**Millennia Professional Services – Survey Manual**

**Office Processing**

1. **Computer Setup** – One-time setup on each processing computer
   1. **Perl** – Is a powerful programming language that manipulates text files very easily. The programs (scripts) are run from the Command Prompt.
      1. Go to the following web site and install the latest version of ActivePerl:

<http://www.activestate.com/activeperl/downloads>

* + - 1. Perl should automatically install to the root directory of your C: drive (C:\perl).
    1. Go to the “P:\ME Survey\perl\_CurrentVersions” folder on the server and:
       1. Copy the files in that folder to your “C:\perl” folder
       2. Copy the files in the “P:\ME Survey\perl\_CurrentVersions\**bin**” folder to the “C:\perl\bin” folder.
  1. **Command Prompt**
     1. Windows XP
        1. In Windows Explorer, right-click on any folder and look at the list of options available. If “Command Prompt” is NOT listed follow the instructions below:
           1. In Windows Explorer, go to Tools -> Folder Options -> File Types.  Select "Folder", as shown in the diagram below, and click on the "Advanced" button.  In the "Edit File Type" dialog that pops open, select "New..." to create a new action.  For the new Action, use "Command Prompt", and for the application used to perform the action, use "cmd.exe". OK your way out of these screens and check your Windows Explorer again.
     2. Windows 7
        1. In Windows Explorer, hold down the Shift key and right-click on any folder. A selection for the “Command Prompt” should be available in the menu.
  2. **UltraEdit** - UE is a very powerful ASCII text editor. Contact the IT department to get it installed.
  3. **Microsoft Excel -** Excel is powerful tool for working with ASCII file. Just rename any text file with a \*.csv extension and double-click the file.
     1. A word of caution when working with excel. Excel will turn anything that looks like a number into a number if it can. So a line code of “668.” will become the number “668.000” and will be displayed and changed to “668” with no line code. That is why it is important to change the original ASCII file to a \*.txt extension.
  4. **Microstation/GeoPak**
     1. Files directories
     2. Folders
     3. Project setup
     4. Smd files
     5. Work offline

1. **Download data collection files**
   1. The files should go onto the server at the following location:

P:\”TheProjectFolder”\(”TheTaskOrder”)\SURVEY\Process\”SurveyTaskNumber”\Original

* + 1. An example:

P:\2011\ME11001\_20characterMax\Survey\Process\ST02\Original

* 1. Download the \*.csv and \*.job files to the “\*\Original” folder.
  2. Rename the \*.csv file to \*.txt
  3. Copy the \*.txt file to the “\*\SurveyTaskNumber” folder

1. **Processing Definitions**
   1. **File Extensions** - We use specific file extensions to indicate what step we are on in the processing process.
      1. **TXT** - The \*.txt file is the data file from the download. The original is in the “Original” folder. The one in the “\*\SurveyTaskNumber” folder is what is modified. We usually continue to modify this file and rerun the Perl scripts until the file comes into Microstation correctly.
      2. **CSV** – The \*.csv file is the file created during the “Checkin” script. This file is reviewed for flags and the \*.txtis modified and the “Checkin” script rerun until the file is clear of flags.
      3. **COR** – The \*.cor files are the files created during both the “Cardno” and the “Process” scripts. These are the files that are input into GeoPak. There are different files created for use at different scales and for use with different \*.smd files. The scripts identify the various files by adding a subscript to the original file. Example: “Survey1.csv” becomes “Survey1\_topo.cor”, “Survey1\_bridge.cor” and others.
   2. **The Processing Scripts -** There are three scripts which manage all of the data for both the SUE and the IDOT work.
      1. **CARDNO** – This is the script that processes the SUE surveys.
         1. The SUE points are not collected in the order that the lines are drawn. The ordering of points is sorted in the script based on the flag and paint mark codes. These sorted points are then output into a file “\*\_cardno.cor”.
         2. The script also checks for field codes that start with “X”. These “X” codes are output into a “\*\_IDOT.txt” file in point number order. This file can then be processed through the “Checkin” and “Process” scripts as regular topographic data.
      2. **CHECKIN** – This script:
         1. Flags codes that aren’t on the list of accepted codes.
         2. Adds Field Comments for codes. Example: adds “CONC” to the field comments for EOC.
         3. Creates text for any IDOT Miscellaneous Codes (700-900) that were used as a comment in the Code. Example: Turns “EOP1 855” into “EOP1 Structure Entrance”.
         4. Outputs the data into a “\*.csv” file. This output file should be checked and the corrections made to the “\*.txt”. Then Checkin should be rerun. Repeat until the output file is clean.
      3. **PROCESS** - This script takes the “\*.csv” file, manipulates the data and outputs it into output “\*.cor” files. The file manipulation includes:
         1. Substitutes the IDOT code for the three-letter field code.
         2. Sorts codes into three different Quality Control files so that useable “Plat-in-hand” sheets can be printed on 11x17.
         3. Substitutes the final line code.
         4. Creates a “\*\_dtm.cor” which excludes most of the items not used to create the TIN model.
         5. Splits all the data into either a “\*\_bridge.cor” or a “\*\_topo.cor”.
   3. **The .smd Files** – There are three “\*.smd” files used to process the data.
      1. **IdotSurvey.smd** – This is the official IDOT Standard smd file.
      2. **TBE\_XX.smd** – This is a smd file created to display the SUE information. It displays the point information in an easy to manipulate and read format. Point numbers and codes are displayed so it is easy to move and rotate the text. The lines are displayed per the IDOT Standards (values, colors and levels).
      3. **Bridge\_XX.smd** - This file is used to better visualize the bridge information collected. The IdotSurvey.smd file puts all bridge information on the same level making it difficult to determine what is what? The Bridge\_XX.smd file puts the information on the IDOT Standard levels, like TOPO\_BridgeStructures, but uses various colors to identify the different components of the bridge. It also eliminates the elevation text on points that have bogus elevations (prismless). This separate data file and smd file can also be processed at a smaller scale to prevent overlapping point text.
2. **Processing**
   1. **Using the Perl Scripts – IDOT Topo Example**
      1. Open a Windows Explorer window and navigate to the directory that contains the “\*.txt” file that you want to process. An example is “P:\2011\ME11001\_20characterMax\Survey\Process\ST02”.
      2. Right-click on the folder and select the “Command Prompt” option.
      3. A DOS window should popup.
      4. At the prompt, type in the name of the script and the name of the file that the script is going to operate on. As an example for the “Checkin” script and a file named “survey1.txt” you would type “checkin survey1.txt” and press enter. A new file should appear in the Windows Explorer window named “survey1.csv”.
      5. Right click on this file and select UltraEdit from the list of options. Scan this file for any error messages. These are shown as “ XXXoutlierXXX” after the comment field.
      6. If there are none, proceed to the next step. If there are errors, right-click the survey.txt file and select the UltraEdit option. Make the necessary changes in that file. Then make the Command Prompt window active and run the script again. You can use the up-arrow to recall the command.
      7. You can keep the Command Prompt window and the UltraEdit window open through this entire process; just remember to save the file in UltraEdit after you make changes.
      8. Once the survey1.csv file is clear, go to the Command Prompt window, type in “process survey1.csv” and press enter.
      9. A number of files will appear in the Windows Explorer window, including:
         1. survey1\_topo.cor – This file contains all of the points in the original Survey1.txt, EXCEPT what is in the “survey1\_bridge.cor” file. This file should be processed into GeoPak using the IdotSurvey.smd.
         2. survey1\_bridge.cor – This file contains the bridge information. This file should be processed in GeoPak using the Bridge\_XX.smd.
         3. survey1\_dtm.cor – This file contains most of the points that are contained in the “survey1\_topo.cor”, but eliminates points that should not be included in a dtm, like top of water elevations, bridge data and things that are commonly found on bridges. This file should be processed into GeoPak using the IdotSurvey.smd.
         4. survey1\_qc\_lines.cor – These QC files were created so that “useable” 11x17 copies of the survey can be printed. Usually a new dgn and project are created. The files are then processed at different scales; this file is processed at 2 scale. These files should be processed using the IdotSurvey.smd.
         5. survey1\_qc\_spots.cor – This file is processed at 10 scale.
         6. survey1\_qc\_symbols.cor – This file is processed at 40 scale.
   2. **Using the Perl Scripts – SUE (Subsurface Utility Engineering) Example**
      1. Open a Windows Explorer window and navigate to the directory that contains the “\*.txt” file that you want to process. An example is “P:\2007\ME07109\_PTB145item24\_VarVarSUE\_D4\09\_TaskOrder\_AllenRoad\SURVEY\Processing\20110411”
      2. Right click on the folder and select the “Command Prompt” option.
      3. A DOS window should popup.
      4. At the prompt, type in the name of the script and the name of the file that the script is going to operate on. The first script to run in the SUE process is named “cardno”. To run this script with the data file named “survey1.txt”, type “checkin survey1.txt” and press enter.
      5. Two new files should appear in the Windows Explorer window named:
         1. survey1\_IDOT.txt – This file contains points that have codes starting with “X”. The “X” indicates that these points are not the special SUE codes and are to be processed using the regular IDOT process. See the above IDOT Topo Example (“checkin” and “process” scripts). These points are typically symbols (power poles, manhole, hydrants, etc.) but could also include lines (edge of pavements, etc.).
         2. Survey1\_cardno.cor – This file contains all of the especially coded SUE line points which have been formatted and sorted for GeoPak input. The TBE\_XX.smd file should be used to process this file. This file can be processed at smaller scales to facilitate readability.
   3. **GeoPak – livin’ the dream** 
      1. Keep the UltraEdit and Command prompt windows open. You will probably need to modify the Survey1.txt file a few times to fix lines and correct codes. This procedure describes the basic input process. It does not cover all of the different possible changes that may be needed.
      2. The Computer Setup section above describes how to setup the Microstation/GeoPak project. Use that section to get all of the Microstation/GeoPak files lined-up.
      3. Using that setup section you should be in a new 3d file and have the project all set to go.
      4. If the Survey module isn’t open, go to “Applications\GEOPAK SURVEY\Survey”. This will open the survey toolbar.
      5. Check the colortable. I usually import the IDOT color table just to make sure.
      6. Check the levels for the IDOT levels.
      7. Check the linestyles at the appropriate scale.
      8. Check the Plot Scale and SMD Feature Files selections in the “Project\Preferences\Visualization\Settings” dialog.
      9. Create a new dataset by:
         1. Selecting “Dataset\New”.
         2. The “Description” is optional.
         3. Enter a “Dataset Name” (6 character limit).
         4. As the “Data Source” select “ASCII File(s)” and “XYZ to Coordinates”.
         5. The “Output Directory” should be the “\*\geopak\job” of the project.
         6. Put a checkmark in the “Use dataset name as output sub-directory” box.
         7. Use the top icon to browse to the “\*.cor” that you want to use.
         8. Press OK.
      10. Setup the “XYZ to Coordinates” dialog.
          1. The “File” should be the one you just selected.
          2. The Delimiter should be a comma.
          3. The Comment Delimiter should be a semi-colon.
          4. The next box shows the first few line of the “\*.cor” file you selected. Select a line in that box.
          5. In the next series of boxes, select the fields (from left to right) Pnum,Y,X,Z,Pcode.
          6. In the box under the “Z” button, select “Link w/No Gap (LF)”.
          7. To the left of that box select the “Next>>” button.
          8. In the box that appears beside the “pcode” box, select Lcode.
          9. A new box appears above the “Comment Delimiter” named “Linking Code”. Select this button.
          10. A new dialog appears. Ensure that the Begin Line code is an “L” and close this dialog.
          11. All five of the boxes at the bottom EXCEPT the “Open Editor After Processing” should be checked.
          12. Select the “Process” button and cross your fingers.
      11. Review the drawing. Look for errors in the drawing.
          1. If changes are needed, delete the dataset (“Dataset\Delete”). Select both “Delete Data Files” and “Delete From GPK”.
          2. Make changes to the “\*.txt” file and run “checkin” and “process” after each change. By leaving UltraEdit and the Command Prompt open, these changes go very quickly. Remember to save the UltraEdit file. Use the up-arrow to find the “checkin \*.txt” line and the down-arrow to get to the “process \*.csv” line in the Command Prompt”.
          3. Create a new dataset. Use the same name as the last time.
          4. “Process” again. Unless you exited the drawings, you should not have to change the settings again.
      12. Continue to check, delete the dataset, edit the “\*.txt”, run “checkin” and “process”, create a new dataset, and process it until everything comes in cleanly and is ready for CADD.