CHAPTER D-DRAFTING

Setting Up Function Keys

⌃ In Microstation go to **Workspace > Function Keys**

⌃ Click on the F Key you want to change and type function into Action Window.

⌃ Then **Ok > Close**

Strip Maps

⌃ Make sure you have the **Border** files copied into your project directory. These are located at **U:\rd\Bentley\V8i\Microstation\bdr\English** then copy the plan.bdr, planrow.bdr, & pro.bdr

⌃ Create a new file and name it **Stripmap.dgn**, using the **Titleseed.dgn** seed file.
  → To find the titleseed, under File Name you will see a Seed box, click browse and choose your seed file. If the seed files do not appear follow this link**. U:\rd\Bentley\V8i\MicroStation\Seed\English**

⌃ You will see view 5 open with Auro.dgn & AuroW.dgn attached **U:\tim\mapping**

⌃ To select another county:
  1. Open Reference Manager and double click Auro.dgn.
  2. Select the "Browse" button then select the desired file
  3. Repeat for AuroW.dgn.
  4. Procedure with clipping the desired area. If you need more than two counties copy these reference file attachments.

⌃ Place a fence around area where project is located and activate the manipulate fence contents command. Make sure copy is selected and fence mode is clip. Place off to one side of the map. Make sure you include Township & Range numbers, Highway numbers, Interstate numbers, Section numbers, City names, etc. within the clipped area, or copy them from the county map into your clipped area. After you have done this you can detach the basic county map and the "w" county map reference files.

⌃ Draw a box in the open area of your title sheet. **Scale** and **Rotate** the clipped portion accordingly and place it in the center of strip map plotting border. This is made easier if you use UC=AS4pt.ucm. When using AS4pt Microstation will prompt you along the way. You will first need to select the box around the existing clipped map. Then you will need to select the box in the title sheet. This will give you a scale factor. Scale the map according to the data.

⌃ The following information shall be included on the strip map:
https://dotfiles.sd.gov/rd/rdmch09.pdf
  → Layout showing the Section Lines and Highway Centerline
  → Centerline should be a Bold Magenta Line from Beginning to End, for ADA Projects put Magenta Circles around intersections.

→ The layout shall only have one mile on either side of the highway centerline showing for a rural scale and one property owner for an urban scale. Project Number, County and PCN in the lower left hand corner.
→ North Arrow in the upper right hand corner.
→ Section, Township, and Range Numbers.
→ Begin Project and End Project notes with leader lines to the beginning & ending of the project.
→ Highway Numbers.
→ All Towns or Cities within 1 mile of Highway Centerline.
→ All major rivers within the limits of the project.
→ All railroads within the limits of the project.
→ County Line and County Names when required.
→ **Indian Reservation Boundary Lines and Reservation Names when required.**

Creating Title Sheet

- ⌁ Us Stripmap.dgn and do a save as and rename it to **Title.dgn**
- ⌁ Open **Title.dgn** and move the Image on the strip to the Title you may have to scale Image down a little to fit the title sheet (**Do not Reference strip or any other dgn. Into title.)**
- ⌁ Fill in the Project Number, Highway Number, County, and other information on the title sheet as needed. You will receive information from ROW and the Designer during the course of the project that will be included on the title sheet.
- ⌁ Place a north arrow close to map preferably on right side of project map.
- ⌁ Place **Index of Sections** in upper right corner of sheet. The last step of creating plan sheets will be filling in this Index.
- ⌁ Place a small shape in the county near the area(**Magenta Oval shape**) of the project and then shade using the create region command and click on flood and around inner shape make sure (**Keep Original**) is check place on level **20** color **10** shade **9** outline.

Creating Title Sheet Notes

- ⌁ Go to Intranet
- ⌁ C2C Project/Work Auth./Microfilm Plans
- ⌁ Select County, Type in Highway, Type in Type of Project in Improvement
- ⌁ Find
- ⌁ Select Year to Sort
- ⌁ Select Newest Project
- ⌁ Select Microfilm Plans (top left corner)
- ⌁ Select Plans and Find Connecting Section Line or go to
- ⌁ C2C Find project type in project PCN **view project**
- ⌁ Scoping Scenarios double click on the **Approved.**
- ⌁ **Background Information.** And there should be micro film pdf's of prier **projects**

Creating Section Title Sheet

- Create new file using **titleseed** seed file.
- Save as **TitleB.dgn** in the proper project folder. Shut off all levels that are not pertinent to Section B. Do the same for Section X (**TitleX.dgn**) and Section Z (**TitleZ.dgn**)
- Place label at top of sheet explaining which section the title sheet is for **(SECTION B: GRADING NOTES) (SECTION X: CROSS SECTIONS) (SECTION Z: PIPE SECTIONS)**
- Place an **Index of Sheets** note in the top right corner of sheet.
- Draw a rough shape within the map showing the general shape of the Borrow Pits.
- Label Borrow Pits with Borrow Pit Numbers and Legal Descriptions.

Creating dPCN#?.dgn

- In Micro station select **Files > New** this will bring up a dialog box called **Create Design File. Type in the name in the file Name (Example: dPCN#r.dgn)** and select **SAVE,** and you will be in a blank file called dPCN#r.dgn. Lower case letter after PCN#; r would indicate rural, u- urban and s-suburban as the scale for this design file **(Example: dPCN#r.dgn).**

- The dialog box (create Design File) has a seed file called seed3D.dgn in the lower browse window and you have just named and saved that seed file dPCN#r.dgn. The parameters for design files are already set.**(Do Not Open Seed Files).Open Microstation select File New browse select seed file you need Name it in the File Name box than select save.**

- You will also create the cg dgn. **File >New browse for seed file called seed3D.dgn save to project folder (Example: cgPCN#.dgn).**
-
- Attach the Topog, Right of Way, Curb & Gutter, and Bridge as reference files.

- Select **File > Reference** then select **Tools > Attach** and select a file you want referenced into the dPCN#?.dgn and click on **OK**. This will open another dialog box called **Attach Reference File**.

- In the **Logical Name Box** type in the name you want to call this reference file and in the **Description Box** type in the description of this reference file and select **OK**.
    - → The **Logical Names** for the reference files will be as follows:
        - ▪ rPCN#.dgn   =   **r**   (Right of Way)
        - ▪ cgPCN#.dgn =   **cg**   (Curb & Gutter)
        - ▪ tPCN#.dgn   =   **t**   (Topog located in Region Project folder)
        - ▪ bPCN#.dgn   =   **b**   (Bridge located in BR Project Folder)

- Any additional reference files attached will need different logical names.

NOTE: Should nothing appear after attaching the reference files, a **Fit View > All** can be done. The reference files attached will appear very small be sure they are not hidden under a dialogue box

- After attaching the reference files set up the levels in each reference file so they appear the way you want them too, refer to the **Symbology Documentation** which you can find at.
- https://dotfiles.sd.gov/cadd/CADD-General.pdf
  - → (Right of Way)   Levels = 21-29 ON
  - → (Curb & Gutter)   Levels = 9,17,19 ON
  - → (Topography)   Levels = 4,10,62,63 OFF
- With the levels set **File > Save Settings**

Starting Inroads

- Once in an open design file Inroads will need to be opened also
- The key in command is **mdl load civustat inroads**
- This command can be saved as a function key under the F1

Creating a Geometry File

- From the **Inroads** Box click on **File > New** this will bring up a dialog box called **New** click on the **Geometry Tab**. For the **Type** select **Geometry Project** and for the **Name** type **dPCN#** select **Apply** and **Close**.
- On the bottom right of the Inroads Pallet it will show all of the files open within Inroads. **Right Click** on the geometry file you just created and select **Save**, a dialog box called **Save** will appear, in the **Name Box**: type in the name you wish to call the file **(Example: dPCN#)** and then select **Save**.

NOTE: Make sure you are in the right project folder before saving.

- Now you will need to open the engineer's geometry file so that you can copy in the engineer's geometry.
- **Right Click** on **Geometry Projects** open ePCN#.alg

- From the **Inroads** Box select **Geometry > Copy Geometry** this will bring up a dialog box called **Copy Geometry**.

- Select the tab labeled **Horizontals** in the box labeled **From > Geometry Project Box >** set this to the ePCN#. In the box labeled **To > Geometry Project Box >** set this box to your dPCN#.alg file and in the **Horizontal Alignment Box >** type in the name of the alignment that you wish to copy, select **Apply** and **Close**.

- Repeat steps for all of the alignments needed for your project. Remember when you copy in the horizontal alignment it also brings the vertical along with it.
- Now that you have all your alignments copied into your file, you can **Close** the ePCN#.alg. From the **Inroads** box **Right Click** on the ePCN# and select **Close** it will ask if you want to save Geometry Project select **NO**.

NOTE: You may want to save your geometry at this time. From the **Inroads** box **Right Click** on your dPCN#.alg file and select **Save (Ctrl + G)**.

Drawing Horizontal Alignments

The main centerline alignment of the proposed project will be named **Mainline**. There will be other alignments that may be needed such as crossroads, diversions, and ramps. Each of these alignments should be given a preference of the scale for which they will be viewed. The scale will alter the length of the alignment shown per plan sheet and the text size. The designer will select the proper preference for the alignments. You can set that by going to **InRoads > File > Project Options > Preferences > Select Scale of Project > Apply > Close.**

NOTE: This will need to be set every time you come and go from the project.

- Make sure that the alignment you want to annotate is active, to check go to **Geometry > Active Geometry >** an **Active Geometry** dialog box will appear. In the box next to **Type** select the pull-down arrow and select **Horizontal Alignment**. Now you can select the alignment you would like to make active in the window at the bottom and then click on **Apply** and **Close**.

- **Geometry > View Geometry > Horizontal Annotation >** A **View Horizontal Annotation** dialog box will appear. Under the **Main Tab** under **Horizontal Alignments Include >** type in the name of the alignment that you are wanting to display. Select **Apply** and **Close**

- **Geometry > View Geometry > Stationing >** A **View Stationing** dialog box will appear. Under **Horizontal Alignment Pull Down Menu** select the correct alignment, if this is an Urban project you will need to go to **Preference > Urban > Apply > Close** then select **Apply & Close**.

Creating Full Plan Sheets

- Make sure you have the **Border** files copied into your project directory. These are located at **U:\rd\Bentley\V8i\Microstation\bdr\English** then copy the hfplpr.bdr, plan.bdr, planrow.bdr, & pro.bdr
- Select **Drafting > Plan and Profile Generator** from the Inroads box, and a dialog box appears.
- **Set Preference > Active Preference (ex. Rural_Plan) > Load > Close**

- Select the **Main Tab** in the **Station Limits Box** you can set up your drawings to start and stop at the stations that you specify. Make the **Horizontal Alignment** the alignment you need plan sheets for.

- Select the **Plan Controls Tab** click on the **Model Files** Button and this will bring up a dialog box. In this box you can select all the files you want to be referenced into the plan sheets. You should be able to see the files you just selected in the **Model Files Box**.

- Select the **Sheet Layout** Tab and click on the **Host File** box to make it active, then select the **Browse Button** and a Browse dialog box appears, should look like U:\rd\prj\COUNPCN#\plan.dgn

- Select the **Border and Title** Tab and click in the **Reference File Name** box, click browse and select the correct bdr from your project folder.

- With all these adjustments done select **Apply**

- The screen will go blank as the program starts to cut the sheets. When the program is finished you should be in the final Plan Sheet created.

NOTE: **Depth Lock Replacement**
V8i now uses Auxiliary Coordinate System (ACS) planes when working in your drawing. The short explanation of how to mimic Depth Lock is to turn on Locks > ACS Plane Snap. We will be incorporating the new version of micro sta. inroads and Open roads for the designers.

Creating Full Profile Sheets

- You will need to load your **Surfaces**. **Right Click** on **Surfaces** in the Inroads box and click on **Open**. This will bring up a dialog box; here you will need to go to the RegionXX Directory in order to load the Original Ground click on **Open** and **Cancel**. Select **Surface > Active Surface >** from the top tool bar, a dialog box will appear select the Surface you want active click on **Apply** and **Close**.

- Select **Drafting > Plan & Profile Generator >** A Plan & Profile Generator dialog box appears, select the **Preference Button** load the Preference that you need click on **Load** and **Close**. In the **Station Limits Box** if you set up your horizontal with a specified station limit then may want to set your vertical to match the horizontal.

- Select the **Profile Controls Tab** then locate the box labeled **Set Name** (this creates a name for the profile grids you are creating). In the **Vertical Alignment** either type in the name of the alignment or use the pull-down arrow and select the alignment. In the **Surface** box make sure that the **Original Ground** is your active surface.

- Select the **Sheet Layout** Tab and click on the **Host File Box** to make it active, then select the **Browse Button** and a Browse dialog box appears the correct path to the county PCN you are working in should be active if not select the correct path. Move your cursor to the **File Name** Box and type in **pro.dgn**

- Select the **Border and Title** Tab and click in the **Reference File Name** box, click browse and select the correct bdr from your project folder.

- Select **Apply** and the Plan and Profile Generator box will collapse and MicroStation will then ask you to **Identify Location** and once you give it a location (close to the horizontal Alignment in the dPCN#?.dgn. The generator will draw the **Profiles** and then **cut** them as well. When the **Plan and Profile Generator** is done cutting your profile sheets you will be in the last profile sheet. Go into the **dPCN#?.dgn** and place a **Reference Line** on the lower left hand corner of the first profile.
- **Close** the Plan and Profile Generator, it will ask you if you want to save your **Current VDF File** select **No**.

Drawing Vertical Alignments

- In the **dPCN#?.dgn** select **Geometry > View Geometry > Vertical Annotation** Click on the **Preferences Button** and select the correct preference, select **Load** and **Close**.
- In the Horizontal and the Vertical Boxes make sure that the alignments match one another.
- In the **Profile Set** box use the pull-down to select the correct profile grids

- If you specified a certain **Start & Stop Stationing** then you may want to activate the **Limits Box** and type in the stations you used for the horizontal

Profile Annotation

- Select **Evaluation > Profile > Annotate Profile >** Click on the **Preference Button** and select the correct preference.

- There will be occasions where you will be ask to do a **Super Elevations and Splines** on profiles (**Shoulder Widing projects with curves)**The verticals will be drawn a little different you will only show mainline on the part of the profile. Where the curve begins and ends this information will come from the designers in between the intervals will have to be set to 50.00 everything else will have to be deleted from the profile **except the original ground**.

- In the Active box make sure that the Profile Set is set to the correct profiles. Change the **Horizontal & Vertical Alignments** to the alignments that you are annotating. Change the box labeled **Surface to the Original Ground**

- Select **Apply** and **Close**.

Changing the Window Clearance

- ⅄ To adjust the placement of the Vertical Alignment within the profile grid get into the **Preference Manager**.
- ⅄ Select the **Evaluation** tab at the top, then select the matching preference used in the **Plan & Profile Generator.**
- ⅄ Double click on the **Create Profile** Preferences. Once in the **Create Profile** dialogue box select the **Controls** tab and change the **Apply Window Clearance** box labeled **Bottom** to 40.00 (this number can vary from profile to profile) then select save, this just changed the preference you select for creating profile sheets.
- ⅄ It is a good idea to record this number in the dPCN#?.dgn close to the profiles, for future reference.

Creating Curb and Gutter Layout Sheets

- ⅄
- ⅄ Select Drafting > Plan & Profile Generator > from the Inroads box, A Plan & Profile Generator dialog box appears, select Plan only then Preference Button load the Preference that you need which would be (urban plan) click on Load and Close.
- ⅄ Main Tab Station Limits Box if you set up your horizontal with a specified station limit then you need to set stationing to match the Plan Sheets and horizontal align.

- ⅄ Select the Plan Controls Tab in the Seed View Name (mainline) in the Model Files box go to Model files browser go to project folder load your cg dgn.

- ⅄ Select the Sheet Layout Tab and click on the Host File box to make it active, then select the Browse Button and a Browse dialog box appears, should look like (U:\rd\prj\COUNPCN#\plan.dgn).

- ⅄ Select the Border and Title Tab and click in the Reference File Name box, click browse and select the plan bdr from your project folder.
- ⅄ With all these adjustments done select Apply

- ⅄ The screen will go blank as the program starts to cut the sheets. When the program is finished you should be in the final CG Sheet created
  Name your sheets according to stationing on plan sheets followed by cg (Example 006cg dgn ect.
- ⅄ You will have to go in to sheets and clean them up and add Highway, streets, avenues. Correct levels ect.
- ⅄ Refer to plans assembly Figure 18-B17 for example.

Creating Curb Ramp Layout Sheets

- Open a **New .dgn** . File new name sheet to the ramp area.
- By this time you should know if the Layouts are Reconstruction or ADA
- Reference in the the cg#? dgn you may have to rotate the view .
- Reference in border from project folder and scale half of the urban scale.
- Urban scale is **.2** scale change to **.1**- text should be 1.8 - notes Level 20 color 10
- Place border in the area of the ramp or quadrant, put a fence around the area at
- least 2 stations if ADA only clip use the closest stationing for the dgn.
- Use the bubbles located in cell Library for numbering.
- Attach Heading cell from Library
- (**Example 034cr dgn**) Refer to plans assembly (**Figure 18-17a and 18-17b**)
- Put header on from cell library repeat steps as you move down the alignment.

Creating Pavement Removal Layout Sheets

- The Designer creates the master file from a seed file that will contain a legend using predetermined hatch patterns, area fills and symbology.

- The file will be saved in the project folder as prPCN#
- Each area of removal will be denoted with a shape and ultimately a hatch pattern or area fill (shading). Refer to the https://dotfiles.sd.gov/cadd/CADD-General.pdf for information on pavement removal symbology.
    - The initial shapes will be created by the designer, within the prPCN#.dgn file and on the appropriate level.
    - It will be up to the designer whether or not to set the color of the initial shape to that of the hatch/area fill for ease of use, or to set it to the color of the finish product - #10.
- The designer will notify the drafter when the shapes have been created and are ready for hatching/area fill. The drafter will then hatch/area fills the shapes in the prPCN#.dgn.
- When all shapes have been hatched/area fill, the plan sheets can be cut. Each PRL sheet will be named following standard plan sheet naming conventions with the "pr" designator (examples: 000pr.dgn, 320pr.dgn). The scale of the PRL sheets will correspond with the construction plan sheets.
- The PRL sheets will be created and inserted into the Section B .pdf no later than when the designer sends out the Request for Final Plans.
- Removal tables will be prepared by the designer and become a part of the Section B Plan Notes & Tables.

Creating Half Plan/Half Profile Sheet

- ⚹ Make sure you have the Border files needed for your sheets
- ⚹ Load your **Surfaces**. **Right Click** on **Surfaces** in the Inroads box and click on **Open**. This will bring up a dialog box; here you will need to go to the RegionXX Directory in order to load the Original Ground click on **Open** and **Cancel**. Select **Surface > Active Surface >** from the top tool bar, a dialog box will appear select the Surface you want active click on **Apply** and **Close**.

- ⚹ Select **Drafting > Plan & Profile Generator >** A Plan & Profile Generator dialog box appears, select the **Preference Button** load the Preference that you need click on **Load** and **Close**. In the **Station Limits Box** if you set up your horizontal with a specified station limit then may want to set your vertical to match the horizontal.
- ⚹ Select the **Main Tab** in the **Station Limits Box** you can set up your drawings to start and stop at the stations that you specify. Make the **Horizontal Alignment** the alignment you need plan sheets for.
- ⚹ Select the **Sheet Layout** Tab and click on the **Host File** box to make it active, then select the **Browse Button** and a Browse dialog box appears, the correct path should be active if not create the correct path. Move your cursor to the **File Name** Box and type in **plan.dgn**.
- ⚹ The **Symbols and Details Tab** you will toggle this off.

- ⚹ Select the **Plan Controls Tab** click on the **Model Files** Button and this will bring up a dialog box. In this box you can select all the files you want to be referenced into the plan sheets. You should be able to see the files you just selected in the **Model Files Box**.
- ⚹ Select the **Profile Controls Tab** then locate the box labeled **Set Name** (this creates a name for the profile grids you are creating). In the **Vertical Alignment** either type in the name of the alignment or use the pull-down arrow and select the alignment. In the **Surface** box make sure that the **Original Ground** is your active surface.

- ⚹ Select **Apply** and the Plan and Profile Generator box will collapse and MicroStation will then ask you to **Identify Location** and once you give it a location (close to the horizontal Alignment in the dPCN#?.dgn. The generator will draw the **Profiles** and then **cut** the Plan & Profile sheets. When the **Plan and Profile Generator** is done cutting your profile sheets you will be in the last sheet. Go into the **dPCN#?.dgn** and place a **Reference Line** on the lower left hand corner of the first profile.
- ⚹ **Close** the **Plan & Profile Generator**, it will ask you if you want to save your **Current VDF File** select **No**.

Setting up the Plan & Profile Sheets

- ⋏ Once the plan sheets are cut you will need to go into them and set the levels up in the reference files using the **Symbology Document**
- ⋏ Attach the name cell to the border file

- ⋏ Delete or change to a junk level the cut boundary shape

- ⋏ Reclip the horizontal view dPCN#?.dgn to the extents of the plan.bdr or the Plan portion of the hfplpr.bdr. **Only.**

- ⋏ Do a Microstation Save Settings and exit the file

- ⋏ Following proper naming conventions, rename the plan sheets.

Adding Reference Files

- ⋏ If a reference file needs to be attached to a plan sheet after the plan sheets were cut start in the plan sheet
- ⋏ **Open** the **References** dialogue box

- ⋏ Right click either the Topog or the ROW reference file and select **copy**
- ⋏ In the **Copy Reference Attachment** toggle on the **copies** box and enter a 1
- ⋏ The prompt asks for a location to copy from and too. Make sure these locations are the same

- ⋏ There should be a copy of the reference file displayed in the References dialogue box. Double click on the copy and change the File Name to the new file you wish to attach. Change the logical name to correspond with the new file you wish to attach.

Updating The Existing Geometry Project

Horizontal Alignments

- ⋏ Open the **dPCN#?.dgn**

- ⋏ Open the dPCN#.alg.

- ⋏ The horizontal alignment must first be deleted from the Draftsman's geometry file.
- ⋏ Select **Geometry>Delete Geometry** this will bring up a dialog box.

- ⋏ In the box next to **Type** select the pull-down arrow and select the **Horizontal Alignment** this will display all your horizontal alignments that you have in your project. Make sure that the **Geometry Project Box** is set to your **dPCN#.alg**

- Select the alignment you wish to delete click on **Apply** and **Close**.

- Open the **ePCN#.alg** and copy the new alignments into the dPCN#.

- Select **Geometry > Delete Geometry** this will bring up a dialog box.

- Select the **Horizontals** tab on the top of the dialogue box

- Set up the box so you are copying the alignments needed from the ePCN#.alg into the dPCN#.alg and are naming them the same.

- Once you have copied in the new alignments close the **ePCN#.alg**.

- Redraw the horizontal alignments and redraw the vertical alignments.

Vertical Alignments

- When you have to update the Vertical Alignment only, you will delete only the old vertical from the **dPCN#.alg**.

- Copy in the new Vertical alignment from the **ePCN#.alg**.
- Draw the vertical alignment and annotate the profiles like you are creating them for the first time.

These are the steps if you need to create new profile grid

- The entire profile and grids will need to be redrawn. Be sure to place them in the same location using the reference line located in the lower left hand corner of the first profile; this will allow them to appear in the profile sheets without having to adjust them.

- There will be some differences in how you set up the **Plan and Profile Generator**

- In the **Profile Control,** tab the setup is exactly the same as if you were creating the sheets for the first time.

- In the **Main Tab,** the **Sheets** portion toggle off **Generate Sheets.** This will allow you create new profile grids without creating new profile sheets.

- Select **Apply** and snap to the end of your profile **Reference Line** when it asks you for a location.

- View the vertical alignment and annotate the profiles like you are creating them for the first time.

Creating Typical Sections

⚖ Select **File**>**New**> A **Create Design File** box appears type **typ.dgn** in the box and hit the **Select** button under the **Seed File** box. Double click on the **typseed** and then select **ok.**

⚖ Once open you will notice some generic Typicals. Look through these you might find one that exactly matches your needs. If not you might find one that could be manipulated to fit your needs. Once you have a pre-drawn Typical chosen fence it and move it into the Border that is already referenced into your seed file

⚖ All of the cells needed are within the typseed file

⚖ Dimensions can be copied and edited to fit your needs. Text within the dimensions can be edited with the text editor command.

⚖ Place the **name** cell

Manual Drawing

⚖ To assign the **TYPICAL USER COMMAND** to a function key.

⚖ **Workspace**>**Function Keys**>once you are in the function key palette find a key that is not currently being used or replace a function key that you are not using.

⚖ Highlight the **Function Key** that is not being used. **Example:** F6

⚖ Select Edit and an **Edit Key Definition** box will appear, in the **New Undefined** box type in **uc=typ.ucm** and select ok (on both boxes).

⚖ Now that you have the Typical User Command assigned these commands will help you to move in the direction you want to.

      -.02 = down 2%   +.02 = up 2%

      -1 = draws right to left   +1 = draws left to right

⚖ If you data twice this brings up the **Enter Option** and allows you to select the following directions without canceling out the string.

      1=Horizontal = Draws the line in a horizontal direction.

      2=Vertical = Draws the line in a vertical direction.

      3=Parallel = Copies lines in a parallel direction

⚖ After creating the drawing you will need to edit the dimensions, copy cells, and place text.

⚖ All of the cells needed for your Typical should be on the pre-drawn typicals within the typseed file. Select the cells needed and move or copy them to the new typical.

- Dimensions will work the same way, move or copy them over to the new typical from one of the pre-drawn typical.

- Place the **name** cell

Annotating Horizontal Curve Data

- Open the **dPCN#?.dgn**

- Open the dPCN#.alg. You should have the correct alignment active.

- Change your active settings using the Symbology document

- From the **Inroads** pallet select **Geometry > View Geometry > Curve Set Annotation**

- Select the alignment you want to annotate

- Hit **Apply**

- Rotate annotation to match sheet border and move to a visible location.

Annotating a Spiral Horizontal Curve:

- **Geometry > View Geometry > Horizontal Annotation**

- Under the **Main tab > Horizontal Alignments >** select the target button and data click on the alignment you want to annotate
- **Apply**

- LT, ST, and LC can now be copied into the Horizontal Curve Data note displayed by the **Curve Set Annotation**.

- The PI for each spiral should be renamed SPI.
  Example:
  SPI 685+65.22
  N   493502.78
  E   2185877.69
  Del $10^0$57'39" R
  Ls 440.00'
  LC 439.28'
  ST 147.18'
  LT 293.90'

NOTE: On Diversions and Crossroads label the Curve Data with corresponding names so there will be no confusion with the mainline Curve Data.

Copying ROW

⚐ Open the **Plan Sheet**

⚐ Turn off the displays of all reference files except for the rPCN#

⚐ Turn off all of levels except level L20 and L33 in the rPCN# reference file

⚐ Copy the labels and landowner names to each sheet

⚐ If the construction sheets and ROW sheets are to be combined leave the legal description on the ownerships, otherwise strip the legal descriptions off of the ownership's, they will be replaced with Parcel #.

Take Out Notes

⚐ The existing pipe size and type labels are on level L4 of the Topog reference file. Turn this level on.

⚐ Using Microstation measure tool, measure the existing pipe length

⚐ Using the **Inroads tracking** snap to the center of the existing pipe to get the Station and offset

⚐ Once the length, pipe size, pipe type, and station offset have been established the note can be created.

⚐ All of the mainline pipe will be removed unless the designer tells you otherwise

⚐ Only the approach pipe within the work limits will be removed unless the designer tells you otherwise.

==*NOTE*==: ==if the topog does not give you any information for pipe you can look on an old set of plans to see what they put in.==

Pipe and Install Notes

Mainline Pipe in Plan Views

⚐ Reference file attach the **pPCN#.dgn** file into the **dPCN#?.dgn** file. You will need the station and offset, and elevations for the pipe labeled. You will also be using the **Install Notes** to copy into the **dPCN#?.dgn**.

==*NOTE*==: ==The offset given here is the offset of the end sections. When the pipe is drawn in the plan view it will display as the overall length of the pipe and ends.==

⚐ Open up the **New Cogo Point** pallet

- Change the **Define By** to <u>**Station & Offset**</u>

- The first point created will be named **18p1, 18p2,** or **24p1, 24p2…30p1, 30p2,** The first number refers the size of pipe being installed and the **p** is for pipe.

- Use the **Station Offsets**, and **Elevations** from the Pipe Sections to insert into the **New Cogo Point** pallet

- Set your Style to Pipe Size and Scale (ex. R54p), this creates points on level L63 which will be turned off.

- Select **apply**

- Once **Cogo Points** for the entire mainline pipe are created you start placing your Graphic lines to display the pipe in the Plan views. Use the **Symbology Document** to set your active symbology for drawing these lines. Use cells to place Gabion Baskets

- With the **pPCN#** file still attached you can use the same **Install Note** attached to each pipe sections by copying them into your **Plan Sheet**.

<u>**Mainline Pipe in Profile Views**</u>

- To place the pipe in the profiles you will use **Evaluation > Profile > Points To Profile** pallet.

- Change the **Profile Set** to the profiles you need to display the pipe in

- Toggle in the **Points to Project** box, and select the **Filter Button.**

- Select all of the same points such as all of the 18p and **add** them into the **selected** box
- Set your **Symbology** for the text to a level that will not print and your point to the correct cell for the size of pipe you are displaying

- Repeat this procedure for the entire 24" pipe, 30" pipe, ETC…This will place the correct cells in the **Profile** at the proper **Station** and **Elevation**. Once this is done you can label the **Flow Line** elevations wherever the pipes are.

<mark>***NOTE***: If you are redrawing pipe in a profile you will need to turn off the **Delete Ink Lock**. This will enable you to redraw one pipe on a sheet without deleting the entire pipe on the sheet.</mark>

Displaying Box Culverts and Cattle Passes

- The structure width and height can be found in the Corresponding dgn file in the br folder on the U:\drive
- The scale for the vertical profiles should be rural unless instructed otherwise.
- Place a orthogonal shape and type in the key in window DX= (With of structure), (10 times height) 80 (for 8'high) and hit enter. The box is drawn.
- Set snap lock to midpoint and with Copy command snap to the bottom of the shape. Type in SE= (station) 24356, (elevation) 1345.06 and hit enter. With the shape still on the curser type in the information for the other end of the structure and enter, reset and you are finished. The overall width and height is all that is required.
- Place flow line information and Q's, notes provided from the bridge dgn. File
- Symbology for profiles would be co=77, lv= 30, wt. =2.

Approach Pipe in Plan Views

- To draw the **Approach pipe**, figure out the stationing for the ends of the pipe. Using a manual engineer scale and a paper set of the Approach pipe sections align the scale on the grid lines of the pipe section to achieve a close enough stationing for the ends of the ends. Once these stations have been acquired begin drawing the Approach Pipe, The offset will come off of the Install note for that pipe.

- Make sure you have the **mainline** alignment active

- Open the **Place Smart Line** command

- Using the **Key-In** box type in the station offset for the left beginning of your pipe

- Select **Enter** and your **Place Smart Line** Start a line at that station offset.

- Repeat the step for the other end of the pipe and for the rest of the Approach pipe.

NOTE: The Approach pipe do not get displayed in the Profile so when placing them in the Plan views they can all be at 1500 elevation

Creating Easements:

- Load the **Subgrade** surface from your Project Folder.

- From the Inroads Pallet Select **View Surface** and then **Perimeter**, a new pallet will open

- The default preference should be active and is the one to use, select apply

- ⚲ Copy parallel the work limits using the **Offset Guidelines** as a reference.
- ⚲ **Offset Guidelines**, Offset work limits distance required according to scale of the file you are using.

<div align="center">

Rural = 20' Urban = 10'

</div>

- ⚲ Change the color of the offset work limits, to simplify the viewing.

- ⚲ Create a shape(color=3, weight=1, Fill Type=Outlined, and Fill color=9) wherever the work limits go beyond the ROW

- ⚲ Use the offset work limit as a guideline and try to limit the amount of vertexes.

- ⚲ Notes should be aligned at the bottom of the page by Parcel Number

- ⚲ Note Should Read: <u>Parcel Number</u>
  Station to Station L/R
  Temporary Easement containing
  ____ ac, sq,ft more or less.

- ⚲ Under **Inroads Tools** select **Tracking** and go to settings preferences click on ease lt or ease rt ease already set to the station and offset.

- ⚲ Using the tracking place station and offsets along these shapes as close to the shapes vertexes as possible and to the nearest 10 foot for both the stationing and offset where possible.

NOTE: The stationing for the proposed ROW will be in the r-file and will have to be copied in if it is not on Lev38 let the ROW drafter know so he or she can get it for you.

- ⚲ Points where the proposed row meets the easement or where the easement vertex does not come in contact with any line should be taken out to the nearest foot for Station and Offset. If the station & offset falls on an existing ROW line that lies parallel to the alignment take the station to the nearest foot. If the station & offset falls on the existing ROW that runs adjacent to the alignment take the offset to the nearest foot. Every other instance will be taken out to the hundredths.

- Once the tracking points have been established, modify the shapes to the points. Use the **Key-in** command line and type in the Station and Offset. (**Example: so=23150,115,1500**)

NOTE: Make sure you type in the 1500 elevation because Microstation defaults to an elevation of 0, and that will alter your easement area.

- To increase the accuracy of an easement that lies on a curve use the **Create Region** command

- Using the **Smartline** command draw a line that follows the offset work limit and crosses the curve of the ROW line.

NOTE: To simplify the process turn off as many unneeded levels as possible.

- Open Microstation **Create Region** Data inside easement area to be created. This area will be highlighted to the exclusion of others. A notice will appear on the command at the lower corner of your screen to **Accept or Reject**. If area is as you had planned, you would left click to accept if not right click and it should highlight a new shape. Continue process until correct easement shape is created.

Creating Alignments

- Once the easement shapes are created you need to make the shapes into alignments

- From the pull down menu of Inroads under **File**, go to **Import** and select **Geometry**.

- A Pallet will appear from which you select **Graphics**. With your Geometry Mainline active, type in the name of your easement as (te1) and arrow down style to read **main**.

- Upon selecting **Apply** at top right corner of this pallet, the pallet will diminish and the command line on your screen will ask you to **Identify Element**.

- When you accept this area, the area and Geometric data is written to a report file and identified by the name you have given it. The pallet will reappear and you are ready to make your next selection. The name is automatically upgraded to another number (te2).

NOTE: If an easement is changed and the area is a different size, it is a good idea to delete the old easement alignment from the dPCN#.alg then create a new one for the new shape

Report Files

- ⚴ Once the alignments are created you need to create reports for them that can be displayed on the plan sheets.

- ⚴ Select Tools > XML Reports.

- ⚴ Under Horizontal Alignment Include type in your alignment name or select the cross hairs and pick the alignment you want to run the report on.
- ⚴
- ⚴ Bentley Civil Report Brower pops up, go to the SDDOT folder and copy the information you need.

NOTE: When the **Results of the Report is 0.0** happens, the problem is either non-intersecting lines or the easement shape is too small to measure. Modify the shape so it is closed geometrically, or if the area of the easement shape is less than one tenth of an acre, than round up to one tenth of an acre.

Fence

Post Panels

- ⚴ The type of existing fence can be researched when on the Preliminary Inspection. When drawing the fence the drafter uses the Landowner notes which will provide what type of new fence is going back in along with gate sizes and if there is temporary fence or not.

- ⚴ Copy parallel the ROW line 5' away from the main alignment; this gives you the proper distance for the fence to be visible. Change the attributes of this line to the new fence attributes.

- ⚴ Place gate cells at the entrances using the length of the fence to the next break and the Standard Plates to determine whether a 2 or 3 post panel gate is needed.

- ⚴ Make all of the breaks and delete any of the new fence line that you will not be using. This will make it easier to place post panels. Usually the new fence will end at Section Line ROW, Property lines, ¼ lines, change in fence types, change in direction of fence (as in a sharp angle) and gates.

- ⚴ Once the fence is drawn to the proper lengths start placing post panels. **Using the Standard Plates** place post panels at the appropriate locations.

- ⚴ When the fence has been drawn place Begin and End Fence notes at the beginning and ending fence segments of the same type fence.

NOTE: You do not need a Begin or End Fence note at gates, property lines or ¼ lines if the Type of fence does not change.

⌃ Label gates, post panels and stream crossings. The fence type will only be labeled on a sheet where the **Begin Fence** or **End Fence** notes are on different sheets.

Attaching Border to Notes and Tables

Create PDF from Word and/or Excel without border

⌃ **Word (Notes)**
  → Remove Header.
  → Print to Blue Beam PDF
  → Store PDF in project subfolder \Documents.
  → Naming Convention:
  →
    ▪ Section_A-EstimateofQuantitiesandEnvironmentalCommitments.pdf
    • Section_B-Grading_Notes.pdf
    • Section_D-Erosion_Control_Notes.pdf
    • Section_H-Landscaping_Notes.pdf
    • Section_L-Lighting_and_Signals_Notes.pdf
    • Section_M-Pavement_Marking_Notes.pdf
    • NonSection_Notes.pdf
    • Control_Data.pdf
    • Horizontal_Alignment.pdf
    • Subsurface_Utility_Locations.pdf

⌃ **Excel (Tables)**
  → Select rows 1 thru 3.
  → Clear Contents.
  → Delete left, top and right cell border for A1 thru X3.
    (The Format Painter tool is very useful)
  → Print to Blue Beam PDF.
  → Store PDF in project subfolder \Documents.
  → Naming Convention:
    ▪ Table_of_Fence_Quantities.pdf
    ▪ Table_of_Pipe_Quantities.pdf
    ▪ Table_of_Conduit_Quantities.pdf
    ▪ Table_of_Pavement_CG_Quantities.PDF

OCR

- **Searchable Text and WEB Links**

- Some pages are only images and need Optical Character Recognition (OCR) to allow this capability.

- <mark>**NOTE**: DO NOT run OCR on SDDOT plan sheets. Run OCR only on pages with images. Some pages that may need OCR are Note Sheets, Quantity Sheets and Data Sheets.</mark>

- 1. Open PDF with Blue Beam.

- 2. Determine which pages need OCR. (**See Note above**).

- 3. Select the Recognize Text command. Dialog box will open.
    - → Make sure Correct Skew, Detect Orientation, Detect Text in Pictures and Drawings and Rotated Markups are check.
    - → To Select a Page Range, click the Pages Menu and Select from the following:
    - → All Pages: Sets the Range to all pages.
    - → Current: Sets the Range to the current page only the page will show in ()
    - → Custom: Sets the range to custom value. When this is selected the list becomes a text box. To enter a custom range.
    - → Use a dash between page numbers to define (example 1-3)
    - → Use a comma to define pages that are separated (example 1,2,3,5,9)
    - → Click OK to run OCR.
    - → Save the Document.

<mark>**NOTE**: If a page with OCR is replotted/replaced, OCR will need to be rerun on that page.</mark>
<mark>**Refer to the Blue Beam Documentation For Stamping and Flattening** .</mark>

Create Sheets

- ⚐ **MicroStation**

  - → Create New File using DataSeed.dgn NotesSeed.dgn or TableSeed.dgn.
  - → Naming Convention:
    - ▪ NotesSection?.dgn (Ex. NotesSectionB.dgn)
    - ▪ NotesNonSection.dgn
    - ▪ StdPlatesSection?.dgn
    - ▪ TableConduit.dgn
    - ▪ TableFence.dgn
    - ▪ TablePipe.dgn
    - ▪ TableCG.dgn
    - ▪ DataControl.dgn
    - ▪ DataHoriz.dgn
    - ▪ DataSubSurface.dgn
    - ▪ WiringTables.dgn
  - → Place "Name" cell on the sheets required.
    - ▪ Cell placement order controls sheet order
  - → Add DGN to your .pset
  - →

NOTE: Other sections will not plot from your DGN along as there is not a "Name" on those sheets.

Pipe Estimate Sheets

- ⚐ It is a good idea to go through the plan sheets and make a list of the different types of **Pipes**, (Circular or Arched) the type of **Ends** (Sloped, Arched, or Flared) the diameter of the pipe and the amount of pipe **Stationing**. This will help you in setting up your **Estimate Sheet** later.

- ⚐ When starting a **Pipe Estimate Sheet** you will need to go Online and select the pipe estimate sheet from the downloadable files section from the Road Design web page.

- ⚐ If you made a list of the of the different types of pipes and their diameter, the different types of ends that go to the pipes, and whether or not the pipe is reinforced concrete or corrugated metal. You can now use this list to setup your **Estimate Sheet**.

- ⚐ Start copying in the Bid Item numbers. At the bottom of the sheet there are tabs select either the **RCP** or the **CMP** tab this will bring up another sheet that has all the information that you will need to make your **Estimate Sheet**.
- ⚐ Next label the different sections and border them off
- ⚐ (**Fig 18-B3a of Plans Assembly**)

D-25

- Once you have all the information in the proper places, then you can start typing in all of the **Stationing** and putting in how much pipe is to be installed under the correct type and size column, and the number of ends under the correct type and size column.

- You may need to **Edit** your formulas if you add a column stop in the middle of the page or on a page that does not have the **Subtotal** and the **Grand Total** at the bottom of the sheet if so refer to your **EXCEL MANUAL**.

Fence Estimate Sheet

- When starting a **Fence Estimate Sheet** you will need to go Online and select the Fence estimate sheet from the downloadable files section from the Road Design web page.

- Open the **dPCN#?.dgn** the fence should already be drawn and labeled.

- Turn off all non-essential levels. Turn the display off of all of the reference files not being used. This will simplify the counting of Post Panels and the viewing of fence notes

- With the dPCN# open scroll through the entire length of the project noting the different fence types, different post panels, and different gates.

- The Landowner Notes used to draw the fence will tell you if there is temporary fence or not and what kind of temporary fence will be needed.

- Once all these items are noted you can place the corresponding Bid Item numbers on to the Fence estimate sheet. By toggling the Bid Items Tab on the bottom of the estimate sheet you can cut and paste the correct fence type, post panels, gates, temporary fence and any other bid items you may need, into the blank estimate sheet.

- Start on the left side of the Mainline alignment

- With your fence estimate sheet open, enter the station the fence begins and ends.

- Enter what side of the alignment you are on.

- If the fence is drawn on the ROW line. Subtract the begin station from the End station to get your quantity

- If the fence is drawn on the work limits. Measure the lengths using the Microstation measure tool to get your quantity.

- When you have your quantity established place this number under the correct Fence Type column.
- Count the 2-Post Panels on the same segment and place the quantity under the 2-Post Panel column.

- Count the 3-Post Panels on the same segment and place the quantity under the 3-Post Panel column.

- Count the gates being installed and place the quantity under the correct gate size column.
- Go to the Landowner Notes and find out if the landowner requested temporary fence or not if they did place this quantity under the correct Temporary Fence column. Round this number to the nearest 10 feet.

==**NOTE**: If no Temporary fence is indicated on the Project it is still included in the Fence Estimate so that a unit per foot cost can be established. 2000' is a good lump sum estimate. (This is done only on a job per job basis).==

- Measure the Existing Fence lengths using the Microstation measure tool to get your quantity and place this quantity in the take out fence column. Round this number to the nearest foot. Type 1 Temporary Fence in the Remove Fence quantity along with the existing fence removal.

- Repeat these steps for each install segment of the project.

Horizontal Alignment Data

- You will need to get the standard Horizontal Alignment Data Sheet
- https://dot.sd.gov/doing-business/engineering/design-services/downloadable-files.
- Do a "Save As" and save it to your project folder in the documents folder.

- Open the dPCN#.alg. Go to the **Tools** tab in Inroads and then **XML Reports**.

- In the **Reports** pallet, go to **Geometry**.

- Click on the **Horizontal Alignments Include** and type in Alignment Name, Hit Apply

- In the **Bentley Civil Report Brower** Select the **SDDOT** folder. Then select the HorizonalAlignmentData.xsl.

- Once applied you will get a **Report Results** box. Hit the display button and pick a spot in the open in the d-file so you can see it.

- At this point you want to use your **Element Selector** and select the whole report.

- Copy the Report to the clipboard
- Go into the Horizontal Alignment sheet and paste it in there.

- You can delete all the info from the top of the report you don't need and the examples that are in there.

- Then put a heading on the report stating the name of the alignment.

- Do this for all the alignments in the project.

Control Points

- You will need to get the standard Control Data sheet from the Road Design web page under **Downloadable Files**. Do a "**Save-as**" on the document and save it to your project folder in the document folder and name it PCN#controldata.doc.

- Open your dPCN#.alg and the PCN#org.alg. **Geometry > Copy Geometry**

- Copy Mainline only from dPCN#.alg to PCN#org.alg **> Apply**

- Make sure you have PCN#org.alg set as active

- **Tools > XML reports > Clearance > Cogo Points > click in the INCLUDE area > Filter > select Benchmarks and Reference Marks > Add > OK > Apply**

- Paste info into your Control Data sheet.

- You will have to use the FWD in control project folder and find the description if available; also check to see if Northing/Easting matches.

Earthwork Notes

- Open the **dPCN#?.dgn**

- Set your Symbology using the Symbology document

- Using **Smartline** draw a line straight across the upper portion of all of the profile grids. This line should not interfere with any notes or the alignment.

- Place the **Begin** and **End** note cells and with the **Balance Point** cells along this line.

- Open the **ewPCN#.xls** files open.

- In the **ewPCN#.xls file** locate the information that you want to link into the **dPCN#Sr.dgn** file. **Highlight** the column that you want to link and do a **copy**.

- Go into the **dPCN#?.dgn** file find the location on the profile that the earthwork information will be placed and go to (**Edit**) (**Paste Special**) (**Linked Text To Design File**) **Paste** along the line drawn earlier and somewhere between the balance points.

- Continue this process until all notes are linked.

Structure Display

Plan View

- Reference in the structures from bridge

Profile View

- The structure width and height are located in the bridge sheet referenced into the dPCN#?.dgn

- The width is always first in the description.

- Go to the bottom right corner of the profile window the structure should be placed in.

- **Copy parallel** the last tick mark left the exact width of the structure.

- **Copy parallel** the bottom tick mark up the height of the structure times 10.

- Set up the correct symbology

- **Place a block** using these new tick marks as guides

- **Delete** the new tick marks

- **Move** the block off to one side for simplicity

- Create a complete structure for one end, by **copying** the original shape. Some structures may have multiple boxes within one structure.

⌃ Snap to the **Midpoint** on the bottom of the structure.

⌃ Using the **key-in** command type in the station and elevation (**Example: se=5171, 1540.57**)

⌃ Copy structure and repeat placement steps for the other end.
⌃ Using the same elevations used to draw the structure place Flow Line notes on profiles close to the structure.
⌃ Using the Hydraulic Data off of the bridge sheet place a hydraulic note close to the structure.

Bridge Display

Plan View

⌃ Reference in the bridge from the Bridge directory.

Profile View

⌃ All of the information needed to display a profile of the bridge will be found on the Bridge sheet referenced into the dPCN#?.dgn

⌃ Locate the beginning and ending station and elevations

⌃ Draw a line using the key in command and type in the station and elevation for the beginning and ending of the bridge. (Example: se=1425.25, 1323.77)

⌃ Extend the lines straight down.

⌃ Find the Berm distance from the end of the bridge, on the bridge sheet.

⌃ Add the Berm dimension to the begin bridge station.

⌃ Next find the Berm Elevation on the profile portion of the Bridge sheet.

Standard Plates
Creating Standard Plates

⋏ Create New Microstation file (DGN) using
"**u\rd\Bentley\V81\Microstation\Seed\English\StdPlateSectionSeed.dgn**" as
the seed file.

⋏ Name "***StdPlateSection?.dgn***", in active project folder.

⋏ Add standard plates by opening Raster Manager (Select **File**, **then select attach
Raster**).This will open the Standardplates PDF file Select the plate you like to
add. If the standard plate that you select has more than one plate, right click on
the pdf .A dialog box will open **Page Selection** right click and another dialog box
will open select page. Make sure to change Place Interactively option to **Yes**.
Place the plate on the left side of the sheet by utilizing the yellow nodes. Place
the plate on the right side of the sheet by utilizing the red nodes. Do the same for
all Plates needed

1. File > Raster Manager.
2. Right Click on appropriate file and select **Detach.**
3. **File > Attach > Raster.** (From Raster Manager)
4. Select appropriate standard plate and select Open.
5. In Raster Attachment Options
   a. Right Click on the File name and select **Page Selection…**
   b. Select the appropriate page and Select OK.
   c. Under Actions Change "Place Interactively" to **YES**.
   d. Select Attach.
   e. Follow Prompts – using the yellow points for the Left Side Plate and the red
      point for the Right-Side Plate.

⋏ Attach the cell (**Name**) to each of the sheets

 NOTE: Micro-Station print organizer reads the print borders in the order the **Name**
cell is placed. You may have to delete the plates out of the print organizer to up date
sheets