

CONNECT DDE GUIDE



CONNECTICUT DEPARTMENT OF TRANSPORTATION

CTDOT DDE CAD Course Listing

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Introduction

Class Rules:

- Be on time for class
- Abide by break times
- Hands on class assignments should be completed to the best of your ability
- No cell phone use or texting
- No web browsing on smart phones, tablets or workstations
- No working on non-class related assignments
- Be courteous, no disruptive (loud) talking

Prerequisites:

Basic PC Skills needed for all CAD Courses

- Familiar with mouse controls
- Can navigate Internet & Windows Explorer
- Understand the control panel
- Have working knowledge of Microsoft Office products
- Able to copy & paste operations
- Familiar with how Email operates

Basic MicroStation CAD Skills needed for all OpenRoads and OpenBridge Courses

- Able to create a DGN file and open the program
- Familiar with the MicroStation interface
- Able to work and navigate in different views
- Familiar with annotation and dimensioning
- Can place lines, cells and shapes
- Able to select, modify and delete elements
- Understand how references work

Fundamental OpenRoads Designer Skills needed for Intermediate OpenRoads Courses

- Able to navigate the OpenRoads Modeling Workflow and Interface
- Able to change the display of terrain model features
- Able to create horizontal and vertical alignments

Intermediate Roadway Modeling Skills needed for Advanced OpenRoads Courses

- Familiar with editing Templates
- Able to create a basic Corridor Model

Beginner Level Classes

CTDDE-101 Introduction to the CTDOT DDE

Duration: 2 Hours

Level: Beginner

Products Covered: OpenX Products

(OpenRoads, OpenBridge, OpenRail, OpenBuildings)

Type: Lecture

Prerequisites: Basic PC Skills

Course Description:

Volume 1 – Getting Started

- Getting Help and support
- SharePoint Syncing
- Requesting a CAD project WorkSet
- Opening a file and reviewing the CTDOT Ribbon
- Maintaining your files and computer

Volume 16 – Configuration and CAD Standards

- Getting acquainted with the CTDOT DDE Appendix Sections
- Understanding CTDOT's DDE File naming Conventions
- Understanding CTDOT's DDE Level Structure

BELRN-110 Drawing Essentials for Civil Solutions

Duration: 10 Hours

Level: Beginner

Products Covered: Base MicroStation Tools using OpenX Products (OpenRoads, OpenBridge, & OpenBuildings)

Type: Hands On (On-demand or Virtual Instructor Lead)

Prerequisites: Basic PC Skills

Course Description:

Bentley Learning Path Link: [Drawing Essentials for Civil Solutions](#)

The course contains 11 modules and will cover the MicroStation interface and tools contained within the OpenX civil platforms such as OpenRoads, OpenBridge and OpenRail.

1. Introduction to the Interface - basic navigation skills, creating & working with design files.
2. Controlling the Display of Designs - References, Levels, Annotation Scale, and Saved Views.
3. Using General Tools
 - Tool settings & Snaps
 - Element creation, Attributes, properties & Selection
 - Measuring
4. Drawing Tools
 - Place and copy Line
 - AccuDraw
5. Creating Geometry with OpenX Civil
 - Civil AccuDraw
 - Place, edit and annotate Points & Linear Geometry
6. Additional Drawing Tools
 - Element placement tools
 - Creating complex elements
7. Manipulating and Modifying Elements
8. Working with Cells
 - Place/replace/update Cells and Line terminators
 - Other functions such as: Element Templates, Item Types & Fences
9. Annotating Drawings
 - Annotation Scale
 - Placing & Editing Text, Notes and Callouts, Dimensions
 - Applying Patterns and Hatching
10. Composing Sheets
 - Creating, Placing, & Adjusting the extent and positioning of a Named Boundary
 - Creating Drawing Boundaries
 - Creating a Sheet Index
11. Printing and Publishing

Fundamental Level Classes

CTDDE-210 OpenRoads Designer Fundamentals

Level: Fundamental

Duration: 12 Hours

Products Covered: OpenRoads

Type: Hands on

Prerequisites:

- Basic PC Skills
- Basic MicroStation CAD Skills

Course Description: This course covers 3 Modules

1. Getting Started (2 Hours)

Module Description: Volume 3.0 – OpenRoads Designer Getting Started

- Proper procedure for opening a DGN file
- Project Roadway Template Library Creation
- Design File Referencing Framework
- Navigating the Interface
 - Working with 2D and 3D Models
 - Working with 2D and 3D Models
 - View Controls
 - Analyzing Civil Data
 - Using Element Selection
 - Viewing Tooltips
 - Selecting a Feature to Review and Edit Geometry
 - Adjusting Manipulators and Other Settings
 - Using the Civil Context Menu
 - On-screen Heads-Up Prompts
 - Using Explorer and Properties

2. Working with Existing Data (5 Hours)

Course Description: Volume 2 of the DDE Guide

- Referencing (older Survey dgn files created in V8i as well as new)
- Understanding Geographic Coordinate Systems
- Creating Raster Container Files
- Attaching Imagery
- Importing LiDAR Data
- Using and creating Terrains
- Re-projecting DGN files
- Connecting to GIS

3. OpenRoads Designer Alignments (5 Hours)

Course Description: Volume 3.1 of the DDE Guide

- CTDOT alignment and linear Feature Definitions uses
- Horizontal centerline layout & annotation
- Vertical Profile Creation
- Driveways
- Placement of Non-Centerline Geometry
- Reporting

CTDDE-240 OpenRoads Designer Survey

The class will be using modules from both CTDOT and Bentley's Learning Paths until CTDOT's course material is complete in Volume 4 of the CTDOT DDE Guide.

Duration: 16 Hours

Level: Fundamental

Products Covered: OpenRoads Designer

Type: Hands on

Prerequisites:

- Basic PC Skills
- Basic MicroStation CAD Skills

Course Description:

CTDOT DDE Guidebook Link: [12 – Survey – Bentley Learn](#)

Volume 4 – OpenRoads Designer Survey

- Review of standards and best practices
- File creation
- Exploring the Interface
- Processing survey data
- Creating terrains
- Annotation
- Deliverables

CTDDE-245 OpenRoads Designer Boundary Survey

Coming Soon

Duration: 4 Hours

Level: Fundamental

Products Covered: OpenRoads Designer

Type: Self-Paced

Prerequisites:

- Basic PC Skills
- Basic MicroStation CAD Skills

Course Description:

Volume 9 – OpenRoads Designer Boundary Surveys

- Review of standards and best practices
- File creation
- Exploring the Interface
- ROW Base Model Creation
- Property Map Creation
- Parcel Posting Workflow

CTDDE-260 OpenRoads Designer Traffic Engineering Base Modeling and Plans Production

Duration: 8 Hours

Level: Fundamental

Products Covered: OpenRoads Designer

Type: Self-Paced

Prerequisites:

- Basic PC Skills
- Basic MicroStation CAD Skills

Course Description:

Volume 6 - OpenRoads Designer Traffic Engineering Base Modeling

- Selecting the proper seed file to create a Base Model
- Aligning a file so it's in the proper geospatial location
- Using the Traffic Toolbar
- Creating Signal Base Models
- Creating Signing Base Models
- Creating Pavement Marking Base Models
- Placing cells, shapes and lines
- Using Item Types for Pay Items and Asset Information

Volume 13 - Sections 1, 2, 3, 5, & 6 - Contract Plans Production

- Review of Standards - Contract Plan grouping, Contract Border Title Block Integration, Annotation, and Dimensioning
- Review of General Subset workflow- Title Sheet, Detailed Estimate Sheets, Index of Revisions Sheet
- Creation of Plans and Details

Volume 14 - Printing and Publishing

- Publishing CAD content to PDF
- Plotting and printing PDF files

CTDDE-270 OpenRoads Designer Roadway Illumination Base Modeling and Plans Production

Duration: 4 Hours

Level: Fundamental

Products Covered: OpenRoads Designer

Type: Self-Paced

Prerequisites:

- Basic PC Skills
- Basic MicroStation CAD Skills

Course Description:

Volume 7 - OpenRoads Designer - Roadway Illumination Base Modeling

- Selecting the proper seed file to create a Base Model
- Aligning a file so it's in the proper geospatial location
- Placing Lines, Shapes and Cells
- Using Item Types for Pay Items and Asset Information

Volume 13 - Sections 1, 2, 3, & 7 - Contract Plans Production

- Review of Standards - Contract Plan grouping, Contract Border Title Block Integration, Annotation, and Dimensioning
- Review of General Subset workflow- Title Sheet, Detailed Estimate Sheets, Index of Revisions Sheet
- Creation of Plans and Details

Volume 14 - Printing and Publishing

- Publishing CAD content to PDF
- Plotting and printing PDF files

CTDDE-280 OpenRoads Designer Landscape Base Modeling and Plans Production

Duration: 4 Hours

Level: Fundamental

Products Covered: OpenRoads Designer

Type: Self-Paced

Prerequisites:

- Basic PC Skills
- Basic MicroStation CAD Skills

Course Description:

Volume 8 - OpenRoads Designer - Landscape Base Modeling

- Selecting the proper seed file to create a Base Model
- Aligning a file so it's in the proper geospatial location
- Placing Lines, Shapes and Cells
- Attaching Item Types
- Editing Item Type Information

Volume 13 - Sections 1, 2, 3, & 9 - Contract Plans Production

- Review of Standards - Contract Plan grouping, Contract Border Title Block Integration, Annotation, and Dimensioning
- Review of General Subset workflow- Title Sheet, Detailed Estimate Sheets, Index of Revisions Sheet
- Creation of Plans and Details

Volume 14 - Printing and Publishing

- Publishing CAD content to PDF
- Plotting and printing PDF files

Intermediate Level Courses

BELRN-310 3D Modeling in MicroStation CONNECT Edition

Duration: 1 Day

Level: Beginner

Products Covered: 3D MicroStation Tools using OpenX Products
(OpenRoads, OpenBridge, OpenBuildings)

Type: Hands On (On-demand or Virtual Instructor Lead)

Prerequisites:

- Basic PC Skills
- Basic MicroStation CAD Skills

Course Description:

Bentley Learning Path Link: [3D Modeling in MicroStation CONNECT Edition](#)

This learning path covers the concepts and capabilities of MicroStation CONNECT Edition for modeling of Curves, Surfaces, Solids and Meshes in a 3D design file. It also teaches the basic tools for ease of viewing and navigating in the 3D space. Logical extensions or applications like parametric modeling or animation are touched upon too with examples. Hands on exercises are provided to reinforce the learning.

CTDDE-320 OpenRoads Designer Intermediate Modeling

The class will be using modules from both CTDOT and Bentley's Learning Paths until CTDOT's course material is complete in Volume 3 of the CTDOT DDE Guide.

Duration: 14 hours

Level: Intermediate

Products Covered: OpenRoads Designer

Type: Hands On (On-demand or Virtual Instructor Lead)

Prerequisites:

- Basic PC Skills
- Basic MicroStation CAD Skills
- Basic OpenRoads
- Familiar with the appropriate sections of the [Highway Design Manual](#)

Course Description: This course covers 6 Modules

This course teaches how to efficiently modify and use existing templates, such as those delivered in the Workspace, for your project situations. This course will also cover designing roadway corridors and intersections.

You will learn how to:

1. CTDOT DDE Guidebook Link: [Using & Editing Templates](#) (2 Hours)
 - use the Template Library Organizer to copy templates from the standards template library to the project template library
 - assemble a template from pavement, curbing, and end condition components
 - edit roadway templates
2. Bentley Learning Path Link: [QuickStart for Corridor Modeling – Road](#) (2 Hours)
 - create and manipulate a Corridor.
 - Assign template drops.
3. Bentley Learning Path Link: [Using and Defining Superelevation](#) (2 Hours)
 - apply the superelevation transitions to your corridor
 - create, edit and review superelevation
4. Bentley Learning Path Link: [Creating and Manipulating the Corridor](#) (2 Hours)
 - add multiple templates drops as you encounter intersections, driveways and turn lanes.
5. Bentley Learning Path Link: [Intersection Design-Horizontal and Vertical Geometry](#) (2 Hours)
 - use Horizontal and Vertical Geometry tools to create 2D and 3D geometric elements to lay out a complex intersection.
6. Bentley Learning Path Link: [Intersection Design-3D Model Detailing](#) (2 Hours)
 - Tools and techniques will be taught to accurately model a complex intersection in 3D. You will learn how to:
 - use Linear Templates to create the side slope grading along the curb returns.
 - use Surface Templates to apply material thickness to the pavement surface.
 - create a Finished Grade Terrain Model using Graphical Filters. Export Finished Grade Terrain Model to LandXML format.

BELRN-330 Introduction to OpenBridge Designer/OpenBridge Modeler

Duration: 4 Days

Level: Fundamental

Products Covered: OpenRoads Designer

Type: Hands On (On-demand or Virtual Instructor Lead)

Prerequisites:

- Basic PC Skills
- Basic MicroStation CAD Skills

Course Description:

Bentley Learning Path Link: [Introduction to OpenBridge Designer/OpenBridge Modeler](#)

This learning path will cover how to import and use geometry and terrain from OpenRoads, model several bridge types including prestressed beam, steel I girder and segmental, setup the libraries, generate reports, create drawings and interoperate with the analytical products.

CTDDE-340 OpenRoads Designer Highway Contract Plans Production

Duration: 4 Hours

Level: Advanced

Products Covered: OpenRoads Designer

Type: Hands on

Prerequisites:

- Basic PC Skills
- Basic MicroStation CAD Skills

Course Topics:

The class will be using modules from Bentley's Learning Paths until CTDOT's course material is ready in Volume 13 of the CTDOT DDE Guide.

- Bentley Learning Path Link: [Drawing Production - Creating Plan and Profile Sheets](#) (2 Hours)
- Bentley Learning Path Link: [Drawing Production - Creating Cross Section Sheets](#) (2 Hours)

Volume 13 - Sections 1, 2, 3, 4, & 11 - Contract Plans Production

- Review of Standards - Contract Plan grouping, Contract Border Title Block Integration, Annotation, and Dimensioning
- Review of General Subset workflow- Title Sheet, Detailed Estimate Sheets, Index of Revisions Sheet
- Creation of Plans, Details, Profiles and Cross Sections
- Sheet Indexing

Volume 14 - Printing and Publishing

- Publishing CAD content to PDF
- Plotting and printing PDF files

CTDDE-350 OpenBridge Modeler Bridge Design Contract Plans Production

Status: Coming Soon

Duration: 4 Hours

Level: Advanced

Products Covered: OpenRoads Designer

Type: Hands on

Prerequisites:

- Basic PC Skills
- Basic MicroStation CAD Skills

Course Topics:

Volume 13 – Sections 1, 2, 3, 10, & 11 – Contract Plans Production

- Review of Standards – Contract Plan grouping, Contract Border Title Block Integration, Annotation, and Dimensioning
- Review of General Subset workflow– Title Sheet, Detailed Estimate Sheets, Index of Revisions Sheet
- Creation of Plans, Details, Profiles and Cross Sections
- Sheet Indexing

Volume 14 – Printing and Publishing

- Publishing CAD content to PDF
- Plotting and printing PDF files

Advanced Level Courses

CTDDE-410 OpenRoads Designer Advanced Modeling

The class will be using modules from Bentley's Learning Paths until CTDOT's course material is ready in Volume 3 of the CTDOT DDE Guide.

This course covers 4 Modules

Level: Advanced

Products Covered: OpenRoads Designer

Type: Hands on

Prerequisites:

- Basic PC Skills
- Basic MicroStation CAD Skills
- Fundamental & Intermediate OpenRoads Skills
- Familiar with the appropriate sections of the [Highway Design Manual](#)
- Familiar with [Cost Estimating](#), [Contract Management](#), and [Contract Development](#) procedures

Course Description: This course covers 5 Modules

Course Topics:

1. Bentley Learning Path Link: [Defining Template Components and Constraints](#) (2 Hours)
2. Bentley Learning Path Link: [Defining Template End Conditions](#) (2 Hours)
3. Bentley Learning Path Link: [Template Triggers and Switches](#) (2 Hours)

In learning paths 1-3 we will dive into complex template corridor workflows, you will learn how to create:

- components such as pavement, curbs, and barriers.
 - side slopes (template end conditions) connecting the template hinge to the tie down point.
 - templates that use null points with component display rules. These act as triggers to display and undisplay parts of your template when linear geometry is added as corridor reference element.
 - use parametric constraints and point controls to vary pavement depths and widths.
 - show how to make the corridor follow edge of pavement geometry.
 - create end condition exceptions.
4. Bentley Learning Path Link: [Using Civil Cells in OpenRoads Designer](#) (2 Hours)
You will learn the basics of placing civil cells. This includes gaining an understanding of what civil cell references are and how to use them in a practical workflow. You will learn to use the civil cells delivered with the product, as well as how to use civil cells taken from external sources and incorporate them into your models. You will learn to edit and re-use civil cells that have been placed within a model.
 5. Bentley Learning Path Link: [Quantities and Earthwork](#) (2 Hours)

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In this course, you will learn various tools and methods to compute quantities and earthwork from the corridor model. You will learn how to assign unit costs and generate an estimated cost report for your project using the Component Quantities and Element Component Quantities tools. We will look at how to generate cut and fill volume reports from single corridor models as well as multiple corridor models. You will also learn how Named Boundaries and the Quantities Report by Named Boundary tool can be used to separate quantities in the corridor model.

CTDDE-420 OpenRoads Designer Drainage and Utility Modeling

Duration: 2 Days

Level: Advanced

Products Covered: OpenRoads Designer

Type: Hands on (On-demand or Virtual Instructor Lead)

Prerequisites:

- Basic PC Skills
- Basic MicroStation CAD Skills
- Fundamental & Intermediate OpenRoads Skills
- Familiar with the appropriate sections of the [CTDOT Drainage Manual](#)

Course Topics:

The class will be using modules from Bentley's Learning Paths until CTDOT's course material is ready in Volume 5 – Drainage and Utility Modeling of the CTDOT DDE Guide.

Bentley Learning Path Link: [Drainage Modeling](#)

This Learning introduces you to the software interface and general tools and then focuses on drainage modeling.

You will learn how to use the Drainage and Utilities tools to:

- layout and import networks
- analyze and design a network
- create reports, plan and profile sheets, and cross section sheets

BELRN-421 OpenRoads Designer Drainage Hydraulics

Duration: 3 Days

Level: Advanced

Products Covered: OpenRoads Designer

Type: Hands On (On-demand or Virtual Instructor Lead)

Prerequisites:

- Basic PC Skills
- Basic MicroStation CAD Skills
- Fundamental & Intermediate OpenRoads Skills
- Drainage Modeling
- Familiar with the appropriate sections of the [CTDOT Drainage Manual](#)

CTDOT DDE CAD Course Listing

Course Description:

Bentley Learning Path Link: [Drainage Hydraulics](#)

This learning path focuses on drainage hydraulics, starting with steady-state (Rational Method) design and analysis, and then moving to unsteady-state analysis, to understand the advantages that it provides.

- Setting up rainfall data
- design, optimize, and analyze a drainage network
- unsteady-state analysis, and design ponds

Workshops

Bentley Workshops

Status: Available

Duration: Varies (Site Modeling)

Bentley Learning Path Link: [Roadway Design & Modeling – Intermediate](#)

Level: Intermediate

Products Covered: OpenRoads Designer

Type: Hands On (On-demand or Virtual Instructor Lead)

Prerequisites:

- Basic PC Skills
- Basic MicroStation CAD Skills
- Fundamental & Intermediate OpenRoads Skills

Workshop Description:

These workshops are intended for users that have a fundamental understanding of Roadway Design Modeling and would like to learn more detailed tools and processes such as:

- Creating and editing complex horizontal and vertical geometry
- Managing and editing complex civil geometry
- Site modeling techniques
- Overlay and Widening
- Site Visibility

CTDOT DDE CAD Training Tracks



Beginner Level

CTDDE-101
Introduction to the
CTDOT DDE

BELRN-110
Drawing Essentials
for Civil Solutions

Fundamental Level

CTDDE-240
OpenRoads Survey

Processing
Survey & Terrain
Data

CTDDE-210
OpenRoads Designer
Fundamentals

Getting Started

Working with
Existing Data

Alignments

CTDDE-245
OpenRoads Designer
Boundary Survey
(Coming soon)

CTDDDE-260
OpenRoads Designer
Traffic Engineering
Base Modeling &
Plans Production

CTDDDE-270
OpenRoads Designer
Illumination Base
Modeling & Plans
Production

CTDDE-280
OpenRoads Designer
Landscape Base
Modeling & Plans
Production

Intermediate Level

CTDDE-320
OpenRoads Designer
Intermediate Modeling

Using & Editing
Templates

Quick Start
Corridor
Modeling – Road

Using & Defining
Superelevation

Creating &
Manipulating
the Corridor

Intersection
Design
H & V

Intersection
Design
3D Modeling

CTDDE-340
OpenRoads Designer
Highway Contract Plans Production

Drawing
Production -
Creating Plan
and Profile
Sheets

Drawing
Production -
Creating Cross
Section Sheets

BELRN-310
3D Modeling in
MicroStation

BELRN-330
Intro to OpenBridge

CTDDDE-350
OpenBridge Modeler
Bridge Design
Contract Plans
Production

Advanced Level

CTDDE- 410
OpenRoads Designer
Advanced Modeling

Defining
Template
Components
and Constraints

Defining
Template End
Conditions

Template
Triggers &
Switches

Using Civil Cell
in OpenRoads
Designer

Quantities &
Earthwork

CTDDE-420
OpenRoads Designer
Drainage and Utility
Modeling

Drainage
Modeling

BELRN-421
OpenRoads Designer
Drainage Hydraulics

CTDOT Course

Module

CTDOT Self-Paced Workflow

Bentley Course

To be rewritten with CTDOT's Data set

Course #
Course Title

Temporary Bentley fill in module

