



NHDOT CAD/D Connect Documentation

CONNECT DOCUMENTATION

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Introduction

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OpenRoads Designer & MicroStation CONNECT Edition

Introduction

GOAL

The CONNECT Edition products will be replacing all other Bentley Software products. New projects in 2022 will be surveyed using new survey codes and processed using OpenRoads Designer (ORD) survey. Projects started with SS4 shall be reviewed and if feasible will be upgraded to ORD and MicroStation CONNECT.

Differences

CONNECT is quite a change from SS4 and has prompted a lot of rethinking and development of resources to work in the new platform. CONNECT is set up to use annotation scale. Annotation scale will be turned on in all drawings which allows the scale to be changed easily updating the size of all Text, LineStyle scales as well as cell sizes.

Many items will be using By-Level settings and all level names are being updated in CONNECT. Levels will exist in the DGBLIB files and all levels will be seen from all drawings. Level filters will help to reduce the number of levels shown in each drawing.

Previously the DOT only used Design models for project work. Many of our consultants have used sheet models and the new CONNECT Edition work flows will use Design models for various project details drawn at 1:1 scale but they will be referenced and annotated into Drawing models which will be further referenced into the Sheet models at 1"=50' or 1"=20' scale. The Sheet models will be used in the Plan Sheet index for sheet numbering and for plotting using Print Organizer.

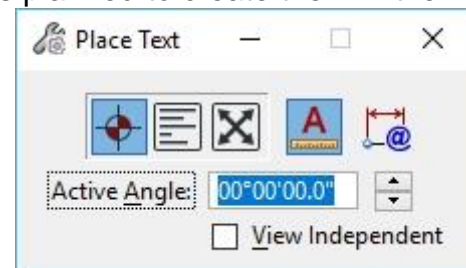


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Fonts and Text Styles

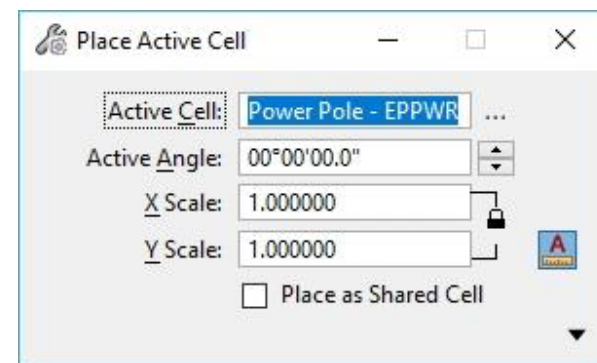
There are going to be new True Type fonts used in drawings where there used to be one with line weights indicating proposed and existing text. The fonts are **Engineering Vert Mono** for existing information and **Engineering Vert Mono Bold** for proposed. Some drawings may use **Engineering Vert Bold** or **Engineering Bold** for titles. The fonts are True Type fonts and become thicker as they get larger. No font has the Bar bend symbols used by bridge design yet though it is planned to create them in the future. These fonts have been used to create Text Styles which are used within both ORD and MicroStation.

Text on drawings will use the text styles which are set up to use annotation scale. When placing a piece of text, you may notice the size is very small, ensure that the Annotation scale lock is on when placing text. Using text style **009_Eng Vert Mo Bold_xx** for proposed text approximates the text size of 5 for a 50 scale drawing previously used. The .009 Height and Width is multiplied by the annotation scale equating to $0.009 \times 1"=50' \times 12"/' = 5.4$. Existing text will use the **008_Eng Vert Mo_xx** text style which is $0.008 \times 600 = 4.8$ high and is narrower in thickness.



Cells

All cells are being updated to Annotation scale cells. Cells in SS4 were sized to be placed at a scale of 1 on a 50 scale drawing. They are all being scaled down to 1/600 to make them usable with annotation scale which will multiply their scale by the scale chosen. Many other cells will not be scaled down as they are placed directly on 1:1 borders used in/on the sheet models.





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LineStyle and Scale

All linestyles have been recreated so their size will work with Annotation Scale. Linestyles in SS4 were created to be at a scale of 1 when used on 50 scale plans. In CE most linestyles have been scaled down by 1/600 so they will work with the annotation scale. Drawings created in CE will have their model's line scale set to Annotation Scale to take advantage of this. SS4 files have the Line Style Scale set to Global Line Style Scale = 1. The New Line styles begin with an * in their name to differentiate them from the SS4 line styles. There are several line styles that are created at actual scale such as the guard rail linestyles for post spacing and RR track line style for the rail spacing.

General	
Is Active	True
Name	Default
Description	Master Model
Ref Logical	
Type	Design
Design Dimension	2D
Is Markup	False
Annotation Scale	1"=50'
Design Scale	600.0000
Paper Scale	1.0000
Propagate Annotation Scale	On
Line Style Scale	Annotation Scale
Update Fields Automatically	True



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Summary

MicroStation Connect (MSC), just like MicroStation in the past, primarily deals with single model 2D dgn files for content. With the coming of CONNECT it will or can now have drawing models, and any plan that wants to make it into the plan set will also now have a sheet model. Sheet models can be created in a separate dgn and reference the content of the 2d design models in the regular dgn files. Sheet models are referenced into the Sheet Index, which uses Print Organizer to print the sheets. Connect uses Annotation scale for line, text and cell scaling. The same “*Default 2D*” model can be referenced into two different sheet models of different scales and be “the correct size” in both. When working in MSC and referencing “civil” or OpenRoads Designer (ORD) two-model dgn files you need to understand ORD concepts so you can make a decision on what to reference.

ORD works with a two-model seed file. It has a 2D and a 3D model within the dgn. The 3D model’s information is generally controlled by the software. The 3D model is attached “civilly” to the 2D model with live nesting. When you attach another ORD Civil drawing to an ORD drawing when you are in ORD you **attach the *Default* model to the *Default* model**. The reference file’s *Default 3D* model will automatically be attached to the *Default 3D* model of the file your in. Using level display you can turn levels on/off in the Referenced 2D *Default* model or in its referenced *Default 3D* model.

Survey information is solely 3D information created using the Survey tools. Data can also be imported from MX to create the 3D survey features and terrain model. So if you are referencing any “Terrain.dgn” you will be looking at the 3D model of that. A terrain dgn can be a single 3D model dgn file, but generally a Terrain dgn is an ORD two-model dgn and the Terrain model itself is in the 3D model. In ORD, the *Default* model of the working drawing should have a reference attachment to the *Default* model of the Terrain dgn. The *Default 3D* model will automatically be attached so you can see the 3D features and 3D terrain model. If referencing in MSC you should reference the *Default 3D* model.

Geometry (alignment) information is stored in a geometry.dgn. A 2D horizontal alignment is created using the horizontal geometry “civil” tools. Then, the vertical geometry tools are used to create a profile. The profile is created in a civil profile view. When the profile is set to be Active, the alignment feature becomes “3D” as it now has horizontal and vertical components. Only the portion of the alignment that has the active profile will show up in the *Default 3D* model. If the beginning and/or end of the alignment do not have a profile designed, that portion will not be displayed in the *Default 3D* model. In MSC you should reference the *Default* model (2D) of the geometry dgn file.

Corridors are created in a corridor dgn file from the geometry. The template is added and slopes interface with the active terrain model, typically the existing terrain model. A corridor is created and a template is selected that is basically placed every 5 feet along the Alignment feature’s 3D geometry. It can be placed from the start of the alignment to the end. The corridor will only be created where there is 3D geometry... meaning where there is an active profile. A corridor also contains other controls affecting the road.... Like parametric constraints... which modify the base corridor values like the slopes. There can also be Point Controls which can, for example, tell a toe of slope to move to the Row line. Corridors can also be clipped... where a drive or side road



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A terrain's level display can work to turn levels on and off, but it depends what the "feature" definition of the actual terrain model is set to and how it is manipulated in its own dgn file. All the properties of a terrain model could be turned on in the terrain's dgn file so everything is displayed. When that terrain dgn is referenced to another drawing, all of those things will be displayed. Levels not needed for the display could be turned off and then back on if needed. However, it takes time and the computer's memory to have all that info displayed all the time and then the levels shut off. If the "default" state is to only have the Terrain Boundary turned on, it can easily be adjusted to turn on what is needed without taking up the memory of having everything in the background. This is particularly significant on larger projects with thousands of contour lines or a terrain containing LiDAR data.

Environmental Drawings

To avoid confusion, Environmental data should be on a single drawing. If placed on the *Default* model of the ORD drawing 12345-E-Env.dgn, then elevations can be attached from the terrain model so the features will appear on cross sections.

If a 12345env file exists in the Prj folder, it should contain a note like the one shown here alerting people that the Environmental data is contained in the ORD drawing.

ENVIRONMENTAL INFORMATION FOR THIS PROJECT IS IN THE
N:\CADD\PBT\yourtown\12345\Cadd\OpenRoads\FinalDesign\12345-E-ENV.dgn

Zoom into the text and save settings so this note appears prominently when the drawing is opened. If the text is as big as the project, anyone attaching the drawing as a reference file will also see it and know to detach it and attach the correct one.

Even though the drawing is in ORD, it can still be edited with MicroStation Connect. Limit MicroStation work to the *Default* model which is 2D.

Right-of-Way Drawings

Ideally, the same could be done for the right-of-way lines. However, that needs to be coordinated with the Bureau of Right-of-Way.

The ert drawing should remain a prj\12345ert.dgn and opened with MSC.

Cross-Section Notes

A cross section is a live look at the 3D model. It shows information that is directly cut across in the section's *Named Boundary*. As information is updated, the section's graphics are automatically updated. The survey's points drawing and other detail drawings containing flat point features not turned on for the cross sections as these detail features are represented in the XS Detail drawing



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as generated tick marks. Just like before. The Drainage and Utilities drawing's 3D models represent actual 3D model of the features used for section representation.

Note that annotation which has been added does not automatically update. Groups of annotation exist such that you remove it from all the models and then re-annotate it as a group. This covers all the superelevation labels, slope labels, the top lines points offset and elevation, the existing feature labels such as the EP, TW, delineated wetlands, cells for ROW, Guardrail cells, XS Detail cells such as trees and poles.

When a set of sections are cut, it creates the drawing models (where labels are added) and sheet models (which reference the drawing models into sheets). If additional sections are cut at a later time that need to be sheeted ORD version 2021-R1/2 has a way of updating the sheets without losing the manually added data. This is an enhancement that we and other DOT's requested.



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Settings

User Files and Settings

For MSC and ORD the user’s files will now be saved solely in the C drive locations as defined by Bentley. We had previously stored them on the N drive so that they would be portable to conference rooms and other locations but this was causing corruptions. To update your user preference files run (Double Click on) the batch files [N:\CADD\Misc Accounts\Cadd\Connect-users\Copy-msc-Seed-to-C.bat](#) and [Copy-ord-Seed-to-C.bat](#). These will update your C drive profiles.

The Seed settings contain the NHDOT’s default settings. They can be checked by accessing the preferences through *File > Settings > User > Preferences*. Review the entries and compare them to the highlighted entries in ORD & MS preference file settings - [NHDOT_Seed_upf_CONNECT.docx](#) or those shown below.

Category	Option	Setting
Input	ESC exits command	(ON) [NHDOT SETTING]
	Hold Delay	20 [NHDOT SETTING]
Mouse Wheel	Wheel:	Zoom In/Out [DEFAULT] or Pan With Zoom [NHDOT SETTING]
Operation	Highlight Broken Associations	(OFF) [NHDOT SETTING]
Raster Manager - General	Disable Delete Element	(ON) [NHDOT Setting]
Raster Manager - Default Attributes	Set Defaults – Geometry – Inherit GeoCS from Model:	Inherited [DEFAULT]
Raster Manager - Georeference	Use Sister Georeferenced File	(ON) [NHDOT Setting]
	Save Location Information	(ON) [NHDOT Setting]
	Sister File: 1 Unit = 1.0000 [DEFAULT]	US Survey Feet [NHDOT Setting]
	Raster file: 1 Unit = 1.0000 [DEFAULT]	US Survey Feet [NHDOT Setting]
Text	Hide Field Background	(ON) [NHDOT Setting]
View Options Civil - Drainage and Utilities	Orient Top to Surface Max Slope	8.01% [NHDOT SETTING]
	Profile Node Drawing	Slice [NHDOT SETTING]
View Options Civil - Manipulator Settings	Manipulator Size	15 [NHDOT SETTING]
	Normal Color	255,255,0 [NHDOT SETTING]



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User Files Corruptions and Back-up/Restore Batch files

Now that we are using the C drive locations for the user's preference files, the N drive location will be used as the backup location. By saving them on the network users can access them when working on computers in the conference rooms. When your setup is working well backup your user preference files, run (Double Click on) the batch files [N:\CADD\Misc Accounts\Cadd\Connect-users\Copy-msc-C-to-N.bat](#) and/or **Copy-ord-C-to-N.bat**. This will save a copy of your current user preferences to the N drive location. The Back ups should be created after working with and setting up your workspaces as you want them.

- N:\CADD\Misc Accounts\Cadd\Connect-users\ORD_Users\n34xxx
- N:\CADD\Misc Accounts\Cadd\Connect-users\MS_Users\n34xxx.

The settings files can become corrupt or changed if using different workspaces such as the Bentley Training and Examples the settings in the personal dgnlib can be changed from the NHDOT default settings listed in the section above. To Restore the backed up preferences or to use them on a different computer run (Double Click on) the batch file's **N:\CADD\Misc Accounts\Cadd\Connect-users\Copy-msc-N-to-C.bat** and/or [Copy-ord-N-to-C.bat](#).

Please report any problems or suggestions regarding the Seed preferences to the CADD Staff.



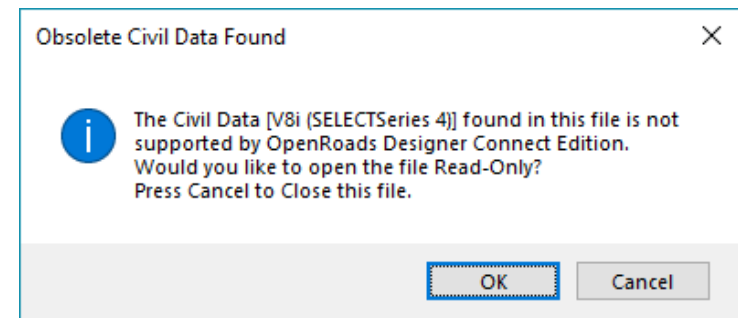
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CONNECT Edition Test Projects

ORD and MSC products **SHOULD NOT BE USED TO OPEN YOUR SS4 PROJECT FILES!!!** If you are testing these products, you should be working in a copy of your project created by the CAD/D staff or in a training project on your C drive. Upon request your project will be copied into a new 12345-1 project where you can use the new software to accomplish design tasks in parallel with your SS4 project work. Before work can begin using MicroStation or ORD CONNECT Edition the survey detail will need to be brought into the Terrain dgn as ORD features. SS4 OpenRoads features are not compatible with ORD so the survey needs to be recreated for ORD.

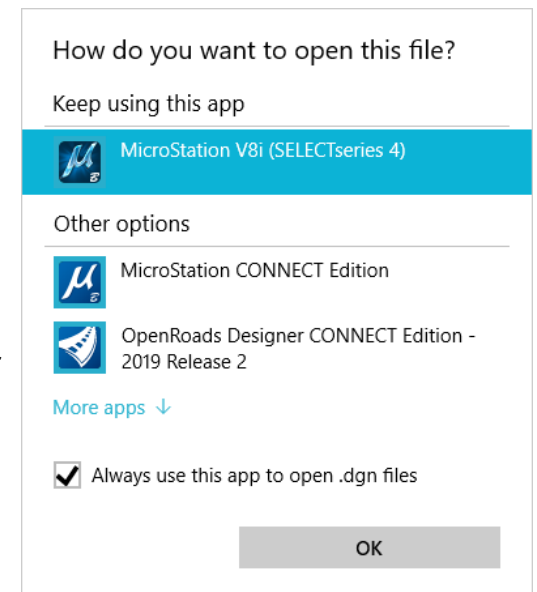
Before working in CONNECT, contact the CAD/D staff so they can create the ORD project and terrain drawings. It should be discussed who will update any existing drawings to use CONNECT levels, linestyles, fonts, and cells. It is not an automated process and takes time.

Once you have a CONNECT project feel free to open any dgns with MicroStation CE. MicroStation drawings can be read from either CE or SS4 but if you create things using new CE functionality it will not work when opening from SS4. SS4 civil drawings opened with ORD will produce the Obsolete Civil Data note shown here.



SS4 projects use PCF files, CE projects use a CFG file. When opening either project make sure you start the product and use the Project selector to set the project appropriately and you will end up in the correct set of project directories! Do not open your SS4 files with CE products even if you can, KEEP THEM SEPARATE!! If you don't see your project in the list you may not be configured correctly to use the NHDOT Workspace and Worksets. See the CAD/D staff for assistance.

After installation of CE you may find that MicroStation CE is the default program to open DGN files. Change it back to SS4 so if you double click on a file it opens SS4 by default. It is better to never double click on a file to open it but sometimes it happens. To re-associate SS4 MicroStation with dgn files, right click on a dgn and pick *Open With > Choose Another App >* Select MicroStation SS4 and check the box indicating to *Always use this app to open .dgn files*. If needed the path to SS4's executable is C:\Program Files (x86)\Bentley\MicroStation V8i (SELECTseries)\MicroStation\ustation.exe





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Project Configuration Files


Each project has a configuration file which contains variables that point to the projects directories as well as defining the projects information that is annotated onto the plan sheets such as the Project Number and Town name. The files are located in N:\CADD\CADD\NHDOT_Workspace\Projects . PCF files are for v8i projects, CFG files are for ORD and MSC projects. If a project has been converted from v8i to connect the PCF file is renamed to have -ss4 added to the name. The -1.CFG files are for Test projects (as noted above) that will remain as v8i projects.

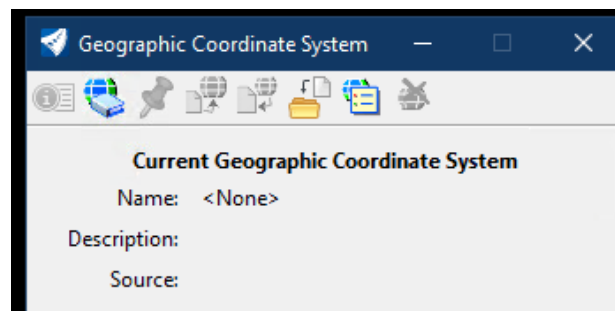
If a project is a proposal project a variable can be added to the pcf file `MS_SHTSIZE = B` defining the size of the sheet models when creating plans. The Options are D-22x34, B-11x17 and A-8.5x11. If the variable is not defined then the default sheet size is D 22x34.

The configuration file also contains Reference file directory paths and should be updated when the Design changes from Preliminary to Final. (`MS_RFDIR > $(PROJDIR)OpenRoads/PreliminaryDesign/` update to `/FinalDesign/`)

Geographic Coordinate System

The *Geographic Coordinate System* (GCS) dialog is used to report, select or delete a GCS for the current model in the design file.

Find this dialog from the *Drawing* workflow, *Utilities* tab. Clicking the **Coordinate System**  button will open the *Geographic Coordinate System* dialog shown below.



The NH83/2011F is the Default *Geographic Coordinate System* attached to NHDOT seed files.



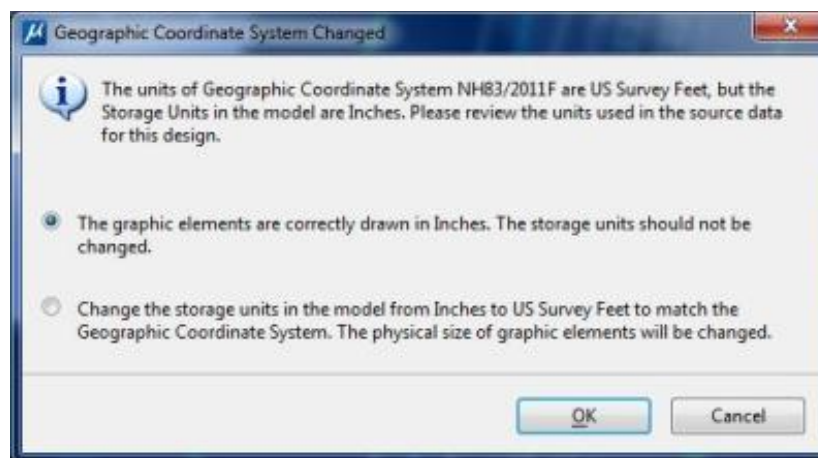
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The GCS can be manually set for the current design file. From the *Geographic Coordinate System* dialog, select the **From Library** button (the second button from the left) to get the *Select Geographic Coordinate System* panel (shown to the right).

At this point there are two choices, the *Library* option and the *Search* option. Each option is presented as a tab. Of the two choices, the *Search* option is easier. From the *Search* tab, enter the partial GCS Name of **NH83** in Search Text. This will present all of the matching New Hampshire State Plane options of GCS.

Select the target GCS for this project from the Search Results and then click the **Add To Favorites** button. This GCS may be used now and will be available in the future. Return to the *Library* tab and select the target GCS which was just added and is now available in the *Favorites* folder. Select **OK** to set.

The following warning panel might appear.



Accept the default selection indicating that the elements are drawn correctly.

In order to set/check the *Vertical Datum*, select the **Details...** tool (first button) of the Geographic Coordinate System dialog box. The *Geographic Coordinate System Properties* panel of the currently set GCS will appear. At the bottom is a section for *Coordinate System Modifiers*. Confirm that the Vertical Datum is correct or change if necessary. Click **OK** when finished.



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Help and Training Introduction

Before You Begin

Bentley Help can be accessed by clicking on File > Help. In the Help screen click on Help Contents, CONNECT Advisor, Bentley Institute, and OpenRoads Communities links are below it and can also be used to find online help, community posts, videos and documentation.

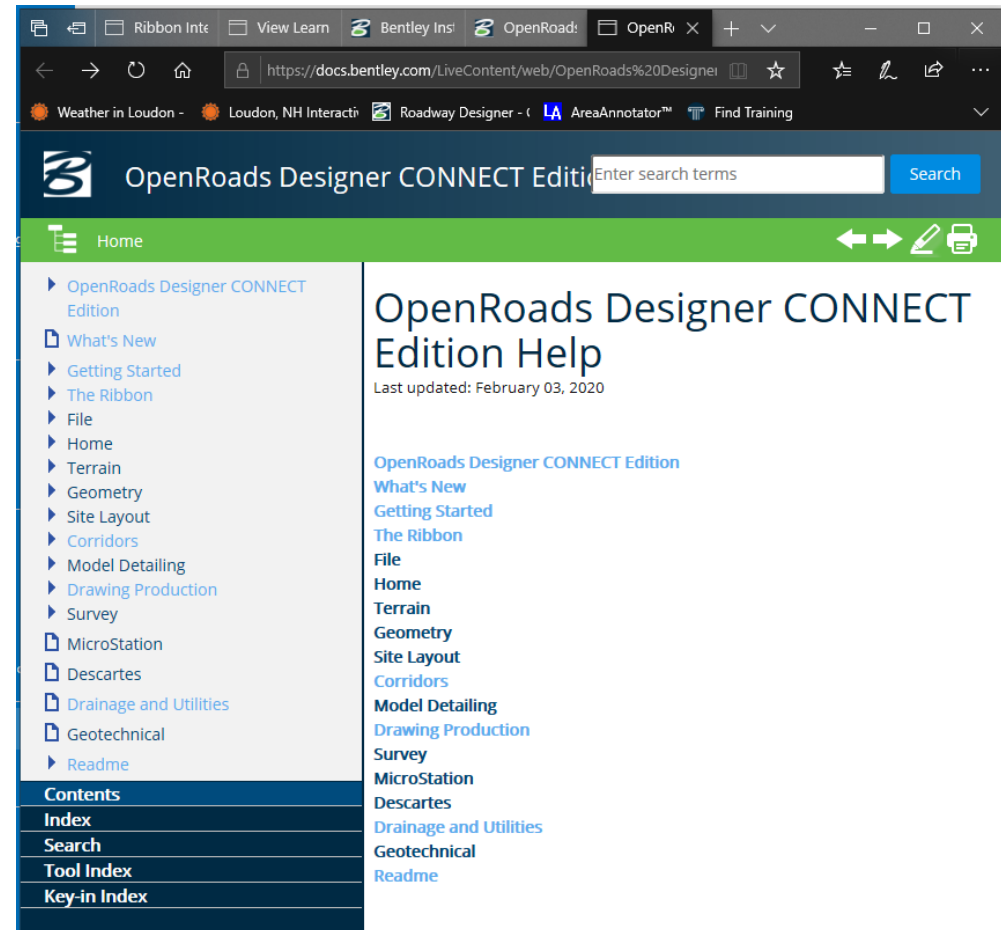
Off/Online Help

Bentley Help will show the ORD online help page with Readme file link at the bottom. The help shows all the various ribbon workflows and the tools available under each. Use this to become familiar with what each tool does and how to use them.

In the readme contents there is a page OpenX DesignerTraining which contains links to the Bentley Learn Server Learning Paths. There are several *Quick Start Guides* to choose from.

Bentley Communities Training Links

The following links are to the Bentley Communities site for Road and site design and contains a lot of useful information.



https://communities.bentley.com/products/road_site_design/w/road_and_site_design_wiki/33436/openroads-designer-connect-edition-training-links

https://communities.bentley.com/products/road_site_design/w/road_and_site_design_wiki/33435/openroads-designer



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Training Options

There are a variety of resources available for learning MicroStation and OpenRoads Designer. Each registered Bentley user has access to their LearnServer which contains many short videos and full classes with videos and workbooks. There are also YouTube channels with playlists of videos to demonstrate the products. NHDOT has also developed some videos to describe our processes.

These and other resources can be found by clicking the link at the bottom of the CAD/D homepage or going directly to:

<https://nhgov.sharepoint.com/sites/DOT-ProjectCentral-Home/SitePages/CADD-Training.aspx>