MARYLAND DEPARTMENT OF TRANSPORTATION

STATE HIGHWAY ADMINISTRATION

Model Right-of-Way Design Using Power InRoads SS4 with Open Roads Technology

Processing Procedures
May 2019

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Assumptions

This guide focuses on the Maryland Department of Transportation, State Highway Administration's (MDOT SHA) configuration and customization of Bentley's **Power InRoads (SS4)** with **Open Roads** Technology. It is intended as a reference for **InRoads SS2** users who are migrating to **Power InRoads SS4/Open Roads.**

This guide assumes previous training and working knowledge of:

- Project Wise
- MicroStation
- InRoads Survey SS2

The software and versions required for the **2018 Standard Managed Workspace** are:

- ProjectWise Explorer Version 10.00.02.265 or Version 10.00.02.320
- Power InRoads V8i (SELECTseries 4) Version 08.11.09.878 or Version 08.11.09.904
- The following are alternate platforms that should also function in the **2018 Managed Workspace**:
  - MicroStation V8i (SELECTseries 3) Version 08.11.09.357 with InRoads V8i (SELECTseries 4) Version 08.11.09.878
  - MicroStation V8i (SELECTseries 4) Version 08.11.09.832 with InRoads V8i (SELECTseries 4) Version 08.11.09.903
- Prerequisites for Bentley Desktop Applications (English) 32-Bit Version 08.11.09.03

Layout

This guide is organized by function, beginning with a **Model Right-of-Way Design Processing Overview** for **MDOT SHA Standard Preferences** and step-by-step instructions for **mRW Processing Procedures**.

Acknowledgement

This guide was produced using project data provided for training purposes. It applies MDOT SHA standards to **InRoads SS4/Open Roads Model Right-of-Way** project data. The **2018 Managed Workspace** provides consistency as you move step-by-step through workflows for typical model right-of-way design processing procedures.

Text and Format Conventions

In this guide, certain conventions are used.

Fonts and Formats

- **Bold Arial Narrow** font indicates the name of an important program, screen element, setting, or process/procedure.

  Example: Expand the available **Plat Features** by selecting the **+ symbol** beside the **Plats folder**, as displayed below.

- **Bold Italic Arial Narrow** font indicates the name of an important association, setting, concept, quotation, example, modifier or idea.

  Example: You must select the icon with the **light bulb and paint pallet** to make the feature **Active**, as displayed in the menu below.

# Standard Settings for InRoads Select Series 4

The following procedure outlines the appropriate **InRoads Select Series 4** settings when using the **MDOT SHA Standard**. Each **InRoads** user should make certain that their machine has the **settings** and **add-ins** described below.

Application Add-ins

Enter the **Standard InRoads Explorer** as shown below and select the **Tools** menu as shown below.
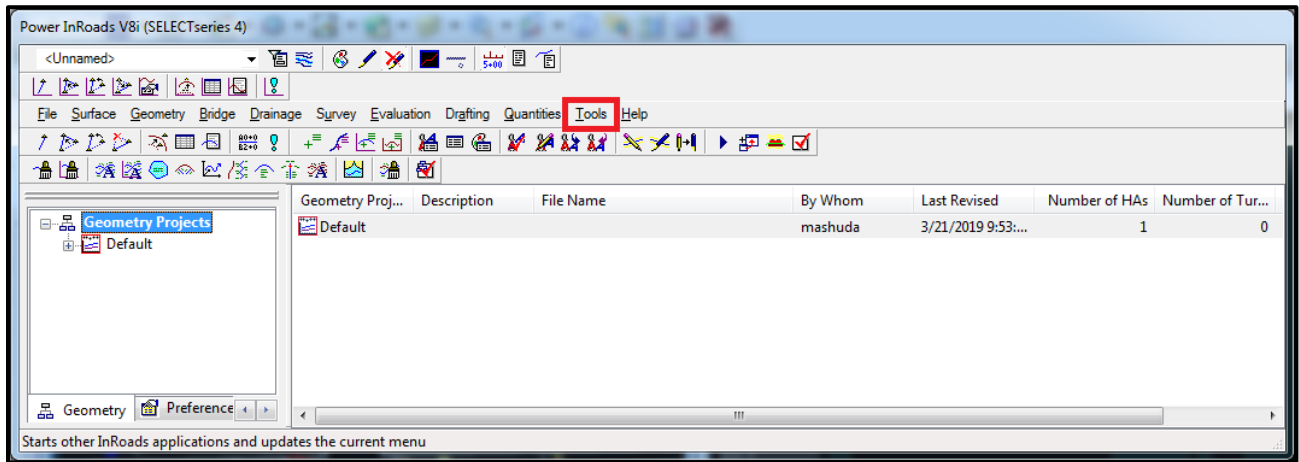
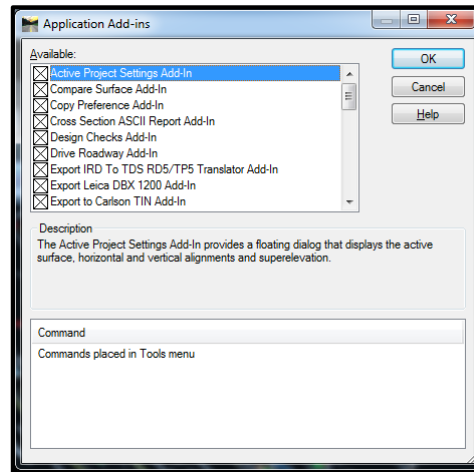Enter the **Tools** menu then enter the **Application Add-ins** as shown below.
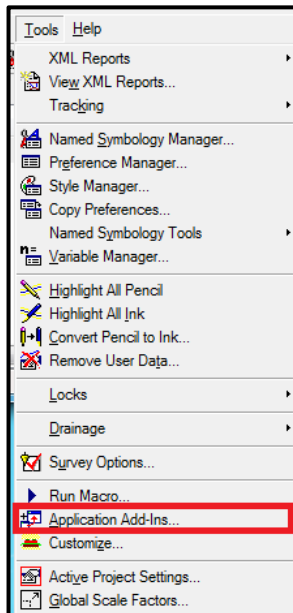
A *dialog* will open making the following options available. Select all the options by placing a **"X"** ☒ in the box.

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Available

The following options should be available.

☒ Active Project Settings Add-in
☒ Compare Surface Add-in
☒ Copy Preference Add-in
☒ Cross Section ASCII Report Add-in
☒ Design Checks Add-in
☒ Drive Roadway Add-in
☒ Export IRD to TDS RD5/TP5 Translator Add-in
☒ Export Leica DBX 1200 Add-in
☒ Export Carlson TIN Add-in
☒ Find Near Points Add-in
☒ Generate Grade Contours Add-in
☒ Global Scale Factors Add-in
☒ Horizontal and Vertical Elements Add-in
☒ Hydrology and Hydraulics Add-in
☒ Import AMSA Add-in
☒ Import LAS Add-in
☒ Import SRV Add-in
☒ Import Subsurface Add-in
☒ Italian Extensions Add-in
☒ Lot Layout Add-in
☒ Multiple Horizontal Element Regression Analysis Add-in
☒ Multiple Vertical Element Regression Analysis Add-in
☒ Named Symbology Tools Add-in
☒ Place Cell/Block Add-in
☒ Remove User Data Add-in
☒ SDMS Translator Add-in
☒ Sight Visibility Add-in
☒ Thin Random Points Add-in
☒ Translate Leica DBX Add-in
☒ Transverse Edit Add-in
☒ Upload Trimble Add-in
☒ Variable Manager Add-in
☒ View Bathymetric Elevation Add-in
☒ View Drainage as Solids Add-in

Variable Manager

Enter the **Variable Manager** found under the **InRoads Tools** menu as shown below. A dialog will open making the following options available. Select the options shown below by placing a **"X"** ☒ in the box.
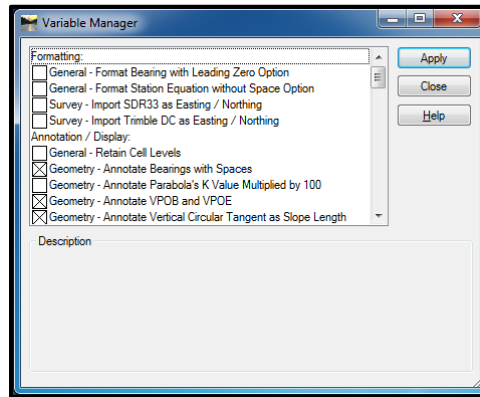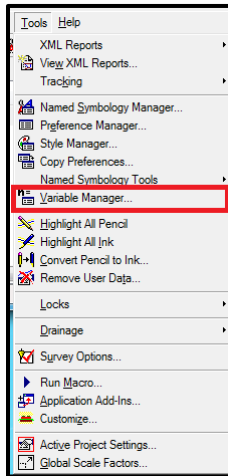
Formatting:

☐ General – Format Bearing with Leading Zero Option

☐ General – Format Station Equation without Space option

☐ Survey – Import SDR33 as Easting / Northing

☐ Survey – Import Trimble DC as Easting / Northing

Annotation / Display:

☐ General – Retain Cell Levels

☒ Geometry – Annotate Bearings with spaces

☐ Geometry – Annotate Parabola's K Value Multiplied by 100

☒ Geometry – Annotate VPOB and VPOE

☒ Geometry – Annotate Vertical Circular Tangent as Slope Length

☒ Geometry – Annotate positive gradients with a plus sign

☒ Profile Annotation – Omit slope signs

☐ Geometry Omit PVC to PVI and PVI to PVT lengths

☐ Geometry – Append Slew to Point Name

☐ Geometry – Display sorted line in Single Element Regression

☐ Survey – Rotate Graphics on Dual – Coded Survey points

☐ Evaluation – Annotate Radius in Cross Section

☐ Rail – Disable Point Display in Switch and Crossing

Command Behavior:

☒ Geometry – Alternate workflow with ProjectWise
☒ File – Persist Project Default Paths
☐ File – Omit Project Options Full Path
☐ File – Enable History Logging
☐ Surface – Disable Highlight for Random Features
☐ Geometry – Disable Cogo Points in Explorer
☐ Geometry – Allow saving disconnected solutions
☐ Geometry – Initialize with undefined problem
☐ Geometry – Enable turnout integrity checking
☐ Geometry – Omit Sight Distance from Vertical Review
☒ Geometry – Alphanumeric Names in Create / Edit Alignment by Cogo Points
☒ Geometry – Enable Degree of Curvature
☐ Geometry – Enable Fixed Elements Insertion
☐ Survey – Disable Survey Points in Explorer
☐ Survey – Use Spaces in Surface and Geometry Description
☐ Survey – Exclude Generated Points from the Cogo Buffer
☐ Survey – Create a Duplicate Point for Out–of-Order Points
☐ Survey – Honor Surface Vertical Scale for Display
☐ Evaluation – Enable Left and Right Shoulder Slope Staking
☐ Evaluation – Slope Stake Report in Cross Section Annotation
☒ Tools – Simultaneous Tracking

Customer – specific
☐ File – Ignore reginal settings for decimal separator
☐ Survey - Convert SDMS Notes to Attribute Code
☐ Survey – Add Prefix to Generated Points
☐ Survey – Dual Coded Points in Survey Data to Surface
☐ Survey – Extend Alignment Attributes
☐ Survey - JPT Parsing Configuration
☐ Survey – Modifications to Trimble DC Import
☐ Can't Gradient as millimeters / meter
☐ Rail – Remap Turnout Description
☐ Rail – Display Turnout Branch Radii
☐ Turnouts – Alternative connecting alignment naming Create Connection
☐ Rail – LRM Reporting in Dutch
☐ Geometry – Display Chorded Length rather than Arc Length
☐ Geometry – View Stationing Ticks
☐ General – Enable Italian localizations
☐ General – Enable UK localizations
☐ Sight Visibility – Enable EGIS Roadway Visibility

Project Defaults

Before you can export to an **ALG file**, users must set the proper **InRoads Project Defaults**. Set the **InRoads Project Defaults** by entering the in the **Standard InRoads** menu as shown below.
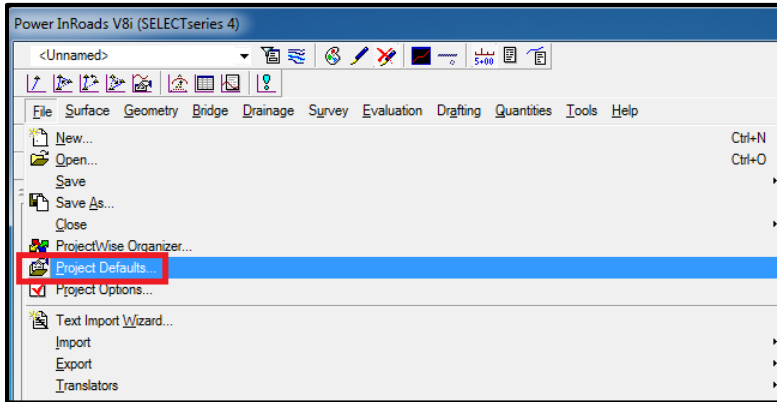

The **InRoads Project Defaults** dialog will appear as shown below.
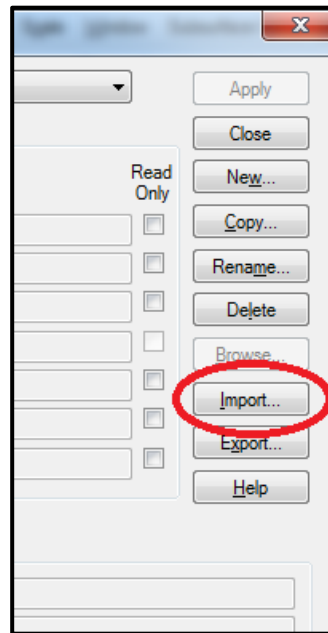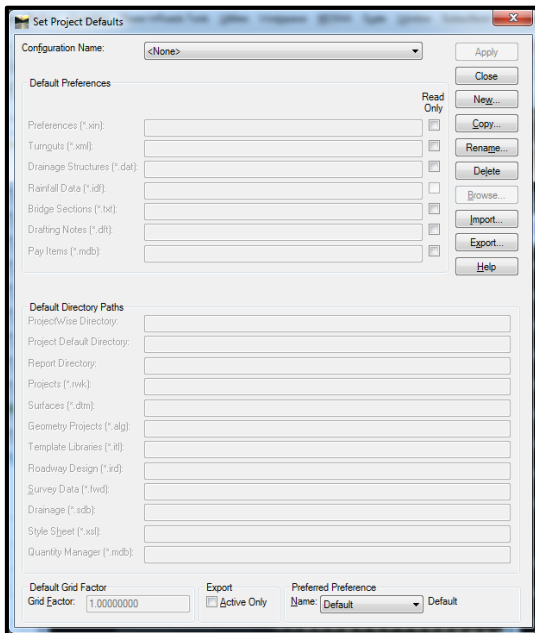
Select **Import** as shown above. Browse to the _Projectwide\CAD Resources\InRoads directory. Select the file named **PW_Variables.reg The** full path is shown in text below and is also shown in the screen capture below.

pw:\\shavmpwx.shacadd.ad.mdot.mdstate:SHAEDMS02\Documents\Standards and Publications\SHA CAD Standards\Development\Test Area (Dev)\MDSHA_V8_02\Example Project_Projectwide\CAD Resources\InRoads\PW_Variables.reg
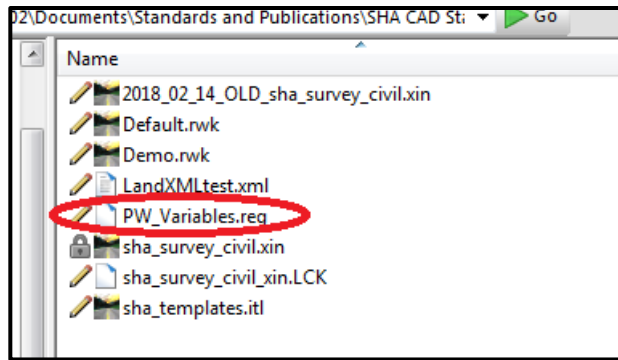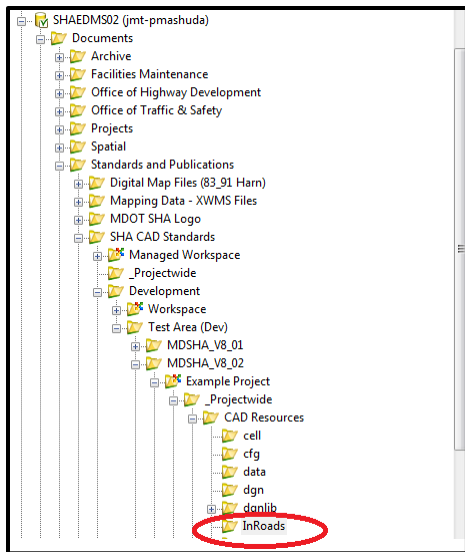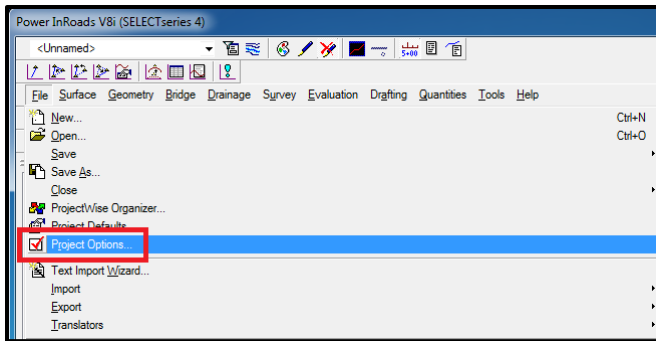
SHA PW Roadway User has been imported and is available. Select **SHA PW Roadway User** under the **Configuration Name** and select the **Preferred Preference HA-BLIN** as shown below.
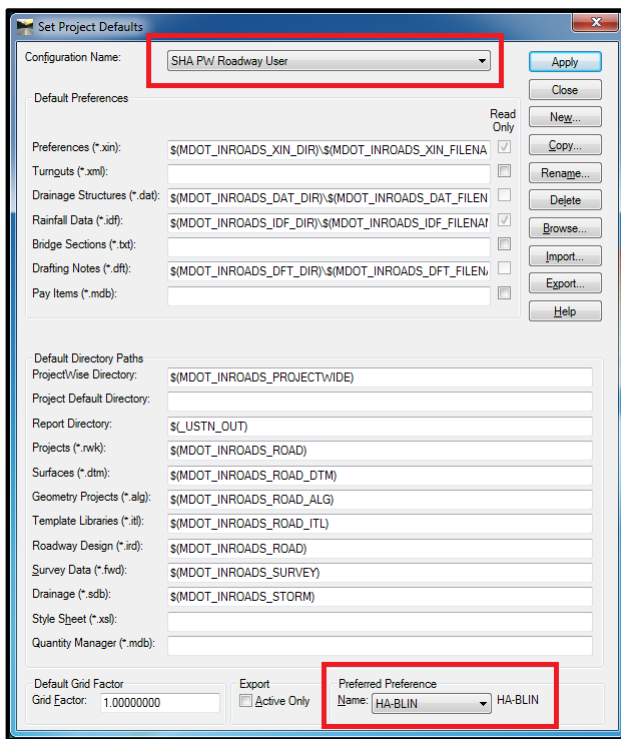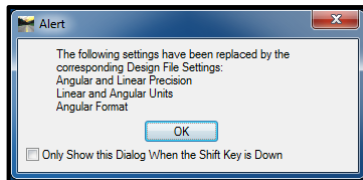

Review the InRoads Project Options

Review the InRoads **Project Options** by entering the **Standard InRoads** menu and selecting **Project Options**.

An *alert* will appear with the message "The following settings have been replaced by the corresponding Design File Settings: Angular and Linear Precision, Linear and Angular Units, Angular Format.", as shown below. **Select OK**

The **Project Options** dialog will load as shown below. Select the **Geometry** tab. Select **Preference** at the bottom of the dialog. In the **Project Options**, the *Read-Only option must be selected* for **Horizontal Alignments** and **Cogo Buffer** as shown below in first screen capture. In **Preferences** Select **HA-BLIN** then **Load** then **Close** as shown in second screen capture
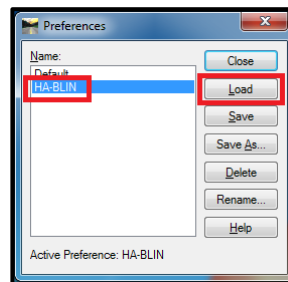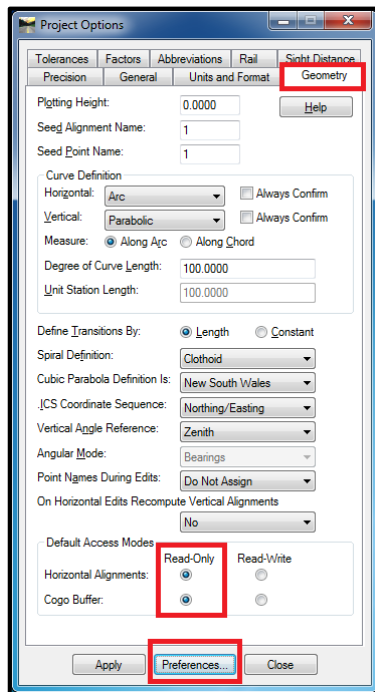
The **Project Options** in this dialog are important in *allowing multiple users* to access the InRoads **ALG file**.

Model Right-of-Way Design File

MDOT SHA Standards

An mRW (**Model Right-of-Way**) file contains **MicroStation** elements representing existing *right-of-way information*, along with existing *easements and property lines*. The mRW file is considered a *project wide* file, meaning it is used by all design disciplines as a **MicroStation** reference file.

The primary purpose of the mRW file is to act as a reference file when producing construction documents. The secondary purpose is to provide **Open Roads** with the information necessary to produce a **Project Corridor Model**. Defining existing *right-of-way*, *easements, and property lines* with **Open Roads** tools allows the information to be used by all design disciplines using **Open Roads** tools. For example, the information contained in an mRW file can appear in a **Cross Section** (sHC) file if it is referenced. Likewise, the information can be viewed in a **Corridor Model** when referenced to an sCO file.

Note: These instructions are specific to the following software using **MDOT SHA** standards in their pre-defined **Managed Workspace**:

- ProjectWise Explorer Version 10.00.02.265
- Power InRoads V8i Select Series 4) Version 8.11.09.878

Per MDOT SHA standards, **Model Right-of-Way** (mRW) files must be processed on **Project Wise** to ensure proper use of **Preference** and **Resource** files.

Note: A file titled <u>OpenMe.dgn</u> is found in each CAD folder in the standard **Project Wise** template. It is intended to give users a launching point and will automatically delete once a new file is created.

Processing Procedures

The following are step-by-step instructions for creating and using an **mRW file** in **SHA MDOT's** Power InRoads SS4 with Open Roads Technology.
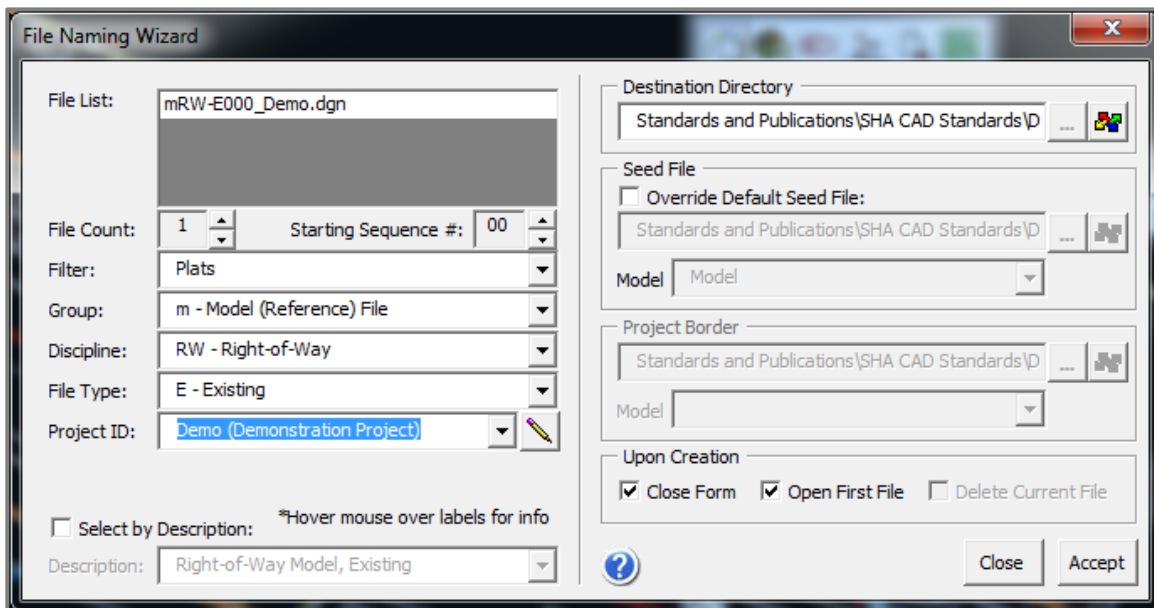
Create mRW File

1) Create a new mRW file using the **File Naming Wizard**. Using the wizard ensures that the correct **DGN Seed** file is used with the correct **Standard Preferences** for MDOT SHA. Furthermore, using the file naming convention provided in the wizard ensures project files are organized. You can only access the **File Naming Wizard** in **Microstation** or **InRoads**, however, the file is used by **Power InRoads**.

2) To begin creating the mRW file, open **Project Wise** and browse to the project's **Right-of-Way** folder. When you open a DGN file using InRoads, the **File Naming Wizard** appears automatically. You can also access the **File Naming Wizard** by selecting the **MicroStation Menu** located along the top of the screen. To do so, select **MDOT SHA**, then select the **File Naming Wizard** option.
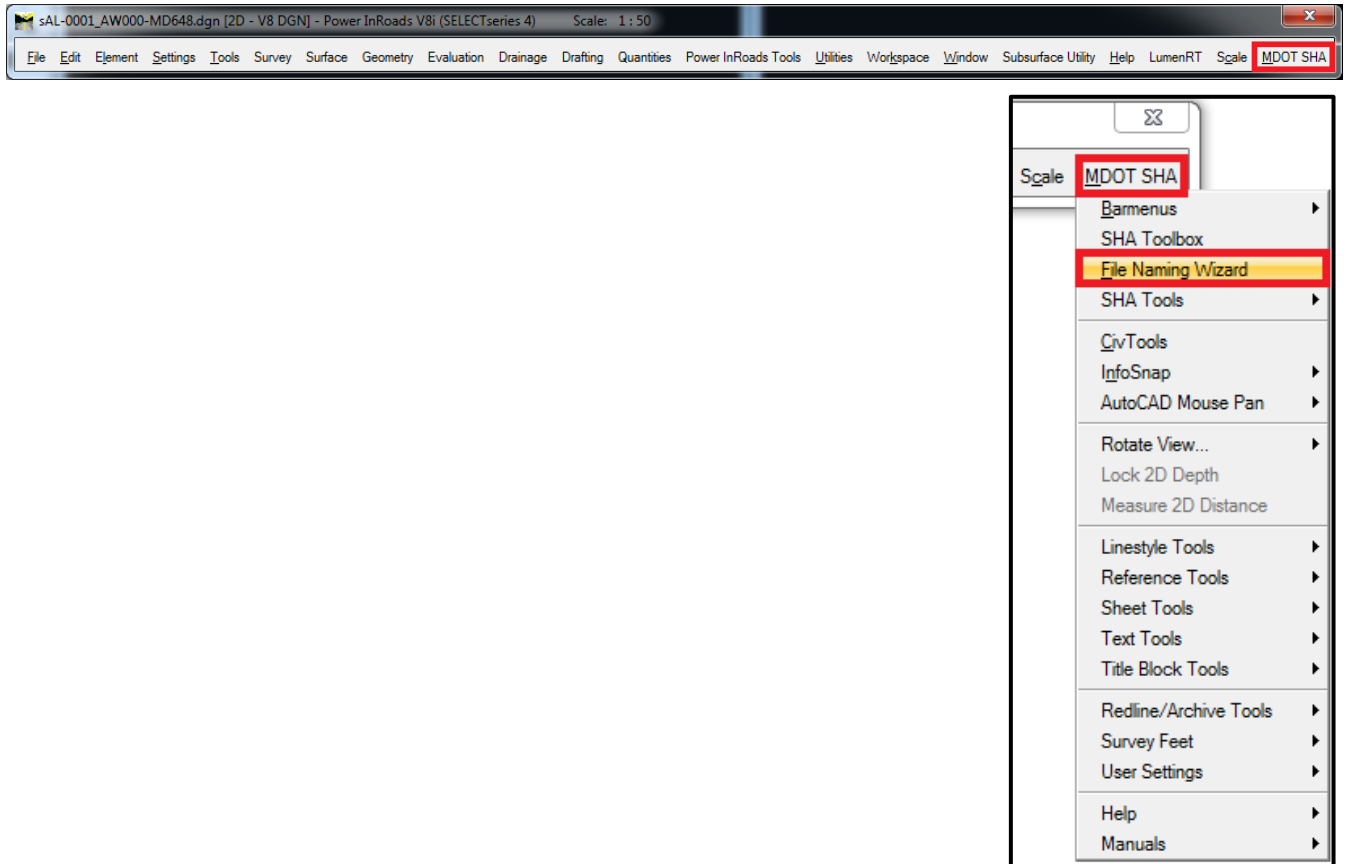

3) The **File Naming Wizard** should open, as displayed below. If the wizard does not open, contact your CADD Manager.

Note: Notice that the option for *Corridor* is not available in the wizard, since the mRW file is considered a *project wide* file. A **Project ID** should already be available in the dropdown menu if there are other files created in the project folders.

1) Enter the appropriate information in the **File Naming Wizard** using the dropdown menus and click **Accept**. The file is automatically created in the current folder and opened using **Power InRoads**.

2) A **Plat Workmap Model (mPL-E)** bar menu specific to the mRW file will become available, as displayed below. The menu naming convention is *Model, Plat -Existing*. Note that the menu options available in the **mPL-E** bar menu are not **Open Roads** tools and should only be used if non-Open Roads elements are desired.

3) Open the **MicroStation Models** menu. Notice that only one 2D model is currently available.
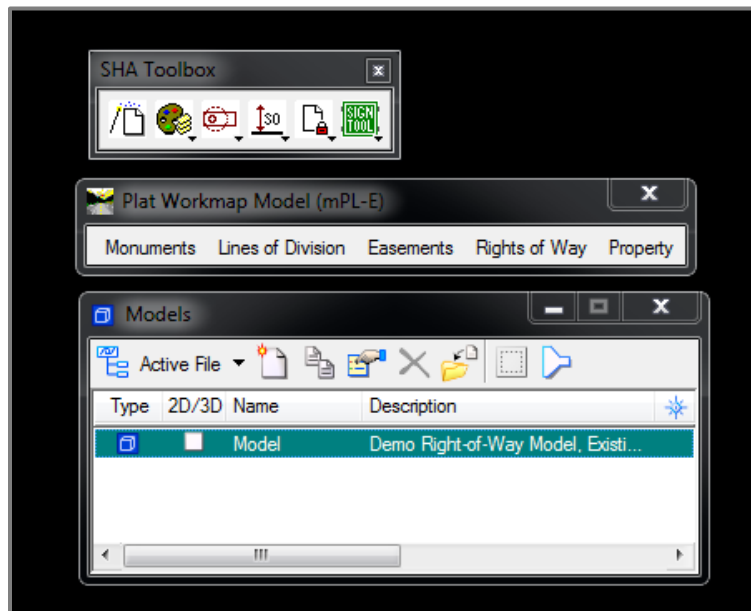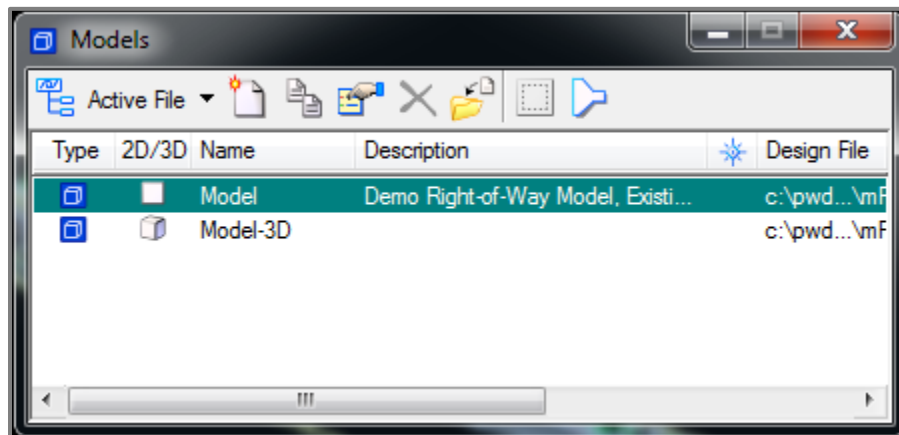

Attach mTO File

1) Attach the *Topography* **mTO file** containing the existing **Open Roads Terrain**. The Topography file is found in the **Survey Directory**.
Look for the file named **mTO**, followed by the *project name*, and ending in a **.DGN** extension.

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2) Once the **mTO file** is attached, make the existing terrain *Active* using the **Terrain Modeling** tools in **Open Roads.** The **Terrain Modeling** tools are located in *Row W* in the **Terrain Model** menu, as displayed below.
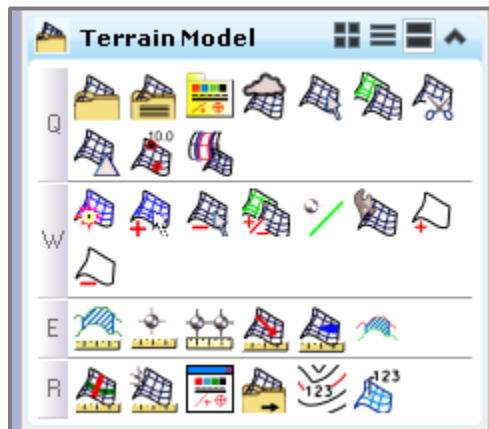

Note: Making the **Terrain Model** *Active* automatically creates a 3D model.

3) Once the **Terrain Model** is *Active*, **verify** that the file contains a 3D model by opening the **MicroStation Model** dialog box, as displayed below.

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Create Open Roads Geometry

1) Access the **Open Roads Horizontal Geometry Tools** menu by clicking on Tasks, followed by Civil Tool, and **Horizontal Geometry**, as displayed, below.
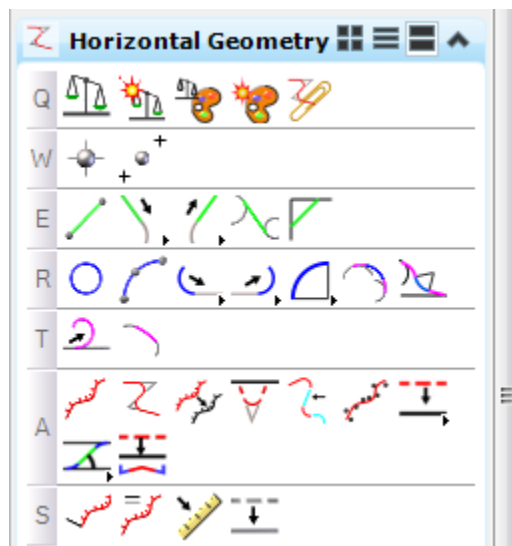
2) Access the **Features Definitions Toggle Bar** located in *Row Q*.

3) Expand the available **Plat Features** by selecting the **+ symbol** beside the **Plats folder**, as displayed below.

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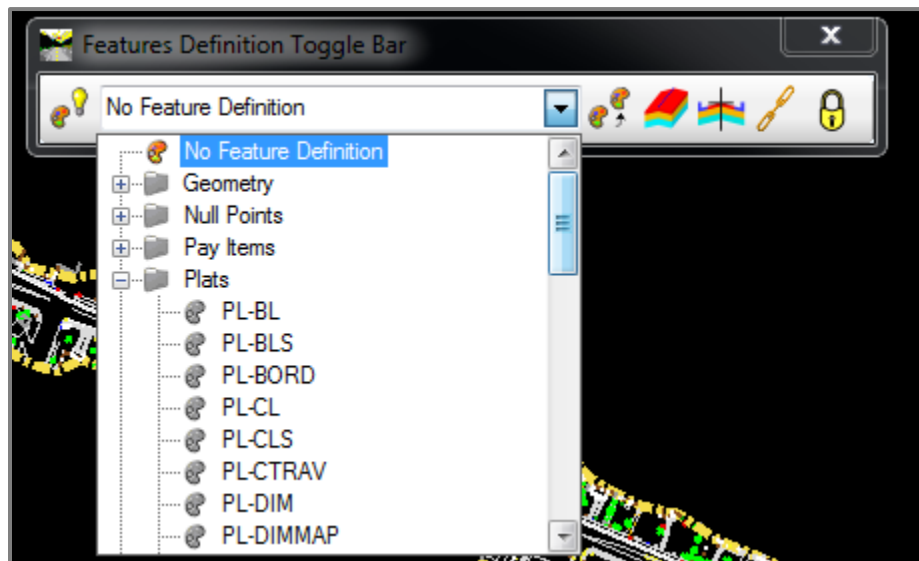
4) Select an *appropriate feature* and make it *Active*. The example below illustrates an *Active* **Existing Right-of-Way Feature**. You must select the icon with the *light bulb and paint pallet* to make the feature *Active*, as displayed below.
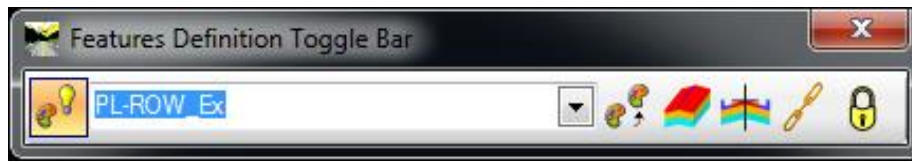

Draw Right-of-Way Line

The following example illustrates how to draw an *existing* **Right-of-Way Line** using **Open Roads** tools.

1) From the **Horizontal Geometry Tools** menu, navigate to *Row E*. Choose the **Line Between Points** command. Draw a line following the command prompts, as displayed in the example below.
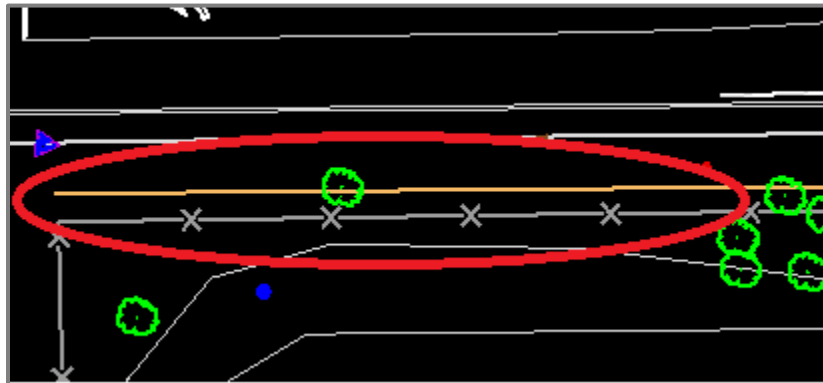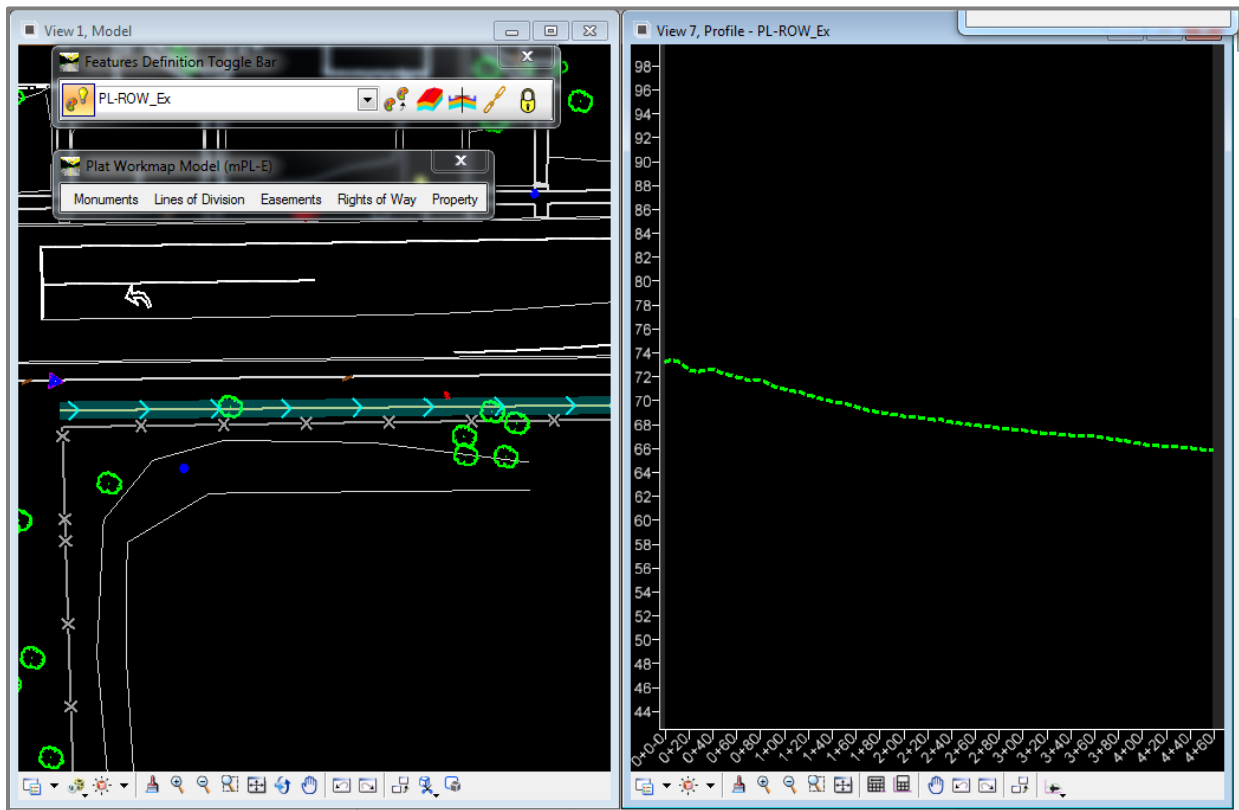

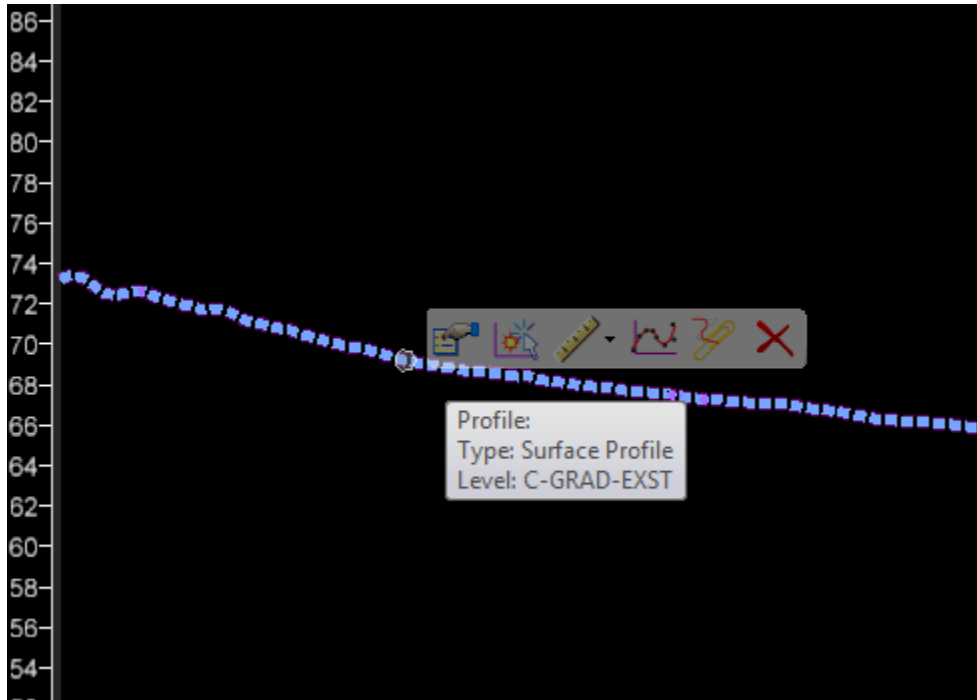2) Once the line is drawn, open another **MicroStation View**.

3) Use your mouse to *left* click on the line, revealing a tool bar. Select the **Open Profile Model** tool, as displayed below.
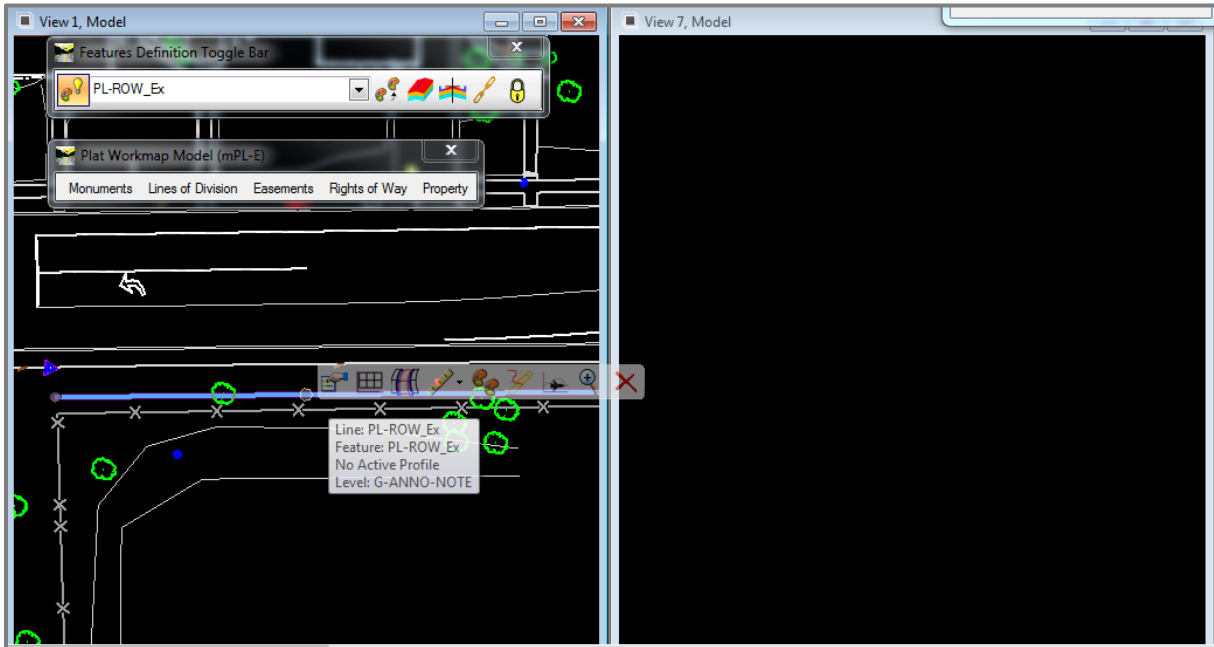
4) Data point in the open view. The existing profile will appear, as displayed below.

5) Use your mouse to *left* click on the existing profile. A **Surface Profile** menu will appear, as shown below.

6) Select the second option: *Set as Active Profile.*

Notes: Setting the *existing profile* as *Active* drapes the line on the existing terrain to create a 3D element. The 3D element is used by other disciplines such as **Roadway Design** to plot the *existing* **Right-of-Way Line** on the *cross sections* found in the sHC file, as shown below.
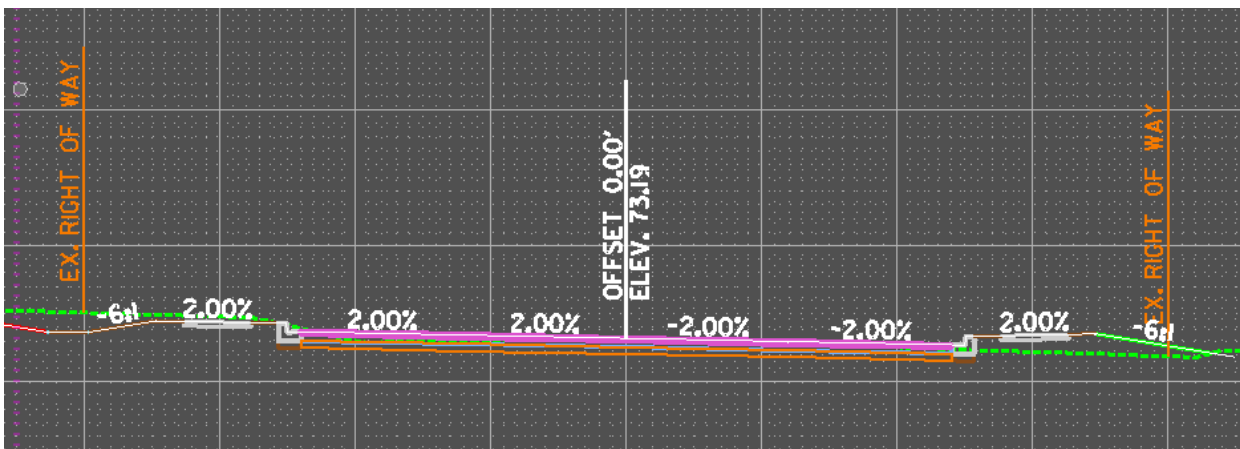
➢ The 2D element is referenced by multiple **Plan View Construction Documents** such as the **Printed Highway Design** (pHD) **file** or when creating plats.

➢ You can also use the **Open Roads** design tools in a similar manner as illustrated above when creating *Easement and Property Line* elements. Prior to drawing the element, change the **Active Feature** found under the **Features Definition Toggle Bar**. Select the element. Open a **Profile View** for the element, then make the profile *Active*. Repeat the process for every element thereafter.