

DRAFTING OF FINAL PLANS

INDEX

| | |
|----|--|
| 1 | Index |
| 2 | Creating a shortcut for Inroads |
| 2 | Strip Map |
| 2 | Creating Title Sheet |
| 3 | Creating Section Title Sheet |
| 3 | Creating dPCEM?.dgn |
| 4 | Starting Inroads |
| 4 | Creating a Geometry File |
| 4 | Drawing Horizontal Alignment |
| 6 | Creating Full Plan Sheets |
| 6 | Creating Full Profile Sheets |
| 6 | Drawing Vertical Alignments |
| 7 | Changing the Window Clearance |
| 7 | Creating Half Plan/Half Profile Sheets |
| 8 | Setting up the plan & profile sheets |
| 8 | Adding Reference Files |
| 8 | Borders in the dPCEM?.dgn |
| 8 | Updating the Existing Geometry |
| 9 | Creating Typical Sections |
| 10 | Annotating Horizontal Curve Data |
| 10 | Copying ROW |
| 11 | Take Out Notes |
| 11 | Pipe and Install Notes |
| 12 | Easements |
| 13 | Fence |
| 13 | Pipe Estimate |
| 14 | Fence Estimate |
| 15 | Horizontal Alignment Data |
| 15 | Control Points |
| 16 | Earthwork Notes |
| 16 | Structures |
| 17 | Bridges |

Drafting

Note: These instructions are based on the assumption that the drafter has had some Inroads and Microstation training. It is recommended that the drafter read through the documentation first before attempting any of the procedures. These directions are just one way of accomplishing these tasks and are not necessarily the only way..

Creating a Shortcut for Inroads

- **Open** the **Desktop Explorer**
- **Right Click** on the correct project directory and drag it to a new location on your desktop and release.
- A new pallet will appear, choose the **Copy Here** command
- This will create a shortcut to the project directory and provide you with access to all of the files

Note: This would be a good time to copy in the plan, pro and the half planpro border files

Strip Maps

- Create new file using **titleseed** seed file, name it **stripmap.dgn**
- Reference in the county, or city map that you will be using for the project. You will only need to attach the county, or city map, and the “w” county map. The “w” county map includes all of the lakes, streams, and rivers in the area.
- Locate on the county map where the project is located.
- Place a fence around area where project is located and do a **clip copy** 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
- **Scale** and **Rotate** the clipped portion accordingly and place it in the center of strip map plotting border.
- The following information shall be included on the strip map:
 - Layout showing the Section lines, Quarter lines and Highway centerline (Centerline shall be bold).
 - The layout shall only have one mile on either side of the highway centerline showing for a rural scale and one property owner for a urban scale. Project Number, County and PCEMS No. in the lower left hand corner. (Needs to be scaled to ½ the size of the title sheet heading and the PCEMS size stays the same.)
 - North Arrow in the upper right hand corner.
 - Township, Range and Section 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

- Create new file using **titleseed** seed file
- Save as **title.dgn** in the proper project folder.

- Reference attach the city map or the county map with the “w” county map. The “w” county map includes all of the lakes, streams, and rivers in the area.
- Place a fence on the county map where the project is located. Do a **clip copy** of the area you will be using. 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. Place the copy off to one side. After you have done this you can detach the map reference files.
- **Scale** and **rotate** the clipped portion accordingly and place in the title sheet border.
- Locate the county, and general area in which the project is located. Draw a circle or an oval in this area, and shade that county on the state map in the upper left corner of the title sheet. Draw an arc from the oval to the project label below the State map.
- 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 map.
- Place **Index of Sections** in upper right corner of sheet. The last step of creating plan sheets will be filling in this Index.

Creating Section Title Sheet

- Open the title sheet.
- Go to **Microstation/file** and do a **save as**
- The **save as** title should follow naming conventions **titleb, titlex, or titlez**
- Select **OK** this should take you directly to that file

MAKE SURE YOU ARE IN THE TITLEB.DGN

- Delete any information that is not needed off of the titleb sheet.
- Place label at top of sheet explaining which section the title sheet is for, (**SECTION B: GRADING NOTES**)
- 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 dPCEM?.dgn

- Create a file called **dPCEM?.dgn**
- Click on **Files>New** this will bring up a dialog box called **Create Design File** type in the name of your file (**Example: d4528r.dgn**) and select **OK**. Now select the file you just created from the MicroStation Manager and click on **OK**.
- Set your Active Depth to 1500 (*az=1500*), then turn your **Depth Lock** on, and do a **MicroStation > Save Settings**.
- Attach the Topog, the Right of Way, and the Curb & Gutter reference files. The Curb and Gutter reference file should be attached only if required, (ask the designer if any other special files need to be attached).
- Select **File>Reference** then select **Tools>Attach>**and select a file you want referenced into the dPCEM?.dgn and click on **OK**. This will bring up 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:

rPCEM.dgn = **r** (Right of Way)
 cgPCEM.dgn = **cg** (Curb & Gutter)
 tPCEM.dgn = **t** (Topog)
 cPCEM.dgn = **c** (Contours)

cPCEM.dgn = c (Contours)

- Any additional reference files attached will need different logical names.
- NOTE:** Should nothing appear after attaching the reference files, a MicroStation **Fit View > All** can be done. The reference files attached will appear very small. Be sure they are not hidden under a dialogue box. Once this is done though you may have to reset your active depth to 1500
- After attaching the reference files set up the levels in each reference file so they appear the way you want them too. The following are standards set by these Departments, for files we created revert to the **symbology .doc**.
 - After setting up the levels, make sure to do a **MicroStation > Save Settings**.

Starting Inroads

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

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 **dPCEM** 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: d4528**) and then select **Save**.
- Now you will need to open the engineer’s geometry file so that you can copy in the engineer’s geometry.
- Go back to the shortcut directory created and locate the **ePCEM.alg**
- **Click and drag** this file over to the **Inroads** pallet
- 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 ePCEM and set the **Horizontal Alignment Box>** to the alignment you wish to copy. In the box labeled **To>Geometry Project Box>** set this box to your dPCEM.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 **Delete** the ePCEM.alg this will just close the ePCEM file. From the **Inroads** box **Right Click** on the ePCEM and select **Delete** it will ask you **Delete geometry project ‘ePCEM’?** select **Apply**
- You may want to save your geometry at this time. From the **Inroads** box **Right Click** on your dPCEM.alg file and select **Save**.

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.

Rural Horizontal Alignments

- Make sure that the alignment you want to annotate is active, if it is not select **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>** This will bring up a **View Horizontal Annotation** dialog box. Select the **Preference Button** at the bottom of the dialog box and a preference box appears select the **rural** preference, **Load & Close**. Under the **Main Tab** check the box labeled **Annotate** 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, select the **Preference Button** at the bottom of the dialog box and a Preference box appears select the **Rural** preference, **Load & Close**. Select the **Main Tab** and in the box next to the **Horizontal Alignment** click on the pull-down arrow and select the correct alignment then select **Apply & Close**.

Suburban Horizontal Alignments

The mainline centerline will be called “mainline”. There will be other alignments that may be needed, such as crossroads, detours, and ramps. Each of these alignments should be given a preference of how they should be annotated (text size, weight, color, and level). The draftsman must select the proper preference for that alignment.

- **Geometry>Active Geometry>** This will bring up another box labeled **Active Geometry**. Set the **Type** to **Horizontal Alignment**. Then select the box labeled **Style** using the pull down arrow, scroll down and select **suburban** then **Apply**.
- **Geometry>View Geometry>Point Symbology>** This will bring up a **Point Symbology** box. Click on the **Preferences** button, set the preference to **Suburban**, then click on **Load** and **Close**.
- Once you closed your preference box you should see the changes made in the **Point Symbology** box, select **Apply and Close**. Now you are set up to run your **Horizontal Annotation & Stationing** and everything should be to scale appropriately.
- **Geometry>View Geometry>Horizontal Annotation>** This will bring up a **View Horizontal Annotation** dialog box. Select the **Preference Button** at the bottom of the dialog box and a preference box appears select the **suburban** preference, **Load & Close**. Under the **Main Tab** check the box labeled **Annotate** 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, select the **Preference Button** at the bottom of the dialog box and a Preference box appears select the **Suburban** preference, **Load & Close**. Select the **Main Tab** and in the box next to the **Horizontal Alignment** click on the pull-down arrow and select the correct alignment then select **Apply & Close**.

Urban Horizontal Alignments

The mainline centerline will be called by convention “mainline”. There will be other alignments that may be needed such as crossroads, detours, and ramps. Each of these alignments should be given a preference of how they should be annotated (text size, weight, color, and level). The draftsman must select the proper preference for that alignment.

- Select **Geometry>Active Geometry>** This will bring up another box labeled **Active Geometry**. Set the Geometry Project to **Horizontal Alignment**. Then select the box labeled **Style** using the pull down arrow scroll down and select **Urban** and then **Apply**.
- Select the **Geometry>View Geometry>Point Symbology>** This will bring up a **Point Symbology** box. Click on the **Preference Button** this will bring up a preference box set the preference to what you set up previously (**Suburban or urban**). Click on **Load and Close**.
- Once you closed your preference box you should see the changes made in the **Point Symbology** box. Select **Apply and Close**. Now you are set up to run your **Horizontal Annotation & Stationing** and everything should be to scale appropriately.
- **Geometry>View Geometry>Horizontal Annotation>** This will bring up a **View Horizontal Annotation** dialog box. Select the **Preference Button** at the bottom of the dialog box and a preference box appears select the **Urban** preference, **Load & Close**. Under the **Main Tab** check the box labeled **Annotate** 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, select the **Preference Button** at the bottom of the dialog box and a Preference box appears select the **Urban**

preference, **Load & Close**. Select the **Main Tab** and in the box next to the **Horizontal Alignment** click on the pull-down arrow and select the correct alignment then select **Apply & Close**.

Creating Full Plan Sheets

- Make sure you have the **Border** files needed are copied into your project directory
- Select **Drafting>Plan and Profile Generator** from the Inroads box, and a dialog box appears. Select the **Preference Button** at the bottom of this dialog box and this will bring up a **Preference dialog box**. Click on the preference desired and then select **Load** and **Close**. This will setup most of your settings.
- 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**.
- 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.

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 PCEM 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 **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 dPCEM?.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 **dPCEM?.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

Vertical Alignment

- In the **dPCEM?.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 pulldown 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
- Select **Apply** and **Close**.

Profile Annotation

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

Note: this same procedure is used in drawing the Special ditches left & right, detour verticals and any other verticals. You will select the correct preference for the left special ditch and then select left special ditch to view. Repeat steps for right special ditch and median ditch.

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 dPCEM?.dgn close to the profiles, for future reference.

Creating a Half Plan/Half Profile Sheets

- 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 dPCEM?.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 **dPCEM?.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 dPCEM?.dgn to the extents of the plan.bdr or the Plan portion of the hfplpr.bdr.
- 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.

Borders in The dPCEM?.dgn

- Open the **dPCEM?.dgn**
- Open the dPCEM.alg.
- Select **Drafting>Plan & Profile Generator**
- Select your preference
- Under the **MAIN** tab Select your Alignment to cut
- Select Plan only
- Check your stationing limits
- Under the **Plan Control** the only thing to change is the Boundary Chords from 6 to 1.
- The last tab is the **Sheet Layout**
- Change the **Host File** to your **dPCEM** (full path)
- Host File Content change to **All Sheets In One**
- **Sheet Location** change to **Layout Along Alignment**
- This is the last set up for putting the plan borders in the **dPCEM**, select the **Apply** button. When asked if you want to regenerate plan sheets select no. Once selected your screen might go black as the process starts, once it comes back it will appear as if you just opened the dPCEM. All of the borders will not show until you reopen the dPCEM.

Note: Open your **Reference** files you will see the new borders referenced into the dPCEM along with the dPCEM, you will have to detach the dPCEM to save yourself from future problems

Note: This would also be a good time to make sure the alignment bearings are displayed on every sheet.

Updating The Existing Geometry Project

Horizontal Alignments

- Open the **dPCEM?.dgn**
- Open the dPCEM.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 **dPCEM.alg** select the alignment you wish to delete click on **Apply** and **Close**.
- Open the **ePCEM.alg** and copy the new alignments into the dPCEM.
- 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 ePCEM.alg into the dPCEM.alg and are naming them the same.
- Once you have copied in the new alignments delete the **ePCEM.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 **dPCEM.alg**.
- Copy in the new Vertical alignment from the **ePCEM.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 grids

- 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 set up 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.

Note: If needed turn the levels back on and check to make sure all of the pipes are displayed with the proper elevations, you might have to redraw the pipe to match the new grids

Creating Typical Sections

Typical Seed File

- 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 Typicalicals. 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, copy or move to wherever they are needed.
- Dimensions can be copied and edited to fit your needs.
- Text within the dimensions can be edited by using 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.
- Hilite 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.

| | |
|--------------------------|--------------------------|
| -0.02 = down 2% | +0.02 = 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 typical 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 **dPCEM?.dgn**
 - Open the **dPCEM.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**
 - You will have to edit the straight line PI annotations to show just the **Station** and the **Bearing**, if the stationing does not appear you can find the stationing use the **Review Horizontal Alignment** command
 - Rotate annotation to match sheet border and move to a visible location.
 - Check to make sure the levels of the placed curve data corresponds with the correct odd or even sheets
- 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 **dPCEM?.dgn**
- Turn off the displays of all reference files in the dPCEM except for the rPCEM
- Turn off all of levels except level L20 in the rPCEM reference file
- Turn off all of the levels in the dPCEM except for level L20
- At this point the ROW labels should be the only thing visible
- Fence the entire project and copy the ROW labels from the rPCEM reference into the dPCEM
- Fence change the level from L20 to level L33
- Go to the **Key-in** box and type in “**rd=**” this will reopen your dPCEM file to the original settings
- Now you will have to move and copy ownership names so ownerships are labeled on each sheet
- Copy the existing Highway labels to each sheet and section line labels to each sheet
- Make sure all section and townships are labeled on 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 #.
- Once you have all of the labels placed onto each sheet you will change levels on every other sheet to match the **odd even sheet levels**

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

The following steps refer to drawings using a rural and suburban scale.

Mainline Pipe in Plan views

- Reference file attach the **pPCEM.dgn** file into the **dPCEM?.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 **dPCEM?.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 **Station & Offset**
- 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 63, this creates points on level L63 which will be turned off.
- Select **apply**
- Once **Cogo Points** for all of the 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 **pPCEM** file still attached you can use the same **Install Note** attached to each pipe sections by copying them into your **dPCEM**, and placing them within the border reference for each sheet at the correct stationing.

Mainline Pipe in Profile views

- 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 all of the 24" pipe, 30" pipe, ECT...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.

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 all of the pipe on the sheet.

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

Stormworks

Creating Easements:

- Load the **Subgrade** surface from your CountyPCEM 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 worklimits using the **Offset Guidelines** as a reference.

Offset Guidelines, Offset work limits distance required according to scale of the file you are using.

Rural = 20' Urban = 10'

- Change the color of the offset worklimits, to simplify the viewing.
- Create a shape(color=1, weight=1, Fill Type=Outlined, and Fill color=9) wherever the worklimits go beyond the ROW
- Use the offset worklimit as a guideline and try to limit the amount of vertexes.

Note: Talk with Designer and try to keep the easement shape away from buildings and trees, if you need to protect objects within an easement, place a **Do Not Disturb** note.

- Under **Inroads Tools** select **Tracking** and change the symbology to match the type of easement station and offset you are doing.
- Under **Inroads Tools** select **Options**, change the preference to either **0Sta&Offset** or **0.12 Sta&Offset**, this changes the precision of the Station and offset readout
- Using the tracking place points 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.
- 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 worklimit 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 hilited 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 hilitate 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 dPCEM.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** in the Inroads and in the pull down menu select **reports**.
- The Reports pallet has the tab **Geometry** selected and **area** as the **report type**.
- The **Report Library** is selected by a data in that field which will activate the **browse** button. Choose **ROW_E.dab** for the correct Report library.
- In the **Report field**, arrow down and select **Easement 1, Easement 2, or Easement 3**; depending on format desired (acres, acres and square feet, or square feet)
- **Description** shows the Report selection and the format it will display
- By selecting the plus target to the right of **Report on** you are asked to identify the alignment to report on. Data on the alignment created which will hilite in the design file and the number you assigned to the alignment, (example te76) is positioned in the selected box. Select the **Apply** button.
- After setting up the correct symbology the **Results** can be displayed in dPCEM?.dgn. You are prompted to identify location, data on screen, & the note appears.
- Typically the Easements beginning and ending stationing, right or left, cut or fill (purpose of easement), are edited to this note as it is placed in the dPCEM?.dgn.
- Align the notes to the Border files Referenced into the dPCEM?.dgn.

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.

Graphic Display

- 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.

Creating 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. Once you are in the **Pipest.xls** do a **save as**, naming it **PCEMpipest.xls**
- 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
- 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 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

- When starting a **Fence 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. Once you are in the **fencest.xls** do a **save as**, naming it **PCEMfencest.xls**
- Open the **dPCEM?.dgn** the fence should already be drawn and labeled.
- Turn off any any 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 veiwing of fence notes
- With the dPCEM 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.
- Repeat these steps for each install segment of the project.
-

HORIZONTAL ALIGNMENT DATA

- You will need to get the standard Horizontal Alignment Data sheet 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 PCEMhorizontaldata.doc.
- Open the dPCEM?.dgn. Go to the **Tools** tab in Inroads and down to **Reports**.
- In the **Reports** pallet, go to the **Geometry** tab. Change the **Report Type** to **Horizontal Alignment**.
- Click on the **Report Library** and go to the right and pick the Browse button. In the Browse pallet select **sd_hor&vert.dba** and **open**.
- Select **SDHORIZONTAL** in the **Report** box. Then go down to the **Report On** box and type in the alignment you want the report done for and hit **Apply**.
- 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.
- In the footer it asks for a scale factor, NAD#, and Zone which can be found in the database of all projects.

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 PCEMcontroldata.doc.
- Open the **dPCEM.alg** and the **PCEMorg.alg** geometry file located in the Region directory
- Copy the **Mainline** alignment from the **dPCEM.alg** to the **PCEMorg.alg** (note check with the designer of the project to be certain that **Mainline** alignment is the final design.).
- Make the **Mainline** alignment active from the **PCEMorg.alg**
- Under the Inroads **Tools**, open the **Reports**.
- Under the **Reports** pallet select **Geometry** Tab. Under the **Report Type** select **Clearance**. Under **Report Library** select **geo.dba**. Under **Report** select **Clearance B**. Under **Horizontal Alignment** select **Mainline**
- Toggle on the points and then toggle inside of the Report on box, with the cursor flashing in the **Report On** box toggle the **filter** button on the right side of the Pallet. This will bring another Pallet up which lists all of the points in the **PCEMorg.alg** file, select all of the **Benchmarks** and all of the **Reference Marks**.
- Once you select the points wanted then select the **Add** button and they will appear in the **Selected** box on the right. Click **OK** and it will take you back to the Reports Pallet and the points you just selected will appear in the selected box
- With the points you selected in the selected box toggle the **Apply** button.
- This brings open the report box, which you can save as **contr.doc**. Make sure this report is saved into the document directory in your PCEMS file directory.
- Once open you will have to edit this file.
- Using the **replace text** command found under the **Edit** pulldown, replace all of the spaces with an asterisk marks. (Hint: start replacing 10 spaces with 1 asterisk and hit apply, then replace 9 spaces with 1 asterisk, and so on until you replace 1 space with 1 asterisk. This should cover all of the spaces in this file.)
- Hilt the text from the top line that has the **Point, Station, Offset, Northing, Easting, Elevation, and Direction** down to the bottom of the file. Once selected go to the Table pulldown and select Convert Text to Table. Every box should be already calculated for you, if not make sure the **Separate Text at** box is toggled on **Other** with an asterisks in the box, this should calculate your number of columns.

Hit **Apply** and check the results carefully. Your final goal will be to have **seven** columns for Horizontal and Vertical Control Points. This is accomplished by either clearing the contents of a column or deleting a column all together.

- Once you have your table looking like the examples in the blank **Control Data.doc** then hilite the table and copy and paste it into the **saved as** one in you project directory.
- The Horizontal Control Points Table should have all of the information that you need except for the Point Numbers, which can be located in the Region folder, file named **refmrk.fwd**. By comparing the point numbers in the two you should be able to determine which Control Point is which.
- The Benchmark Numbers can be achieved the same way as the reference numbers. The file name will be **bnchmk.fwd**. The descriptions and elevations of the Benchmarks should be straight from the Green Survey Books.
- Some of the points might be shot as a Horizontal and a Vertical Control Point, these you will show as both but in one row
- Align the points in the Table by stationing starting with the first station.
- In the footer it asks for a scale factor, NAD#, and Zone which can be found in the database of all projects.
- Once the Control data sheet is done you can place the Benchmark Notes in the Profiles. Use the **BMNOTE** cell and place these cells at the bottom of the profile views at the proper stations in the **dPCEM**.

Linking Earthwork to Profiles:

- Open the **dPCEM?.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 **ewPCEMS.xls** files open.
- In the **ewPCEMS.xls** file locate the information that you want to link into the **dPCEMSr.dgn** file. **Hilite** the column that you want to link and do a **copy**.

Note: We are only able to link one column at a time as to keep it in the proper placement that is desired. The link command also does not copy text and numbers the same so link them separately.

- Go into the **dPCEMS?.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.

Note: If the **ewPCEMS.xls** is changed or updated you must open the **ewPCEMS.xls** and the **dPCEMSr.dgn**. In the **dPCEM?.dgn** go to **Microstation>Edit>DDE Links**. This will bring up a Dialogue box that will show all of the links attached to the **dPCEM?.dgn**. Select **Open All Links**, this should bring in al of the information.

Structure Display

Plan View

- Reference in the structures from bridge
- Once the reference of the structure is attached to the **dPCEM?.dgn** zoom in and locate an even foot dimension on the structure sheet.
- Using the Microstation **measure** command, measure between the dimension lines.
- **Divide** the dimension length by the results of the measure command. This is the value to scale the structure drawing to actual size within the **dPCEM?.dgn**.
- Once the scale is determined turn off all levels in the reference file except for the levels containing the actual **structure** and **rip rap** and reference scale the structure to the established scale.
- Place a **fence** around the plan portion of the structure and copy the structure into the **dPCEM?.dgn**

- **Delete** out any unnecessary lines within the copy.
- **Fence and change symbology** of the structure to match the symbology document.
- Snap to where the center of the structure crosses the center of the mainline alignment
- Using the **key-in** command box type in the station and offset found on the structure sheet referenced into the dPCEM?.dgn. (Example:so=5171,0,1500)
- **Fence** the structure again after it has been placed on the alignment.
- **Rotate** the structure to line up with the alignment, or with the skew of the structure.
- Place **Install note** in the border referenced around structure. Information for the note is found in the structure reference.

Profile View

- The structure width and height are located in the bridge sheet referenced into the dPCEM?.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.
- Once the reference of the bridge is attached to the dPCEM?.dgn zoom in and locate an even foot dimension on the bridge.
- Using the Microstation **measure** command, measure between the dimension lines.
- **Divide** the dimension length by the results of the measure command. This is the value to scale the bridge drawing to actual size within the dPCEM?.dgn.
- Once the scale is determined turn off all levels in the reference file except for the levels containing the actual **bridge** and **rip rap** and reference scale the structure to the established scale.
- Place a **fence** around the plan portion of the bridge and copy it into the dPCEM?.dgn
- **Delete** out any unnecessary lines within the copy.
- **Fence and change symbology** of the bridge to match the symbology document.
- Snap to where the center of the bridge crosses the center of the mainline alignment
- Using the **key-in** command box type in the station and offset found on the bridge sheet referenced into the dPCEM?.dgn. (Example: so=5171,0,1500)
- **Fence** the bridge again after it has been placed on the alignment.
- **Rotate** the structure to line up with the alignment, or with the skew of the bridge.
- Place **Install note** on the plan sheet in the dPCEM?.dgn. Information for the note is found in the bridge reference.

Profile View

- All of the information needed to display a profile of the bridge will be found on the Bridge sheet referenced into the dPCEM?.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
-