.cel	
\NCDOT_Structures\Standards\cell\qculvert.cel	
\NCDOT_Structures\Standards\cell\sculvert.cel	
\Standards\cell\SMU_3D Cells.cel	
\Standards\cell\SMU_Abutments.cel	
\Standards\cell\SMU_Annotation.cel	
\Standards\cell\SMU_Bearings.cel	
\Standards\cell\SMU_CrossFrames.cel	
\NCDOT_Structures\Standards\cell\SMU_Deck.cel	
\Standards\cell\SMU_Girders.cel	
\Standards\cell\SMU_PE_Seals.cel	
\NCDOT_Structures\Standards\cell\SMU_Piers.cel	
\NCDOT_Structures\Standards\cell\SMU_PRR.cel	
\Standards\cell\SMU_Retrofit.cel	
\Standards\cell\structures_ncbdsedetails.cel	
$\NCDOT\_Structures\Standards\cell\tculvert.cel$	
	<b>7</b> <sup>th</sup> Select the Design or PRR Plan Profile She
※ Cell Library: [S:\Share\\NCDOT SMU Sheet Border.cel]	
<u>F</u> ile	

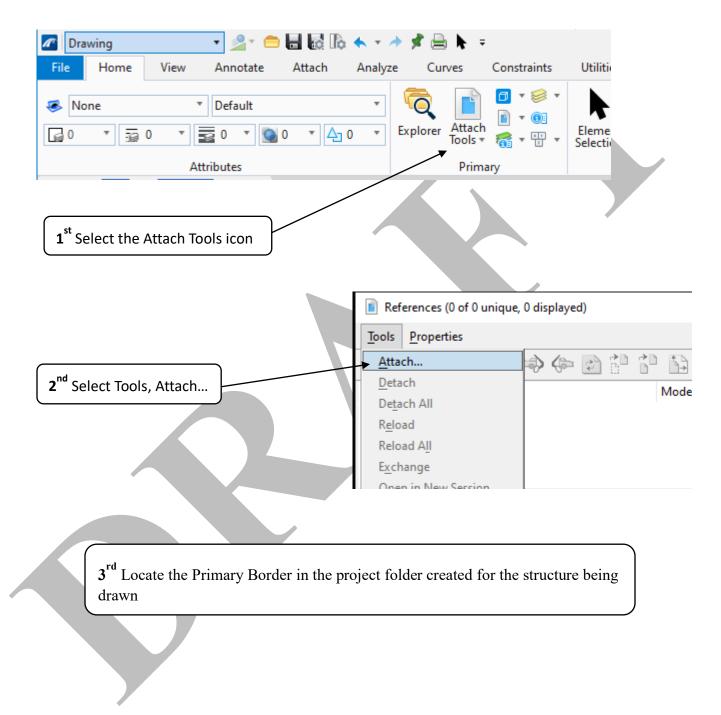
	Name	Description	Туре	$\underline{A}$
Ø	Design Dual Plan Profile	Dual Combination Plan Profile Sheet Borders	Graphic	A
Ø	Design Plan Profile	Design Plan Profile Sheet Borders	Graphic	A
Ø	Design Standard	Design Standard Plan Profile Sheet Borders	Graphic	A
Ø	PRR Dual Plan Profile	PRR Dual Combination Plan Profile Sheet Borders	Graphic	A
Ø	PRR Plan Profile	PRR Plan Profile Sheet Borders	Graphic	A
$\otimes$	PRR Standard	PRR Standard Plan Sheet Borders	Graphic	A
	00000	<ul> <li>Name</li> <li>Design Dual Plan Profile</li> <li>Design Plan Profile</li> <li>Design Standard</li> <li>PRR Dual Plan Profile</li> <li>PRR Plan Profile</li> </ul>	Name     Description       Design Dual Plan Profile     Dual Combination Plan Profile Sheet Borders       Design Plan Profile     Design Plan Profile       Design Standard     Design Standard Plan Profile Sheet Borders       PRR Dual Plan Profile     PRR Dual Combination Plan Profile Sheet Borders       PRR Plan Profile     PRR Plan Profile       PRR Plan Profile     PRR Plan Profile Sheet Borders	Name         Description         Type           Design Dual Plan Profile         Dual Combination Plan Profile Sheet Borders         Graphic           Design Plan Profile         Design Plan Profile         Design Plan Profile         Graphic           Design Standard         Design Standard Plan Profile Sheet Borders         Graphic           PRR Dual Plan Profile         PRR Dual Combination Plan Profile Sheet Borders         Graphic           PRR Plan Profile         PRR Plan Profile         PRR Plan Profile Sheet Borders         Graphic

Place the border in the dgn Design Model at the axis origin point. Note the border will come in small, use the "Fit View" icon to zoom in.

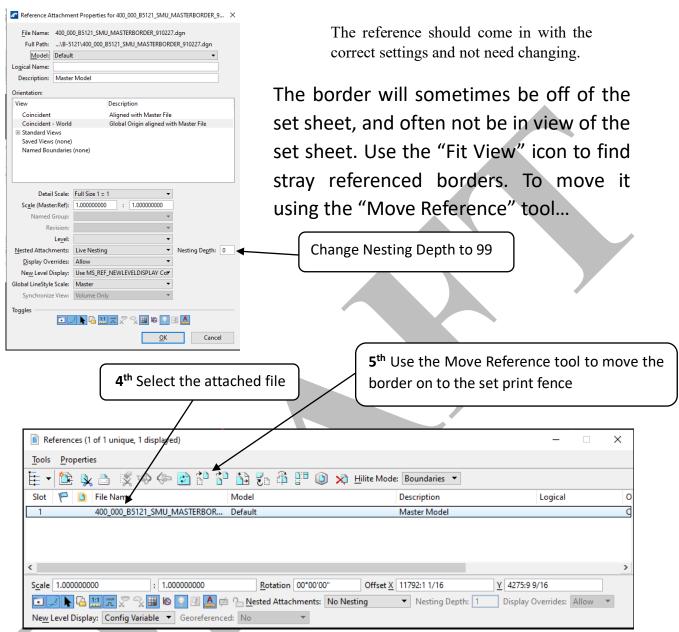


#### 5.4.2.2 Referencing a Project Primary Border

Once the Sheet Model for each project DGN file is set up and ready for a border, follow these steps to reference in the Master sheet border into the Sheet Model:



#### NCDOT STRUCTURE MANAGEMENT OPENBRIDGE MANUAL



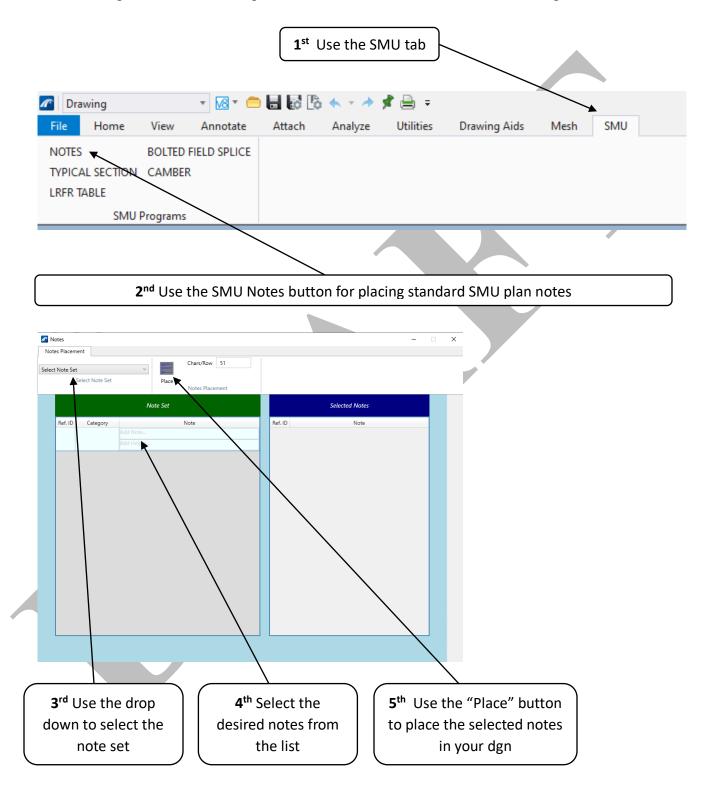
The Sheet Model scale should be left at "Full Size 1=1".

**6<sup>th</sup>** Once the border is placed, the following items need to be placed in each DGN file on the referenced Master Border:

- Drawn By & Date
- Checked By & Date
- Engineer of Record
- Title
- Sheet Number
- Sheet \_ of \_\_

#### 5.4.3 Placing Plan Notes With SMU Notes Tool

To place standard SMU plan notes on the Sheet Model, follow these steps



Note that you can change the number of characters per row by editing the number.

## 5.5 TITLE SHEET

SMU Title Sheet should be placed in the Sheet Model as a cell from either the Annotation Cell Library or from the PRR Standard Drawing tool. The Sheet Model drawing scale can be changed with the use of this cell. For required title sheet content, refer to Chapter 1 of the SMU Design Manual.

## 5.6 INDEX SHEET

SMU Index Sheet should be placed in the Sheet Model as a cell from either the Annotation Cell Library or from the PRR Standard Drawing tool. The Sheet Model drawing scale can be changed with the use of this cell. For required title sheet content, refer to Chapter 1 of the SMU Design Manual.

#### 5.7 PRELIMINARY GENERAL DRAWING

Preliminary General Drawings (PGD) depict the basic layout of the proposed structure and involve the use reference files, such as the Hydraulics Units BSR file or the Roadway alignment file and cross section files. Reference Chapter 4 the SMU Structure Design Manual for guidance on requirements of a PGD. The following is how to generate a plan and cross section drawing in OBD.

#### 5.7.1 DGN File Set Up

4

Once the DGN is setup with the Design, Drawing and Sheet Models, take the following steps to set up the Sheet Model.

Use the "Dual Combination Plan Profile Sheet Border"

File				
<u>*</u>		×/ 🛞 🕀 🎯 🗌 📘		
	Name	Description	Туре	$\underline{A}$
0	Design Dual Plan Profile	Dual Combination Plan Profile Sheet Borders	Graphic	A
0	Design Plan Profile	Design Plan Profile Sheet Borders	Graphic	A
0	Design Standard	Design Standard Plan Profile Sheet Borders	Graphic	A
0	PRR Dual Plan Profile	PRR Dual Combination Plan Profile Sheet Borders	Graphic	A
0	PRR Plan Profile	PRR Plan Profile Sheet Borders	Graphic	A
0	PRR Standard	PRR Standard Plan Sheet Borders	Graphic	A

The Sheet Model should look like this:

Drawing	• 🐼 • 🧉	🖻 🖬 🕼 To 🔦 -	• 🔺 📌 🚔 = -				(	()/Users/napierce/	.Desktop\OpenBri	dge\8-5121\PlanSheetPro	oduction2.c	dgn [2D - V8 DGN] - OpenBridge Mo	deler CE	Search	Ribbon (F4)	ρ.	1 7 . (	)• = @ ×	
File Home V	/iew Annotate	Attach Anal	lyze Curves	Constraints		Drawing Aids	Content 1			Help								^	
🐣 None	* Default	٠	· 🗟 📄	- 😒 - 💽 1 - 👀	i 🕨 🖇	88 🛄 🕺	1	21:	D • + • * • ⊐ • ☆ •		38	$\begin{tabular}{ c c c c } \hline & & & \\ \hline & & & \\ \hline \hline & & \\ \hline \hline & & \\ \hline & & \\ \hline \hline \\ \hline & & \\ \hline \hline \\ \hline \\$	ें 🗄 🚡	Bernent Selection		×			
G · · 50	* <u>50</u> * §	<u>10 * 400 *</u>	Explorer Attach		Element	G Fence	Place	Place Arc	V-A-	Move Copy Rotate	216	Modify Break Trim	Create Region ()						
	Attributes		Prim	arv		Selection		Placement		Manipulate		Modify	Groups	∰m <i>0</i> 0 ∕	-0				
Properties		•	🕈 🗙 🖵 View 1,	GD-01 Sheet										<b>3+-</b> 2⊗	<b>B</b> .			- 9 -	
a Models (1)			<u>-</u>	P P P	🗖 🛭 🔊 🖻										-4	•			
References (1 of 1	Sheet																		
0.0				· · · · · · · · · · · · · · · · · · ·															
1					_											1			
ique																			
1 di																			
playe																			
8																			
General Is Active	True		<b>^ ^</b>	1															
Name	GD-01 She	et																	
Description Ref Logical																			
Type Design Dimen	Sheet ision 2D																		
Is Markup	False																		
Annotation Sc Design Scale	1.0000	- 1																	
Paper Scale Propagate Ann	1.0000																		
Line Style Sca Update Fields	le Annotation	Scale																	
	Automa True																		
Sheet Show Sheet B	oundary True																		
Sheet Number	000																		
Sequence Nur Border Atlach	ment (None)																		
Sheet Size Height	ANSI D 22.0000	-																	
Width Sheet Unit	34.0000 Inches																		
> Origin	0.0.0.																		· · · · · · · · · · · · · · · · · · ·
Rotation Sheet Index	0.0000* Not In S	heet Index												PROJECT NO	-				
Angle Read	out		~	*										\$241 jähe					
Direction Base	e East																		
Direction Mod Format	~DD.DDD0	)											6						
Accuracy Direction	0.1234 AntiClockw	tae												• )					
Isometric													,	<b>1</b>					
Isometric Plan	ю Тор		1 1	C 2305	_								2 Co. 10	1. 11 · · · · · · · · · · · · · · · · ·	-				
Isometric Lock	k False			5.62		- 592										<u>.</u>			
Locks			<u>^</u>	_												_			
ACS Plane	False		*	_						~									
<b>₹</b> 8 <b>¥</b> ₹	"a 🔾 • 🔘	* 🐚 • 🔁 GD-0	01 Sheet Views 👻	23	4 5 6 7	8 X 0:41/8		Y 0:4											1
New Node		Cu	urrent drawing is pre	pared to work v	with ProStruct	tures						🖸 🖉	Default			2		🤋 🗣	

# 5.7.2 Referencing Other DGN's

In the "Plan View" (Design Model) take the following steps to reference in other disciplines DGN's:

Models
Type 2D/3D Name
👘 🧊 Plan View
Elevation View
1 <sup>st</sup> Select "Attach Tools"
📶 Drawing 🛛 🔹 🖂 🕈 📥 🔚 🔚 🕼 🏠 🛧 🔹 🖈 🎗 🚍 🖛
File Home View Annotate Attach Analyze Corves Constraints
None Default
□ 0 ▼ 3 0 ▼ 3 0 ▼ 3 0 ▼ Attach Strain Tools ▼ 6 7 0 • Explorer Attach Tools ▼ 6 7 0 • 5
Attributes Primary

_		2 <sup>nd</sup> Under "Tools", select "Attach"	
	References (0 of 0 unique,	0 displayed)	
	Tools Properties		
[	Attach	🐳 🦃 🔂 🔂 🖧 🛱 🔛 🔯 🛪 Hilite Model Boundaries 🔻	
1	Detach	Model Description Logical	
	Detach All		
	R <u>e</u> load		
	Reload A <u>I</u> I		
	E <u>x</u> change		
	Open in New Session		
	Activate		
	Deactivate		
	Move	<b>,</b>	
-	<u>C</u> opy	: 1.000000000 Rotation	
	Scale		
	<u>R</u> otate		r
	Merge Into Master	👷 🎟 🚱 🖓 🙆 📥 📫 🔒 Nested Attachments: 📉 💌 Nesting Depth:	
	Make Direct Attachment	New Level Display: Georeferenced:	
1	Create Drawing Boundary		
	Mirror <u>H</u> orizontal		
	Mirror <u>V</u> ertical		
	Clip <u>B</u> oundary		
	Clip Mas <u>k</u>		
	Delete Clip		
	Clip <u>F</u> ront		
	Clip Back		

3<sup>rd</sup> Navigate to the project folder and find the plan view file(s) to be referenced, such as the HYD rpt brg or Rdy dsn. For elevation views, use files like HYD rpt brg or rdy pfl.

#### NCDOT STRUCTURE MANAGEMENT OPENBRIDGE MANUAL

Reference Atta	chment Properties for\b4616_hyd_drn.dgn	×
File Name: N	ICDOT\b4616_hyd_drn.dgn	
-	.\Desktop\OpenBridge\B-5121\NCDOT\b4616_hyd_drn.dgn	
Model: D		
_	elault •	
Logical Name:		
	Aaster Model	This should be automatically se
Orientation:		to "Coincident-World"
View	Description	
Coincident Coincident - V	Aligned with Master File Vorld Global Origin aligned with Master File	
Standard View		
Saved Views (r Named Bound	none)	
Detail So	cale: Full Size 1 = 1	4 <sup>th</sup> Make "Nesting Depth"
Scale (Master:		greater than "0"
Named Gro		
Revis		
	evel:	
Nested Attachme	-	
_		This should be automatically se
<u>D</u> isplay Overri		
	olay: Use MS_REF_NEWLEVELDISPLAY Cor	to "Live Nesting"
Global LineStyle So		
Synchronize V	iew: Volume Only	
	□	Click "OK" 5th Once the references attached, click of "Fit View" icon to locate the references
🗊 View 1, 🚮 ▾ Øָ	, General Drawing ☆ ▼ 🛓 🕫 🔎 🌅 📑 🍕 🔊 👣 <	
		If needed, rotate the view

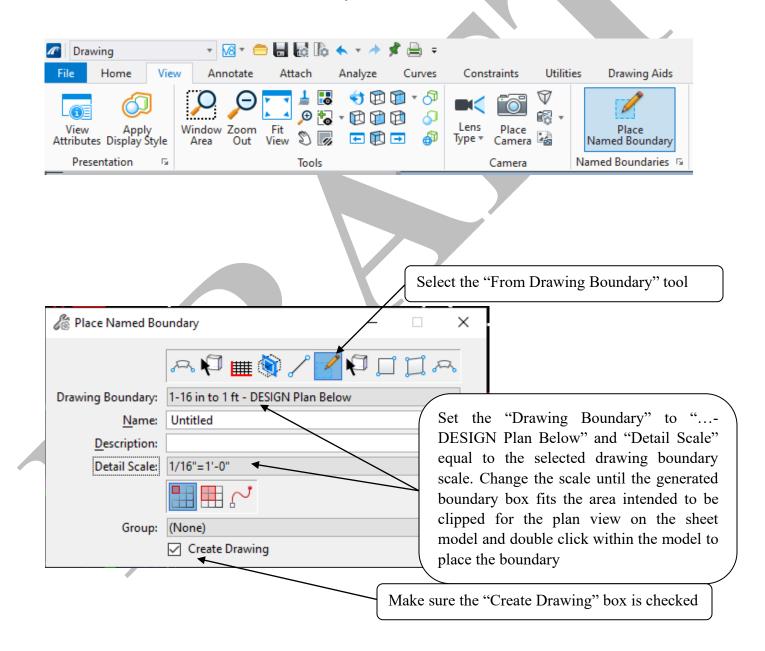
Note, the view might also need to be rotated to get the structure to appear horizontally left to right. Take similar steps in the Elevation View drawing model to reference DGN's such as a BSR.

# 5.7.3 Using the Place Named Boundary Tool

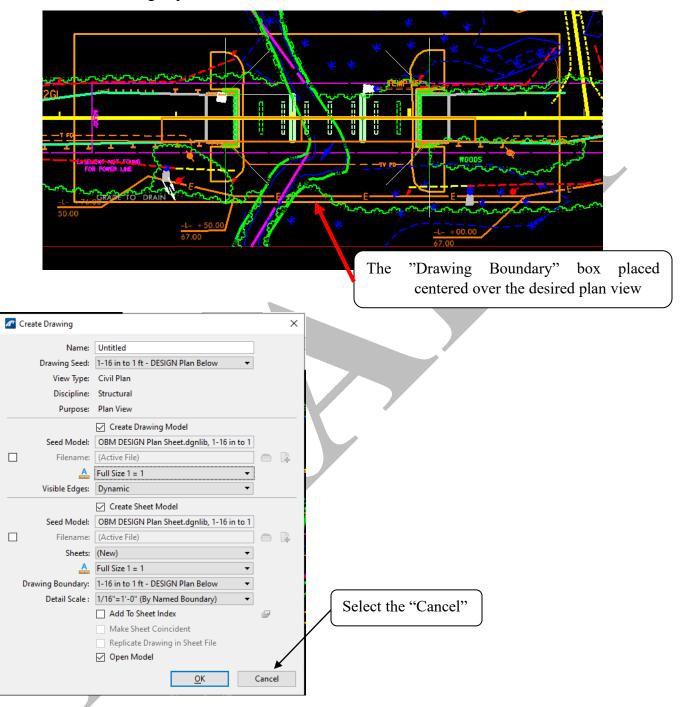
#### 5.7.3.1 Plan View

Take the following steps in the plan view design model:

- Use Level Display tool to drop all unnecessary levels that restrict view of existing and proposed structures
- Draft proposed substructure elements in their correct locations on top of the referenced file(s). Do not add dimensions, call-outs or text here, they will be added at a later stage.
- Use the "Place Named Boundary" tool



Note, the Drawing Boundary box is placed by the center of the left vertical leg. To center the plan view in the box, place the box on the alignment with the placement point before double clicking to place it.

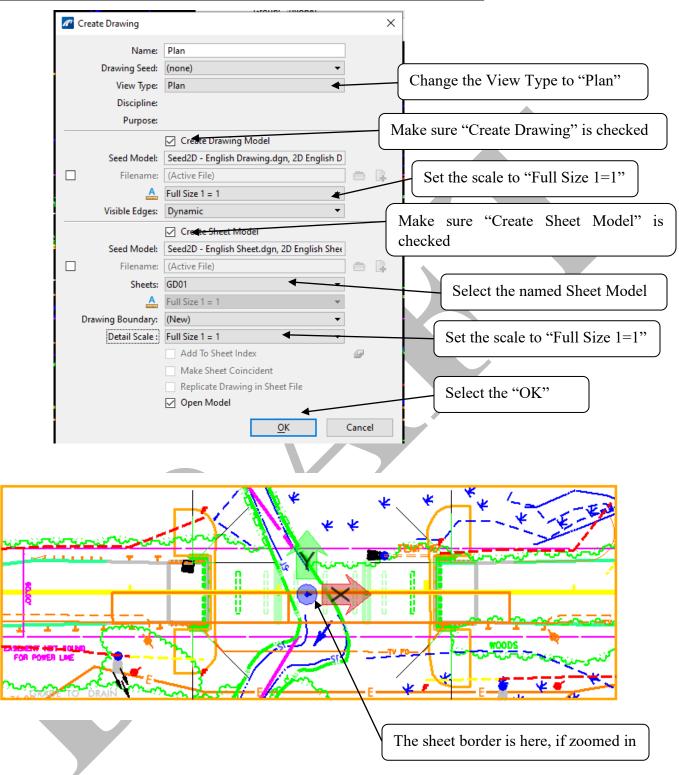


Because the Sheet Model is always at Drawing Scale "Full Size 1=1", if the "From Drawing Boundary" is used at the scale that best fits around the plan view desired, the same issue as placing the border within the design model space and changing the Drawing Scale happens. All the custom line styles and other annotavite items within the referenced files

will scale to the scale selected, which can cause them to move off the area selected. To "cheat" this from happening, cancel out of using the tool which leaves the Drawing Boundary box on your plan view drawing.

Open the "Place Named Boundary" tool again.

Brace Named Bo	undary	- Sele	ct the "By 2 Points" Tool	
	R 🖓 🏢 🍥 🖉 🌾			
Name:	Plan 🗸		Change the name to "Plan"	
Description:				J
Group:	(None)	•		
	Create Drawing			
		Make sure "Cre	eate Drawing" is checked	
Using the	e already placed "Drawing Bou	undary" box in th	e drawing, select oposite corner	s of
	nd double click.	indary box in th	e drawing, select oposite corner	5 01



The drawing will come into the sheet model space larger than the sheet border.

Go to "Attach Tools"

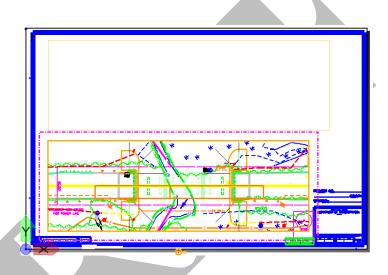
File Home View	Annotate Attac	h Analyze	Curves	Constraints	
None *	Default	т ( <u> </u> <u> </u> <u> </u>	lorer Attac	□ • 🥯 • □ • 🚳 •	
At	tributes		Prir	mary	
		-			
		Click	on the	referenced	view and use
👔 References (18 of 18 unique, 14	displayed)	"Mov	ve Referen	nce" tool	
Tools Properties					
E • 陰 🕵 🗅 🌿 🖘	🌾 🖻 📬 🚱	😪 🛱 ᢪ 🕲	🗙 <u>H</u> ilite I	Mode: Boundaries	•
Slot 🏴 🗋 File Name		Model		Description	Logical
1 Plan and Profile			- Plan a A	ANSI D - Plan and P	
2 √ S:\DEV\OpenBrid	lgeDesign\PlanSheetMod	lelTest.dgn Plan	F	Plan	Plan
S <u>c</u> ale 1.000000000 :	1.00000000 Y 1549654:4 1/4	<u>R</u> otation 0°			
Offset X -1595849:3 1/16	Y 1549654:4 1/4		ive Nesting	▼ Nesting	Denth: 99
Scale 1.00000000 :: Offset X -1595849:3 1/16 	Y 1549654:4 1/4	lested Attachments: [		▼ Nesting	De <u>p</u> th: 99
S <u>c</u> ale 1.00000000 :: Offset X -1595849:3 1/16 	Y 1549654:4 1/4	lested Attachments: [			Depth: 99
S <u>c</u> ale 1.00000000 :: Offset X -1595849:3 1/16 	Y 1549654:4 1/4	lested Attachments: [			Depth: 99
S <u>c</u> ale 1.00000000 :: Offset X -1595849:3 1/16 	Y 1549654:4 1/4	lested Attachments: [			Depth: 99
Scale 1.00000000 :: Offset X -1595849:3 1/16 	Y 1549654:4 1/4	lested Attachments: [			De <u>p</u> th: 99
S <u>c</u> ale 1.00000000 :: Offset <u>X</u> -1595849:3 1/16	Y 1549654:4 1/4	lested Attachments: [			De <u>p</u> th: 99
Scale 1.00000000 :: Offset X -1595849:3 1/16 Scale X -1595849:3 1/16	Y 1549654:4 1/4	lested Attachments: [			De <u>p</u> th: 99
Scale 1.00000000 :: Offset X -1595849:3 1/16 Scale X -1595849:3 1/16	Y 1549654:4 1/4	lested Attachments: [			De <u>p</u> th: 99
S <u>c</u> ale 1.00000000 :: Offset <u>X</u> -1595849:3 1/16	Y 1549654:4 1/4	lested Attachments: [			De <u>p</u> th: 99
S <u>c</u> ale 1.00000000 :: Offset <u>X</u> -1595849:3 1/16	Y 1549654:4 1/4	lested Attachments: [			Depth: 99
S <u>c</u> ale 1.00000000 :: Offset <u>X</u> -1595849:3 1/16	Y 1549654:4 1/4	lested Attachments: [			De <u>p</u> th: 99
S <u>c</u> ale 1.00000000 :: Offset <u>X</u> -1595849:3 1/16	Y 1549654:4 1/4	Iested Attachments: I /ariable ▼ Georefere	enced: No		

0
Move the referenced boundary box to the lower box in the horder
the border
Use the "Scale Reference"
References (18 of 18 unique, 14 displayed) - 🗆 X
Tools Properties
🗄 🔻 📴 🛼 🎰 🌠 🐵 🦛 🛃 🚰 🎦 🏠 😴 🍈 📅 🕼 🖉 III 🕼 🖉
Slot 🏴 🚺 File Name Model Description Logical
1         Plan and Profile Border.dgn         ANSI D - Plan a         ANSI D - Plan and Pr           2 $\checkmark$ S:\DEV\OpenBridgeDesign\PlanSheetModelTest.dgn         Plan         Plan
Scale 1.00000000 : 1.00000000 Rotation 0°
Offset X -1595642:5 7/8 Y 1549725:7
E I I I I I I I I I I I I I I I I I I I
Display Overrides: Allow 🔻 New Level Display: Config Variable 🔻 Georeferenced: No 💌

#### NCDOT STRUCTURE MANAGEMENT OPENBRIDGE MANUAL

🔏 Scale Reference	- 🗆 X	Use "By Points"
Method:	By Points	
	Move Boundary with Reference	
	Use References Dialog List	
Use Fence:	Inside 💌	

Grab the referenced file by the Boundary Box (not the reference fence) starting in the lower bottom left corner, then the diagonal top right corner. Reduce the box to fit the bottom box on the border sheet.

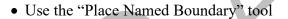


All annotation (text, dimensions, etc.) will happen in the sheet model.

#### 5.7.3.2 Elevation View

Take the following steps in the elevation view drawing model:

- Reference in the "Plan View"
- For stream crossings, reference in the HYD\_rpt\_brg file if it's not in your referenced "Plan View". Copy the elevation view and paste it vertically below the referenced file. Note the ground line might need to be selected separately because it might extend beyond the graph. Use the scale tool to change the y-scale to 0.2, this will make the drawing 1:1. Make sure to keep the drawing vertically in-line with the plan view. Clip the elevation and station lines back that restrict view of existing and proposed structures, use them later to establish the elevations and stations on your plan sheet.
- For grade separations, reference in the rdy\_pfl file, make sure the profile is vertically in-line or on top of the referenced Plan View so the stations are matching. Use the Level Display tool to turn off levels not needed.
- Draft proposed substructure elements, slope protection, excavations, etc. in their correct locations on top of the copied view
- Once the elevation view has been drafted, go back up to the referenced "Plan View" file and copy the "Boundary Box" and move it vertically over the elevation view keeping the stations the same in both views.

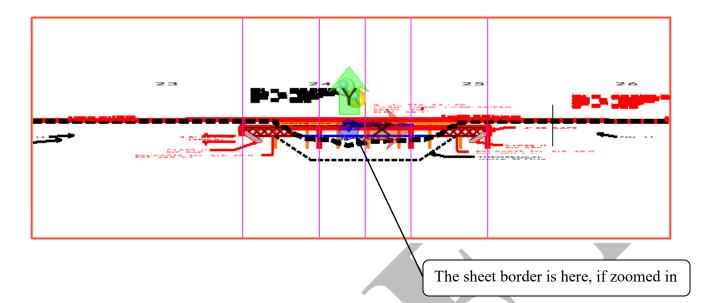




C Place Named Bound	dary – Se	elect the "By 2 Points" Tool
8	¬, 🖓 🏢 🕲 🖍 🗹 🖓 🚺 🎞 r	~
<u>N</u> ame: E	levation	
Description:		
Group: (N	None)	-
	Create Drawing	

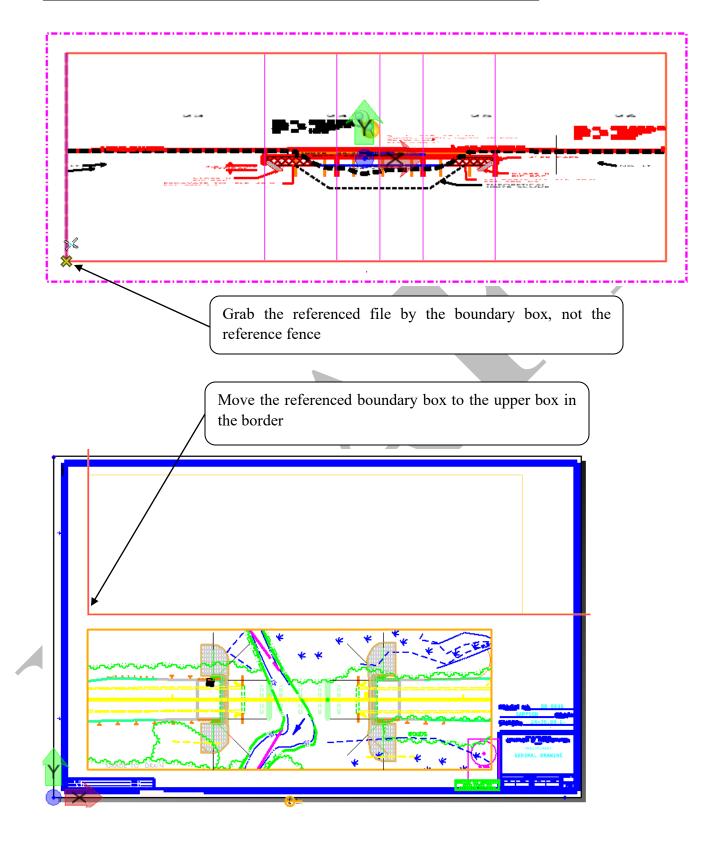
Using the copied "Drawing Boundary" box in the drawing, select oposite corners of the box and double click.

Create Drawing		×
Name:	Elevation	
Drawing Seed:	(none) 🔻	
View Type:	Detail	
Discipline:		
Purpose:		
	Create Drawing Model	
Seed Model:	Seed2D - English Drawing.dgn, 2D English D	
Filename:	(Active File)	Set the scale to "Full Size 1=1"
A	Full Size 1 = 1	
	Create Sheet Model	
Seed Model:	Seed2D - English Sheet.dgn, 2D English Shee	
Filename:	(Active File)	
Sheets:	GD01	Select the named Sheet Model
A	Full Size 1 = 1	
Drawing Boundary:	(New) 👻	
Detail Scale :	Full Size 1 = 1	Set the scale to "Full Size 1=1"
	Add To Sheet Index	G C
	Make Sheet Coincident	
	Replicate Drawing in Sheet File	
	🗹 Open Model	
	<u>O</u> K	Cancel



The drawing will come into the sheet model space larger than the sheet border.

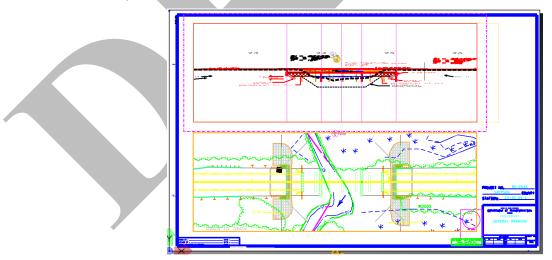
Z	2 Drawing	* <u>N</u> *	- 🖶 🛃 🖡 🔸	· 🥕 📌 🚔	₹ Go to "A	Attach Tools"
	File Home	View Annotate	Attach Ana	lyze Curve	es Constraints	
	None           Image: 0         Image: 0<	▼ Default 0 ▼ 🕎 0 ▼	ັ <b>0</b>	Explorer	Attach ools •	
		Attributes			Primary	
				Click on t	the referenced vi	iew and use the
	References (35 of 35 u					
	<u>T</u> ools <u>P</u> roperties					
	1 🗄 🕈 隆 隆 🗎	🕺 🗟 🔄 🗢 🔅	🖻 🌮 🛱 🎽 🔘 🛪	Hilite Mode: Bound	laries 🔻	
	Slot 🏴 🚺 File Nar		Model	Description	Logical	
		id Profile Border.dgn eetModelTest.dgn	ANSI D - Plan Plan	a ANSI D - Plan a Plan	and Pr Plan	
		\OpenBridgeDesign\PlanSheet№		Elevation	Elevation	
	< <u>Scale</u> 1.00000000 Offset X -1595849:3 1/16 <b>I</b> 11 77		<u>R</u> otation 0°	sting Ve	sting Depth: 99	>
	Display Overrides: Allow		g Variable  Georeferenced:	-	<u></u>	



#### NCDOT STRUCTURE MANAGEMENT OPENBRIDGE MANUAL

References (35 of 35 unique, 27 displayed)		Use the "So	cale Reference	e"
Tools Properties		<b>`</b>		
≣ - 📴 🕵 🗅 🌠 🗇 😓 🗗 🗗 🟠 🐔 🗄	🕮 📦 🗙 <u>H</u> ilit	e Mode: Boundaries 🔻	•	
Slot 🏴 🚺 File Name	Model	Description	Logical	
1 Plan and Profile Border.dgn	ANSI D - Plan a	ANSI D - Plan and Pr		
2 ✓ PlanSheetModelTest.dgn 3 ✓ S:\DEV\OpenBridgeDesign\PlanSheetModelTest.dgn	Plan Elevation	Plan Elevation	Plan Elevation	
<     Scale 1.00000000 : 1.00000000 Rotation (	)•		>	
Offset X -1595849:3 1/16 Y 1549890:7 3/8				
🖸 🔎 🍋 🏥 🍸 🏸 💥 📾 🛇 🗐 📥 🚎 🏠 <u>N</u> ested Attacht	ments: Live Nesting	g 🔻 Nesting Dej	<u>p</u> th: 99	
Display Overrides: Allow  Vew Level Display: Config Variable  (	Georeferenced: No	*		
🔏 Scale Reference —		Use	e "By Points"	
Method: By Points	•			
Move Boundary v	vith Referenc	e		
✓ Use References Di	alog List			
Use Fence: Inside 🔻	-			

Grab the referenced file by the Boundary Box (not the reference fence) starting in the lower bottom left corner, then the diagonal top right corner. Reduce the box to fit the height of upper box on the border sheet. Note it will not be the full width of the box, but the elevation view will match up with the plan view.



All annotation (text, dimensions, callouts, etc.) will happen in the Drawing Model. Labels, such as "Plan" and "Section Along Centerline Bridge" can be placed in the Sheet Model.

#### 5.8 GENERAL DRAWING SHEETS

The Preliminary General Drawing should be transformed into the General Drawing following the guidelines in Chapter 5 of the SMU Design Manual.

## **5.9** FOUNDATION TABLE SHEETS

Geotech provides foundation recommendations in an Excel spreadsheet format where the data is included in tables on one single sheet or multiple sheets depending on the size of the structure. The purpose of this section is to show how to incorporate these tables into a DGN file to be included in the structure plan set.

#### 5.9.1 Foundation Tables Excel File

Once the Excel file has been received from GEU and saved in the project folder, open the file, to identify which table tab(s) have been used for the recommendations and will need to be incorporated into the DGN file. Most likely it will look like the sheet below.

End Beet/					and the unit	Cate item is not Driven Piles	apprication	losuracta	Predrilling for Piler	e .		Drilled In Piles	-		nk entries i Ne Driving Analy		in to not ap		Pile Order Le	
Bent No, Pile(s) ## (e.g., "Bent 1, Piles 1.5")	Factored Resistance per Pile TONS	Pile Cut Off (Top of Pile) Elevation FT	Estimated Pile Lenth per Pile FT	Scour Critical Elevation FT	Min Pile Tip (Tip No Higher Than) Elev FT	Required Driving Resistance (RDR)** per Pile TONS	Total Pile Redrives Quantity FACH	Predritting Length per Pile Lin FT	Predrilling Elevation (Elev Not To Predrill Below) FT	Maximum Predrilling Dia INCHES	Pile Excavation (Bottom of Hole) Elev FT	Pile Exc Not in Soil per Pile Lin FT	Pile Exc In Soil per Pile Lin FT	End Bent/ Bent No	PDA Testing Required? YES or MAYBE	PDA Test Pile Length FT	Total PDA Testing Quantity FACH	End I Bent	Bent/ No(s)	Pile O Leng Basi EST or
END BENT 1 Piles 14 END BENT 2, Piles 14	125 125	805.95 803.21	50 30			210 210	•							END BENT 1 Piles 1-8 END BENT 2, Piles 1-8	MAYBE	56 36	1			
*Prodrillion for Diles	monited for our	A beatshorts with	a sceribilling here	th and at the	Contractor's cel	ion for end bents/bent	a with preddillin	a information I	had no scardvilling has	auth				'EST - Pile order leng	the from entirest	of oils leasthe	PDA = Pile oole	r korte bare	d on POA test	ina Lora
	Resistance +	Factored Dowr	drag Load + i			minal Downdrag		Nominal Sco	our Resistance stance Factor					end bents/bents with p representative end be	ille order lengths	based on PDA	testing, the first	end bent/bent	no. listed for	each grou
		(1				RMATION applicable to st	ructure)								MMARY				ure)	
End Bent/	Factored	Factored	Factored			Nominal		ninal	Sco	-	1			End Bent/	Pipe Pile		Steel Pile Point			
Bent No, Pile(s) ## (e.g., "Bent 1, Piles 1.5")	Axial Load per Pile TONS	Downdrag Load per Pile TONS	Dead Load* per Pile TONS	Res	namic Istance actor	Downdrag Resistance per Pile TONS	Scour R	lesistance r Pile ONS	Resistz Fact (Default	ince or				Bent No, Pile(s) ## (e.g., "Bent 1, Piles 1.5")	Plates Required? YES or MAYBE	Pipe Pile Cutting Shoes Required? YES	Pipe Pile Conical Points Required? YES	H-Pile Points Required? YES	Steel Pile Tips Required? YES	
END BENT 1 Piles 13 END BENT 2, Piles 14					0.60				1.0 1.0 1.0 1.0	1				END BENT 1 Piles 1-8 END BENT 2, Piles 1-8	-	YES	YES	YES		
*Factored Dead Load	is factored weigh	t of pile above the	ground line.						1.0											
														TOTAL QTY	5			8		
			SUMMA			PIER INFO				N					MMARY (					
End Bent/		Minimum			Minimur		Drilled	Drilled	Permanent	Perma	nent Steel				Standard Penetration	Crosshole	Total CSL Tube	Shaft	P	ile
Dent No, Pier(s) ## (e.g., "Bent 1, Piers 1.3")	Factored Resistance per Pier TONS	Pier Tip (Tip No Higher Than) Elevation FT	Required Tip Resistance per Pier TSF	Scour Critical Elevation FT	Drilled Pi Penetration Rock per P Lin FT	Into Length	Pier Length Not In Soil per Pier Lin FT	Pier Length In Soll per Pier Lin FT	Steel Casing Required? YES or MAYBE	Casing T (Elev No	ip Elevation t To Extend g Below) FT	Casing	sent Steel 3 Length" r Pier in FT	End Bent/ Bent No, Pier(N)## (e.g., "Bent 1, Piers 1.3")	Test (SPT) Required? YES or MAYBE	Logging (CSL) Required?* YES or MAYBE	Length (For All Tubes) per Pier Lin FT	Inspection Device (SID) Required YES or MAYBE		grity Ist 11) Ired? YBE
BENT 1, Piers 1-3	605	760.0	30			27.0	10.0	17.0						BENT 1, Piers 1-3	YES	MAYBE	108	NO		10
"Permanent Steel Car	ing Length cause	s the difference is	etween the orono	ad line or too	of dritted nier et	evation, whichever is	histor, and the	Dermanent car	ins tip elevation.		1									
														*CSL Tubes are requir	ed if CSL Testing	is or may be re	324 rquired. The m	mber of CSL T	ubes per drill	lod pier
														is equal to one tube p CSL Tube is equal to t	rr foot of design he drilled pier le	pier diamoter w ngth plun 1.5 ft.	rith at least 4 tul	xes per pier. T	he length of	rach
																		PROJECT	NO	BR
																		STATION:		20+38.
																	CARGO		STATE OF	NORTH CA
NOTES: 1. The Pile and D	rilled Pier For	undation Table	s are based	on the bride	e substructu	re design and fou	ndation reco	mmendation	ts sealed by a N	lorth Carolin	a Profession	I Engineer	(Robert Lawren	e. PE 054066) on 08-15-		1011	51 QE		AND	PLALENSH
2022. 2. Total Pile Driv 3. The Engineer	ng Equipment will determine	t Setup quantit the need for F	y (not shown 'DA Testina. I	in Pile Fou Permanent	ndation Table Steel Casing	equals the number of the second se	mber of drive ting. SID Ins	en piles, i.e., pections and	the number of p PITs when the	blies with a R se items may	equired Drivi	ing Resistar	nce.	, , , , , , , , , , , , , , , , , , , ,		100	MCA LEA		FOU	
																GENATURE	SATE		REVISION	s
																CONSIDERED	ENTINUT FINAL UNLESS	NO. BY: 1	DATE: NO. 3	8Y:

#### 5.9.2 Turn Off the Gridlines

In the Excel file, go to the View menu, uncheck Gridlines so it doesn't show when the spreadsheet is imported into OBD.

Cut-Off of Pile) vation FT	Estimated Pile Lenth per Pile FT	Scour Critical Elevation FT	Mi Tiptri No High Than) El	) Tell m	e more Driving Resistance DR)** per Pile TONS	Pile Redrives Quantity EACH	Predrilling Length per Pile Lin FT	
	sui	MMARY (Blank e	r OI S	how the l plumns in	ines between the sheet to		STALL.	ieck
E	F	G	v	iew Grid	ines		-	
kbook Vie	ews		L	Show			Zoom	
	age Custom yout Views	Naviga	tion 🖂	Gridlines	✓ Heading	s Zoo	om 100%	
			~	Ruler	🗌 Formula	Bar	2	
ulas	Data R	eview	View	Help	BLUEBEA	M Pro	ectWise	

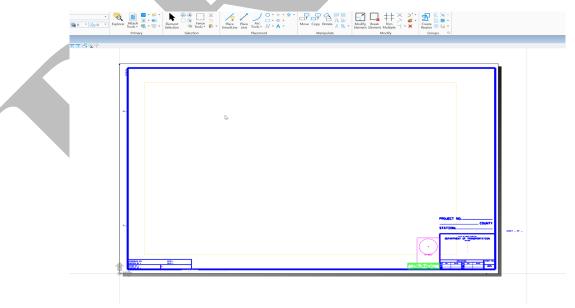
#### 5.9.3 Link Spreadsheet Into The OBD File

Create or open the 4XX\_###\_TIP#\_SMU\_FT##\_Sheet#\_6digitStrID DGN file following Chapter 4.

#### 5.9.4 Setting Up the DGN

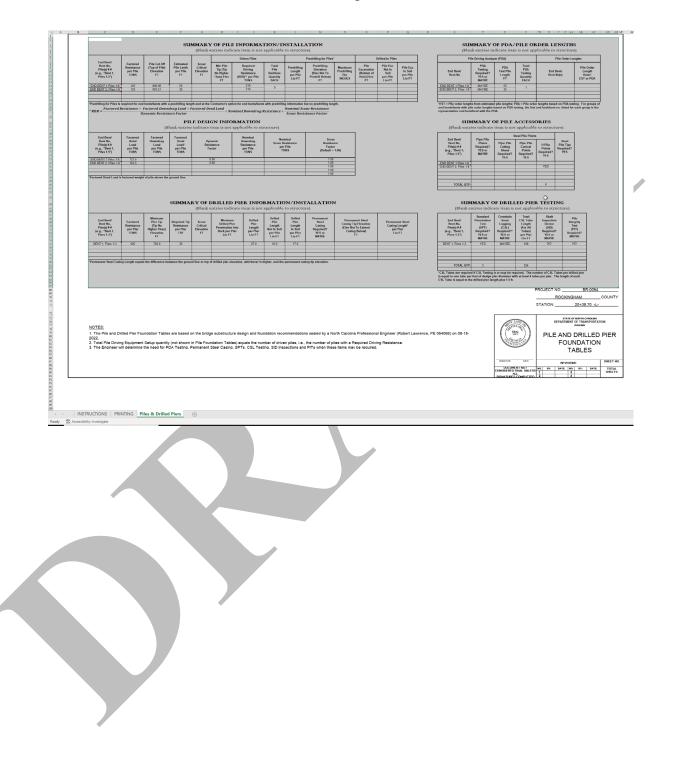
Once the DGN is created and saved in the correct folder, open the DGN and open the "Models" dialog box.

Create a new sheet model and add the appropriate plan sheet border as described in Section 5.4.

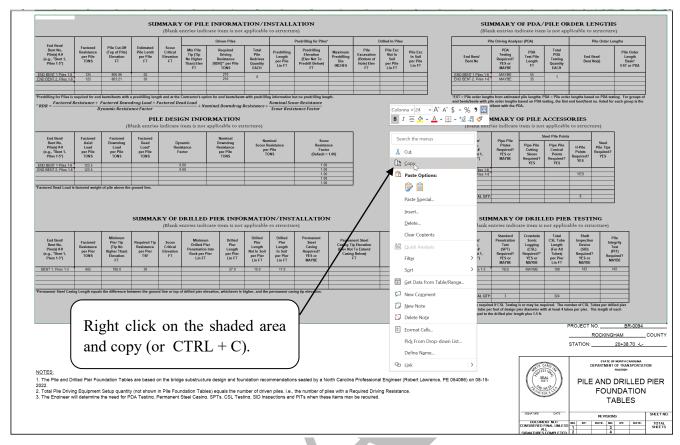


# 5.9.5 Copy from The Excel File

In the Excel file, select the tables from the spreadsheet.



#### NCDOT STRUCTURE MANAGEMENT OPENBRIDGE MANUAL

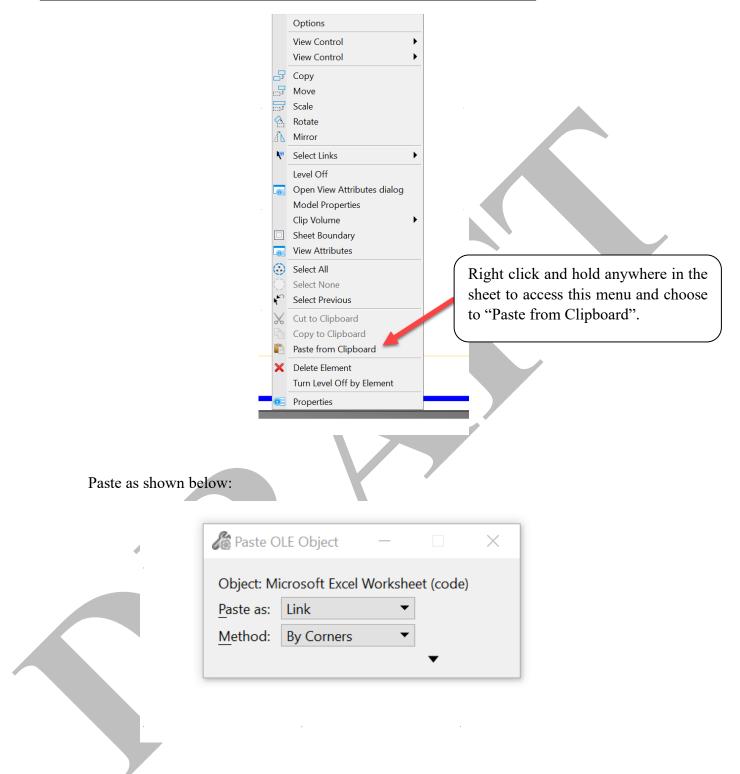


### 5.9.6 Paste From Clipboard Into OBD

In the sheet model, right click and hold to access the menu and select "Paste from

Clipboard". Then select from the pop-up menu to paste as "Link" and method "By Corners".

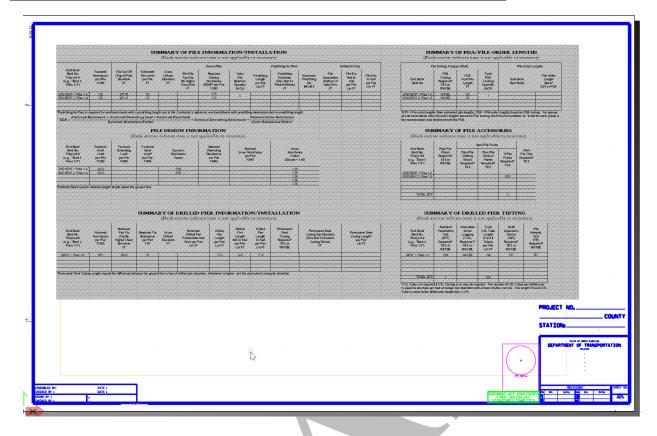




Make sure you select "Transparent Background".

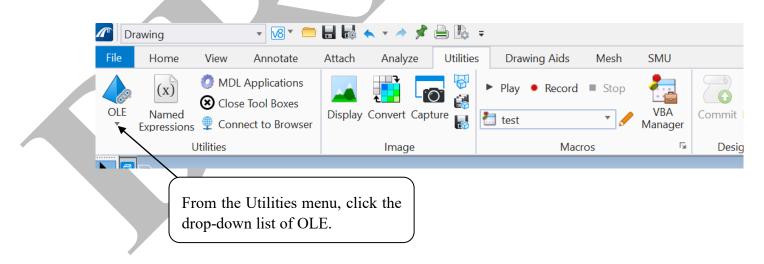
				Conste Paste	OLE Object	_		$\times$		
				Object: I <u>P</u> aste as <u>M</u> ethod	By Corne	•	ground		Click to	expand!
_	Plac	e the tab	oles by c	corners as	shown be	elow.		>		
	+									
	+_				ace the bl the plan s				COUNTY	9417 _ V _
		800 : 100 :						POLISIT IN TRUE IN TRANSPORT		

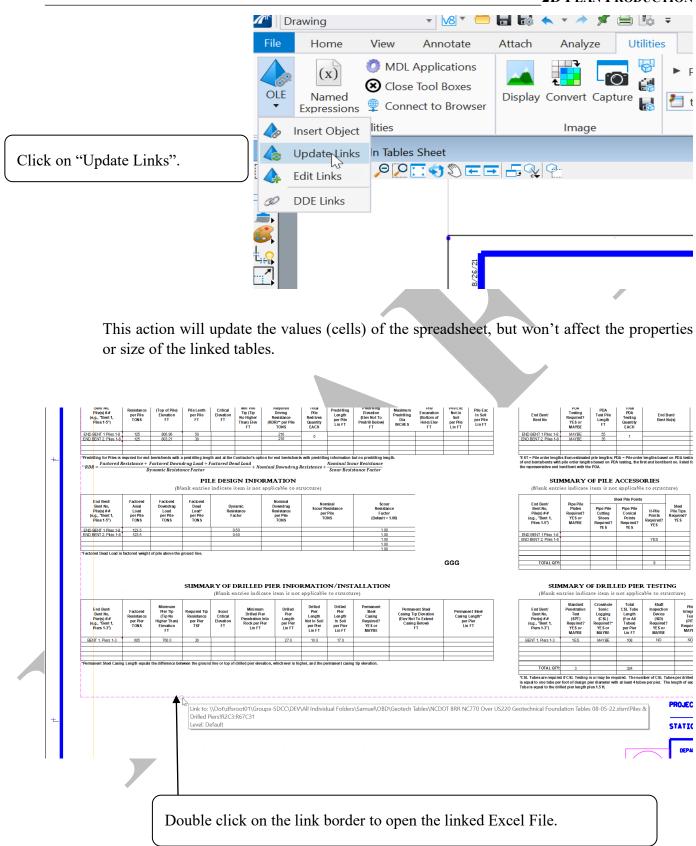
Copied tables are now linked.



#### 5.9.7 **Properties of the Linked Tables in OBD**

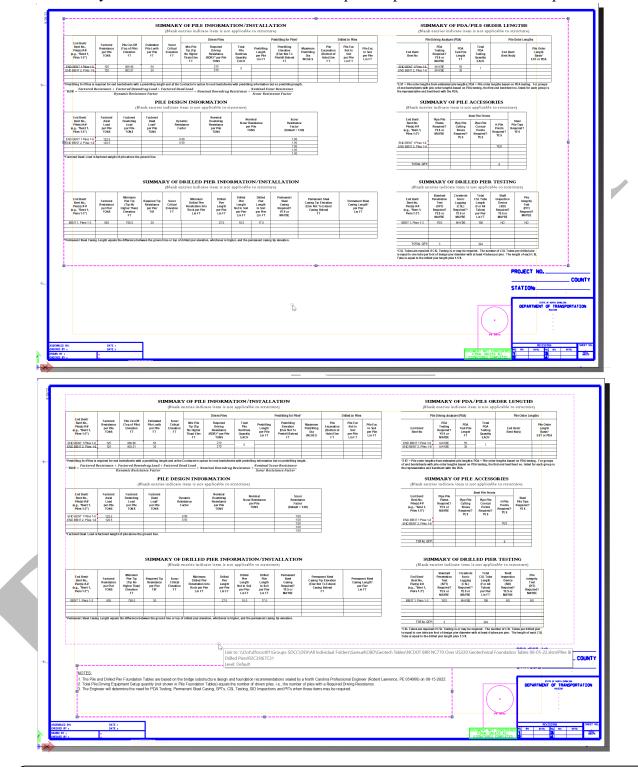
Excel files linked in OBD will be live and can be updated to reflect any changes made in the original files. Follow the steps to update links in OBD:





#### 5.9.8 Multiple Links

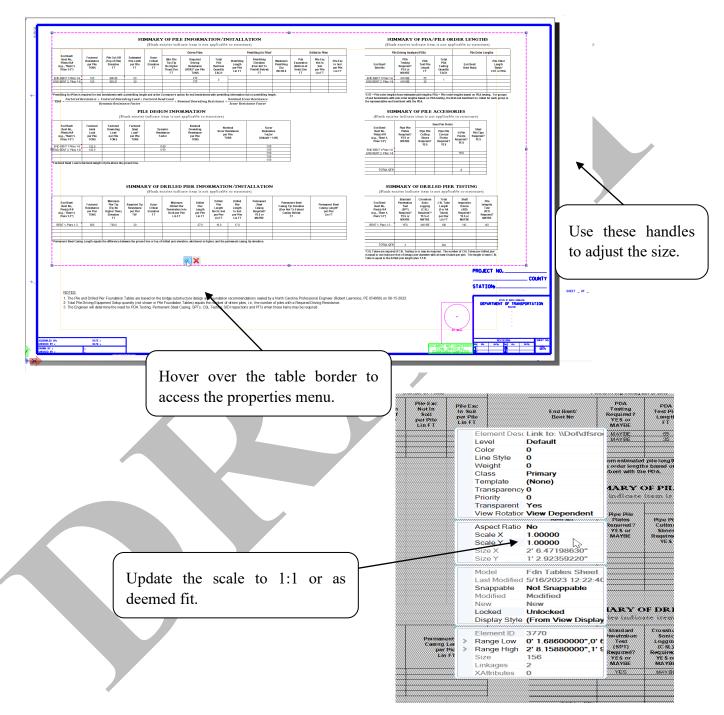
You may link different tables or notes from separate spreadsheets on the same plan sheet.



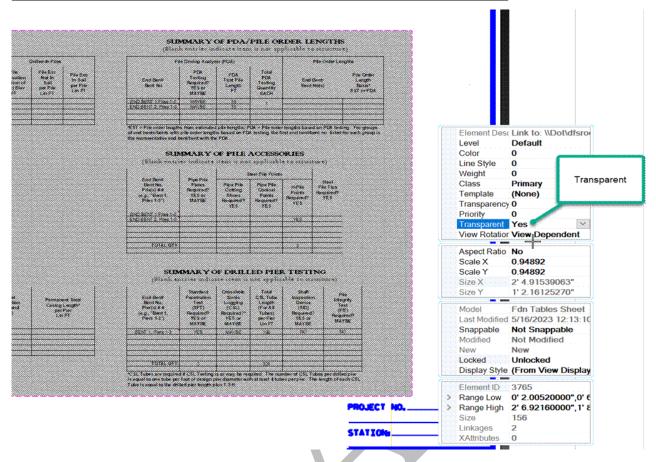
Any part of the spreadsheet can be linked as a separate link on this plan sheet. Remember to add the needed Foundation Notes from the SMU Notes tab in OBD.

#### 5.9.9 Edit Link Properties

You may resize the tables either by adjusting the handles/borders or by changing the scale in properties as shown below:



If you forget to select Transparent Background, you may change that from properties by choosing YES for Transparent.



<u>NOTE</u>: To see the transparent background after changing the properties of the linked file, you may need to close the OBD file and reopen it.

### 5.10 SUPERSTRUCTURE SHEETS

Superstructure sheets include the typical section throughout the superstructure, plan of spans, bridge framing plan, girder/beam details, diaphragm details, expansion joint details, barrier rails details, and bearing detail sheets. For detailed guidance on what is required in those plan sheets, see Chapter 6 of the SMU Design Manual.

Superstructure elements should be drawn full scale 1:1 in the Design Model, and dimensioned in the Drawing Model, with final plan sheet assembly in the Sheet Model. Superstructure sheets will commonly use the "Design Plan Profile" or "PRR Plan Profile" SMU borders in the Sheet Model. Use the SMU Element Templates to match the corresponding line styles, weights, levels, features, and material properties to the elements being drawn. Use SMU's Standard Plans as appropriate, following the steps in Section 5.12.

#### **5.11 SUBSTRUCTURE SHEETS**

Substructure sheets detail end bent caps, bent caps, columns, piles, drilled piers, footings, pile caps, and wing walls. For detailed guidance on what is required in substructure plan sheets, see chapter 7 of the SMU Design Manual.

Substructure elements should be drawn full scale 1:1 in the Design Model, and dimensioned in the Drawing Model, with final plan sheet assembly in the Sheet Model. Substructure sheets will commonly use the "Design Plan Profile" or "PRR Plan Profile" SMU borders in the Sheet Model. Use the SMU Element Templates to match the corresponding line styles, weights, levels, features, and material properties to the elements being drawn. Use SMU's Standard Plans as appropriate, following the steps in Section 5.12.

# 5.12 SMU STANDARD DRAWINGS & PLANS

SMU Standard Drawings and Plans are available on the SMU website for external users and on the SMU server for internal users to download to the project folder. Once downloaded to the project folder, they can be referenced into the Sheet Model of the DGN.

Structure standard drawings and plans should be pulled into their own DGN files, named according to Section 2.3, where they can be edited as needed.

The Drawing Scale of the Sheet Model will need to be changed from "Full Size 1=1" to match the scale noted above the referenced drawing.

At this point in time many of the standard drawings and plans contain outdated fonts and levels, SMU will update these features as standards are revised. Users are **not required to update** standard drawing content to current workspace fonts and levels within the drawing's field, only the title block content to match other plan sheets within a plan set. Each standard drawing used should be its own DGN file set to the scale noted above the plan sheet.

# CONTENTS

Chapte	er 6	
6.1	Drawi	ng Workflow
6.2	Refere	ncing Files
6.3	3D Mo	odel By Elements
	6.3.1	Adding A Bridge
	6.3.2	Adding Supportlines
	6.3.3	Adding the Deck
	6.3.4	Adding the Beam Layout
	6.3.5	Adding the Beams
	6.3.6	Adding Diaphragms
	6.3.7	Adding Bents
	6.3.8	Adding End Bents
	6.3.9	Adding Wing Walls
	6.3.10	Adding Bearings
	6.3.11	Adding Barrier Rails
		Adding Approach slabs
6.4		odel With The Bridge Wizard6–18
6.5	Editing	g 3D Element Templates6–20
6.6	Editing	g A 3D Model6–22
	6.6.1	Editing the Bridge Deck
	6.6.2	Editing the Beam Layout6–24
	6.6.3	Editing the Beam Definitions
	6.6.4	Editing the End Bent
	6.6.5	Editing the Bent6–27
	6.6.6	Editing Barrier Rails
	6.6.7	Editing Bearings
	6.6.8	Editing Wing Walls
6.7		
		Attaching Item Types6–31
	6.7.2	Detaching Item Types

# CHAPTER 6

# **3D MODEL CREATION**

#### 6.1 DRAWING WORKFLOW

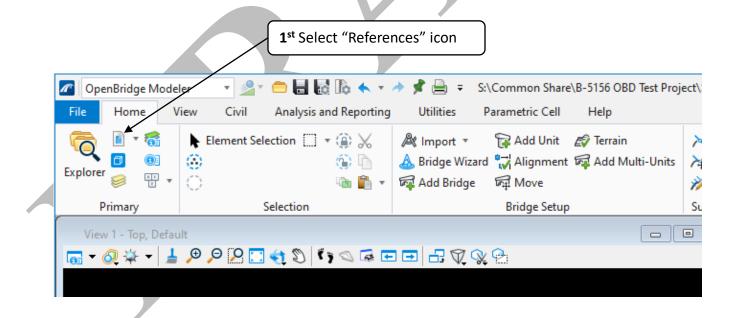
Once the DGN file is created following the guidelines in Chapter 4, for 3D drawing creation set OBD to the "OpenBridge Modeler" Workflow.

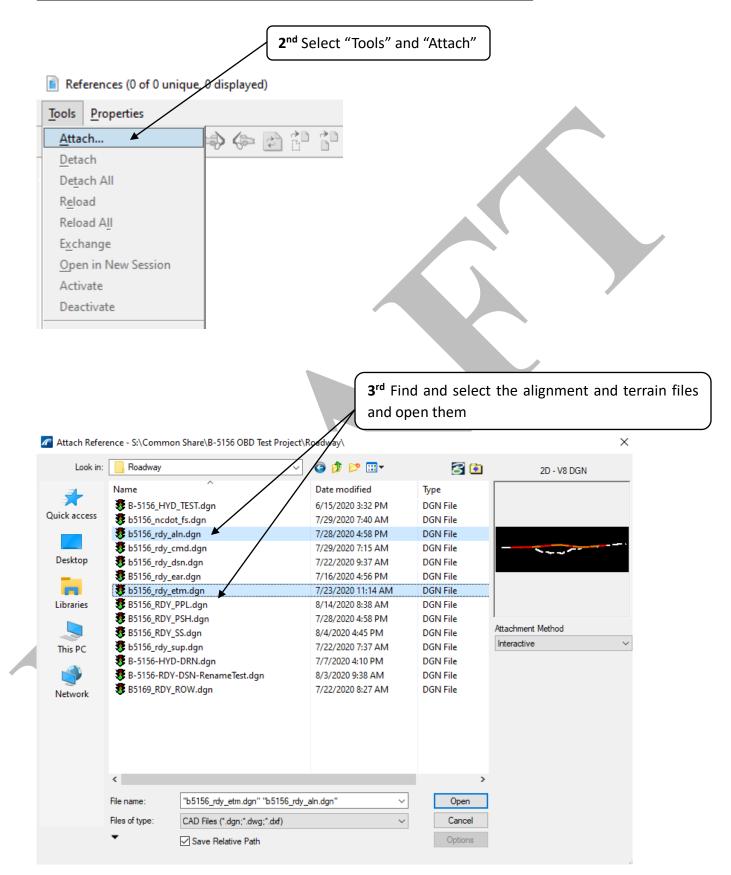


Note Drawing Models and Sheet Models are the same process as described in Chapter 5.

# 6.2 **REFERENCING FILES**

To reference the Geometry (Alignment (rdy\_alg.dgn), Alternates (rdy\_alt.dgn) for NCDOT) and Terrain (rdy\_etm.dgn for NCDOT) files. If you are using an older project, see Chapter 7.5.





#### NCDOT STRUCTURES MANAGEMENT OPENBRIDGE MANUAL

File Name:	\Roadway\b51	56 rdy alp dop			
Full Path:		Test Project\Road	iway\bbilbo_ro	dy_ain.dgn	
<u>M</u> odel:	Default			-	
Logical Name:					
Description:	Master Model				
Orientation:					
View		Description			
Coincident		Aligned wit	th Master File		
Coincident -		Global Orig	jin aligned wit	h Master File	
E Standard Vie			< l>		
Saved Views	(none) ndaries (none)			_	
Named Bod	indaries (none)				4 <sup>th</sup> Set references to "Coincident-World"
					and scale to 1"=50'
Detail	Scale: 1"=50'		•		
Sc <u>a</u> le (Maste	er:Ref): 1.000000	0000 : 600	0.000000000		
Named (	Group:		Ŧ		
Re	vision:		-		
	Level:		•		
<u>N</u> ested Attachr	_	rting	•	Nesting Depth: 0	
		king	•	Nesting Depth.	
<u>D</u> isplay Ove					
Ne <u>w</u> Level D		_REF_NEWLEVELD	JISPLAY COP		
Global LineStyle			•		
Synchronize	View: Volume	Only	Ŧ		
Toggles		) <u>111 m</u> 2 %	₩ В	Cancel	
_					<b>5<sup>th</sup></b> Fit your view in both View 1 and Vie
					<u>д</u>
					<b>\</b>
View 1 - Top, Default					sometric, Default
<ul> <li>View 1 - Top, Default</li> <li>→ Q  + → ↓ ↓ 9 </li> </ul>	» <u>P :                                  </u>		ini i	□ □ ⊠ Ĭ ♥ View 2 - 1	È▾╡▙ृፇृ₽ <mark>ॖॼ</mark> ॶॖॖॖॖऀॏॷ॒ख़ॾॿऻ <u>क़ॖॣॷॷॖख़</u>
● View 1 - Top, Default	» <b>P 1 1 1 1 1 1</b>			□ □ ☆ View 2 - 1	k ▼   ≟ 𝒫 𝒫 📴 <t td=""  ="" ـ="" ਦ="☐" ♥="" 奋="" 𝔅="" 𝔍="" 𝔤<=""></t>
view 1 - Top, Default				D O X View2-1	È▾╡▙ृፇृ₽ <mark>ॖॼ</mark> ॶॖॖॖॖऀॏॷ॒ख़ॾॿऻ <u>क़ॖॣॷॷॖख़</u>
● View 1 - Top, Default			3	□ □ ☆ View 2 - 1	k ▼   <b>↓</b> 𝒫 𝒫 💽 ℓt 𝔅 ℓ τ ⊂ □ Ξ Ξ 𝔅 𝔅 Ϙ
view 1 - Top, Default a₂ ▼ @ ☆ ▼   ≟ Ø ¢			]	□ □ ☆ View 2 - 1	k ▼   <b>↓</b> 𝒫 𝒫 💽 ℓt 𝔅 ℓ τ ⊂ □ Ξ Ξ 𝔅 𝔅 Ϙ
u View 1 - Tog, Default 		a • • 6 V ¥ 9	3	U U View 2 - 1	k ▼   <b>↓</b> 𝒫 𝒫 💽 ℓt 𝔅 ℓ τ ⊂ □ Ξ Ξ 𝔅 𝔅 Ϙ
view 1 - Top, Default → Q ☆ + ↓ 0 \$				□ □ ☆ View 2 - 1	k ▼   <b>↓</b> 𝒫 𝒫 💽 ℓt 𝔅 ℓ τ ⊂ □ Ξ Ξ 𝔅 𝔅 Ϙ
View 1 - Top, Default			3	□ □ ☆ View 2 - 1	k ▼   <b>↓</b> 𝒫 𝒫 💽 ℓt 𝔅 ℓ τ ⊂ □ Ξ Ξ 𝔅 𝔅 Ϙ
v View 1 - Top, Default			3	□ □ ∞ i view2 - 1	k ▼   <b>↓</b> 𝒫 𝒫 💽 ℓt 𝔅 ℓ τ ⊂ □ Ξ Ξ 𝔅 𝔅 Ϙ
View 1 - Top, Default ■ • • • • • • • • • • • • • • • • • • •			3		k ▼   <b>↓</b> 𝒫 𝒫 💽 ℓt 𝔅 ℓ τ ⊂ □ Ξ Ξ 𝔅 𝔅 Ϙ

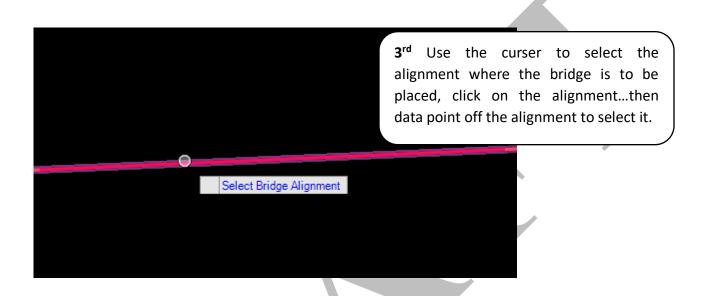
# 6.3 **3D MODEL BY ELEMENTS**

For 3D digital twins the Design Model will be used to create the proposed or existing structure elements in a 3D view at full scale (1:1) in their correct geospatial locations. Leave the Drawing Scale at "Full Size 1=1" and create all elements at their true dimensions.

### 6.3.1 Adding A Bridge

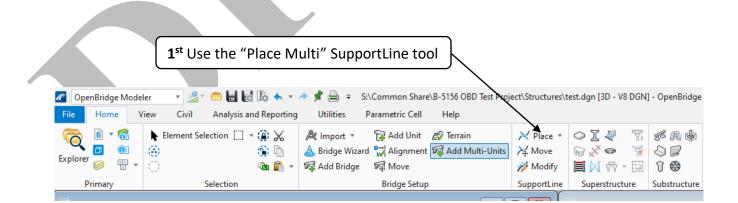
After referencing the alignment and terrain files into the bridge model dgn, use the following steps to add a bridge. If multiple bridges are present on the project, create separate dgn files and reference the alignment for each structure.

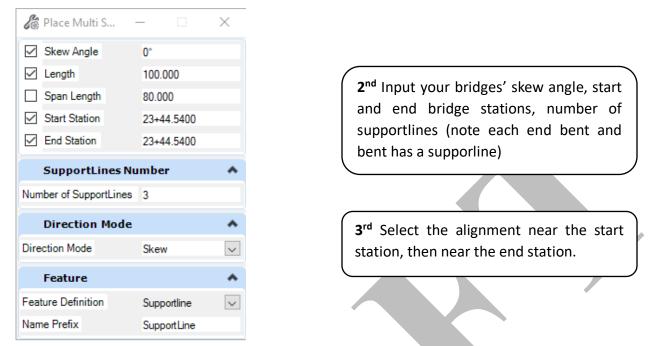
1 <sup>st</sup> Use the "Add Bridge" icon					
🖉 OpenBridge Modeler 🔹	2- 😑 🔙 🗟 🕼 🐟 - 🥕 🖻	' 📄 🔻 S	Common Share\E	3-5156 OBD Test Pr	oject
File Home View Civ	il Analysis and Reporting U	Jtilities	Parametric Cell	Help	
Explorer	💮 🖻 💊 B	Import 🔹 Bridge Wiza Add Bridge	ি Add Unit rd '' Alignment 舜 Move		its
Primary	Selection		Bridge Setup		
Add Bridge		×			
Description	910227				
Requires Road Alignment					
Use Road Alignment For Stationing	$\checkmark$			r Structure ID in th	
Unit			scription and Name boxes and select e bridge type and feature definitions		
Name	910227	fror	n the drop dow	/ns	
Description					
Bridge Type	Beam Slab (P/S or RC Concrete Girde	rs) 🗸			
Feature		*			
Feature Definition	Bridge_decorations	$\sim$			
Name Prefix	Bridge				



#### 6.3.2 Adding Supportlines

After adding a bridge, use the following steps to add the end bent and bent supportlines. Supportlines will also need to be placed at the begin approach slab and end approach slab stations to add an approach slab deck.





Note: The "Length" in this box is the length of the SupportLine, so if you have a wide bridge make sure the length is long enough to preject beyond your bridge model. Also OBD uses the skew angle as ahead and to the left as a negative value, unlike SMU that does ahead and to the right.

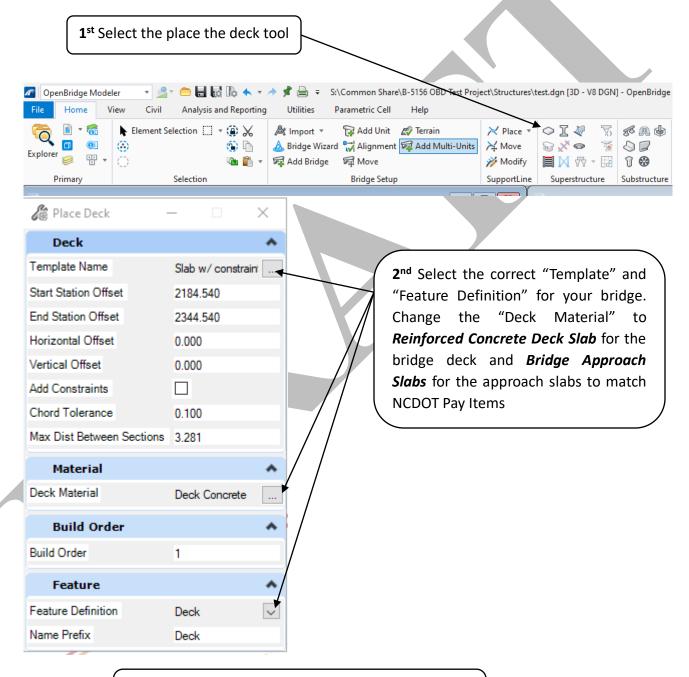
					· · · ·		
1	🕐 Place Multi Sup	portLines					$\times$
	#	Name	Station	Angle	Span Length	Length	
Þ	1	SupportLine1	23+44.5400	0°	0.000	100.000	
	2	SupportLine2	23+44.5400	0°	0.000	100.000	
	3	SupportLine3	23+44.5400	0°	0.000	100.000	

**4**<sup>th</sup> Verify the stations, skew angles, and span lengths

			span lo
		ОК	Cancel

#### 6.3.3 Adding the Deck

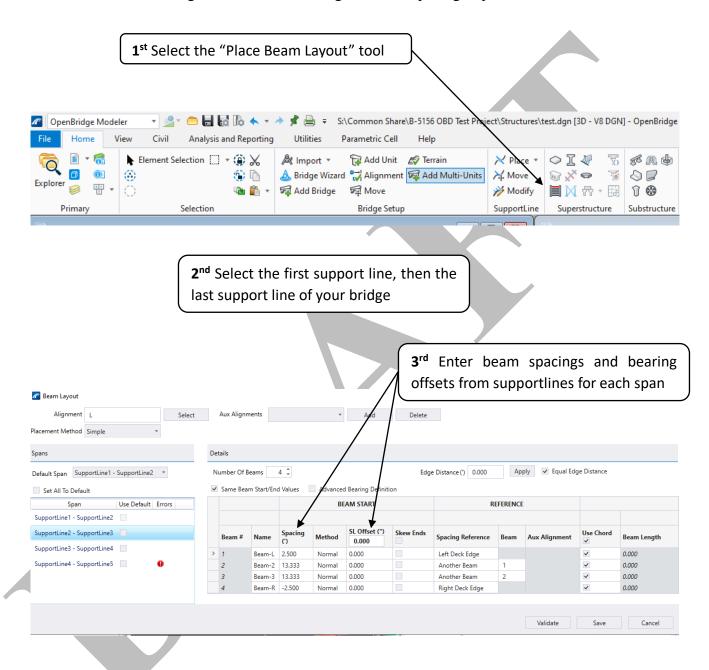
After placing your supportlines, use the following steps to place the deck. There can be different deck templates used or multiple placements of the same template to create a bridge. An example of where multiple placements might be used is when including the approach slabs in your model you would place it from the begin approach slab supportline to the end bent 1 supportline and then the bridge deck would go from end bent 1 support line to end bent 2 supportline.



**3**<sup>rd</sup> Select the first support line, then the last support line for which the deck selected is to be placed

#### 6.3.4 Adding the Beam Layout

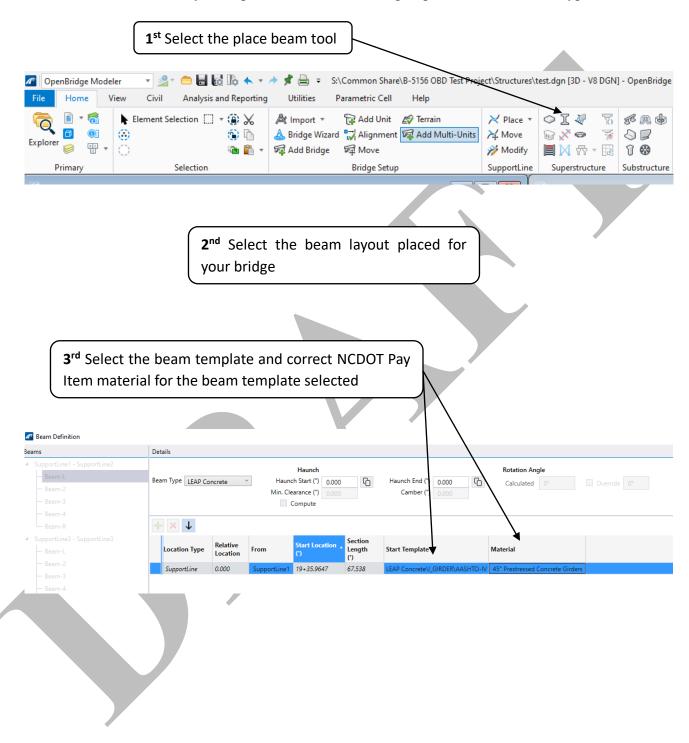
After adding the deck, use the following steps to place the bridge's beam layout. Be sure to follow the Design Manual for overhang and beam spacing requirements.



Note: the first and last beam spacing is the distance from the edge of deck and the last beam's spacing is a negative value.

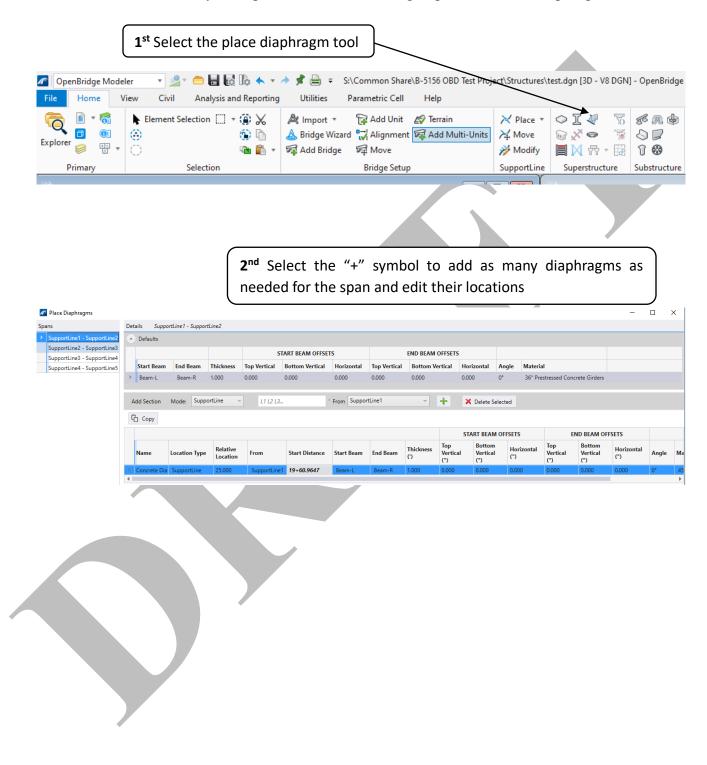
# 6.3.5 Adding the Beams

Once the beam layout is placed, use the following steps to attach the beam types.



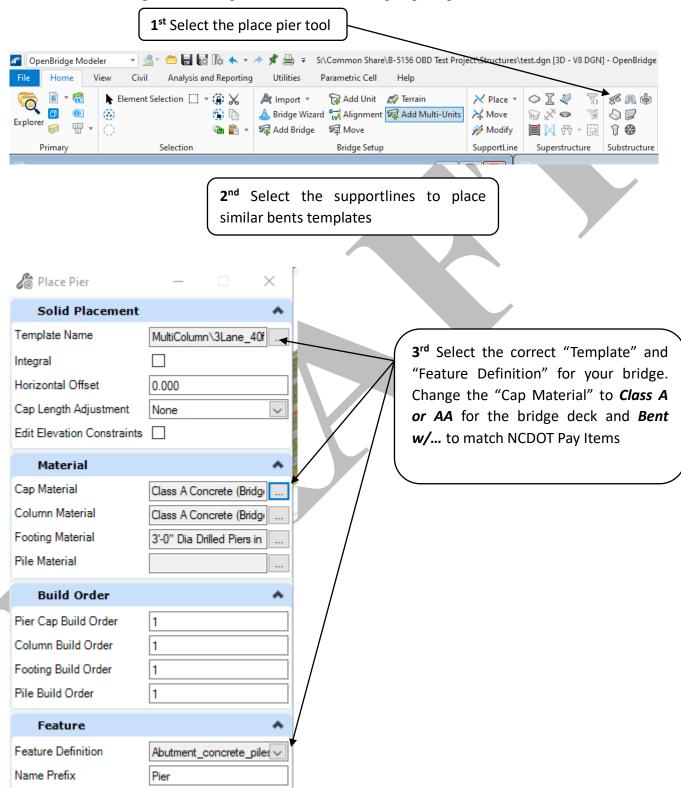
# 6.3.6 Adding Diaphragms

Once the beam layout is placed, use the following steps to attach the diaphragms.



# 6.3.7 Adding Bents

Once the superstructre is placed, use the following steps to place the bents.



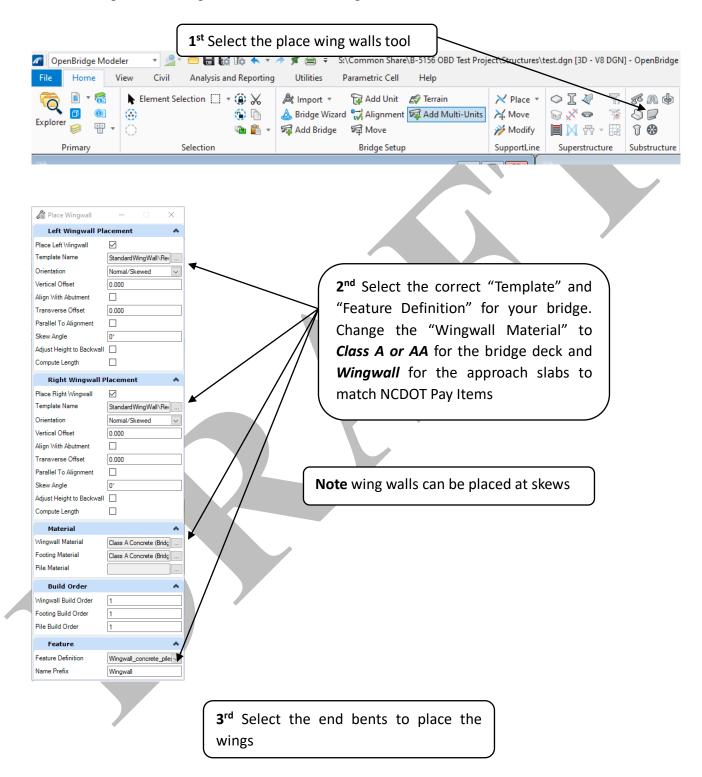
# 6.3.8 Adding End Bents

To place the end bents, use the following steps:

Explorer 🗧 📵	it Selection 📄 🔹 🎲 📈 🎲 🗅 🖓 🛍 🐔 🔹 Selection	Import ▼       Import ▼       Add Unit       Import ▼       Terrain         Bridge Wizard       Import ▼       Alignment       Import Add Multi-Unit         Import ▼       Import ▼       Import ▼       Import ▼         Import ■       Import ▼       Import ■       Import ■         Import ■       Import ■       Import ■       Import ■         Import ■       Import ■       Import ■       Import ■ <t< th=""><th>X Place ▼     Image: Constraint of the second second</th></t<>	X Place ▼     Image: Constraint of the second
	Selection	bruge setup	
🕼 Place Abutment	- 🗆 ×		
Solid Placement	*		
Template Name	PileCap\3 Lane - 40ft		
Integral			
Horizontal Offset	0.000		
Longitudinal Offset	0.000	<b>2</b> <sup>nd</sup> Select t	he correct "Template" and
Apply Skew To Solids		"Feature D	efinition" for your bridge
Conform BackWall With Deck Top			"Cap, Column, Footing and
Edit Elevation Constraints			al" to <i>Class A, AA, etc.</i> and
Orientation	Start 🗸		
Cap Length Adjustment	None		v/ to match NCDOT Par
Material	*	Items	
Cap Material	Class A Concrete (Bridg	* /	
Column Material			
Footing Material			
Pile Material	HP 12x53 Steel Piles		
Build Order	*	T	
Pier Cap Build Order	1		
Column Build Order	1		
Footing Build Order	1	/	
Pile Build Order	1	/	
		(	
Feature	**		
Feature Feature Definition	Abutment_concrete_piles		

# 6.3.9 Adding Wing Walls

To place the wing walls, use the following tool:



#### 6.3.10 **Adding Bearings**

To place bearings, use the following tool:

	<b>1</b> <sup>st</sup> Select the place bearings tool
OpenBridge Modeler     File Home View	<ul> <li></li></ul>
	Element Selection 🗋 🔹 🎲 😹 🙈 Import 🔹 😨 Add Unit 😰 Terrain 🛛 💥 Place 🔹 🗢 🖫 🖑 🙉 🤀 😩
Filling	Selection Bruge Setup Support ine Superstructure Substructure Acce
Ch air an a'	
Place Bearing	- • ×
Bearing	· · · · · · · · · · · · · · · · · · ·
Bearing Type	Cube
Cube Width, W	0.328
Cube Depth, D	0.328
Cube Height	0.328 <b>and</b> Calact the correct "Template" and "Feature
Orientation	Pier  2nd Select the correct "Template" and "Feature
Grout Pad/Beve	Definition" for your bridge. Change the
Has Pad or Plate	
Pad Thickness at Center	0.492 "Bearing Material" to <b>Elastomeric Bearing</b> ,
Pad D1	<b>Etc.</b> for the bridge deck and <b>Elastomeric</b>
Pad D2	0.246
Pad W1	0.328 // Bearings to match NCDOT Pay Items
Pad W2	0.328
Pad Orientation	Girder
Bearing Seat	
Has Bearing Seats	
Model Stepped Cap	
Seat Min. Thickness	0.492
Seat D1	0.246
Seat D2	0.246
Seat W1	0.328
Seat W2	0.328
Seat Orientation	Pier 🔽
Path	
Back Offset	0.000
Ahead Offset	0.000
Material	
Pad or Plate Material	
Bearing Material	
Bearing Seat Material	
Build Order	▲
Pad or Plate Build Order	
Bearing Build Order	1
Beam Seat Build Order	1
Eastern	
Feature	
Feature Definition Name Prefix	No Feature Definition

# 6.3.11 Adding Barrier Rails

To place the barrier rails, use the following tool, once for the left rail and again for the right: 1<sup>st</sup> Select the place barriers tool

		<u> </u>		$\neg$	
OpenBridge Mode	ler 🔹 🔹 😑 🖨 🛃 🕼 🦘 🔻	→ ★ 🚔 = S:\Common Share\B-5156 OBD Test Proj	ect\Structures\t	test.dgn [3D - V8 DGN	] - OpenBridge Modeler CO
File Home V	iew Civil Analysis and Reporting	Utilities Parametric Cell Help			
🧑 🔋 🐔	🖡 Element Selection 🔲 👻 🏠	🍂 Import 🔹 🙀 Add Unit 🖉 Terrain	💥 Place 🔻	0 I 🦑 🐻	
<b>D</b> 💷	🛞 🛞 🖻	💩 Bridge Wizard 🖏 Alignment 🙀 Add Multi-Units	🔀 Move	🗑 🔆 🗢 🛛 🚡	
Explorer 🥪 💷 🔻	🛞 👘 🛍 🕈	ब्दि Add Bridge ब्दि Move	ờ Modify	🗎 📈 🕁 - 🖽	1 🤀 🏼 🖉
Primary	Selection	Bridge Setup	SupportLine	Superstructure	Substructure Accessory

Primary S	Selection	Bridge Setup	SupportLine	Superstructure Substructure Accessory
Place Barrier	×			
Template Name Start Station Offset End Station Offset Horizontal Offset Vertical Offset Add Constraints	BPB-5 L 0.000 0.000 0.000 0.000		Feature Defini Change the " <b>Concrete Barri</b> pridge deck and	orrect "Template" and tion" for your bridge. Barrier Material" to <b>er Rail, Etc.</b> for the <b>Concrete Barrier Rail</b> ach slabs to match
Material Barrier Material Solid Placement	Vertical Concrete		NCDOT Pay Item	
Chord Tolerance Max Dist Between Sections Template Orientation	0.100 16.404 Vertical			
Build Order Barrier Build Order	<b>^</b>			
Feature Feature Definition	A Barrier			
Name Prefix	Barrier			

	<b>3</b> <sup>rd</sup> Select the strong	ructure, then data point
<b>Path Selection</b>	- 🗆 X	
Candidate	A -	
WP      Select Alig      Select Guidelin	ne from List	4 <sup>th</sup> Click on "select alignment" then click on the alignment of the structure, then click on "select guideline from list" and select the point which to place the rail on the deckrepeat for other rail
	DK Cancel	

#### 6.3.12 Adding Approach slabs

To place approach slabs in the model, add a single span bridge at the beginning of the bridge and the end of the bridge using the steps found in 6.1.2 through 6.1.4.

🔏 Add Bridge	- 🗆 X
Main	*
Description	Begin App Slab
Requires Road Alignment	
Use Road Alignment For Stationing	
Unit	*
Name	Begin App Slab
Description	
Bridge Type	RC Slab
Feature	*
Feature Definition	No Feature Definition
Name Prefix	BAS

Enter "Begin/End App Slab" for bridge name, "RC Slab" for bridge type, select alignment, then follow the steps in section 6.1.2-6.1.4 and 6.1.12.

or using the "bridge wizard" as found in section 6.2

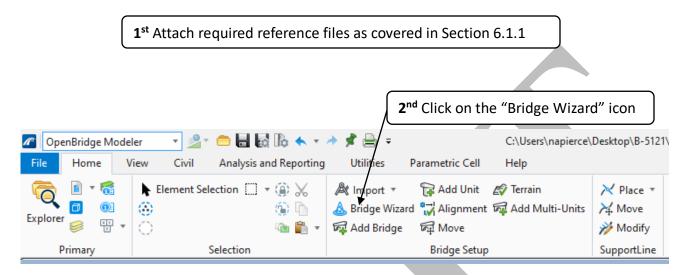
Bridge Name	Begin App Slab	
Bridge Type	RC Slab	
Alignment	L	
- Bridge Start Station	21+78.00	_
<ul> <li>Alignment Advanced</li> </ul>	l Options	
Deck Template	Slab w/ constraints	
Custom Deck		
Spans	10	
Support Skew Angles	0°	
Beam Spacing	5@8	
Beam Template	Type IV	
Abutment Template	3 Lane - 40ft	
Pier Template	3x3 - 3 COL PIER	
Left Barrier Template	8" CURB-LT	
	8" CURB-RT	-

Enter "Begin/End App Slab" for bridge name, "RC Slab" for bridge type, select alignment, enter the start station, select deck template, enter the approach slab length for span, leave the abutment and pier templates as defaulted, select the appropriate left and right curbs for barrier templates

Note: once the bridge is placed with the bridge wizard, use the edit model techniques found in section 6.3 to DELETE the abutments placed in the model.

# 6.4 **3D** MODEL WITH THE BRIDGE WIZARD

A quick way to place a 3D bridge model is using the bridge wizard. Here are the steps.



🎢 Bridge Wizard		$\times$
Geometry Materials		
Bridge Name	911234	
Bridge Type	Beam Slab (P/S or RC Concrete Girders)	Ŷ
Alignment	L	v
Bridge Start Station	10+00.0000	
<ul> <li>Alignment Advanced</li> </ul>	Options	
Deck Template	NC Deck w/constraints	
O Custom Deck		
Spans	80:0 2@100:0 70:0	
Support Skew Angles	0°	
Beam Spacing	5@8:0	
Beam Template	AASHTO-IV	
Abutment Template	4' End Bent Cap w/Steel HP Piles	
Pier Template	3 COLUMN BENT w/DRILLED SHAFTS	
✓ Left Barrier Template	CBR LT 42"	
Right Barrier Template	CBR RT 42"	

**3**<sup>rd</sup> Enter the bridge name, select the bridge type, select the alignment which the bridge is to be placed on, enter the bridge start station (work point 1 station), select the deck template to be used, enter the span arrangements, the skew, number and spacing of beams, and select the templates to be used for the beams, abutment, piers, left and right barrier rails

NOTE: Span lengths and Beam Spacing are entered as feet: inches, so 6'-3 <sup>1</sup>/<sub>2</sub>" beam spacing would be 6:3.5. Span lengths are also separated by a space between them.

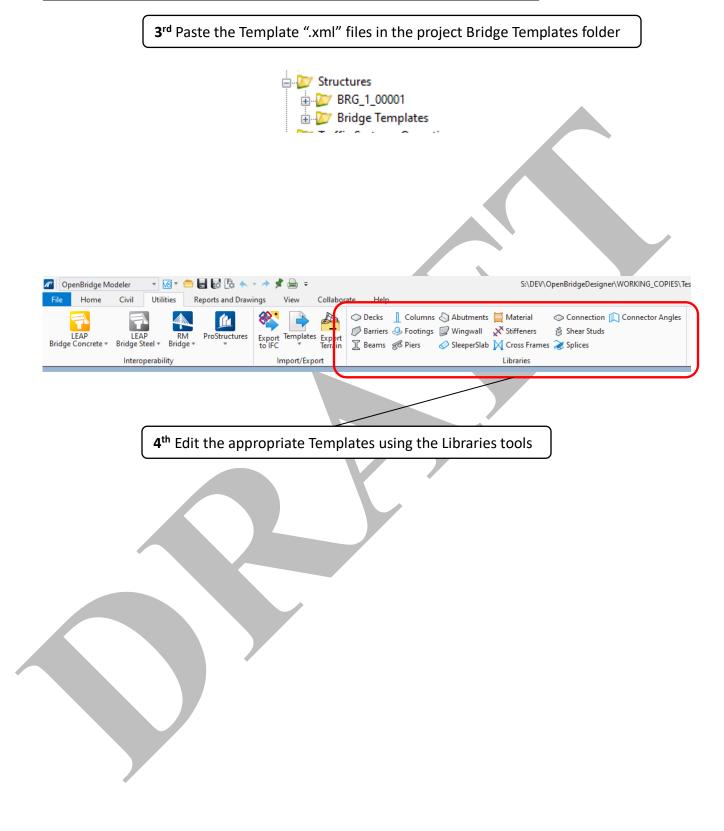
🌈 Bridge Wizard		×
Geometry Materials		
Deck:	Reinforced Concrete Deck Slab	
Barrier:	Concrete Barrier Rail	-
Beam:	45" Prestressed Concrete Girders	-
	Bearing	
Grout Pad/Bevel Plate:		<b>4<sup>th</sup></b> Select the "Materials" tab and select
Bearing:	Elastomeric Bearing	
Bearing Seat:		the pay items that match the elements.
	Pier	Once completed, go back the "Geometry" tab and click "OK."
Cap:	Class A Concrete (Bridge)	
Column:	Class A Concrete (Bridge)	
Footing:	4'-0" Dia Drilled Piers in Soil	
Pile:		
	Abutment	
Cap:	Class A Concrete (Bridge)	
Footing:		
Pile:	HP 12x53 Galvanized Steel Piles	

The model should be built in your DGN, but bearings will need to be edited to display the correct type and dimensions and wing walls will still need to be added. The model will also need properties edited to display the correct material properties when reports are generated. If multiple Element Templates need to be changed, rather than editing each element, it may be easier to delete the existing 3D bridge model and start over with the Bridge Wizard. To quickly delete the existing bridge, use the Select All button to highlight the bridge and then hit Delete.

# 6.5 EDITING **3D** ELEMENT TEMPLATES

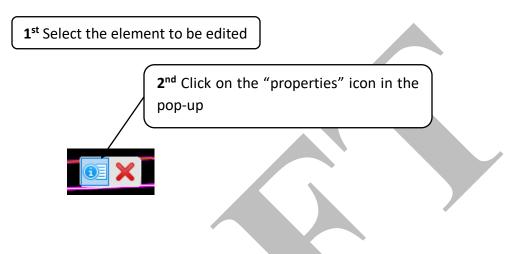
If the Element Templates provided in the workspace are not adequate for the bridge being designed, the User may copy and edit the Element Templates before creating a structure as follows.

1<sup>st</sup> Go to the following folder SMU workspace in ProjectWise Documents\Administration\WorkspaceGroups\NCDOTWorkspaces\Configuration 2023\W orkSpaces\DOT-USNorth Carolina\Roles\NCDOT Structures\Standards\Bridge Templates\ 2<sup>nd</sup> Copy all the Template ".xml" files 💯 Auxiliaries 💯 Bearings 💯 Cell W Functional Components AuxLib.cel ConnectionPlateLibrary.xml CrossFrameLibrary.xml default.lbclib ElementNumbers\_NBI.xml a) E ElementNumbers\_State.xml FieldSpliceLibrary.xml MaterialLibrary.xml PierCellLib.cel 🔍 📄 PierLib.xml ShearConnectorLibrary.xml StiffenerLibrary.xml templates.xml



# 6.6 EDITING A 3D MODEL

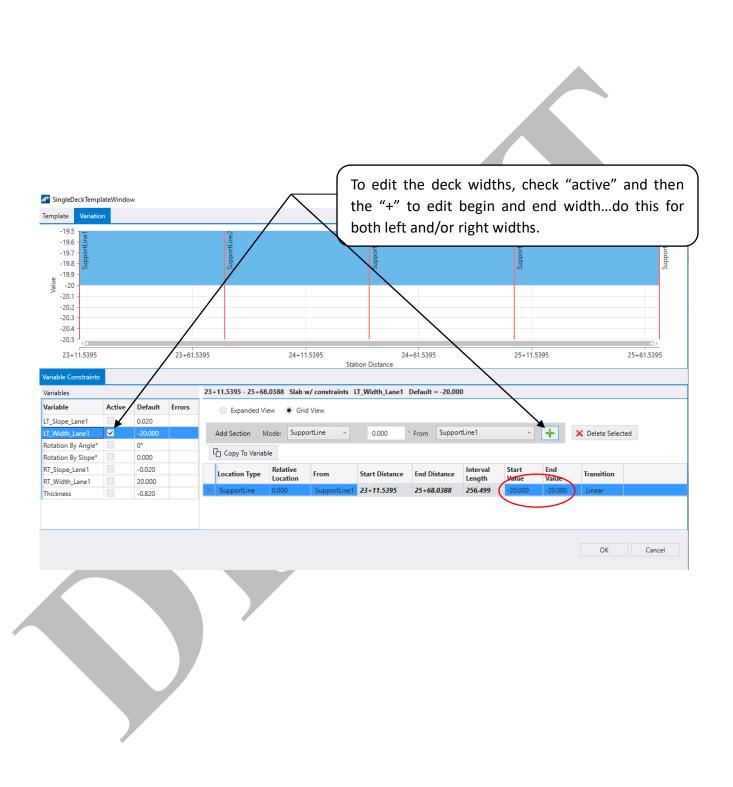
Changes happen in bridge design, to edit an existing model use the steps for the elements below. For each element listed below, the following steps are required:



# 6.6.1 Editing the Bridge Deck

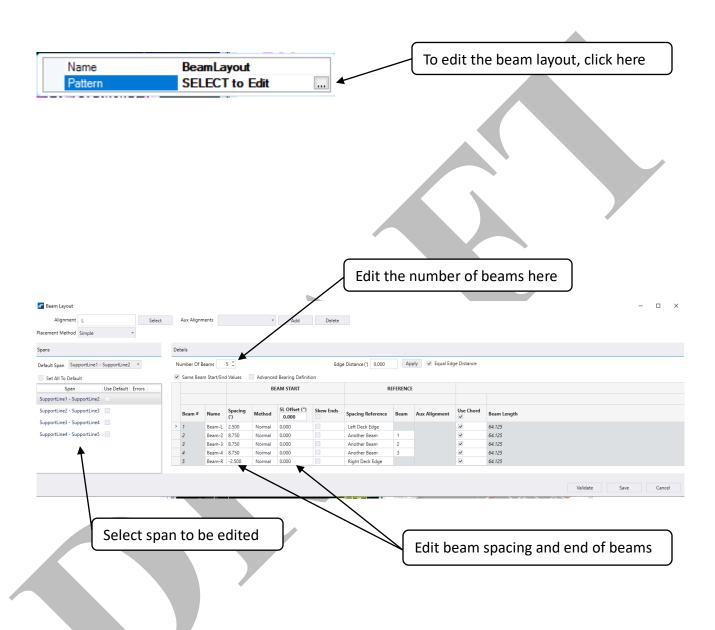
The bridge deck can be edited to change the template (super elevation left or right, or normal crown) or to edit the template constraints (left and right widths) and material type.

CDOT Pay
DOT Pay
n, click here
k here
ick here
• • •
:1



#### 6.6.2 Editing the Beam Layout

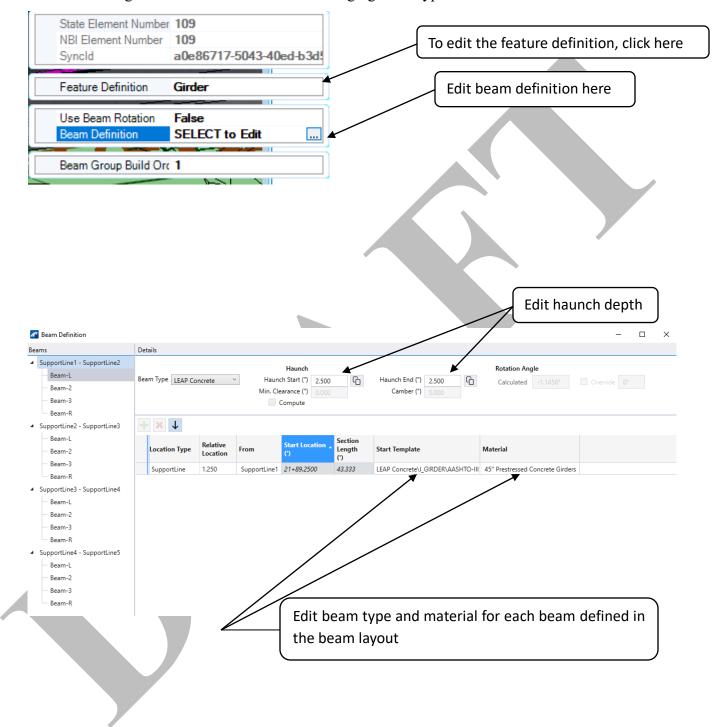
Beam Layout controls the number of beams, beam spacing and beam lengths



Note: The first and last beam spacing is the distance from the outside edge of the deck and the last beam's spacing should be negative from the right outside edge of deck.

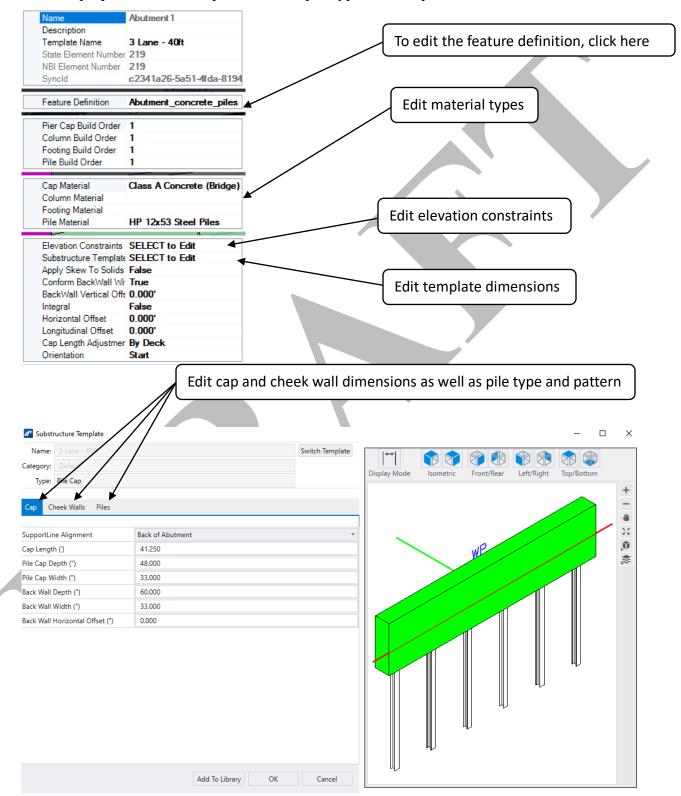
# 6.6.3 Editing the Beam Definitions

Editing the beam definitions allows changing beam types and material



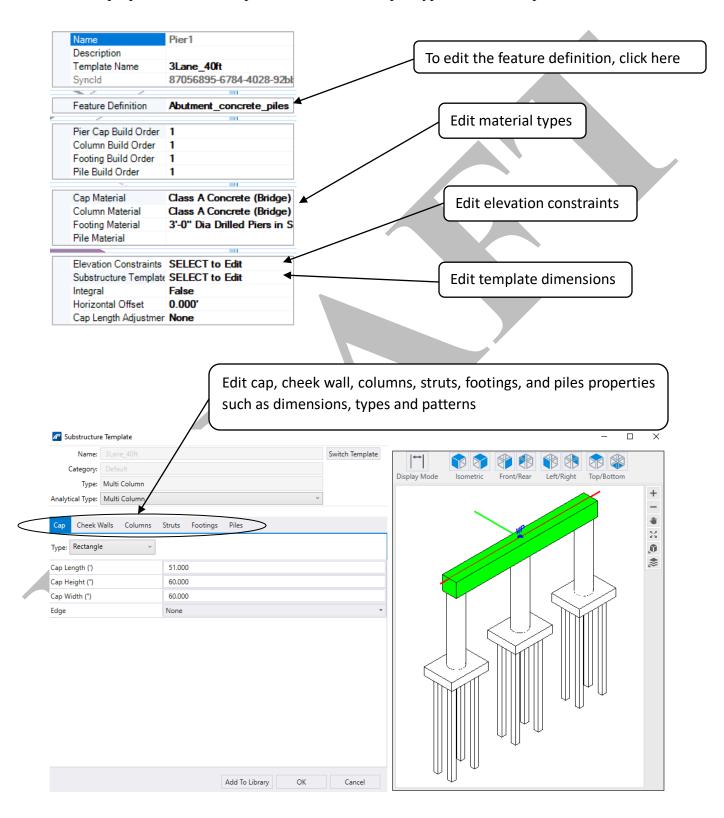
# 6.6.4 Editing the End Bent

End Bents properties can be edited for material types, elevation constraints and template properties such as cap dimensions, pile type/size and pattern.



#### 6.6.5 Editing the Bent

Bent properties can be edited for material types, elevation constraints and template properties, such as cap dimensions, column/pile type and size and pattern.



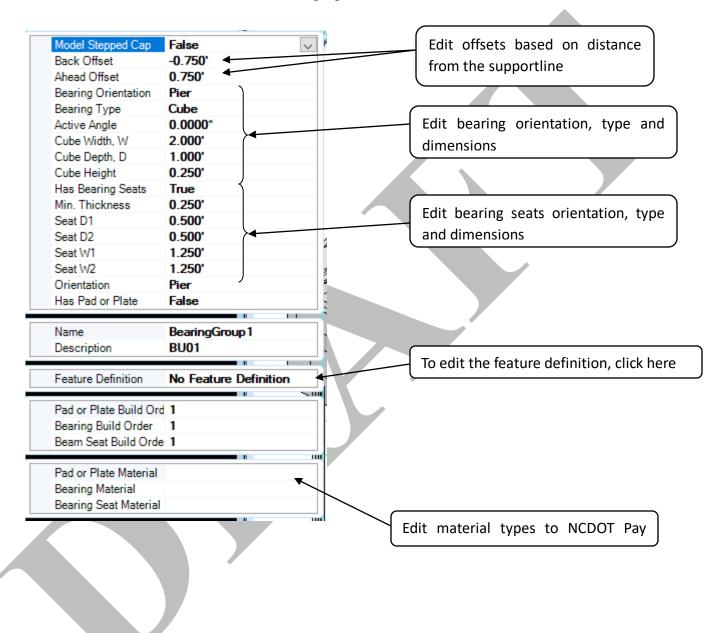
# 6.6.6 Editing Barrier Rails

Barrier rail properties can be edited for start and end station offsets, template orientation, horizontal and vertical offsets, rail template, variable constraints, point control, point control path, feature definitions and material type.

Syncld	9910a3bb-5c7c-45c5-8a4	Edit start and end offsets if rails
~	1 11	don't go full length of deck
Start Station Offset	0.000'	
End Station Offset	0.000'	
Template Orientation	Vertical	Edit offsets if rails are offset
Horizontal Offset	0.000'	
Vertical Offset	0.000'	horizontally or vertically
Template	SELECT to Edit	
Chord Tolerance	0.328'	Change rail template
Max Dist Between Se	c 3.281'	
Variable Constraint	SELECT to Edit	
Point Control	SELECT to Edit	Edit variable constraints
Point Control Path	SELECT to Edit	
11 11	/ // \	
Volume	655.838 Cu.'	Edit point control and point control
Surface Area	1802.640 Sq.'	
<u> </u>		path if barrier rail is to be placed on
Name	Barrier1	a different location than default
Description	BU01	edge of deck
Template Name	42" LT Vert Rail	
11	11 1 10 1	
Feature Definition	No Feature Definition	To edit the feature definition, click here
11	1 10 1 1	
Build Order	1	
	~ / //	Edit material type to NCDOT Pay Item
Barrier Material		

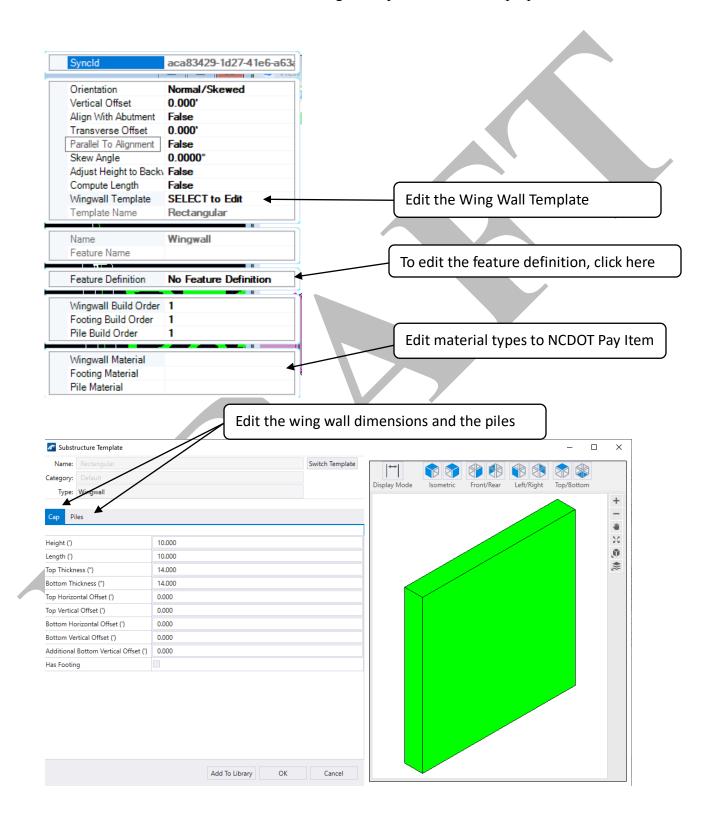
# 6.6.7 Editing Bearings

Bearing properties can be edited for cap steps, offsets from supportline, orientation, type, skew angle, dimensions, if it has a bridge seat or not and its dimensions, if it has a plate/pad and its dimensions and the material properties.



# 6.6.8 Editing Wing Walls

Editing wing wall properties can be edited to change the vertical offset, alignment with abutment, transverse offset, skew angle, template and material properties.



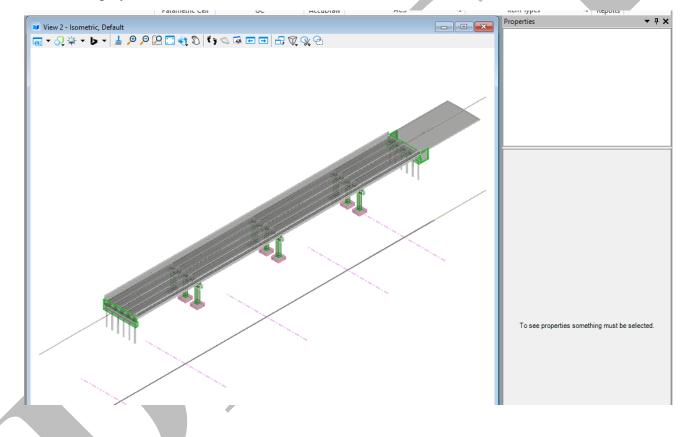
# 6.7 **ITEM TYPES**

Once the 3D model has been generated, Item Types should be attached to the various elements to convey metadata to be shared with various Stakeholders of the structure model.

# 6.7.1 Attaching Item Types

The following steps should be followed to attach Item Types:

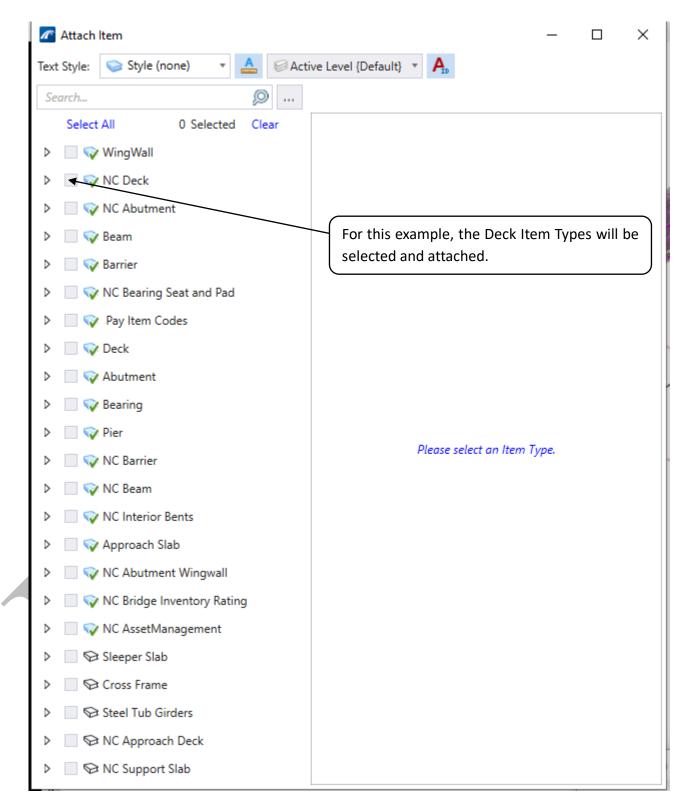
Below is a view of the 3D model before any element is selected. There are no properties displayed until an element is selected.



Under the OpenBridge Modeler workflow, go to Utilites tab and find Item Types Group on the ribbon.

🖉 🛛 OpenBridge Modeler 🛛 🔻 🧰 🖬 🛃 🎼 🦘	- 🔶 📌 🚔 =	C:\U	Jsers\jdhawk\OneDrive - State of North Ca	rolina\Desktop\test	1.dgn [3D - V8 DGN] - OpenE	Bridge Modeler 2023		Search Ribbon (F4)	🔎 • 🌒 • 🛞 •
File Home Civil Utilities Reports and Drawi	ngs View Collabor	ate Help							
LEAP Bridge Concrete + Bridge Steel + Bridge + ProStructures	Export Templates Export Terrain	de la constante de la constante		🐳 t 🖓	Import Variable Delete GCP File Mapping Node	Toggle Defir AccuDraw	Nove Rotate Select	Attach Detach Picklist	Import/Export Reports
Interoperability	Import/Export	Libraries		Parametric Cell	GC	AccuDraw	ACS	item Types	Fa Reports
			Click on the	Attacl	h Item ic	on			

After clicking on the Attach Item icon, the Attach Item dialog box below will appear. Select the appropriate toggle for the Element to be attached.



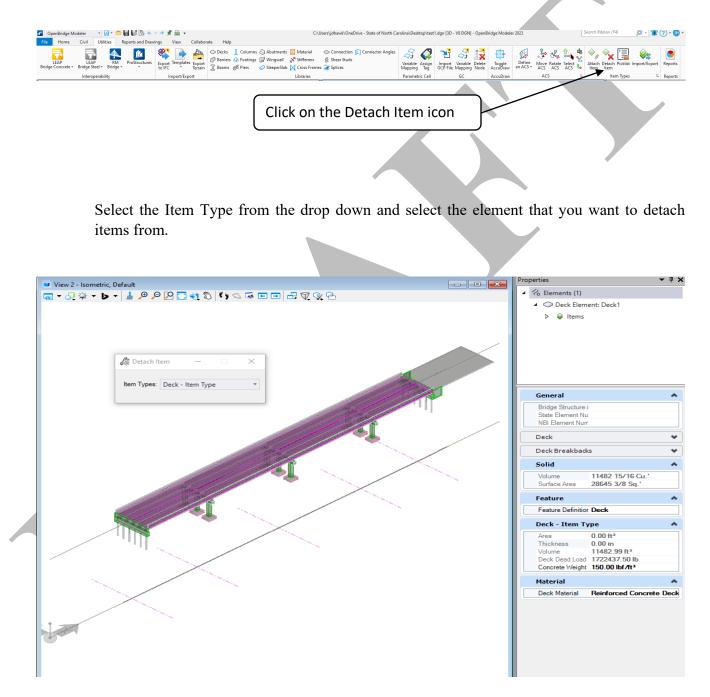
Use the Element Selection tool to select the Element to attach the Item Type to (eg the Deck for this example).

**-** ₽ × Properties 😺 View 2 - Isometric, Default A Co Elements (1) Deck Element: Deck1 D Items General \* Bridge Structure I State Element Nu NBI Element Nurr \* Deck Deck Breakbacks ¥ Solid ۸ 11482 15/16 Cu.' 28645 3/8 Sq.' Volume Surface Area Feature ۸ Feature Definitior Deck Deck - Item Type \* Area 0.00 ft<sup>2</sup> Thickness 0.00 in 11482.99 ft<sup>3</sup> Volume Deck Dead Load 1722437.50 lb Concrete Weight 150.00 lbf/ft3 Material \* Deck Material Reinforced Concrete Deck

# 6.7.2 Detaching Item Types

The following steps should be followed to detach Item Types:

Under the OpenBridge Modeler workflow, go to Utilites tab and find Item Types Group on the ribbon.



# CONTENTS

Chapte	er 7		-1
7.1	2D Fil	e Quality Control	-1
	7.1.1	File Management	-1
	7.1.2	PDF's	-1
	7.1.3	DGN's	-1
7.2	3D Mo	odel Quality Control	-4
	7.2.1	File Management	4
		Bridge Layout	
	7.2.3	Bridge Deck	-5
	7.2.4	Bridge Superstructure	-6
	7.2.5	Bridge Substructure	-7
	7.2.6	Reports	-8

# CHAPTER 7

# QUALITY CONTROL & QUALITY ASSURANCE

# 7.1 2D FILE QUALITY CONTROL

The Drafter of the 2D files needs to create PDF renditions of all DGN files. PDF check plans should be stored in the Plans folder under the structure from which they were generated, along with what percentage review plans they are within the name and metadata. Files should then be assigned to the Checker for review through ProjectWise by the Drafter or a Supervisor.

#### 7.1.1 File Management

The Checker should verify that each plan sheet is its own DGN file as well as each DGN file has the correct file name following the SMU naming conventions and assigned metadata.

Checkers shall notify the Project Manager/Supervisor about files that are not following SMU policies for file management.

#### 7.1.2 **PDF's**

2D PDF plans should continue to be checked for accuracy as to the structure's design, AASHTO and NCDOT policies and specifications using electronic document review software, such as BlueBeam or Adobe Acrobat.

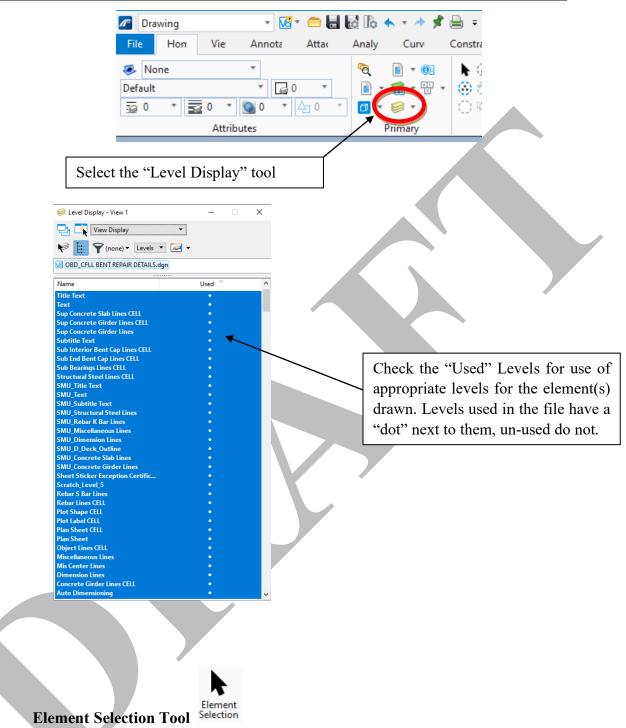
# 7.1.3 DGN's

2D DGN files should be assigned and checked at the same time as the PDF's so that comments can be placed on the PDF plan sheet about that sheet's DGN file. The Checker should create their own DGN file and reference the original DGN files in to review it. DGN files should be checked for correct use of SMU element templates, line styles, and annotation styles.

# Level Display Tool 🏾 😂 🕶

A quick way to see if the correct element templates have been used is to check the "Level Display" tool. Using this tool, a Checker can quickly see if the levels used make sense for the DGN being checked. For example, if checking an End Bent plan sheet does the "SMU\_End Bent Cap Lines" level appear in the list as being used?

CHAPTER 7 QC/QA

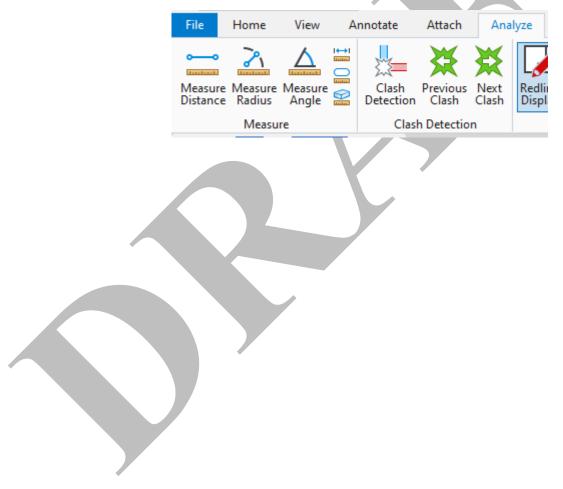


Another way to check a dgn for correct element template usage is to use the element selection tool. Select the Element Selection tool and hover over elements within the dgn to see what level they are on. Verify the levels match the element drawn.



#### **Measurement Tools**

The measurement tools, under the "Analyze" tab, can be used inside the DGN to verify element dimensions.



# 7.2 **3D MODEL QUALITY CONTROL**

The first step in reviewing the 3D model is to know the level of detail (LOD) to which the model is supposed to detailed to. The next step is for the Drafter or Supervisor to create a copy of the model and name it 4XX\_QC#\_TIP#\_SMU\_BR#\_MODEL\_6digitStrID and assign the file to the designated Checker. If the structure is large or if the review is to be broken up into superstructure and substructure reviews, create multiple QC copies of the model changing the QC# in the name and assign the QC versions to the designated checkers. Checkers will need to check, but not limited to, the following items.

# 7.2.1 File Management

The Checker should verify that the 3D model DGN follows the SMU naming conventions and has been assigned metadata. All 2D plans DGNs created from the 3D model should also follow the SMU naming convention and have metadata assigned.

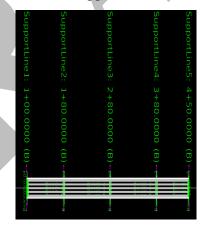
Checker shall notify the Project Manager/Supervisor about files that are not following SMU policies for file management.

# 7.2.2 Bridge Layout

The structure layout QC is a macro check against the design, AASHTO and NCDOT policies and specifications. The Checker will need to verify:

• Support Line stations

View 1 (plan view) shows the support line stations.



• Support Line skew angles

Click on the support lines and clicking on the "Properties" icon.

	Name Description	Support Line 1	J
	Feature Definition	Supportline	
	Length	100' 0"	
	Station	1+00.0000	
	Direction Mode	Skew	
	Direction	90.0000°	
	Skew	0.0000°	
>	Start Point	100:0,-50:0	

- Horizontal Clearance clashes to roadways, rail roads, utilities, etc.
- Vertical Clearance clashes to roadways, rail roads, etc.

### 7.2.3 Bridge Deck

The Checker will use the steps in Sections 6.5.1 and 6.5.6 of this manual to review the bridge deck element properties using the same tools as editing them.

The deck should be checked against the design for:

LOD 300

- Feature Definitions
- Deck Materials

Verify:

- Deck width
- Deck thickness
- Haunch width
- Haunch thickness
- Left overhang width
- Right overhang width
- Left gutterline offset from proposed -L-
- Right gutterline offset from proposed -L-
- Rail Section properties
- Left rail offset from left outside deck edge
- Right rail offset from right outside deck edge

LOD 350 (LOD 300 plus the following)

- Reinforcing steel size
- Reinforcing steel spacing/layout (includes clearances)
- Reinforcing steel bar lengths
- Reinforcing steel bar splices

LOD 400 (LOD 350 plus the following)

- Prestressing strand sizes
- Prestressing strand spacing/layout

# 7.2.4 Bridge Superstructure

The Checker will use the steps in Sections 6.5.2, 6.5.3 and 6.5.7 of this manual to editing element properties as a way to review the superstructure elements. The superstructure elements should be checked against the design for:

# LOD 300

- Girder section properties
- Girder lengths
- Girder end offsets/clearances
- Girder spacing
- Diaphragm locations
- Diaphragm section properties
- Bearing locations on girders
- Bearing dimensions

LOD 350 (LOD 300 plus the following)

- Girder reinforcing steel sizes
- Girder reinforcing steel spacing/layout (includes clearances)
- Girder reinforcing steel splice lengths
- Girder shear stud sizes
- Girder shear stud spacing

LOD 400 (LOD 300 plus the following)

- Girder prestressing strand sizes
- Girder prestressing strand spacing/layout (includes clearances)

# 7.2.5 Bridge Substructure

The Checker should use steps shown in Sections 6.5.4, 6.5.5 and 6.5.8 of this manual for editing substructure elements as a way to review the substructure elements. The substructure elements should be checked against the design for:

LOD 300

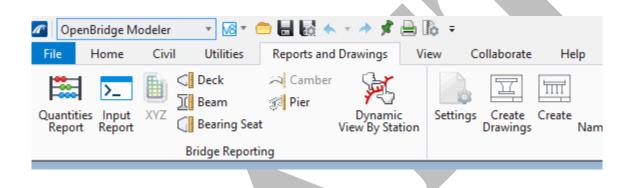
- Cap Dimensions
  - $\circ$  Length
  - o Height
  - $\circ$  Width
  - Overhangs with Columns/Piles
  - Bearing edge distances
- Bridge Seats
  - o Bearing edge distances
  - Seat width
  - Seat height
  - Seat Elevations
- Columns/Piles
  - o Size
  - Spacing
  - Lengths
- Footings
  - Spacing
  - Lengths/Widths/Height
- Elevations (top of cap, footings, pile tips, etc.)
- LOD 350 (LOD 300 plus the following)
  - Caps/Bridge Seats/Columns/Piles/Footings Reinforcement
    - o Bar Sizes
    - Bar Spacing/Layout (includes clearances)
    - o Bar Lengths
    - Bar Splices

LOD 400 (LOD 300 plus the following)

- Caps/Bridge Seats/Columns/Piles/Footings Prestressing
  - o Bar Sizes
  - Bar Spacing/Layout (includes clearances)

# 7.2.6 Reports

When checking 3D models, the Bridge Reporting tools should be used to verify the structure's element properties such as quantities and elevations from the model. The reporting tools can be found here:



Checkers should continue to use NCBDS, spreadsheets, and other tools that are currently used to verify structure designs, layouts, and quantities.

# **Item Type Reports**

To generate an Item Type report, under the OpenBridge Modeler workflow and Utilities tab, find the Reports Icon on the ribbon.



Reports			
Utilities			
	🗞 🗅 🗶 🛍	^ <b>V 🗄 😫 🗙</b>	
_			

To create a new category, find the add New Category icon on the ribbon.

Reports		8 <u></u>	$\times$
Utilities			
📪 📴 💺 🖻 🖌 🛍 🔺 🖌 🗮 🛠			
Superstructure	Properties		
	Add report definition		

Give the new Category a name.



CHAPTER 7 QC/QA

Reports		s	×
Superstructure	Properties		
	Add repor	definition	

To add report definition, find the New report definition icon on the ribbon.

