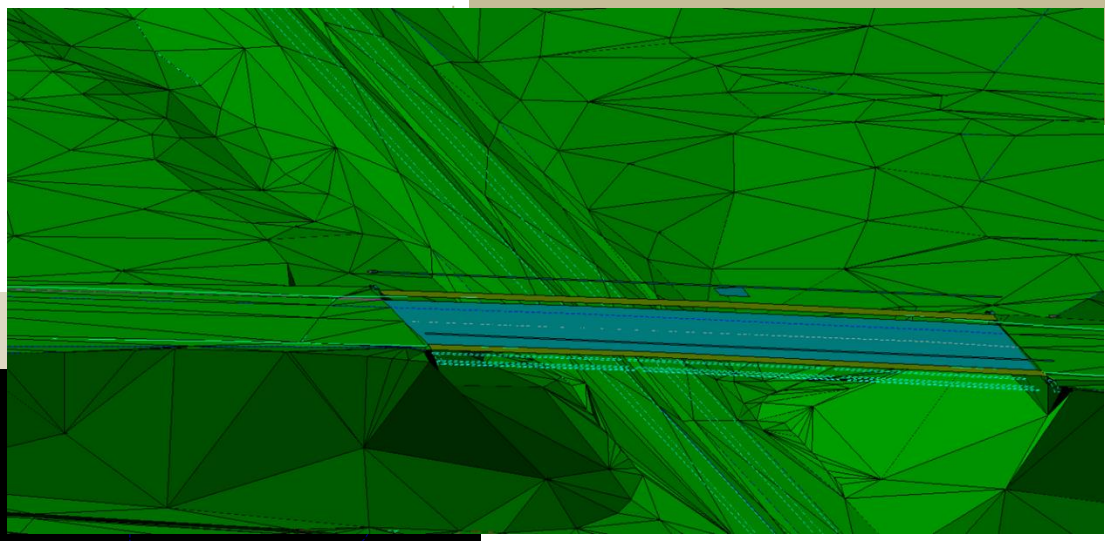
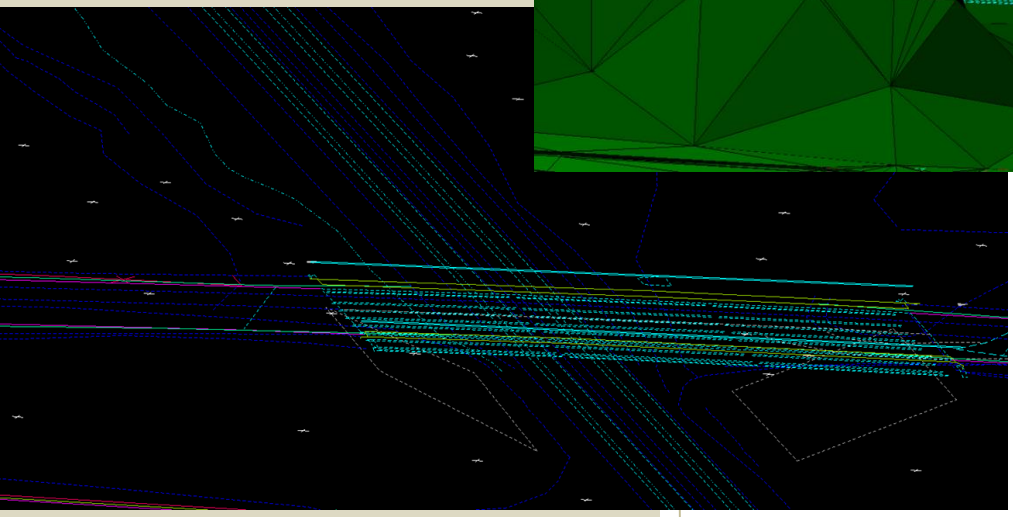
State of Georgia

Department of Transportation

InRoads Survey Data Processing Guidelines

InRoads Select Series 2





InRoads Survey Data Processing Guidelines

1/31/2019

Revision 2.5

Atlanta, Georgia 30308

GDOT Georgia Department of Transportation

This document was developed as part of the continuing effort to provide guidance within the Georgia Department of Transportation in fulfilling its mission to provide a safe, efficient, and sustainable transportation system through dedicated teamwork and responsible leadership supporting economic development, environmental sensitivity and improved quality of life. This document is not intended to establish policy within the Department, but to provide guidance in adhering to the policies of the Department.

Your comments, suggestions, and ideas for improvements are welcomed.

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DISCLAIMER

The Georgia Department of Transportation maintains this printable document and is solely responsible for ensuring that it is equivalent to the approved Department guidelines.

Revision Summary

Date	Revision Number	By	Sections	Description
02-01-13	1.00	CB-HC-JB	All	All
07-15-13	1.1	CB-HC-JB	2.2, 2.3, 3.1	Revised document to depict import process from AMSA format to import of Photogrammetry Graphics from DGN File.
“”	“”	“”	2.5	Removed references to AMSA import Process.
“”	“”	“”	2.7	Revised GDOT Standard Photogrammetry Code Table to depict the new K Codes for DGN file import.
09-03-13	1.2	CB-HC-JB	Appendix C	Added Appendix C InRoads procedure on USACE 404 Permit for Perennial Streams – Culverts.
“”	“”	“”	2.8	Added new Feature Codes/Feature Styles TOPO_E_SBF and TOPO_E_SXS for use on 404 Permit for Perennial Streams – Culverts.
01-13-14	1.3	CB-HC-JB	2.8	Added new Feature Codes/Feature Styles TOPO_E_DBOD and TOPO_E_DTOD for Drainage Bottom and Top of Ditch.
10-31-14	1.4	CB-HC	1.4	Updated reference location of the GDOT 3D seed file.
“”	“”	“”	2.7	Added TEAD K5 Code.
“”	“”	“”	2.8	Revised “Utilities” Feature Codes/Feature Styles to contain a “UU” Prefix for use in the UTLE DGN file.

Date	Revision Number	By	Sections	Description
“”	“”	“”	2.8	Added new Feature Codes/Feature Styles UUTLE_E_ PCL, UUTLE_E_TSB, UUTLE_E_FM, SUEBOT, SUETOP
“”	“”	“”	2.8	Revised following Topo Feature Codes/Feature Styles to UTLE_E_ UTRCR, UTLE_E_UTRCL, UTLE_E_UTSATDSH, UTLE_E_UTMPR
“”	“”	“”	2.8	Added new Feature Codes/Feature Styles UTLE_E_ UXXA, UTLE_E_UXXB
“”	“”	“”	2.6	Added new Preferences for SUE Profile and X-Section Annotation
“”	“”	“”	4.4	Revised deliverable list and QA Check list to reflect the deliverable format of XSL for the PSR (Property Statistic Report)
04-30-15	1.5	CB-HC	1.1, 4.4 & Appendix C	Revised document Hyperlinks to reference/open the associated GDOT TravelSmart Web Page links.
10-15-15	1.6	CB-HC	2.8	Revised the organization of several Survey Feature Codes in Section 2 to reflect correct location under sub-headings.
01-15-16	1.7	CB-HC	4.4	Revised the Survey Data Processing QA form.
06-08-16	1.8	JB	Appendix D	Added Appendix D: Property Resolution on GDOT and GDOT-sponsored projects
10-15-16	1.9	VJ & JB	2.8	Revised the description and Group Code for TOPO_E_TSW; moved

Date	Revision Number	By	Sections	Description
				from Dimension Codes to Roadways section
“”	“”	“”	2.8	Revised the spelling for the TOPO_E_TCAN and TOPO_E_DPD descriptions.
“”	“”	VJ	2.8	Removed the TOPO_E_TDR and TOPO_E_TDD features
“”	“”	“”	4.4	Revised the Survey Data Processing QA form
“”	“”	JB	2.4 & 2.8	Added PROP_E_BGMD
“”	“”	“”	2.8	Removed TOPO_E_DEW and TOPO_E_MISC
“”	“”	“”	2.8	Revised descriptions of TOPO_E_TBRDGCOR, TOPO_E_TBGL, TOPO_E_TWF, TOPO_E_TWFT, TOPO_E_TWFB
12-20-16	1.10	JB	Table of Contents/ Tables	Added hyperlinks for Table of Contents, descriptions for the Table of Tables, and bookmarks for PDF.
“”	“”	“”	1.6	Added link to ProjectWise document for setting up Project Defaults on PW projects.
04-01-17	“”	VJ	2.8	Replaced TOPO_E_DHWE with TOPO_E_DHWT and TOPO_E_DCWE with TOPO_E_DHWB. Removed TOPO_E_DDCB and revised TOPO_E_DCB description.
4-28-17	2.0	VJ & JB	All	Updated manual to standard template
7-25-17	2.1	JB	2.7	Updated Photogrammetry Codes chart to include all items used in Mapping; added levels used;

Date	Revision Number	By	Sections	Description
				removed K codes and InRoads Alpha codes.
“”	“”	“”	2.8	Added feature style for bottoms of bridge beams: TOPO_E_TBBB. Added TOPO_E_TSTP. Removed TOPO_E_TBRDGCEN
“”	“”	“”	Appendix B	Added PROP_E_ESMT to list of feature styles to export to LandXML for Stakeouts.
11-9-17	2.2	JB	2.8	Changed feature style TOPO_E_TBBB from a Point to a Chain Type. Added feature style for Junction Boxes. Manhole Storm Sewer, Top has been changed from a Utility to a Topo item. Removed feature styles UTLE_E_UUMHST and UTLE_E_UUMHSTF and added TOPO_E_UHMST.
12-8-17	2.3	JB	2.7	Changed SWIMMING POOL triangulate field to Yes. Change RAILROAD, TOP OF RAIL description to RAILROAD, CENTERLINE
9-10-18	2.4		All	Updated GDOT logo throughout
1-31-19	2.5	JB	2.4, 2.6.2	Added PROP_E_LTD-ACCESS & PROP_E_RWE-LTD-ACCESS to Property & Alignment Codes Survey Style Filter & the GDOT Preferences: Prop.dgn Alignments/Points & Stakeout Survey Data; Added new Cross Section

Date	Revision Number	By	Sections	Description
				Preference Wide 20h 20v for large cross sections up to 300’ L/R offset. Included the PRE Drawing #’s for Narrow/Wide 10h 10v in the chart. All Cross Section Preferences have been updated to increase the maximum offsets (up to 85’ L/R for Narrow and 150’ L/R for Wide).
“”	“”	“”	2.7, 2.8	Both sections are now standalone documents. Removed both tables and included hyperlinks to new location.
“”	“”	“”	4.3-4.4	Updated to include ProjectWise in archival process. Added deliverables and replaced the QA checklist with the new version. Included links to InRoads Survey QA Review Guide.

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Preface

Survey Data Processing consists of verifying, coordinating, formatting and processing full field survey data, field mapping enhancement data, additional survey data and existing right of way and property data. This data is then submitted to end users as planimetric MicroStation (.DGN) files, Topographic 3D Digital Terrain Model (.DTM) files and Geometry Project (.ALG) files in InRoads. The digital field/mapping data is used as a database in the development of highway project plans.

These Survey Data Processing Guidelines have been developed as part of the statewide GDOT implementation of MicroStation V8i and InRoads V8i Select Series 2. The intent of this document is to provide guidelines and standards for processing survey data in InRoads V8i Select Series 2. These guidelines must be followed in detail in order to conform to the current GDOT standards for producing the required survey data deliverables. Updates to this document will be made periodically when minor revisions, additional information, and/or enhancements are added.

If there is any approved deviation from the standard file and data naming/feature style conventions as prescribed by this document - a detailed description of the deviation(s) and approved reasons for the deviation(s) shall be documented and included with the project files in electronic format.

Contact Information

To submit any comments or questions regarding the information contained in this document, please contact the **Office of Design Policy & Support** by email at the following address:

SolutionsCenter@dot.ga.gov

In the Email Subject Header, please reference the **InRoads Survey Data Processing Guidelines**

List of Effective Chapters

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Preface	2.1	9/12/18
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Overview

These Guidelines cover the GDOT standards for processing Survey Data by utilizing the MicroStation V8i and InRoads V8i Select Series 2 software(s). These procedures depict the Project Initialization Standards and Conventions to create an InRoads Survey Project to GDOT format and the processes to create/generate the files which are to be submitted as deliverables to the Design Engineer.

For detailed Survey Data Processing instructions please refer to the Training Manual:
Introduction to InRoads for Survey Data Processing

Document Content
Below is a list of topics covered in this document:

- Project Initialization Standards
- Standard Conventions
- Surface and Property Data Information
- Survey Data Project Deliverables
- Additional Survey Enhancements
- Appendix A
- Appendix B
- Appendix C.

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Chapter 1. Project Initialization Standards

Project Initialization Standards have been established in order to promote consistency and assist in the organization of project data. These standard project schemes help to ensure uniformity for all users who may work on the project.

This section covers the following topics:

- GDOT Standard Files (MicroStation and InRoads)
- Standard Project Structure
- Starting MicroStation V8i and InRoads V8i Select Series 2
- Overview of InRoads Interface
- InRoads Project Defaults
- Survey Default Preferences
- InRoads "Locks"
- Application and Variable Manager Add-Ins
- Initiating a Survey Project in InRoads

1.1 GDOT Standard Files – MicroStation and InRoads

In order to conform to current policy for plan deliverables – GDOT provides the requisite files needed to standardize InRoads and MicroStation to GDOT requirements. The first step in the development of an InRoads and MicroStation Project is to ensure that these standard files are being utilized. Instructions for downloading/installing the executables are included on the GDOT web page (see the links depicted below). These files are required for any Survey Data Projects generated for GDOT.

- ***MicroStation Standard Files Location For Internal GDOT Users*** – a server location has been established to map a drive (an N:\ Drive) in order to access the latest MicroStation Files. Once the internal user maps the N:\ drive – all of the standard MicroStation Files will be available through this mapped drive.
- ***MicroStation Standard Files Location For External Users*** - a MicroStation (CaddALL.exe) executable file is available and located in a download executable which can be accessed from the GDOT web page. This executable contains all of the GDOT MicroStation V8i Select Series 2 standard files. This file can be downloaded by navigating to the MicroStation and InRoads links from the following location:

  http://www.dot.ga.gov/PS/DesignSoftware/Microstation

- ***InRoads Standard Files Location for Internal and External Users*** - an InRoadsALL executable file (InRoadsALL.exe) is available and located in a download executable which can be accessed from the GDOT web page. This executable contains all of the GDOT InRoads V8i Select Series 2 standard files. This file can be downloaded by navigating to the MicroStation and InRoads links from the following location:

  http://www.dot.ga.gov/PS/DesignSoftware/InRoads

The **InRoadsALL.exe** file contains all of the standard GDOT files which are required to generate projects to GDOT standards. The user will perform the following steps to extract and set-up the GDOT Standard InRoads Files:

1. Close MicroStation V8i and InRoads V8i Select Series 2 if they are still open.
2. Navigate to the InRoads links from the following web page:
3. Save the ***InRoadsALL.exe*** file to the hard drive and then double click the file. http://www.dot.ga.gov/PS/DesignSoftware/InRoads
4. The self-extractor will download the GDOT InRoads Standard Files to the following locations:
   a. **C:\InRoads Data\Standards**
      - GDOT_Standard V8i_SS2.xin
      - GDOT_Standard V8i_SS2.itl
      - Project_Data_Sheet_MultipleAlign.xlsx
      - Photogrammetry_InRoads QA.pdf
      - Survey Data Processing_InRoads QA.pdf
      - Design Data_ InRoads QA.pdf
      - GDOT (PI#) Pay Item Database.mdb
   b. **C:\InRoads Data\Component Documentation**
      - GDOT Component Description Help Documentation
   c. **C:\InRoads Data\Style Sheet Documentation**
      - GDOT Style Sheet Help Documentation
   d. **C:\InRoads Data\Style Sheets\GDOT**
      - GDOT Style Sheets
5. For detailed instructions on downloading and installing **InRoadsALL.exe** - navigate to the InRoads links from the GDOT web page and click on the ***Downloading and Running InRoadsALL.pdf*** document for installing these standard files.

1.2 Standard Project Structure

The standard File Structure for InRoads is a Project Folder (which is named for the PI # of the Project – *Example:* **1234567**) located as a sub-folder under **C:\InRoads Data** – *Example:* **C:\InRoads Data\1234567**. The Project Files are then located in an **SDE** sub-folder under the PI # – Example: **C:\InRoads Data\1234567\SDE** -- This Project Folder contains the individual InRoads Data Files. (See *Table 1.1*)

Table 1.1

InRoads Project Structure	
InRoads Project Structure	C:\InRoads Data\PI Number\ SDE
InRoads Project Structure (Example)	C:\InRoads Data\1234567\ SDE

Some examples of InRoads Data File Types are:

1. **.DTM** ------- (Digital Terrain Model File) – contains Surface data
2. **.FWD** ------- (Survey File) – contains Field Survey data
3. **.ALG**-------- (Geometry File) – contains Geometric Point, Horizontal and Vertical data
4. **.IRD** -------- (Roadway Design File) – contains the Design Surface data
5. **.RWK**------- (Project File) – contains project data for InRoads files in ASCII format
6. **.ITL**--------- (InRoads Template File) – contains InRoads Templates for cross-sections
7. **.SDB**-------- (Drainage File) – contains the InRoads Storm and Sanitary data

Although InRoads consists of the above file types -- the "Survey Data" will usually consist of the following file types and will be located in the **C:\InRoads Data\PI Number\SDE folder:**

- Processed DTM Surface file (**PI#_ SDE.dtm**)
- Processed ALG Geometry File (**PI#_ SDE.alg**)
- Processed FWD Survey File(s) (**PI#_A.fwd, PI#_B.fwd, PI#_XO.fwd, etc.**)
- Processed Property DGN file (**PI#_PROP.dgn**)
- Processed Topographical DGN file (**PI#_TOPO.dgn**)
- Processed Utility DGN file (**PI#_UTLE.dgn**)

It is highly recommended to backup the Project Folder (which contains these individual data files) after each work session to your Group Account on the GDOT Server if you are a GDOT Employee (or to an appropriate Business Server if you are a GDOT Consultant).

1.3 Starting a Survey Project in InRoads

After creating the Survey Project folder of **C:\InRoads Data\PI Number\SDE** – the Surveyor/SDE will then copy the **Standards** folder (which is downloaded through the InRoadsALL.exe executable) to the **C:\InRoads Data\PI Number\SDE** folder.

1.3.1 Copy the "Standards" folder which is downloaded from InRoadsALL.exe

Important Step:

After installing InRoadsALL.exe – the user will copy the **Standards** folder under **C:\InRoads Data** to the Project Location. The rest of the Standard Files will remain in the default install location.

Whenever a new Project is created – the Surveyor/SDE will download and install InRoadsALL.exe. The files will be extracted to the Default Location(s). The reason for the install is to ensure the user has the latest published XIN File. The Surveyor/SDE will then perform the following step:

- The user will copy the **C:\InRoads Data\Standards** Folder to the **InRoads Data\PI# \ SDE** folder. (Example: **C:\InRoads Data\1234567\SDE\Standards**).

Table 1.2

Copy Standards Folder to Project Folder		
C:\InRoads Data\Standards	Copy To ►►	C:\InRoads Data\PI #\SDE

1.4 Starting MicroStation V8i and InRoads V8i

The user will be working in both **MicroStation V8i Select Series 2** (the CADD Software) and **InRoads Suite V8i Select Series 2** (the Survey/Design Software). The **MicroStation CADD Software** is used for the viewing and manipulation of graphics derived from **InRoads**. The **InRoads Software** is the database in which the Surveying data is created and processed. The user will select the standard GDOT 3D "seed" file to use as the "seed" DGN in order to create the three dimensional "Working" DGN file. This "Working" DGN file is used to display the temporary and/or permanent graphics in **InRoads**.

This section details the following processes:

- Steps to Create a Survey "Working" DGN File
- Steps to Open an Existing Survey "Working" DGN File

The "Working" DGN file will be saved to the following folder location:

C:\InRoads Data\PI Number\ SDE\Standards

Table 1.3

Standard Naming Convention of the "Working" DGN File

Working DGN File Name	**C:\InRoads Data\PI Number\SDE\Standards** GDOT 3D Working File.dgn

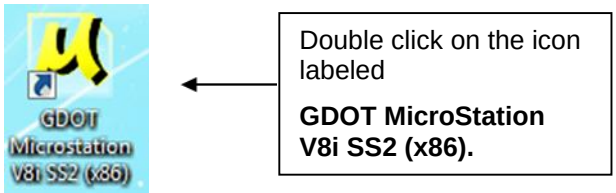
The MicroStation software will open first before InRoads. After the MicroStation Splash Screen appears, the MicroStation Manager dialog (See *Figure 1-1*) will open so that a "**Working**" DGN file can be created or an existing "**Working**" DGN file can be opened. The **InRoads** software can then be initiated.

1.4.1 Steps to Create a Survey "Working" DGN File

The Survey "Working" DGN file will be created from the **GDOT_V8_3D.dgn** seed file.

Please Note: The current seed file in the MicroStation configuration defaults to a 2D Seed File. In order to view spikes in the DTM and for additional 3D Checks, the user will need to browse to select the 3D Seed file as depicted in the steps below. Following are the steps to create a **Survey "Working" DGN File:**

1. From the desktop, double-click on the **GDOT MicroStation V8i SS2 (x86)** icon.



2. After the MicroStation Splash Screen appears, the **MicroStation Manager** dialog box will open. (See *Figure 1-1*).

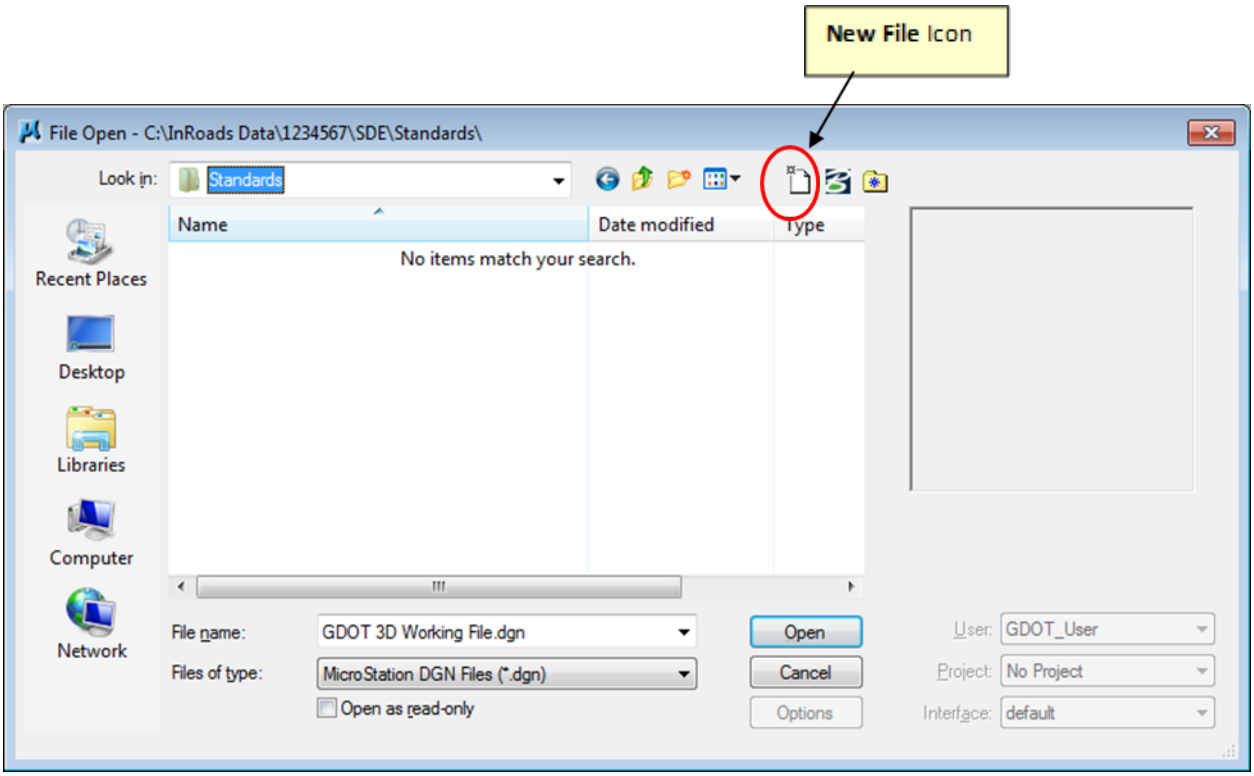


Figure 1-1 Starting MicroStation V8i and InRoads V8i

3. In the **MicroStation Manager** dialog box, click on the **New File** icon  (See *Figure 1-1*) depicted above. The **New File** command will be used to create the "Working" DGN file.

4. After the **New File**  command is selected, the **MicroStation New File** dialog box will open. (See *Figure 1-2*).
   - Click in the **Save in:** Pulldown - and browse to the ***C:\InRoads Data\PI Number\SDE\Standards*** location to save the new "Working" DGN file
   - In the **File name:** Pulldown – enter ***GDOT 3D Working File.dgn***
   - In the **Save as type:** Pulldown – select ***MicroStation DGN Files (*.dgn)***
   - In the **Seed:** Field - Click the **Browse** button to select the seed file named **GDOT_V8_3D.dgn**

   The inputs should now be similar to the screen capture depicted in *Figure 1-2* (as shown below).

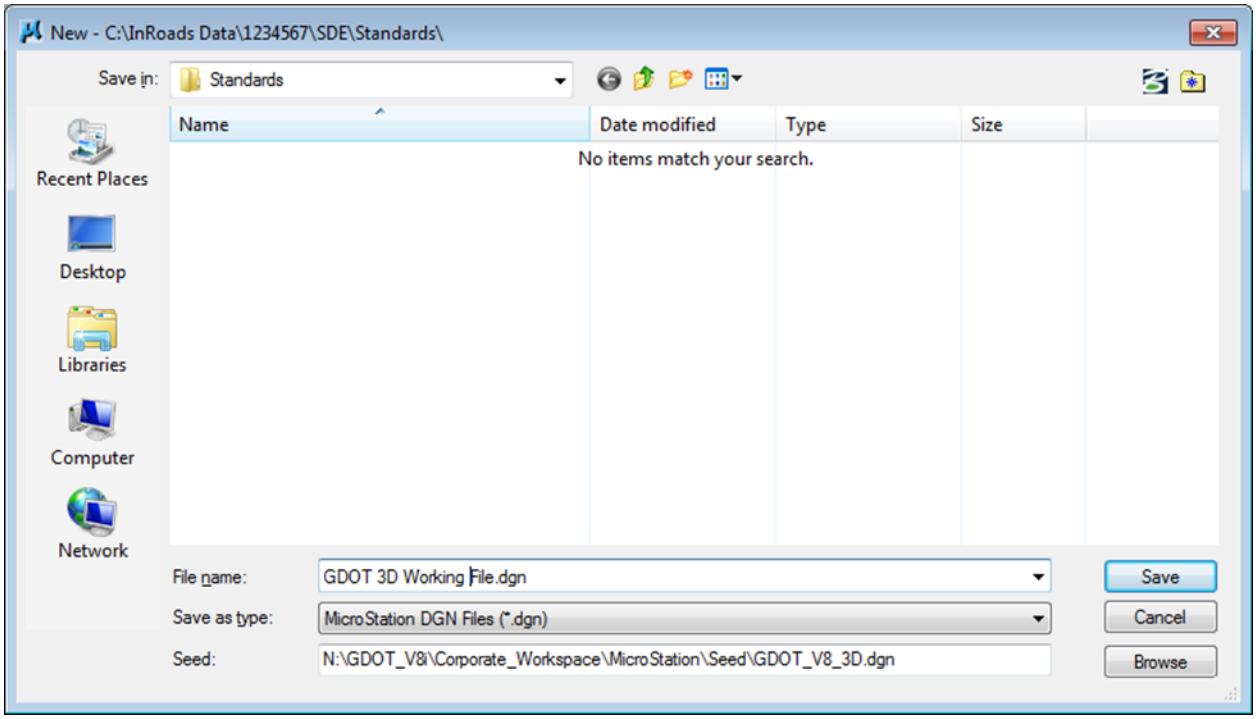
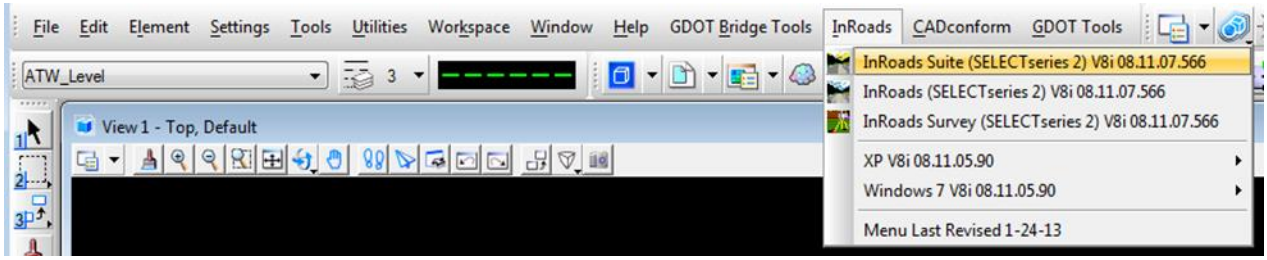


Figure 1-2 MicroStation New File Window

5. Click the **Save** command button and the **MicroStation Manager** dialog box will appear.
6. In the **MicroStation Manager** Dialog box – highlight the file just created (***GDOT 3D Working File.dgn***) and click the **Open** button.
7. The **MicroStation V8i Select Series 2** interface will then finish opening.
8. In the ***Main MicroStation Pull-down Menu*** – click on the following InRoads pull-downs:



9. Select ***InRoads ► InRoads Suite (SELECTseries 2) V8i 08.11.07.566*** — and the **InRoads V8i Select Series 2** interface will open. Once **InRoads** and **MicroStation** are up and running, the desktop should look similar to that of *Figure 1-3* and *Figure 1-4*.

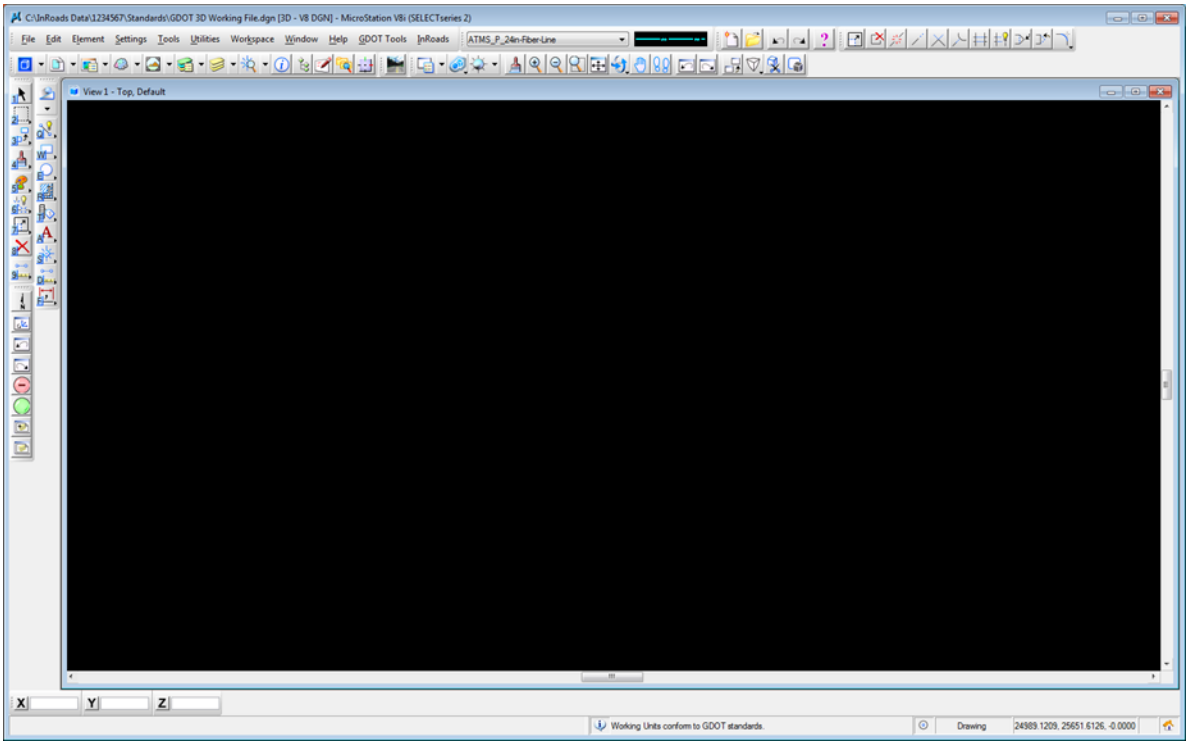


Figure 1-3 Main MicroStation V8i Window

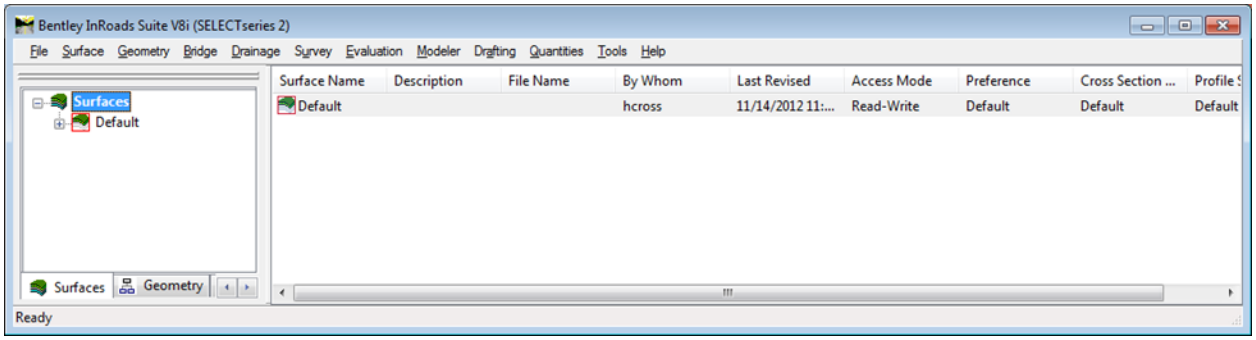


Figure 1-4 Main InRoads V8i Window

1.4.2 Steps to open an existing Survey "Working" DGN File

If the Survey "Working" DGN file has been created previously – use the following steps to open a **Survey "Working" DGN File:**

1. From the desktop, double-click on the **GDOT MicroStation V8i SS2 (x86)** icon.

Double click on the icon labeled

GDOT MicroStation V8i SS2 (x86).

2. After the **MicroStation** Splash Screen appears, the **MicroStation Manager** dialog box will open. (See *Figure 1-5*).

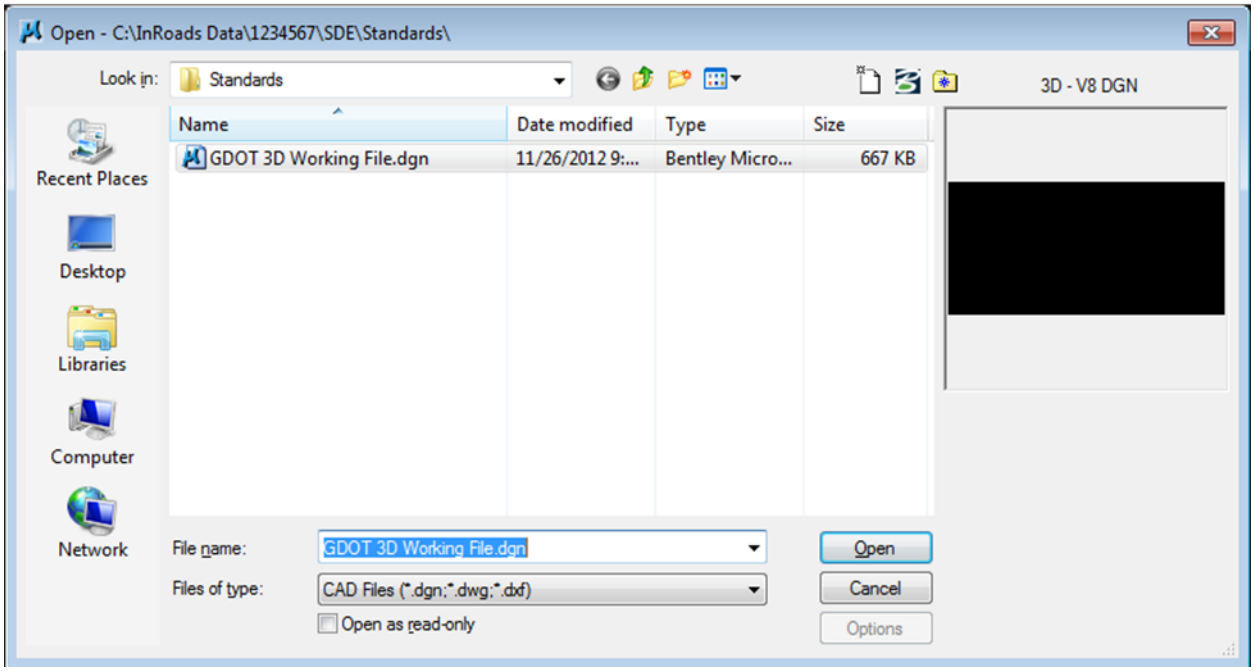


Figure 1-5 Starting MicroStation V8i and InRoads V8i

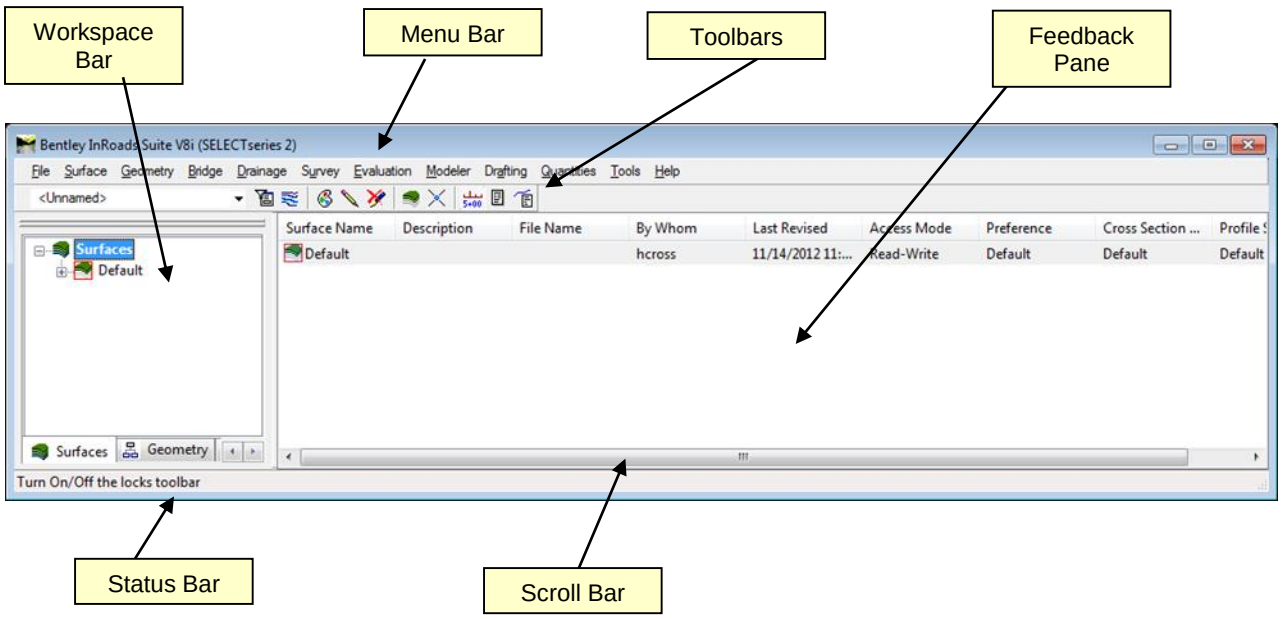
3. In the **MicroStation Manager** dialog box, browse to the ***C:\InRoads Data\PI Number\SDE\Standards*** location and highlight the (***GDOT 3D Working File.dgn***) and click the **Open** button.

4. The **MicroStation V8i Select Series 2** interface will then finish opening. Then select ***InRoads ► InRoads Suite (SELECTseries 2) V8i 08.11.07.566*** — and the **InRoads V8i Select Series 2** interface will open. Once **InRoads** and **MicroStation** are up and running, the desktop should look similar to that of previous screen captures *Figure 1-3* and *Figure 1-4*.

1.5 Overview of InRoads Interface

As mentioned previously - the user will be working in both the **InRoads Design Software** and the **MicroStation CADD Software**. The **InRoads Software** is the database in which the Surveying data is created and processed.

Shown below is a **diagram** which depicts the InRoads Explorer objects and a brief overview of the InRoads Explorer Interface:



- **Workspace Bar** – Contains all of the InRoads Project Data information
- **Menu Bar** – Contains the pull-down menus to access InRoads commands
- **Toolbars** – Contains default and customized toolbars to access InRoads commands
- **Feedback Pane** – Contains details of selected Project Data from the Workspace Bar
- **Scroll Bar** – Enables the user to view more of the InRoads Explorer Interface. (The Scroll Bar may not be visible if the InRoads Interface is already viewed to extents).
- **Status Bar** – Contains InRoads messages and prompts (Please note: InRoads may direct you to locate something graphically in MicroStation -- some of these prompts may display in the MicroStation Status Bar instead). It is very important that the user review both the InRoads and the MicroStation Status Bar for prompts and information.

1.6 InRoads Project Defaults

The **InRoads Project Defaults** setting allows you to define the “default folder locations” for projects. A ***Project Default*** configuration can then be saved for each project so that multiple projects can be accessed. This configuration allows you to easily navigate between projects. Once the Project Folder locations are saved in the Configuration, the projects can then be accessed by selecting the appropriate Project Configuration Name. The Project Defaults also contain the location for selecting the standard GDOT InRoads Preference File (**GDOT_Standard V8i_SS2.xin**).

The standard Project Default configuration for Survey projects will be **PI#_SDE**. Each Survey Project Default will consist of this naming structure in order to easily navigate between projects. (See *Table 1.4*)

**Once the Project Default Location is set for a particular project – this will also be the default folder location whenever the InRoads commands of File ▶ Save and File ▶ Close are used.

Table 1.4	
Project Defaults Configuration	
Project Default Structure	PI Number_SDE
Project Default Structure (Example)	1234567_SDE

Following are the steps to create a **Survey Project Default Configuration (Substitute the appropriate PI # as required):**

1. Click **File ▶ Project Defaults** from the InRoads pull-down menu to access the **Set Project Defaults** dialog box.

2. Click **New** and enter **1234567_SDE** in the **New Configuration** dialog box. Then click **OK**.

3. NOTE: For projects done in ProjectWise, please refer to the Using InRoads in ProjectWise document on the ROADS page to see how to properly set up the Default Directory Paths.

4. Under the Default Preferences section - Click in the **Preferences (*.xin):** field and then click the **Browse** button to navigate to the following file:
   C:\\InRoads Data\1234567\SDE\Standards\GDOT_Standard V8i_SS2.xin file and click **Open**.

5. Under the Default Directory Paths Section - Click in the **Project Default Directory:** field and then click the Browse button to navigate to the folder:
   C:\InRoads Data\1234567\SDE. Next - click **Open**.

6. Under the Default Directory Paths Section – copy and paste the following text into each entry field shown below: **C:\InRoads Data\1234567\SDE**

   - Report Directory: - **C:\InRoads Data\1234567\ SDE **
   - Projects (*.rwk): - **C:\InRoads Data\1234567\ SDE **
   - Surfaces(*.dtm): - **C:\InRoads Data\1234567\ SDE **
   - Geometry Projects: (*.alg): - **C:\InRoads Data\1234567\ SDE **
   - Template Libraries:(*.itl): - **C:\InRoads Data\1234567\ SDE **
   - Roadway Design: (*.ird): - **C:\InRoads Data\1234567\ SDE **
   - Survey Data: (*.fwd): - **C:\InRoads Data\1234567\ SDE **
   - Drainage: (*.sdb): - **C:\InRoads Data\1234567\ SDE **
   - Quantity Manager: (*.mdb): - **C:\InRoads Data\1234567\ SDE**
   - Site Modeler Projects (*.gsf): - **C:\InRoads Data\1234567\ SDE**

7. Under the Default Directory Paths Section - Click in the **Style Sheet (*.xsl):** field and then click the **Browse** button to navigate to the folder:
   C:\InRoads Data\Style Sheets\GDOT. Next - click **Open**.

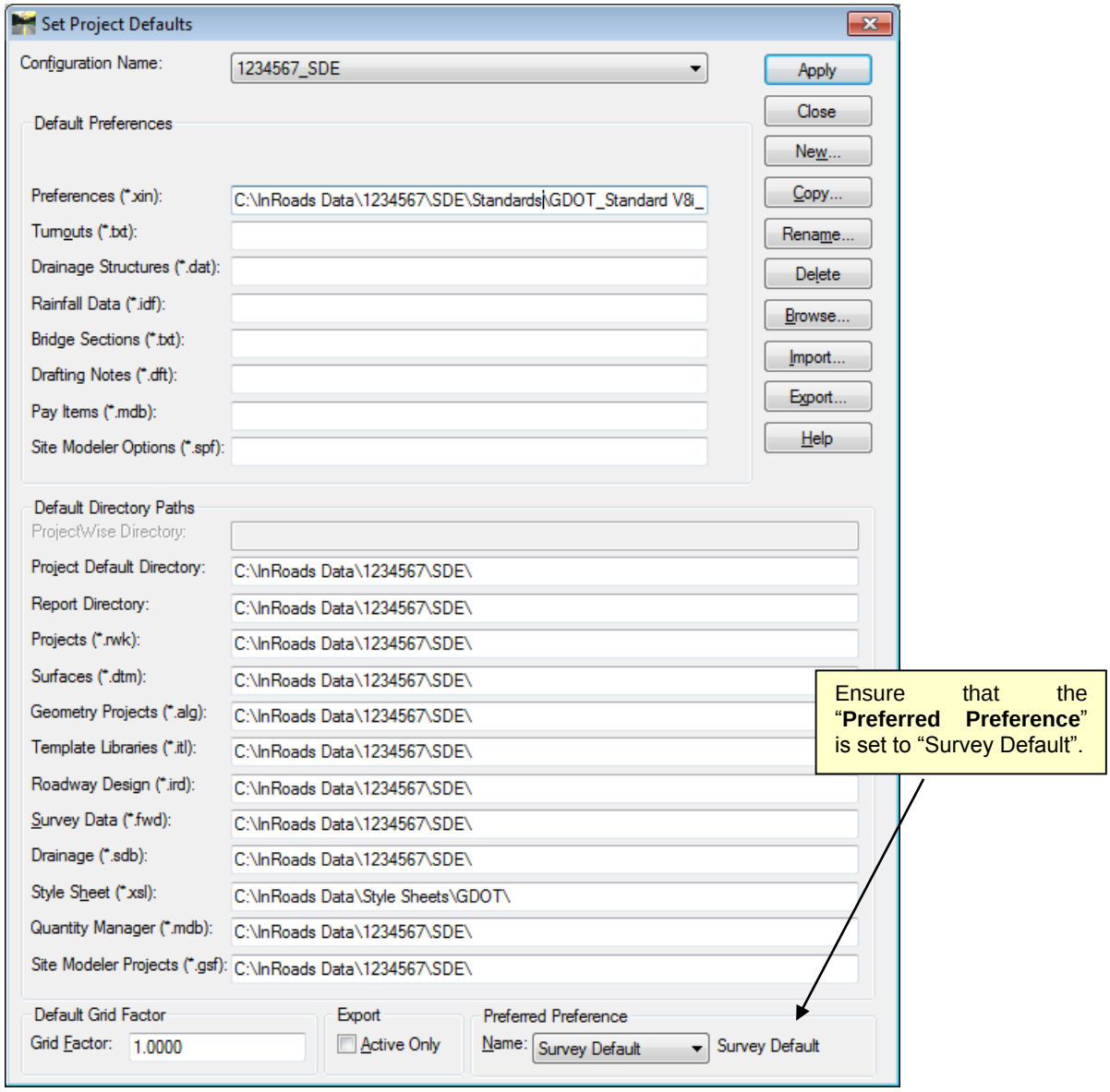


Figure 1-6 Project Defaults

8. The **Project Defaults** should look similar to the screen capture depicted in *Figure 1-6* (as shown above). Click **Apply** and then click **Close**. ‘

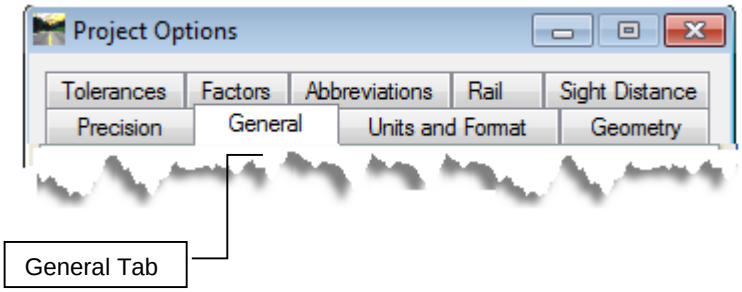
1.7 Survey Default Preferences

The **Survey Default** Preferences must be loaded in InRoads in order to conform to standards for the processing of Survey/Mapping Projects. This is a very important step to ensure that standards are followed for any Survey or Photogrammetric data that will be processed. The **Survey Default** Preference loads the Precision Settings, Tolerances, Units and Formats, Default Point and Alignment Numbering scheme(s), etc. Once the **Survey Default** Preference is loaded – the project will retain these settings each time the project is accessed.

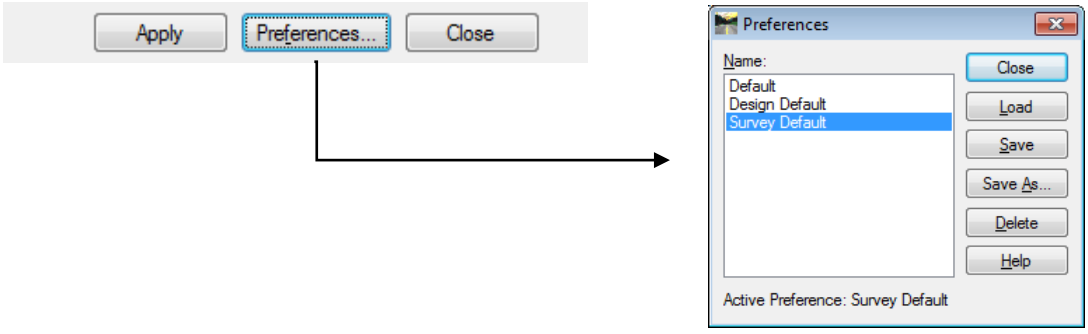
Following are the steps to set the **Survey Default Preferences**:

1. Click **File** ▶ **Project Options** from the InRoads pull-down menu to access the **Project Options** dialog box.

2. In the **Project Options** dialog box - click on the **General Tab** and the **General Tab** dialog box will appear.



3. In the **General Tab** dialog box click the command button named **Preferences…** (Located at the bottom of the dialog box) and the **Preferences** dialog box will open.



4. In the **Preferences** dialog box – select **Survey Default**. Then click **Load** and then click Close.
5. The **Survey Default** Preference should now correspond to the screen capture depicted in *Figure 1-7* (as shown below).

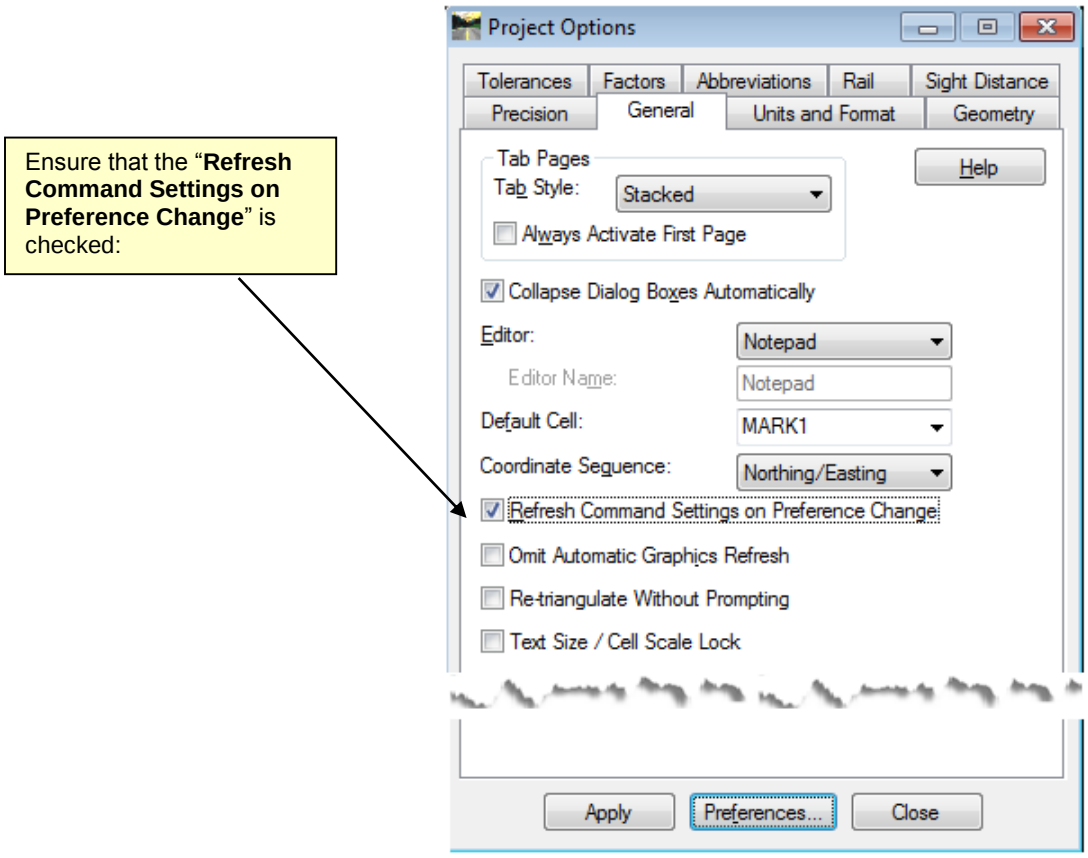


Figure 1-7 Survey Default Settings

6. Click **Apply** and then click **Close**.

The **Survey Default** Preference is now loaded. This Preference loads the appropriate data for ALL of the tabs in the Options dialog box. The individual tabs (Tolerances, Geometry, Units and Format, etc.) will automatically be configured for use in Survey calculations. The Point and Alignment Numbering scheme(s) are also automatically configured for the standard Survey conventions in the **Survey Default** Preference. These individual tab options will NOT need to change. Once the **Survey Default** Preference is loaded – the project will retain these settings each time the project is accessed on this computer. These settings are specific to this computer Profile/XIN file. If the Project is accessed on another computer – these settings may need to be re-applied in order to load the correct **Survey Default** Preference.

1.8 InRoads "Locks"

InRoads contains several "Locks" which are used by many InRoads commands to control different aspects of the selection and viewing of data as well as the reporting of data. There are basically two types of "Locks" – On/Off "Locks" and Switch "Locks". (Switch "Locks" contain different modes but one mode is always active and the user can switch between modes). Both types of "Locks" can be changed by the user as the situation dictates during the course of the database generation. These locks affect many commands – so it is very important that the user understand the use of these locks.

If an InRoads command does not function as expected when utilizing the Surface Viewing or Reporting commands -- a “Lock” may have been inadvertently turned on/off.

The following section contains a brief overview of some of the InRoads “Locks”. Only the “Locks” pertaining to the Survey aspect will be reviewed. As mentioned previously the “Locks” may be changed as situations dictate – but the settings depicted in the following section are applicable for most Survey Projects. It is a very important step to ensure that the “Locks” are set accordingly. (See *Table 1.5*)

Following are the steps to access the InRoads “Locks”:

Click Tools ▶ Locks from the InRoads pull-down menu. Each time a “Lock” is changed – the pull-down menu will close and the user must click on Tools▶Locks again to access the Locks pull-down.

Table 1.5

InRoads Locks Settings

Feature Filter	Unchecked
Feature Highlight	Unchecked
Style	Unchecked
Pencil/Pen	Set to Pencil
Delete Ink	Unchecked
Locate	Set to Features
Point Snap	Checked
Element Snap	Unchecked
Station	Unchecked
Report	Checked
Cogo Audit Trail	Unchecked
Toolbar	Checked

Following is a brief overview of the InRoads "Locks":

(See *Table 1.6*)

Table 1.6
InRoads Locks Overview

Feature Filter
displays or obscures Surface Features based on a filter (also controls Survey Style Filter)

Feature Highlight
highlights the feature in plan view when selected from a list

Style
determines if a dialog box is displayed for a surface command or cross sections

Pencil/Pen
controls the redisplaying of Graphics

Delete Ink
allows redisplayed graphics to replace graphics in pen mode

Locate
controls if Locate Buttons snap to Graphics or Features

Point Snap
controls the ability to snap to points in Geometry Project

Element Snap
controls the ability to snap to elements in Geometry Project

Station
controls the Stationing as it pertains to Cross Sections

Report
controls if Report is displayed or not displayed in a dialog box

Cogo Audit Trail
controls the reporting of coordinate geometry results to a text file

Toolbar
displays or turns off the Locks Toolbar

1.9 Application and Variable Manager Add-Ins

InRoads contains several Application and Variable Manager "Add-Ins" which must be selected and added to the InRoads Program in order to access the standard GDOT customized menu applications/translators for Survey. Once the Application and Variable Manager Add-Ins are selected – the settings are written to registry keys in the user's profile. This ensures that each time InRoads is accessed in the user profile -- these settings will already be available. These add-ins will only need to be added once and will then be accessible in all of the InRoads Modules and InRoads Projects.

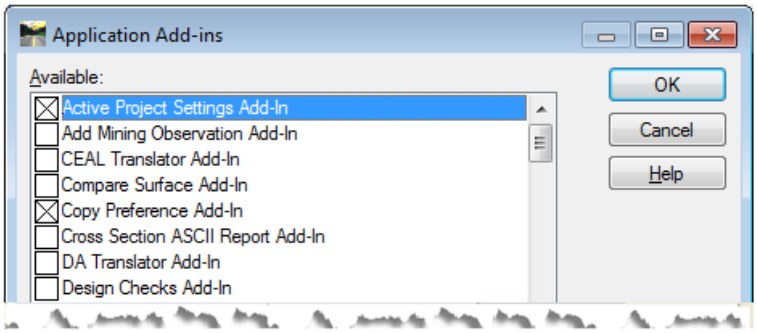
The "Application and Variable Manager Add-Ins" must be set accordingly in order to access the required GDOT Survey commands and translators.

This section details the following processes:

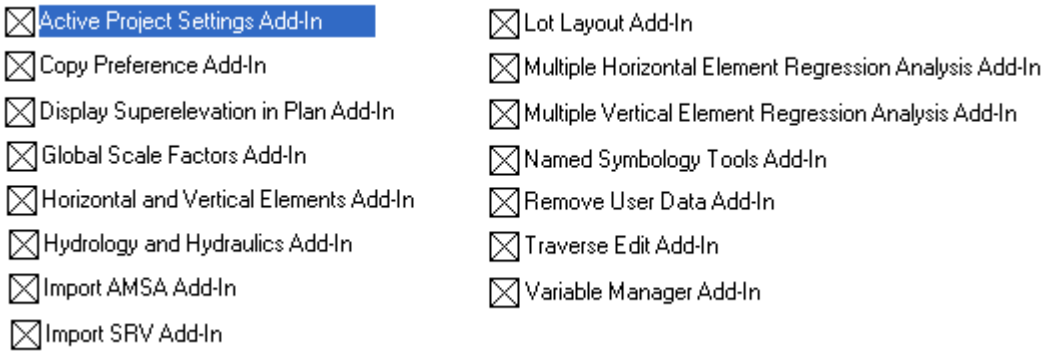
- Steps to select the Application Add-Ins
- Steps to select the Variable Manager Add-Ins

1.9.1 Steps to select the Application Add-Ins:

1. Click **Tools ▶ Application Add-Ins** from the InRoads pull-down menu and the following dialog box will appear:



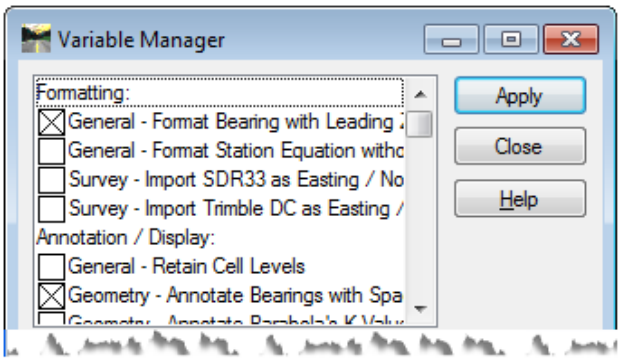
2. Select the following Application Add-Ins by clicking a ☒ by the appropriate Add-In:



3. Click **OK** to accept the settings and to close out of the dialog box.

1.9.2 Steps to select the Variable Manager Add-Ins:

1. Click **Tools▶Variable Manager** from the InRoads pull-down menu and the following dialog box will appear:



2. Select the following Variable Manager Add-Ins by clicking a ☒ by the appropriate Variable:

☒ General - Format Bearing with Leading Zero Option

☒ Geometry - Annotate Bearings with Spaces

☒ Geometry - Alphanumeric Names in Create/Edit Alignment by Cogo Points

3. Click **Apply** to accept the settings and then click **Close** to close out of the dialog box.

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Chapter 2. Standard Conventions

This section provides an overview of the GDOT standard Project, File and Object naming conventions. The standard Feature Types for DTM (Digital Terrain Model) data are discussed and the GDOT Preference File (.XIN) is reviewed. Feature Code Tables are also listed which provide the standard Feature Codes/Feature Styles to utilize for Photogrammetric and/or Field Survey Projects.

This section covers the following topics:

- Project, File and Object Naming Conventions
- Standard Surface Feature Object Names
- Standard Surface Feature Types
- Standard Geometry Object Names
- Standard File Information
- Standard Preference File (XIN) and GDOT Preferences
- GDOT Standard InRoads Photogrammetry Feature Codes
- GDOT Standard InRoads Field Survey Feature Codes

2.1 Project, File and Object Naming Conventions

As mentioned previously in **Section One** - in order to ensure Project and File Naming consistency – standard Project, File and Object Naming conventions have been established.

This section details the following Standard Naming Conventions:

- Standard Project Naming Conventions
- Standard File Naming Conventions
- Standard Object Naming Conventions

**** Important Conventions regarding CSV File Import:**

InRoads contains a **CSV** file importer which converts the CSV file(s) into a format that is usable for InRoads. The .CSV file is imported based on a format of **Point Number, Northing, Easting, Elevation, Feature Code** and **Attribute**. After the CSV file(s) are imported into the Field Book, the data can then be exported into a Surface Project and/or Geometry Project.

2.1.1 Standard Project Naming Conventions

The standard File Structure for InRoads is a Project Folder named for the PI Number of the project. A sub-folder – named ***SDE*** – will be located under this PI Number. This is the folder location where the core Survey File data is located. When submitting project deliverables to the Designer – submit the entire Project Folder (*Example: the PI Number Folder and the associated SDE sub-folder*). This will ensure that all of the applicable files are submitted to the end-user. (See *Table 2.1*)

Table 2.1	
Standard Project Naming Conventions	
InRoads Project Structure	C:\InRoads Data\PI Number\ SDE
InRoads Project Structure (Example)	C:\InRoads Data\1234567\ SDE

2.1.2 Standard File Naming Conventions

InRoads contains several different file types but the Survey data will usually consist of file types pertaining to the .CSV (Survey Trimble File), .FWD (Survey Field Book), the .DTM (Digital Terrain Model), the .ALG (Geometry File) and the associated topographical .DGN (MicroStation Design File) deliverables. Following are the applicable file naming conventions (See *Table 2.2*)

	Table 2.2	
	Standard File Naming Conventions	
	File Type	**File Name**
•	**3D "Working" DGN file**	GDOT 3D Working File.dgn
•	**CSV – Full Field Survey File** **1st (Original) Field Survey CSV** **2nd Enhancement Field Survey CSV** **3rd Enhancement Field Survey CSV, Etc.**	PI#A.csv PI#B.csv PI#C.csv, Etc.
•	**CSV – Mapping Enhancement File** **Original Mapping Enhancement CSV** **1st Mapping Enhancement CSV** **2nd Mapping Enhancement CSV, Etc.**	PI#XO.csv PI#XA.csv PI#XB.csv, Etc.
•	**FWD – Full Field Survey File** **1st (Original) Field Survey File** **2nd Enhancement Field Survey File** **3rd Enhancement Field Survey File, Etc.**	PI#_ A.fwd PI#_ B.fwd PI#_ C.fwd, Etc.

	Table 2.2	
	Standard File Naming Conventions	
	File Type	**File Name**
•	**FWD – Mapping Enhancement File** **Original Mapping Enhancement File** **1st Mapping Enhancement File** **2nd Mapping Enhancement File, Etc.**	 PI#_ XO.fwd PI#_ XA.fwd PI#_ XB.fwd, Etc.
•	**ALG - Geometry File**	PI#_ SDE.alg
•	**DTM - Processed DTM Surface File** **(All DTM's are incorporated into this one Existing DTM before submission)** **Note:** (A PI#_Map.dtm will be provided by Photogrammetry if the project is Mapping. Please see the SDE Training **Lab 8A** for the process to copy the Mapping DTM into the PI#_SDE.dtm before adding enhancements).	PI#_ SDE.dtm ← See Note:
•	**Intermediate DTM – Full Field Survey File** **Note:** (The First Original Field Survey File is obtained from the PI#A.csv and PI#_A.fwd files. These files are incorporated as PI#_SDE.dtm during initial DTM creation – therefore there is no intermediate DTM named PI#_A.dtm.) **2nd Enhancement Field Survey File** **3rd Enhancement Field Survey File, Etc.**	 ← See Note: PI#_ B.dtm PI#_ C.dtm, etc.
•	**Intermediate DTM – Mapping File** **Original Mapping Enhancement DTM** **1st Mapping Enhancement DTM** **2nd Mapping Enhancement DTM, Etc.**	 PI#_ XO.dtm PI#_ XA.dtm PI#_ XB.dtm, etc.
•	**Processed DGN Files**	PI#_TOPO.dgn

	Table 2.2	
	Standard File Naming Conventions	
	File Type	**File Name**
		PI#_UTLE.dgn PI#_PROP.dgn
•	**Processed DGN PDF Plot Files**	PI#_TOPO.pdf PI#_UTLE.pdf PI#_PROP.pdf

2.1.3 Standard Object Naming Conventions

InRoads contains several different object types such as DTM Feature Points and Alignments, Cogo Points, Alignment Points and Alignments. Following are the applicable object naming conventions (See *Tables 2.3 – 2.5*).

Table 2.3
Example Standard Object Names

Object Type	Object Name	Object Name Convention
Mapping Feature Points and Alignments	Example: M_TPBL224	Feature Code & Number
Field Feature Points and Alignments	Example:TOPO_E_TPBL-1	Feature Code Style & Number
Cogo Points	Example: 1789 --- (No Prefix)	Point # only – No Prefix
Alignment Points	Example: 1790 --- (No Prefix)	Point # only – No Prefix
Alignments	Example: SV23--- (SV Prefix)	Prefix + Alignment #

Table 2.4
Example Exterior Boundary Naming Conventions

Exterior Boundary Type	Feature Name	Feature Style
Mapping Exterior Boundary	MBOUNDARY	TOPO_E_TLIML
Full Field Survey Boundary	XBOUNDARY	TOPO_E_TLIML

Table 2.5 Point & Alignment Ranges to Use	
Points	Range 1-9999
Alignments	No Limitations for Alignments -- but must have the **SV** Prefix

2.2 Standard Surface Feature Object Names

Mapping and Field Data:

InRoads contains an **Import►Surface Advanced** command which imports the 3D Photogrammetric Data from the Softcopy MicroStation DGN file into a format that is usable for InRoads. The **Surface Advanced** command imports the 3D DGN elements into InRoads based on the Level of the Features in MicroStation as well as the Level and Cell for Random Terrain Points. (*The SDE will receive this data already imported into the DTM. This DTM Surface will be provided to the SDE as PI#_ Map.dtm*).

The CSV (Field Data Collector) files are imported directly into InRoads through an internal Import Survey Data Translator. After the CSV file is translated and imported into the Field Book, the data can then be exported into a Surface Project and/or Geometry Project. The processing and triangulating of the Surface Data/Geometry Data are discussed and demonstrated in the *Introduction to InRoads for Survey Data Processing*.

The CSV data is imported in as surface features into a surface. Each Feature object is assigned a hard coded unique naming scheme based on the Feature Style – **Example**: TOPO_E_TPBL-1, TOPO_E_TPBL-2, TOPO_E_TPBL-3, etc. for Field Survey DTM data. (See *Table 2.6*). The internal surface points are numbered consecutively in the particular Feature Object - Example: 1, 2, 3, etc. Each Feature can be made up of one or many points. The Feature Style is based on the associated Feature/Alpha Code and is assigned during the CSV Import Translation process. The Feature Style determines if the Feature will be included in the triangulation process.

The Feature Type affects how the DTM triangles are formed. The Feature Type can be a breakline, random point, etc. and is determined based on a setting in the corresponding Feature Style. The attribute of the Surface Feature (whether it is 3D topographic or a 2D planimetric Feature) and the triangulation effect is also determined during the translation process.

The Standard Object Names for the Surface Features are determined by the Feature Code/Feature Style – this is an automated process so that the Standard Object Names are already defined for the user. (See *Table 2.6*)

Table 2.6 Example DTM Feature Object Names	
Mapping Feature Points and Alignments	Example: M_TPBL224
Field Feature Points and Alignments	Example: TOPO_E_TPBL-224

2.3 Standard Surface Feature Types

InRoads contains five Feature Types: **Breakline, Random, Contour, Interior** and **Exterior**. These Feature Point Types are set according to the corresponding Feature Code/Feature Style in the standard GDOT Preferences file (**GDOT_Standard V8i_SS2.xin**). As mentioned previously, the Feature Point Type determines how DTM triangles are formed when the points are connected. When the data in the CSV file is imported during the translation process – the correct Feature Type is automatically assigned by the Feature Style and to the Feature Object which is imported into the Surface. Following are examples of the Feature Types: (See *Table 2.7*)

Table 2.7 Example Surface Feature Types	
Feature Type	**Description**
Breakline	Linear connected points that represent discontinuities in a surface
Random	Randomly spaced points that are independent of other points
Contour	Connected points that form a linear segment based on elevation
Interior	Interior connected points that represent areas in a DTM that are undefined or obscured
Exterior	Exterior connected points that represent the outer limits of a DTM surface and can be used to trim extraneous triangulated data

2.4 Standard Geometry Object Names

As mentioned previously - the CSV (Field Data Collector) files are imported directly into InRoads through an internal Import Survey Data Translator. After the CSV file is translated and imported into the Field Book, the data can then be imported into a Surface Project and/or Geometry Project. The processing and triangulating of the Surface Data/Geometry Data are discussed and

demonstrated in the Introduction to *InRoads for Survey Data Processing Training Guide*. The previous Section described the data which is imported into the DTM Surface. The following Section depicts the data which is imported into the Geometry project.

The survey data which is imported into the Geometry Project (.ALG) is survey that consists of Property data, Existing Right of Way, Alignment data, etc. Basically it is survey which is "Geometry related" and which will be used in the creation of the property, alignment and COGO database. This Geometry data will not be represented in the DTM. All other Survey Data will be imported into the Surface Project (.DTM) and will be represented as Surface Features. Please see the *Introduction to InRoads for Survey Data Processing* which depicts the process to filter data to import into the Geometry Project (.ALG).

The following codes/styles (which are composed of data which will be used for the generation of Property and Alignment information) are included in the Survey Style Filter which is named ***Property and Alignment Codes***. All Codes which are not listed in the table below– will be imported into the Surface Project (.DTM File). The Survey Control Codes are imported into both the .ALG and the .DTM Files.

Property and Alignment Codes Survey Style Filter			
PROP_E_LTD-ACCESS	Existing Limited Access	**PROP_E_BCOL**	County Line
PROP_E_RWM	Right-of-Way Marker Found	**PROP_E_BCTL**	City Limit Line
PROP_E_RWC	Right-of-Way Point Computed	**PROP_E_BGMD**	Georgia Militia District Line
PROP_E_RWU	Right-of-Way Utility Company	**PROP_E_BLDL**	Land District Line
PROP_E_RWE	Right-of-Way Prescription Pt	**PROP_E_BSL**	State Line
PROP_E_RWE-LTD-ACCESS	Right-of-Way Existing & Limited Access	**TOPO_E_SNGSCM**	NGS Control Mon.
PROP_E_POEL	Point on Easement Line	**TOPO_E_SLCM**	Loc. Cont. Mon.
PROP_E_PCF	Property Corner Found	**TOPO_E_SLCD**	Loc. Cont. Delta
PROP_E_PPOL	Property Point on Line	**TOPO_E_SDCD**	Dist. Cont. Delta
PROP_E_PPC	Property Point Computed	**TOPO_E_SCCHK**	Cont. Re-shot
PROP_E_APOT	Point in Tangent, Existing	**TOPO_E_SBNCHMK**	Benchmark
PROP_E_APC	Point of Curvature, Existing		
PROP_E_APOC	Point on Curve, Existing		
PROP_E_APT	Point of Tangency, Existing		
PROP_E_API	Point of Intersection		
PROP_E_ACL	Alignment Centerline		
PROP_E_BLLL	Land Lot Line		

A. Geometry Object Names:

The Geometry Objects consist of Cogo Points, Alignment Points and Alignments. Existing Property Data is imported from the Field Survey CSV file. The SDE then utilizes deeds, plats, existing plans or tax maps if required to assist in the input of the Parcel and Alignment Data. The SDE will store property data by utilizing the existing Cogo Points imported from the CSV file and by storing additional Cogo Points, Alignment Points and Alignments computed/based off of deeds, plats, etc. as required.

Please Note:

The points/chains imported from the CSV file will contain No prefixes. The SDE will also store any computed points with No prefixes. Any computed Alignments will be stored with an SV prefix to represent a Survey stored Alignment.

*The reason that Survey (field collected and computed points) do not contain pre-pended prefixes is to reduce the possibility of duplicate points going back to the data collector and to ensure that duplicate points are not submitted to the Designer when additional enhancements are added during the life of the project. Designers will name their computed points and alignments with a pre-pended **DE** prefix in order to differentiate between Survey and Design points/alignments.

*Please note that it is a requirement for the SDE to pre-pend the SV Prefix to all computed Alignments. This includes Parcel Alignments, Existing Centerline Alignments, Existing R/W Alignments, etc.

- **Cogo Points** - These points will be stored with NO Prefix. Only the Point Number will be represented.
- **Alignment Points** - These points will be stored with NO Prefix. Only the Point Number will be represented.
- **Alignments** – The Alignments will always be stored with an **SV** prefix.

The above Naming Scheme is utilized in order to differentiate between Survey Data and Design Data. The Naming Scheme is also used to assist in adding Additional Survey Enhancement information to a database. This information can then be submitted to the Designer so that the Designer's Points and Alignments will not be overwritten when additional enhancements are added to the Designer's Geometry Project Database. (See *Table 2.8*)

Table 2.8
Example Standard Object Names

Cogo Points	Example: 1789 --- (No Prefix)	Point # only – No Prefix
Alignment Points	Example: 1790 --- (No Prefix)	Point # only – No Prefix
Alignments	Example: SV23--- (SV Prefix)	SV Prefix + Alignment #

The following Table depicts the **Standard Alignment Descriptions** which are required for each Alignment stored in the Geometry Project. This Table depicts the **Alignment Type, Description Convention** and the **Description Example**. (See *Table 2.9*)

Table 2.9
Standard Alignment Descriptions

Alignment Type	Description Convention	Description Example
Existing Centerlines	EXIST C/L (Roadway Name)	EXIST C/L SR 100
Existing Right-of-Way Left	EXIST R/W LT (Roadway Name)	EXIST R/W LT SR100
Existing Right-of-Way Right	EXIST R/W RT (Roadway Name)	EXIST R/W RT SR100
Land Lots	LAND LOT #	LAND LOT #102
Parcels	PAR # (Owner Name)	PAR 71 ELLIS

B. Feature Styles to Utilize for Storing Points and Alignments:

The Standard Feature Styles to use when storing Points and Alignments for the Existing Centerline Alignments, Existing R/W, Property, etc. will be named according to the type of Point or Alignment which is to be stored. The following Table lists the applicable Feature Style(s) to utilize when storing the Point and Alignment data: (See *Table 2.10*)

Table 2.10
Feature Styles For Points and Alignments

Existing/Computed Points	PROP_E_ACL PROP_E_ACL-PC-PT PROP_E_APC PROP_E_API PROP_E_APOC PROP_E_APOT PROP_E_APT PROP_E_PCF PROP_E_RWE-LTD-ACCESS	PROP_E_POEL PROP_E_PPC PROP_E_PPOL PROP_E_RWC PROP_E_RWE PROP_E_RWM PROP_E_RWRR PROP_E_RWU PROP_E_LTD-ACCESS
Existing Centerline Alignment	PROP_E_ACL	
Existing R/W Alignment	PROP_E_RWE	
Existing Property (Parcel) Alignment	PROP_E_PAR	
Existing R/W & Limited Access Alignment	PROP_E_RWE-LTD-ACCESS	
Existing Limited Access Alignment	PROP_E_LTD-ACCESS	

C. Point and Alignment Numbering Ranges:

Point Numbers 1 – 9999 are reserved for survey collecting and survey data processing. Point numbering should be done consecutively and if more points are required the numbering should continue consecutively as needed. When additional survey data is gathered in the field, the point numbers should begin with the lowest number that has not already been submitted to design. Designer's Point numbering range begins at 10,000. Points 10,000 and above are reserved for Design. If the total number of survey points has reached the 9,999 point limit, the Survey Data Engineer should contact the Designer and obtain the next starting point number.

A gap in point numbering should only exist where the location survey points total less than 9,999. All other numbering gaps should be minimized. (See *Table 2.11)*

Table 2.11
Point & Alignment Numbering Ranges

Points	Range 1-9999
Alignments	No Limitations for Alignments -- but must have the **SV** Prefix

2.5 Standard File Information

Following is a brief overview of the most common file types the SDE will process and generate: (See *Table 2.12*)

Table 2.12
Standard File Information Overview

GDOT 3D Working File.dgn

This DGN file is created from the GDOT 3D "seed" file (**GDOT_V8_3D.dgn**) and is used to display the temporary and or/permanent graphics in InRoads.

.CSV

The .CSV files are comma delimited ASCII format files and contain Field Survey Data collected utilizing Data Collectors in the field (Topography, Property, Drainage, etc.). The .CSV file is imported into the InRoads .FWD file (Electronic Field Book).

.FWD

The .FWD file contains the imported Field Survey Data (.CSV File Data). Basically this file is an Electronic Field Book in which the .CSV File data is imported so that the survey data can be exported to the .DTM (Surface) and .ALG (Geometry) files.

.DTM

The .DTM file contains all of the Surface Features imported from the 3D Photogrammetric DGN File and/or CSV File(s). The appropriate Surface Features are triangulated in order to form an Existing Ground Surface (TIN Model) for use in Survey and Design.

.ALG

The .ALG (Geometry File) contains all of the "Geometry" related data imported from the FWD File(s). This data is utilized to create Property, Existing R/W and Existing Centerline Alignments for use in Survey and Design.

PI#_TOPO.dgn

This DGN file contains all of the Topographical and Drainage information generated from Mapping and Full Field Survey.

PI#_PROP.dgn

This DGN file contains all of the Property, Existing R/W, Existing Centerline, etc.., information generated from Survey Processing and Field Survey Data.

PI#_UTLE.dgn

This DGN file contains all of the Utility information generated from Field Survey Data and Mapping.

2.6 Standard Preferences

InRoads Standards for Survey Data Processing has been set up in a "Preference" file (also known as an XIN file). This preference file contains the Georgia Department of Transportation's standards for Feature Codes, Feature Styles, Feature Filters, Dialog Box Settings, Linestyles, Lineweights, colors, and numerous other settings. The XIN file is basically a compilation of INI Files (Initialization files) which controls the standardization of the InRoads settings and display options. This preference file is critical for use in the InRoads Survey Process and for accurate Digital Terrain Model/ Geometry Objects creation. The XIN file is used in conjunction with MicroStation V8i's ByLevel settings and configuration files to assist in the viewing of project data and in the generation of Topographical, Property and Utility DGN plan file deliverables.

The standard GDOT XIN file is named **GDOT_Standard V8i_SS2.xin** and is included in the **InRoadsALL.exe** download.

After downloading and executing the **InRoadsALL.exe –** a **Standards** folder is created directly under the C:\InRoads Data folder. The Surveyor/SDE will copy this **Standards** folder to the Project Folder: (See Example in *Table 2.13*).

Table 2.13	
Name and Location of the GDOT Standard XIN File	
GDOT Standard XIN File	C:\InRoadsData\1234567\SDE\Standards\GDOT_Standard V8i_SS2.xin

NOTE: The XIN file contains Named Symbology and Feature Styles which correspond with the ByLevel Settings in MicroStation. Please note that if any modifications or additional Feature Styles/Named Symbology are added by the user to the XIN – the MicroStation Levels may not view with the correct Symbology for those modified Feature Styles. It is advisable to NOT add additional Named Symbology or Styles in order for the XIN file to be consistent with the current MicroStation Bylevel settings so that utilities for Plans Productions will function correctly.

2.6.1 Standard Preference File (XIN) Details

The XIN File contains the GDOT configuration settings for use in Design/Survey. These settings contain the current GDOT standards for plan development and processing of Design/Survey Data. Following are some of the Configuration Settings contained in the XIN:

- **Named Symbology** – This controls how elements such as points, lines, text, etc. appear in plan, cross section and profile views in MicroStation. The GDOT named symbology is also set to ***ByLevel*** which references the Level Settings for Symbology in the MicroStation DGNLIB. ByLevel controls the Symbology (weight, color, linestyle) and the Named Level on which the elements are located. The Named Symbology can also be set in the InRoads Named Symbology Manager by selecting each symbology (color, weight, linestyle, etc.) separately but GDOT uses the ByLevel Symbology to correspond with the DGNLIB Levels. (The Named Symbology determines “How” an element is viewed”).

- **Feature Styles** – InRoads contains Features which represent elements such as points, lines, arcs, spirals, etc. The Feature Style for each Geometry, Survey, DTM and Component element is used to determine how the elements view. The elements can be set to view in plan view, profile, cross section, DTM, etc. The Feature Style references the associated Named Symbology to view the element with the appropriate corresponding Symbology. The Feature Style determines “Where” the element is viewed.

- **Preferences** – When using commands in the InRoads dialog boxes – it is useful to set Preferences which can be loaded later without having to re-enter information into the dialog boxes. Preferences are basically entries in dialog boxes which can be saved and then selected to automatically configure the settings of a dialog box without manual re-entry.

- **Filters** – Filters are commands in dialog boxes which can be used to “filter” selections of data based on set criteria. This can include selection of Points, Alignments, Features or other entities by using a filter based on the entities’ Style, Name, etc.

These are some of the GDOT standards that have been configured for use in the XIN file. These settings are used to assist in the Survey/Design process to ensure that standards are consistent for development of GDOT project plans.

2.6.2 GDOT Preferences

As mentioned previously - Preferences are entries in dialog boxes which can be saved and then selected later to automatically configure the settings of a dialog box without manual re-entry. The following Table lists the GDOT Preferences available in the GDOT XIN file. These Preferences are discussed in more detail in each of the applicable Sections of the Survey and Design Guidelines.

Preference Name	Dialog Name	Dialog Location	Description
10 Scale Work Sec 1x Vert Exg *(Ensure the "Create Cross Section Folder" is selected)*	**Cross Sections**	Evaluation ▶ Cross Section ▶ Cross Sections ▶ Preferences	X-Section Grid (10 Scale) for Earthwork and End-Area reports. For use on projects with small footprints. Most situations will require using the '50 Scale Work Sec 2x Vert Exg' Preference.
100h_10v Profile	**Annotate Profile**	Evaluation ▶ Profile ▶ Annotate Profile ▶ Preferences	Sets settings for 100' Scale Horizontal and 10' Scale Vertical viewing of existing and proposed Profile elevations on the Profile plan sheets. Use when annotating Profiles for Profile sheets using the '50 Scale Single Profile' Preference in the Plan and Profile Generator.
100h_10v_SHEETS	**Create Profile**	Evaluation ▶ Profile ▶ Create Profile ▶ Preferences	Loads grid settings, station formats, fonts and symbology for use in plotting a Profile at 100' Horizontal Scale and 10' Vertical Scale. This Preference is also referenced in the Plan & Profile Generator when generating 50 Scale Single Profile Sheets.
	Annotate Profile	Evaluation ▶ Profile ▶ Annotate Profile ▶ Preferences	This same preference name is now also used in the Annotate Profile dialog box. It was copied from and is identical to the 100h_10v Profile preference. This is so the 'Profile Preference' under the 'Profile Controls' tab of the 'Plan and Profile Generate' dialog will not display Superelevation diagrams on the profile sheets.
100h_10v_WORKING	**Create Profile**	Evaluation ▶ Profile ▶ Create Profile ▶ Preferences	Loads grid settings, station formats, fonts and symbology for use in plotting a Profile at 100' Horizontal Scale and 10' Vertical Scale. Same as 100h_10v_SHEETS except grid is not drawn. For use during temporary viewing of Profile during vertical alignment design.

Preference Name	Dialog Name	Dialog Location	Description
20 Scale	**Survey Options**	Survey ▶ Fieldbook Data ▶ Survey Options ▶ Preferences	Sets Cell Scale, Text Scale, and Line Scale for viewing survey planimetrics for 20 Scale projects.
20 Scale Double Profile	**Plan and Profile Generator**	Drafting ▶ Plan and Profile Generator ▶ Preferences	Used for generating 20 Scale Double Profile Sheets.
20 Scale Plan	Plan and Profile Generator	Drafting ▶ Plan and Profile Generator ▶ Preferences	To be developed.
20 Scale Plan & Profile	**Plan and Profile Generator**	Drafting ▶ Plan and Profile Generator ▶ Preferences	Used for generating 20 Scale Plan & Profile Sheets.
20 Scale Single Profile	**Plan and Profile Generator**	Drafting ▶ Plan and Profile Generator ▶ Preferences	Used for generating 20 Scale Single Profile Sheets.
20h_5v Profile	**Annotate Profile**	Evaluation ▶ Profile ▶ Annotate Profile ▶ Preferences	Sets settings for 20' Scale Horizontal and 5' Scale Vertical viewing of existing and proposed Profile elevations on the Profile plan sheets. Use when annotating Profile for Profile sheets using the '20 Scale Single Profile', '20 Scale Double Profile, and '20 Scale Plan & Profile' Preferences in the Plan and Profile Generator.

Preference Name	Dialog Name	Dialog Location	Description
20h_5v_SHEETS	**Create Profile**	Evaluation ▶ Profile ▶ Create Profile ▶ Preferences	Loads grid settings, station formats, fonts and symbology for use in plotting a Profile at 20' Horizontal Scale and 5' Vertical Scale. This Preference is also referenced in the Plan & Profile Generator when generating 20 Scale Single Profile Sheets, 20 Scale Double Profile Sheets and 20 Scale Plan and Profile Sheets.
	Annotate Profile	Evaluation ▶ Profile ▶ Annotate Profile ▶ Preferences	This same preference name is now also used in the Annotate Profile dialog box. It was copied from and is identical to the 20h_5v Profile preference. This is so the 'Profile Preference' under the 'Profile Controls' tab of the 'Plan and Profile Generate' dialog will not display Superelevation diagrams on the profile sheets.
20h_5v_WORKING	**Create Profile**	Evaluation ▶ Profile ▶ Create Profile ▶ Preferences	Loads grid settings, station formats, fonts and symbology for use in plotting a Profile at 20' Horizontal Scale and 5' Vertical Scale. Same as the 20h_5v_SHEETS Preference except the grid is not drawn. For use during temporary viewing of Profile during vertical alignment design.
50 Scale	**Survey Options**	Survey ▶ Fieldbook Data ▶Survey Options ▶Preferences	Sets Cell Scale, Text Scale, and Line Scale for viewing survey planimetrics for 50 Scale projects.
50 Scale Double Profile	**Plan and Profile Generator**	Drafting ▶ Plan and Profile Generator ▶ Preferences	Used for generating 50 Scale Double Profile Sheets.

Preference Name	Dialog Name	Dialog Location	Description
50 Scale Plan	**Plan and Profile Generator**	Drafting ▶ Plan and Profile Generator ▶ Preferences	To be developed.
50 Scale Plan & Profile	**Plan and Profile Generator**	Drafting ▶ Plan and Profile Generator ▶ Preferences	Used for generating 50 Scale Plan & Profile Sheets.
50 Scale Single Profile	**Plan and Profile Generator**	Drafting ▶ Plan and Profile Generator ▶ Preferences	Used for generating 50 Scale Single Profile Sheets.
50 Scale Work Sec 2x Vert Exg	**Cross Sections**	Evaluation ▶ Cross Section ▶ Cross Sections ▶ Preferences	X-Section Grid (50 Scale) for Earthwork and End-Area reports. Most situations will require using this Preference.
50h_10v Profile	**Annotate Profile**	Evaluation ▶ Profile ▶ Annotate Profile ▶ Preferences	Sets settings for 50' Scale Horizontal and 10' Scale Vertical viewing of existing and proposed Profile elevations on the Profile plan sheets. Use when annotating Profile for Profile sheets using the '50 Scale Double Profile', and '50 Scale Plan & Profile' Preferences in the Plan and Profile Generator.

Preference Name	Dialog Name	Dialog Location	Description
50h_10v_SHEETS	**Create Profile**	Evaluation ▶ Profile ▶ Create Profile ▶ Preferences	Loads grid settings, station formats, fonts and symbology for use in plotting a Profile at 50' Horizontal Scale and 10' Vertical Scale. This Preference is also referenced in the Plan & Profile Generator when generating 50 Scale Double Profile Sheets and 50 Scale Plan and Profile Sheets.
	Annotate Profile	Evaluation ▶ Profile ▶ Annotate Profile ▶ Preferences	This same preference name is now also used in the Annotate Profile dialog box. It was copied from and is identical to the 20h_5v Profile preference. This is so the 'Profile Preference' under the 'Profile Controls' tab of the 'Plan and Profile Generate' dialog will not display Superelevation diagrams on the profile sheets.
50h_10v_WORKING	**Create Profile**	Evaluation ▶ Profile ▶ Create Profile ▶ Preferences	Loads grid settings, station formats, fonts and symbology for use in plotting a Profile at 50' Horizontal Scale and 10' Vertical Scale. Same as the 50h_10v_SHEETS Preference except the grid is not drawn. For use during temporary viewing of Profile during vertical alignment design.
ACL	**View Stationing**	Geometry ▶ View Geometry ▶ Stationing ▶ Preferences	Loads settings for viewing Horizontal Alignment Stationing and Curve Data.
	Curve Set Annotation	Geometry ▶ View Geometry ▶ Curve Set Annotation ▶ Preferences	

Preference Name	Dialog Name	Dialog Location	Description
ACL Cogo Point Feature Styles	**Geometry Selection Filter**	Geometry ▶ View Geometry ▶ Horizontal Annotation ▶ Filter ▶ Preferences	For use by the Survey Data Engineer (SDE) when creating the ACL centerline alignment. The Preference is used in the Geometry Selection Filter when only points with the following Feature Styles are desired to be viewed. PROP_E_API,PROP_E_APT,PROP_E_APC,PROP_E_APOT,PROP_E_APOC
BEARING & DISTANCE	**View Horizontal Annotation**	Geometry ▶ View Geometry ▶ Horizontal Annotation ▶ Preferences	Loads settings into the View Horizontal Annotation dialog to label the bearing when viewing Roadway alignments with the feature styles MAIN_P_CONSTCL, MAIN_P_SIDECL, and PROP_E_ACL. Although DISTANCE is part of the Preference name the distance is no longer set up to be labeled.
BOGUS SURFACE	**View Triangles /** **Surface Properties**	Surface ▶ View Surface ▶ Triangles ▶ Preferences. Surface ▶ Surface Properties ▶ Advanced	Used for viewing surface triangles of 'Bogus' Surfaces (surfaces created by the designer for the temporary filling of obscured areas). The Bogus Surface Preference loads settings to view the surface as pink, easily distinguishing it as a Bogus Surface. The Bogus Surface Preference is used in both the View Triangles dialog and the Surface Properties dialog. The Surface Properties dialog ensures the pink surface is displayed when viewing existing ground Profiles and Cross Sections.
Bridge Hydraulics	**Annotate Feature**	Surface ▶ View Surface ▶ Annotate Feature ▶ Preferences	Loads settings into the Annotate Feature dialog to annotate selected Bridge Features in the Surface for use in Bridge Hydraulics.

Preference Name	Dialog Name	Dialog Location	Description
CONSTCL	**View Stationing/** **Curve Set Annotation**	Geometry ▶ View Geometry ▶ Stationing ▶ Preferences Geometry ▶ View Geometry ▶ Curve Set Annotation▶ Preferences	50 Scale settings for viewing Stationing and Curve Set Annotation for Mainline Construction Centerline Alignments.
CONSTCL 20 SCALE	**View Stationing**	Geometry ▶ View Geometry ▶ Stationing ▶ Preferences	20 Scale settings for viewing Stationing of Mainline Construction Centerline Alignments.
Default		Default Preference	Original Equipment Manufacturers default settings.
Design Default	**Project Options**	File ▶ Project Options ▶ Preferences	For use by Design. Loads proper point numbering and prefixes, precision, abbreviations, sight distance settings, factors, tolerances Units and formats for GDOT projects.

Preference Name	Dialog Name	Dialog Location	Description
DETCL	**View Stationing/** **Curve Set Annotation**	Geometry ▶ View Geometry ▶ Stationing ▶ Preferences Geometry ▶ View Geometry ▶ Curve Set Annotation ▶ Preferences	50 Scale settings for viewing Stationing and Curve Set Annotation for Detour Centerline Alignments.
DETCL 20 Scale	**View Stationing**	Geometry ▶ View Geometry ▶ Stationing ▶ Preferences	20 Scale settings for viewing Stationing for Detour Centerline Alignments.
Ditch Flow Arrows	**Annotate Feature**	Surface ▶ View Surface ▶ Annotate Feature ▶ Preferences	Loads settings into the Annotate Feature dialog to place the 'Ditch Flow Arrow' cell on user selected features. The settings ensure the 'Ditch Flow Arrow' cell point in the direction of flow.
ENHANCEMENTS	**View Triangles**	Surface ▶ View Surface ▶ Triangles ▶ Preferences	For use by the SDE when viewing enhancements to obscured areas for inclusion into the Existing DTM.
EXISTING	**View Triangles/** **View Contours**	Surface ▶ View Surface ▶ Triangles ▶ Preferences Surface ▶ View Surface ▶ Contours ▶ Preferences	For use when viewing the Existing DTM.

Preference Name	Dialog Name	Dialog Location	Description
Existing Majors	**Label Contours**	Surface ▶ View Surface ▶ Label Contours ▶ Preferences	For use in labeling individual Major Contour Elevations of Existing ground surfaces.
Existing Minors	**Label Contours**	Surface ▶ View Surface ▶ Label Contours ▶ Preferences	For use in labeling individual Minor Contour elevations of Existing ground surfaces.
FINISH	**View Triangles/** **View Contours**	Surface ▶ View Surface ▶ Triangles ▶ Preferences Surface ▶ View Surface ▶ Contours ▶ Preferences	For use when viewing Final DTM Surfaces.
Finished Majors	**Label Contours**	Surface ▶ View Surface ▶ Label Contours ▶ Preferences	For use in labeling individual Major Contour Elevations of Finished Design Surfaces.
Finished Minors	**Label Contours**	Surface ▶ View Surface ▶ Label Contours ▶ Preferences	For use in labeling individual Minor Contour Elevations of Finished Design Surfaces.

Preference Name	Dialog Name	Dialog Location	Description
GDOT	**Display Template**	Modeler ▶ Create Template ▶Right mouse click over the Template to Display and select Display ▶ Preferences	Loads settings for viewing a component or template in MicroStation.
GDOT Earthwork Volumes *(Ensure the "End-Area Volumes" folder is selected)*	**Cross Sections**	Evaluation ▶ Cross Section ▶ Cross Sections ▶ Preferences	Loads settings for generating the GDOT Earthwork Volumes Report.
GDOT Profiles	**View Vertical Annotation**	Geometry ▶ View Geometry ▶ Vertical Annotation	Settings for proper viewing of vertical curve data on the Profile Plan Sheets.
Narrow 10h 10v *(Ensure the "Create Cross Section" folder is selected)*	**Cross Sections**	Evaluation ▶ Cross Section ▶ Cross Sections ▶ Preferences	Loads settings for creating Narrow Cross Section Sheets at a 10 Horizontal to 10 Vertical Scale. The Global Scale Factor must be set separately to 10.0000 for proper viewing.
Narrow 10h 10v PRE Drawing #'s *(Ensure the "Create Cross Section" folder is selected)*	**Cross Sections**	Evaluation ▶ Cross Section ▶ Cross Sections ▶ Preferences	For older projects that do not use Drawing Numbers. Loads settings for creating Narrow Cross Section Sheets at a 10 Horizontal to 10 Vertical Scale. The Global Scale Factor must be set separately to 10.0000 for proper viewing.
NO BEARING & DISTANCE	**View Horizontal Annotation**	Geometry ▶ View Geometry ▶ Horizontal Annotation ▶ Preferences	Loads settings into the View Horizontal Annotation dialog to turn off labeling the bearing and distance when viewing alignments.

Preference Name	Dialog Name	Dialog Location	Description
OEM_Default		Surface ▶ View Surface ▶ Triangles ▶ Preferences	Original Equipment Manufacturers default settings.
PAR NAMES	**View Closed Areas**	Geometry▶View Geometry▶Closed Areas▶ Preferences	Loads settings for viewing the Alignment Names of closed Alignments in the MicroStation DGN.
Prop.dgn Alignments	**Geometry Selection Filter**	Geometry ▶ View Geometry ▶ Horizontal Annotation ▶ Filter ▶Preferences	For use by the SDE when creating the PI#_PROP.dgn file for delivery to the Design Office. The Preference filters the Feature Styles to the 13 Features Styles listed here: PROP_E_ACL,PROP_E_BCOL,PROP_E_BCTL,PROP_E_BGMD, PROP_E_BLDL,PROP_E_BLLL,PROP_E_BMISC,PROP_E_BSL, PROP_E_PAR,PROP_E_POEL,PROP_E_RWE,PROP_E_RWRR, PROP_E_RWU, PROP_E_RWE-LTD-ACCESS, PROP_E_LTD-ACCESS
Prop.dgn Points	**Geometry Selection Filter**	Geometry ▶ View Geometry ▶ Horizontal Annotation ▶ Filter ▶Preferences	For use by the SDE when creating the PI#_PROP.dgn file for delivery to the Design Office. The Preference filters the Feature Styles to the 22 Features Styles listed here: PROP_E_APC,PROP_E_API,PROP_E_APOC,PROP_E_APOT, PROP_E_APT,PROP_E_BCOL,PROP_E_BCTL,PROP_E_BGMD, PROP_E_BLDL,PROP_E_BLLL,PROP_E_BMISC,PROP_E_BSL, PROP_E_PAR,PROP_E_PCF,PROP_E_POEL,PROP_E_PPC, PROP_E_PPOL,PROP_E_RWC,PROP_E_RWE,PROP_E_RWM, PROP_E_RWRR,PROP_E_RWU, PROP_E_RWE-LTD-ACCESS, PROP_E_LTD-ACCESS

Preference Name	Dialog Name	Dialog Location	Description
REQD.dgn Alignments	**Geometry Selection Filter**	Geometry ▶ View Geometry ▶ Horizontal Annotation ▶ Filter ▶Preferences	For use in creating the PI#REQD.dgn file. The Preference filters the Feature Styles to the 4 Features Styles listed here: REQD_P_DWESMT,REQD_P_PESMT,REQD_P_REQD,REQD_P_TESMT
REQD.dgn Points	**Geometry Selection Filter**	Geometry ▶ View Geometry ▶ Horizontal Annotation ▶ Filter ▶Preferences	For use in creating the PI#REQD.dgn file. The Preference filters the Feature Styles to the 5 Features Styles listed here: REQD_P_DWESMT,REQD_P_PESMT,REQD_P_REQD,REQD_P_TESMT,REQD_P_RWRM
SE LEFT	**Display Super-elevation in Plan**	Drafting▶ Display Superelevation in Plan▶Preferences	For use in displaying the Transition Stations and Superelevation Rate for a developed Corridor and Superelevation Control Line. SE Left displays information to the left of the Pivot Line defined in the command.
SE RIGHT	**Display Super-elevation in Plan**	Drafting▶ Display Superelevation in Plan▶Preferences	For use in displaying the Transition Stations and Superelevation Rate for a developed Corridor and Superelevation Control Line. SE Right displays information to the right of the Pivot Line defined in the command.

Preference Name	Dialog Name	Dialog Location	Description
SIDECL	**View Stationing/** **Curve Set Annotation**	Geometry ▶ View Geometry ▶ Stationing ▶ Preferences Geometry ▶ View Geometry ▶ Curve Set Annotation ▶ Preferences	50 Scale settings for viewing Stationing and Curve Set Annotation for Side Road Construction Centerline Alignments.
SIDECL 20 SCALE	**View Stationing**	Geometry ▶ View Geometry ▶ Stationing ▶ Preferences	20 Scale settings for viewing Stationing for Side Road Construction Centerline Alignments.
Stakeout Survey Data	**Geometry Selection Filter**	Tools ▶ XML Reports ▶ Point Validation ▶ Filter ▶ Preferences	Used to create the Stakeout Report. The Preference filters the Feature Styles to the following 20 Feature Styles. PROP_E_PAR, PROP_E_RWE, PROP_E_RWE-LTD-ACCESS, PROP_E_LTD-ACCESS, PROP_E_RWM, PROP_E_RWC, PROP_E_RWU, PROP_E_POEL, PROP_E_PPC, PROP_E_PCF, TOPO_E_SNGSCM, TOPO_E_SLCM, TOPO_E_SLCD, TOPO_E_SDCD, TOPO_E_SBNCHMK, REQD_P_*, MAIN_P_CONSTCL, MAIN_P_SIDECL
Surface Check MPCKGRD	**Geometry Selection Filter**	Tools ▶ XML Reports ▶ Surface Check ▶ Filter ▶ Preferences	Used by the District Survey Party Chiefs and the Consultant Compliance Supervisor in the Office of Design Policy and Support/Location Bureau to generate a GDOT Surface Check Report. The Surface Check MPCKGRD Preference is used to filter the Feature Styles for the **First Check Points** - **Include:** field to include only the Feature Style: TOPO_E_MPCKGRD

Preference Name	Dialog Name	Dialog Location	Description
Surface Check MPCKPAV	**Geometry Selection Filter**	Tools ► XML Reports ► Surface Check ► Filter ► Preferences	Used by the District Survey Party Chiefs and the Consultant Compliance Supervisor in the Office of Design Policy and Support/Location Bureau and Support to generate a GDOT Surface Check Report. The Surface Check MPCKPAV Preference is used to filter Feature Styles for the **Second Check Points** - **Include:** field to include only the Feature Style: TOPO_E_MPCKPAV
Survey Default	**Project Options**	File ► Project Options ► Preferences	For use by Photogrammetry and Survey. Loads proper point numbering and prefixes, precision, abbreviations, sight distance settings, factors, tolerances Units and formats for GDOT projects.
SUE	**Annotate Feature in Profile**	Evaluation ► Profile ► Annotate Feature In Profile ► Preferences	Used for the profile annotation of SUE QL-A Test Hole data.
Vertical Gore Design Tool	**Vertical Gore Tool**	Modeler► Roadway Designer ► Tools ► Vertical Gore Tool► Preferences	Loads the 'Gore' Feature Styles into the proper fields for use in the Roadway Designer Vertical Gore Design Tool.
Wide 10h 10v *(Ensure the "Create Cross Section" folder is selected)*	**Cross Sections**	Evaluation ► Cross Section ► Cross Sections ► Preferences	Loads settings for creating Wide Cross Section sheets at a 10 Horizontal to 10 Vertical Scale. The Global Scale Factor must be set separately to 10.0000 for proper viewing.
Wide 10h 10v PRE Drawing #'s *(Ensure the "Create Cross Section" folder is selected)*	**Cross Sections**	Evaluation ► Cross Section ► Cross Sections ► Preferences	For older projects that do not use Drawing Numbers. Loads settings for creating Wide Cross Section sheets at a 10 Horizontal to 10 Vertical Scale. The Global Scale Factor must be set separately to 10.0000 for proper viewing.

Preference Name	Dialog Name	Dialog Location	Description
Wide 20h 20v *(Ensure the "Create Cross Section" folder is selected)*	**Cross Sections**	Evaluation ▶ Cross Section ▶ Cross Sections ▶ Preferences	For extremely wide cross sections with offsets up to 300' L/R. Loads settings for creating Wide Cross Section sheets at a 20 Horizontal to 20 Vertical Scale. The Global Scale Factor must be set separately to 10.0000 for proper viewing.
XSEC TEXT – CL. EL. GROUND *(Ensure the "Annotate Cross Section" folder is selected)*	**Annotate Cross Section**	Evaluation ▶ Cross Section ▶ Cross Sections ▶ Preferences	Used for annotating the existing ground elevation on the Cross Sections at the centerline alignment.
XSEC TEXT – EL. DIAGONAL *(Ensure the "Annotate Cross Section" folder is selected)*	**Annotate Cross Section**	Evaluation ▶ Cross Section ▶ Cross Sections ▶ Preferences	Used for the annotation of proposed elevations in which the text must be viewed diagonally. (i.e. Roadway Profile.)
XSEC TEXT – EL. HORIZONTAL *(Ensure the "Annotate Cross Section" folder is selected)*	**Annotate Cross Section**	Evaluation ▶ Cross Section ▶ Cross Sections ▶ Preferences	Used for the annotation of proposed elevations in which the text must be viewed horizontally. (i.e. Roadway Ditches.)
XSEC TEXT – EL. VERTICAL *(Ensure the "Annotate Cross Section" folder is selected)*	**Annotate Cross Section**	Evaluation ▶ Cross Section ▶ Cross Sections ▶ Preferences	Used for the annotation of proposed elevations in which the text must be viewed vertically.
XSEC TEXT – OFFSET *(Ensure the "Annotate Cross Section" folder is selected)*	**Annotate Cross Section**	Evaluation ▶ Cross Section ▶ Cross Sections ▶ Preferences	User for the annotation of offset distances as measured from the centerline. (i.e. Slopestakes/Construction Limits.)
XSEC TEXT – OFFSET/EL. VERTICAL *(Ensure the "Annotate Cross Section" folder is selected)*	**Annotate Cross Section**	Evaluation ▶ Cross Section ▶ Cross Sections ▶ Preferences	Used for the annotation of offset distances as measured from the centerline. The elevation at the offset is also placed. This form of annotation is not required on the final Cross Section plans. It is provided to be used 'as desired' during the design process.

Preference Name	Dialog Name	Dialog Location	Description
XSEC TEXT – SLOPES % *(Ensure the "Annotate Cross Section" folder is selected)*	**Annotate Cross Section**	Evaluation ▶ Cross Section ▶ Cross Sections ▶ Preferences	Used for the annotation of slopes that require a percentage be used rather than a ratio (i.e. Pavement Cross Slopes).
XSEC TEXT – SLOPES x:y *(Ensure the "Annotate Cross Section" folder is selected)*	**Annotate Cross Section**	Evaluation ▶ Cross Section ▶ Cross Sections ▶ Preferences	Used for the annotation of slopes that require a ratio be used rather than a percentage (i.e. Ditch Slopes, Front Slopes, Back Slopes, etc.).
XSEC TEXT – SUE *(Ensure the "Annotate Cross Section" folder is selected)*	**Annotate Cross Section**	Evaluation ▶ Cross Section ▶ Cross Sections ▶ Preferences	Used for the cross section annotation of SUE QL-A Test Hole data.

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2.7 GDOT Standard InRoads Photogrammetric Feature Codes

To see the most current GDOT InRoads Photogrammetric Features and the Levels used for them, please see the InRoads Photogrammetric Features document, found on the GDOT ROADS webpage.

2.8 GDOT Standard InRoads Field Survey Feature Codes

To see the most current GDOT InRoads Survey Feature Codes/Styles, please see the InRoads Field Survey Feature Codes document, found on the GDOT ROADS webpage.

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Chapter 3. Surface and Property Data Information - Contents

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Chapter 3. Surface and Property Data Information

This section provides a brief overview of the requirements for the GDOT standard DTM Surface and Property Data generation.

This section covers the following topics:

- DTM Surface Information
- Property Data Information

3.1 DTM Surface Information

In order to generate DTM Surfaces to GDOT standard conventions – the following Surface information should be adhered and followed.

a) The DTM Surface will contain all Surface data which is not property or alignment related (both triangulated and non-triangulated data). All Property Data, Existing Right of Way, Alignment Data, etc. will not be available in the DTM. The Geometry data will only be available in the Geometry Project (.ALG).

b) Never save Surface Data to the "Default" Surface listed in the InRoads Explorer. Always create a new empty Surface to import the data and name the surface using the naming schemes depicted in the *Introduction to InRoads for Survey Data Processing Training Guide*. See also **Chapter 2 - Table 2.2** (Standard Naming Conventions listed in this document) for the standard Processed DTM and Intermediate DTM naming schemes.

c) The Maximum Length of Surface triangles will be **300.00** feet in order to correspond to current GDOT DTM standards. This setting can be entered in the **Triangulate Surface** dialog box in InRoads.

d) In order to view ALL Surface Feature Data – ensure the Feature Filter Lock is turned OFF. To accomplish this - remove the check mark from **Tools► Locks ► Feature Filter** in InRoads. In order to view filtered Surface Feature Data – ensure the Feature Filter Lock is turned ON.

e) During the processing of survey data, situations can occur where breaklines may overlap or breaklines may cross at mismatched elevations. If these segment crossings are not resolved, erroneous point and breakline data may affect the triangulation and accuracy of the DTM (Digital Terrain Model). These crossings need to be addressed and resolved prior to the final creation of the DTM Surface to ensure that an accurate Surface Model is generated.

f) When using the **View Crossing Segments** command -- crossing segment points are represented by a **Yellow X**. Mismatched elevations are represented by a **Red O**. There are two main types of crossing segments: overlaps and mismatched elevations.

g) When using the InRoads **Resolve Crossing Segments** command, the default delta tolerance for elevation differences (mismatched elevations) is 0.020. This is considered the standard GDOT default tolerance. Any mismatched elevations with a 0.020 tolerance or less are considered to be of minimum significance. Any mismatched elevations greater than a Delta Tolerance of 0.020 should be manually evaluated and resolved by using the InRoads **Edit Surface** Tools.

h) An Exterior Boundary (a Limit Line with Feature Style of **TOPO_E_TLIML**) will be created to represent the bounds of the field data. This Exterior Boundary is also used in the trimming of extraneous triangles from the DTM Surface. During the creation of a DTM Surface, extraneous triangles (erroneous triangle data) will be generated which does not represent actual Surface data. A common situation where this occurs is at "T Intersections". In order to remove these triangles (which represent inaccurate data) an Exterior Boundary is required.

i) Verify that the DTM Surface contains no erroneous "Spikes" (errors in elevation or discontinuities of Features).

j) Exterior Boundary Requirements:

- InRoads has a requirement that only **ONE Exterior Boundary** may be present in a DTM Surface Project.
- The Exterior Boundary must be one continuous complex shape.
- Ensure that the Exterior Boundary is a closed shape entity.
- The Existing Feature Points on the exterior Boundary must be located on the Existing Surface in order for the Boundary to trim triangles correctly.
- If there are Obscured Areas on the outside of the Surface data – the Exterior Boundary must not include these areas inside of the Exterior Boundary.
- Interior Obscured Areas can be included inside the Exterior Boundary.
- Verify that all extraneous triangles are trimmed

k) Exterior Boundary Naming Conventions:

- For Mapping Projects – the Exterior Boundary Feature Name should be named **MBOUNDARY** and have the Feature Style of **TOPO_E_TLIML**.
- For Full Field Survey Projects – the Exterior Boundary Feature Name should be named **XBOUNDARY** and have the Feature Style of **TOPO_E_TLIML**.

l) Interior Boundary (Obscured Area) Requirements:

- InRoads may contain numerous **Interior Boundaries** (Obscured Areas) in a DTM Project.
- The Interior Boundary must be one continuous complex shape.
- Verify that all Interior Boundaries are closed shape entities

m) Interior Boundary Naming Conventions:

- For Mapping Projects – the Interior Boundary Feature Name will be named the default name that is imported from the 3D Photogrammetric DGN file and have the Feature Style of **TOPO_E_MOBSC**.
- For Full Field Survey Projects – the Interior Boundary Feature Name will be named the default name that is imported from the CSV file and have the Feature Style of **TOPO_E_DOBSC**.

n) Review the DTM Surface to ensure that there are no erroneous or "bad" data included in the DTM. This review will determine if there are any elevations that are incorrect or bad shots that were picked up. The DTM will be reviewed in a 3D environment as a "shaded model" to assist in the resolutions of any "spikes" or erroneous data.

o) When viewing the DTM triangles and the MBOUNDARY and/or XBOUNDARY (the Topo Limit Line) at the same time – please be aware that if you use this combination and view the DTM

as “Smooth” instead of “WireFrame” --- the Triangles will be intermixed with the color of white and green and will appear as a mottled color. If you view the DTM triangles in the “Smooth” mode – it is best NOT to view the MBOUNDARY/XBOUNDARY at the same time. This will allow the triangles to view as the Existing Green color.

p) The **PI#_SDE.dtm** is a “working surface” for the use of Survey Data Engineers. After submission to the Designer(s) – the Designer will re-name the surface to **1234567_Exist.dtm**. The procedure of re-naming the Surface will be the responsibility of the Designer and will be described in the Design Guidelines and Tutorials.

q) The **FWD File (Survey File)** will not be submitted to the Designer. The information contained in this file will be merged into the Surface (DTM) or applicable Geometry (ALG) files and will also be represented in the **PI#_TOPO**, **PI#_UTLE** and **PI#_PROP** DGN files.

r) The SDE will submit the **PI#_SDE.dtm (Surface File)**, **PI#_SDE.alg** (Geometry File), **PI#_TOPO.dgn**, **PI#_UTLE.dgn** and **PI#_PROP.dgn** files to **the Engineering Management / Operations Manager**. These Files will then be submitted to the Design Engineer.

3.2 Property Data Information

In order to generate and store Property Data and Existing Right of Way to GDOT standard conventions – the following Property information should be adhered and followed.

- **InRoads Property Information**

  a. Point Prefixes shall not be utilized by the Surveyor/SDE when storing points in InRoads. The Surveyor/SDE shall work in the point range of 1-9999. This is to eliminate problems with enhancements during the life of the project. If points beyond 9999 are needed, the SDE shall contact the Designer and request a range of points be set aside for the SDE to work in that the Designer will not use.

  b. All Alignments (for Parcels, Existing Centerlines, Existing R/W, etc.) stored in InRoads will have an SV Prefix pre-pended to the Alignment Name.

  c. **Important Point Information:** InRoads has different kinds of points. Alignment Points and COGO Points are two types of points to be aware of when working with alignments---- (whether it is a centerline alignment, a R/W alignment or a property alignment). Alignment points are nothing more than names assigned to coordinates in an alignment and do not exist in the COGO points buffer. In order to satisfy GDOT plan presentation requirements and prepare R/W tables and properly deliver enhanced survey data to the Designer -- Surveyors and Designers alike must ensure that all alignments have a corresponding COGO point stored. Some InRoads commands only assign Alignment Point names and must be converted to COGO points. Some don’t assign alignment point names or store COGO points and must be assigned Alignment point names and then be converted to COGO points. As such we recommend that you adhere closely to the methods presented in the tutorials concerning centerlines, R/W and property.

  d. All Alignment Points must be converted to COGO Points in the InRoads Geometry Project. (See previous bullet above).

e. Ensure that only ONE coincident COGO point is located at shared property corners. If this is not done - there may be issues when storing proposed Right of Way Alignments and creating Right of Way tables. It also reduces plan clarity.

f. **In InRoads <u>all terminology</u> for chains (whether it be Parcel Chains, Existing R/W Chains, or actual Existing Centerline Chains) are always referred to as "Alignments"**.

- Parcel Data

a. All parcels must be stored clockwise and the alignments must close (first and last point number must be the same). The alignment should be a graphic representation of all corners of the parcel as defined in the deed or plat. Property corners and lines which lie within the "right-of-way take" should be located by field survey if possible. If they cannot be found, their position should be computed from the deed or plat. The positions of corners which do not lie within the "right-of-way take" can be determined by digitizing from a plat or tax map, or by computation.

b. The alignment for the parcel must contain sufficient information to accurately locate all curved property lines. The beginning and the ending point of each curve should be equated to a point number and those numbers must be included in the parcel alignment.

c. The District shall provide the official area in acreage for each parcel in the **Property Statistic Report (.XLS**). This area, which is to be taken from the deed or plat, is to be used by the Designer. The area which can be computed from the parcel chain is **not the official area** and therefore is **not** to be used in design. If acreage is not provided on the deed or plat, the District shall be responsible for computing this area from a legal description.

d. If a parcel is split by the proposed right-of-way, or if existing access to the parcel is eliminated, all available access to a public roadway for the remaining parcel(s) should be identified by the surveyor or the Survey Data Engineer and a comment about this access should be added as an explanatory note in the **Property DGN File (PI#_PROP.DGN) (i.e. "access to County Road #77" - shown at the appropriate place in the file)**.

e. The following information for each parcel shall be provided in a **Property Statistic Report (.XLS)** File. The filename and location shall be provided to the designer. **<u>No</u>** printout of this file should be submitted.

  - Land District/Section Number.
  - Land Lot Number.
  - Georgia Militia District (GMD).
  - Block Number.
  - Tax Map Number.
  - Tax Map Parcel Number.
  - Parcel Chain Number (This will be the Alignment Number for the parcel).
  - Area in acres (as recorded in the deed or plat).

- Book and Page Number of where the deed is recorded.
- Book and Page Number of where the Plat is recorded.
- Property Owner's Name and Address.

  NOTE: Parcels not described by this system will be described by the legal description contained in the deed.

f. Explanatory notes (**Parcel Alignment Number, Prescription R/W, Easements, etc.)** should be added to the **Property DGN File (PI#_PROP.DGN**). Additional text must have the correct attributes and level as indicated by the state-wide attributes and level conventions.

- **Right-of-Way (deeded/prescriptive) and Easement**

a. The District shall provide all information about existing right-of-ways for public roadways (including railroads) located within the limits of the project.

b. The right-of-way data shall be chained into alignments.

c. The following procedures should be followed for surveying deeded Right-of-Way:

- Locate the centerline alignment of the road that was used to describe the deeded right-of-way coordinating at least two (2) points on all tangents and three (3) points on all curves. It is very important to determine if any widening has taken place since the deed centerline was established. If widening was not symmetrical, use available field evidence to establish the deed centerline.
- All existing right-of-way markers should be coordinated.
- All existing property corners which will be used to determine the property take will be coordinated either by field survey or by computation from a deed or plat. All property points not directly impacting the "**take**" can be digitized from the deed, plat, or tax map.
- The **Property DGN File (PI#_PROP.DGN)** provided by the District **must** contain a notation which states that the "right-of-way is claimed by prescription".

d. The following procedures should be followed in developing the Property/Right-of-Way database for roads with deeded right-of-way:

- The alignment of the existing road should be determined by using the tangent and curve points from the field survey. Degrees of curves should be computed by using the field points, and then compared to old plans, and then an appropriate degree assigned to the curve.
- The Department's right-of-way should then be set to correspond with this alignment.
- At this point the differences between the Department's right-of-way and the existing right-of-way markers and property information should be evaluated. Major discrepancies should receive further investigation.
- When the District creates an alignment from the field survey file, all corners and boundaries which conflict with the right-of-way should be projected or terminated to conform precisely with the deeded right-of-way.

- The parcel alignment should contain the newly created points which conform to the right-of-way. The alignment should not include any property points that conflict with this right-of-way. These conflicting points should be retained in the data file as part of the project records.
- All existing right-of-way markers which conflict with the true position of the right-of-way are not to be used in any alignments but are to be retained in the data files as part of the project records.

e. The following procedures should be followed for surveying a public roadway that does **not** have a deeded right-of-way:

- The surveyor will notify the Preconstruction Engineer in writing that the roadway does not have a deeded right-of-way.
- Locate the centerline alignment of the road by coordinating at least two (2) points on all tangents and three (3) points on all curves.
- Coordinate the limits of the area along the roadway which is maintained by the Department or by the local government (**e.g., back of ditch to back of ditch**). This area may be claimed by prescription if it meets the legal requirements.
- The surveyor is to document on a tax map, or other drawing, all areas for which the Department or a local government does not have deeded title.

f. The following procedures should be followed in developing the Property/Right-of-Way database for roads with **no** deeded right-of-way:

- The District shall create property alignments from the field survey file that include all property corners (field located, computed or digitized) which identify parcels.
- The District shall create alignments from the field survey file that reflect the right-of-way that is considered to have been acquired by prescription* (possession).
- The property and right-of-way alignments shall show the conflicts between the property lines and these limits of the "claimed" (prescriptive) right-of-way.
- The **Property DGN File (PI#_PROP.DGN)** provided by the District **must** contain a notation which states that the "right-of-way is claimed by prescription".

g. Easement right-of-ways for utility companies should be surveyed and chained.

h. Explanatory notes should be added to the **Property DGN File (PI#_PROP.DGN)**. The text must have the correct attributes and level as indicated by the statewide attributes and level conventions.

- ✶ Prescriptive R/W is acquired by long uninterrupted use (in GA usually 7 years).

- Boundary Lines

a. The District should provide the following types of boundary lines:

- State
- County

- City
- Land Lot
- Public Lands

b. The boundary lines shall be chained.

c. Explanatory notes should be added to the **Property DGN File (PI#_PROP.DGN)**. The text must have the correct attributes and level as indicated by the statewide attributes and level conventions.

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Chapter 4. Survey Data Project Deliverables - Contents

Chapter 4. Survey Data Project Deliverables - Contents 4-i

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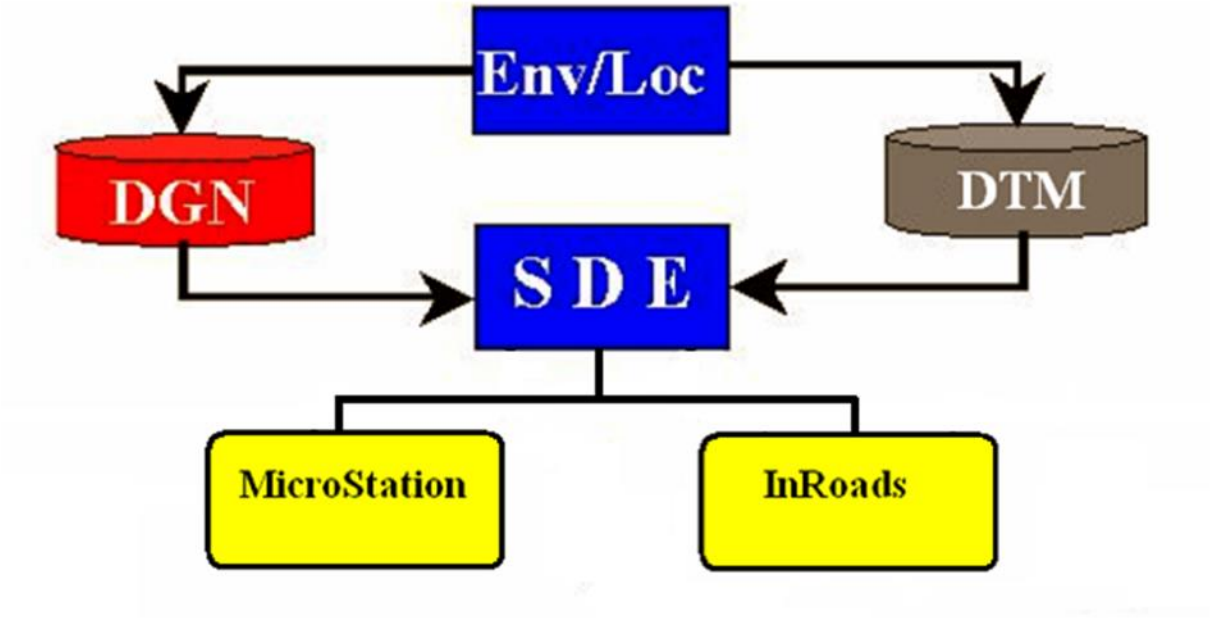
Chapter 4. Survey Data Project Deliverables

This section provides an overview of the Survey Data Project Deliverables which will be submitted to the Office of Design Policy and Support/Location Bureau (Engineering Management / Operations Manager). This data will then be forwarded to the Designer.

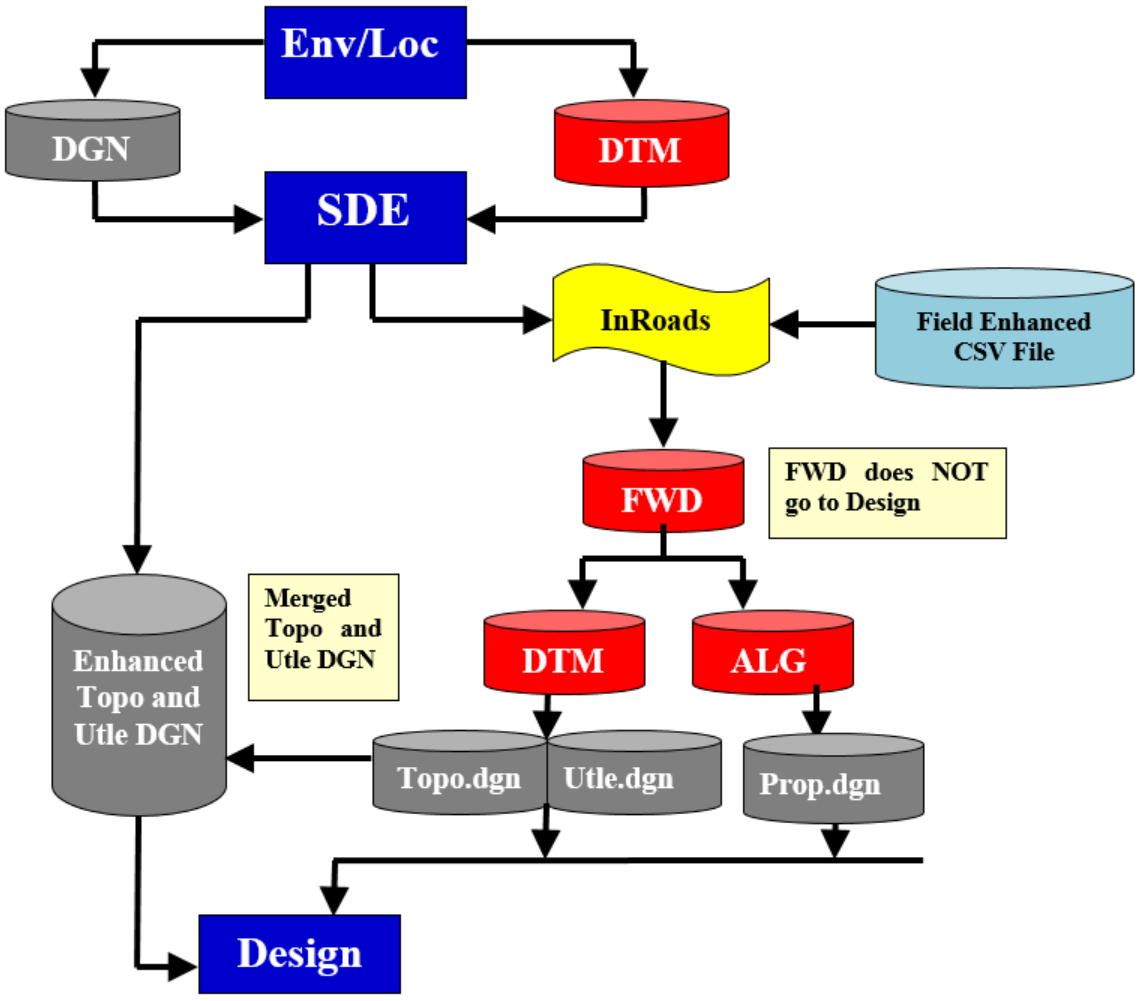
This section covers the following topics:

- Information on the Processing of Mapping and/or Full Field Survey Surface (DTM)
- Information on the Processing of the Geometry Project (ALG)
- Generation of the Topographical, Property and Utility DGN File(s)
- Listing of the SDE Project Deliverables

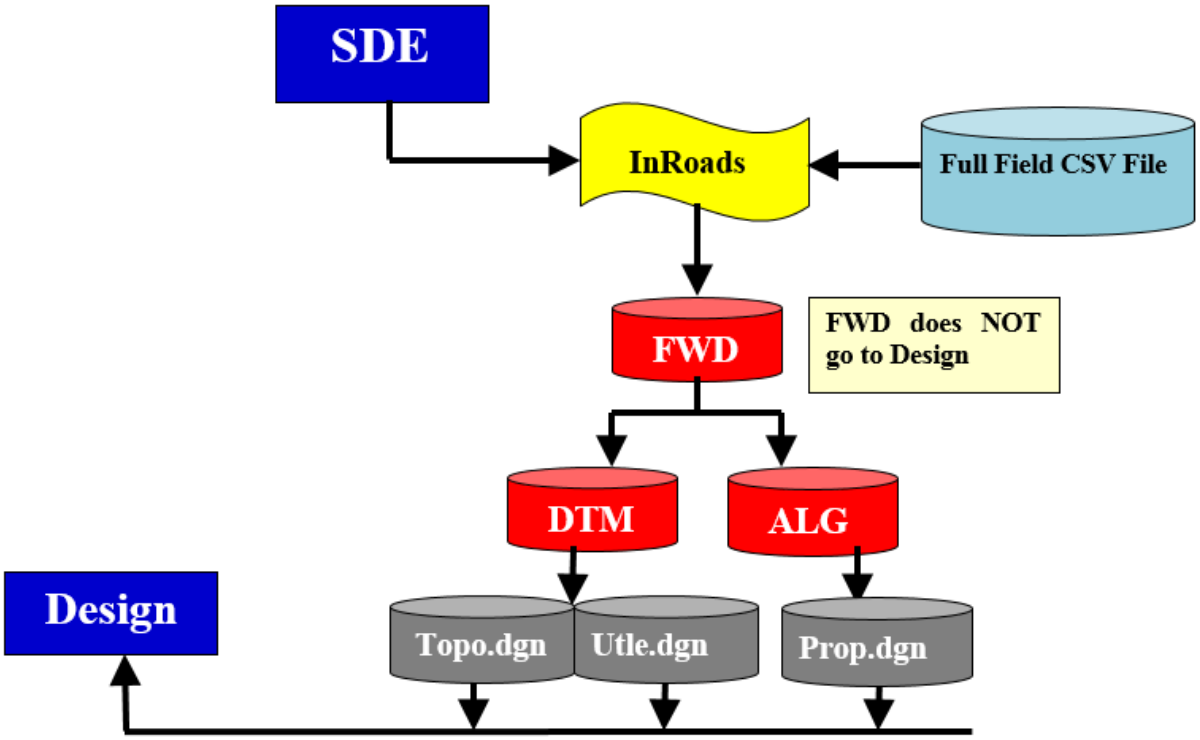
Mapping Process Overview



Mapping Enhancement Process



Full Field Survey Process



4.1 Processing of the Mapping and/or Full Field Survey Surface (DTM)

For detailed instructions regarding the generation and processing of the Survey Data and the creation of the DTM Surface – please refer to the ***"Introduction to InRoads for Survey Data Processing"*** Training Tutorial. Detailed information for the processing of the Survey Data for DTM Surfaces are listed and described in **Labs 1-9**.

Following are some Quality Assurance Verification Items to review in order to insure that an accurate DTM Model is created:

Survey Data:

- Make sure that all crossing segments and crossing overlaps are resolved
- Ensure that there is only one Exterior Boundary
- Verify that the Exterior Boundary Feature Style is XBOUNDARY for Full Field Survey and MBOUNDARY for Mapping Survey
- Ensure that the Exterior Boundary is a closed shape entity
- Verify that all Interior Boundaries are closed shape entities
- Check to ensure there are no erroneous (bad) point elevations
- Verify that Standard GDOT Naming Conventions and Feature Styles are used

DTM Surface Data:

- Make sure that the DTM is created using the "EXISTING" Preference
- The Surface Properties Symbology Preference is set to "EXISTING" for both the Cross Sections and Profiles
- Ensure that the Maximum Triangle Length of 300.00 is used.
- Verify that the DTM contains no erroneous "Spikes"
- Verify that all extraneous triangles are trimmed
- Ensure that all MOBSC Features (obscured areas) are obscured
- Make sure to compress the DTM Surface before submittal to the Designer

After the DTM Surface data has been verified and all errors corrected - the next step is the completion of the final processing of the DTM Surface. The DTM Surface will be re-triangulated and compressed (which will release memory slots that contain deleted data). The Surface Properties Symbology Preference will also be set to "EXISTING" for both the Cross Sections and Profiles.

1. **Set the Surface Properties**

   The SDE will need to set the default Surface Properties before submitting the DTM. The Surface Properties are settings that determine how the Existing ground will display in the Cross Sections and Profiles.

   In InRoads, Select **Surface►Surface Properties** from the **InRoads Menu** and the **Surface Properties** dialog box will appear.

   - Click on the **Advanced** Tab (at the top of the **Surface Properties** dialog box.).
   - In the Surface: Pull-down – Ensure **1234567_SDE** is selected.

   In the Cross Sections frame:
   - In the **Symbology**: Pull-down – select **EXISTING**

   In the Profiles frame:
   - In the **Symbology**: Pull-down – select **EXISTING**

2. **Save the InRoads Surface File**

   After re-triangulating and compressing the DTM Surface – the data will need to be saved. As mentioned previously, InRoads retains the data in temporary memory but does not save the data on the fly. Whenever a change has been made to an InRoads Surface Project – Save the project and its associated modifications or changes.

   Select **File►Save►Surface** from the **InRoads Menu** and save to the following location:

   C:\InRoads Data\PI#\SDE
   Example - C:\InRoads Data\1234567\SDE

   Please Note: (The "Save As" dialog box may not appear because the Surface has already been saved initially).

3. The **PI#_SDE.dtm** Surface Project is now ready for submittal. This file will be sent to the Office of Design Policy and Support/Location Bureau (E**ngineering Management / Operations Manager**). This data will then be forwarded to the Designer.

*This **.DTM** file replaces the CAiCE .SRV file format. The **DTM** file contains all of the Features (random points, breaklines, border, obscured features, etc.) that used to be contained in the CAICE .SRV File.

4.2 Processing of the Geometry Project (.ALG)

For detailed instructions regarding the generation and processing of the Survey Data and the creation of the Geometry data and objects – please refer to the ***"Introduction to InRoads for Survey Data Processing"*** Training Tutorial. Detailed information for the processing of the Survey Data for Geometry Projects are listed and described in **Labs 10-15**.

Following are some Quality Assurance Verification Items to review in order to ensure that an accurate Geometry Project is created:

Geometry Project:

- Point Prefixes shall not be utilized by the Surveyor/SDE when storing points in InRoads
- All Alignments (for Parcels, Existing Centerlines, Existing R/W, etc.) stored in InRoads will have an **SV** Prefix pre-pended to the Alignment Name
- The Surveyor/SDE shall work in the point range of 1-9999
- If points beyond 9999 are needed, the SDE shall contact the Designer and request a range of points be set aside for the SDE to work in that the Designer will not use.
- All Alignment Points **must be** converted to COGO Points in the InRoads Geometry Project.
- Ensure that only ONE coincident COGO point is located at shared property corners. If this is not done - there may be issues when storing proposed Right of Way Alignments and creating Right of Way Tables. It also reduces plan clarity.
- In InRoads all terminology for chains (whether it be Parcel Chains, Existing R/W Chains, or actual Existing Centerline Chains) are always referred to as "Alignments".
- All parcels must be stored clockwise and the alignments must close (first and last point number must be the same).
- The beginning and the ending point of each curve should be equated to a point number and those numbers must be included in the parcel alignment.

NOTE: For more information about Property Resolution on GDOT and GDOT-sponsored projects, please see Appendix D of these guidelines.

When the **PI#_SDE.alg** Geometry Project is ready for submittal, the file will be sent to the Office of Design Policy and Support/Location Bureau (**Engineering Management / Operations Manager**). This data will then be forwarded to the Designer.

4.3 Generation of the Topographical, Property and Utility DGN File(s)

After the final processing of the DTM Surface and the generation of the Geometry Project (.ALG) - Topographical, Property and Utility DGN file(s) will be generated for submission to Design.

For detailed instructions regarding the generation and processing of these DGN files – please refer to the "***Introduction to InRoads for Survey Data Processing***" Training Tutorial. Detailed information for generating these DGN Files(s) are listed and described in **Labs 16-17**.

Table 4.1	
Standard DGN File Names	
Topographical DGN File Name	PI#_TOPO.dgn
Property DGN File Name	PI#_PROP.dgn
Utility DGN File Name	PI#_UTLE.dgn

Before submitting the DGN Files – perform the following steps in the [MicroStation Software] –

For each DGN File - **"Fit the Active View"** so that all the data appears in the MicroStation View Window.

1. Select **File▶Save As▶** from the [MicroStation Menu].

   Save the DGN File (Example: ***1234567_TOPO.dgn***) to the path shown below -- under the folder **SDE** --

   C:\InRoads Data\1234567\SDE

2. In the [MicroStation Software] –

   Select **File▶Compress▶Design** from the [MicroStation Menu].
   (This will compress and reduce the size of the MicroStation file).

When all associated DGN files are ready, the **SDE** is instructed to contact the **Engineering Management / Operations Manager** and make copies available on **ProjectWise**. For projects not in **ProjectWise**, a request shall be made to the **Office of Design Policy & Support** to add the project to **ProjectWise**. All files shall be saved in locations according to established **ProjectWise** procedures. The **Engineering Management / Operations Manager** will keep all original copies and inform the designer when they are available for use in **ProjectWise**. Consultant Survey Compliance is summarized here. The SDE is also instructed to obtain original copies from the **Engineering Management / Operations Manager** whenever enhancements are to be performed during the life of the project.

Important: In order to be approved by GDOT, ALL Survey Databases shall be reviewed prior to submittal using the InRoads Survey QA Review Guide for Consultants and must be accompanied by the Survey Data Processing InRoads QA Checklist (checklist example shown in section 4.4 below).

4.4 Listing of the SDE Project Deliverables

After the DTM Surface (.DTM) and Geometry Project (.ALG) have been processed and thoroughly reviewed using the InRoads Survey QA Review Guide for Consultants, along with all other Project Deliverables, and have been approved by GDOT, the files will be sent to the Office of Design Policy and Support/Location Bureau (**Engineering Management / Operations Manager**). This data will then be forwarded to the Designer.

The Final Deliverables include the following:

- PI#_SDE.alg (InRoads Geometry file)
- PI#_SDE.dtm (InRoads Digital Terrain Model)
- PI#_TOPO.dgn (Existing Topo features)
- PI#_PROP.dgn (Existing Property Information)
- PI#_UTLE.dgn (Existing Utility features)
- PI#_PSR.xls (Property Statistics Report)
- PI#_Misc.txt (Miscellaneous information SDE deems important. This file may not be included.)
- A Survey Data Processing InRoads Quality Assurance Checklist Document
- Property Research (scanned PDF of deeds, plats, tax maps, etc.)
- Survey Control package
- Hydraulic Engineering Field Report
- Bridge Hydraulics Study (if applicable)
- Septic Tank Report
- CSV file of Survey Points/Alignment Chains
- Any comments addressing potential issues of the survey

PLEASE NOTE:

A Survey Data Processing InRoads QA Checklist will be documented by the District SDE and/or Office of Design Policy and Support/Location Bureau and/or the Consultant Firm performing the Survey Data Processing work. This document lists several areas including the Survey Data, DTM Surface, Geometry Data and Final Deliverables which need to be verified before Project Submittal. This Document is a required Deliverable and will be submitted with the previously listed Deliverables. The InRoads Survey QA Review Guide for Consultants explains in detail how to review the InRoads files prior to submittal to GDOT for approval and must be followed in order to obtain approval.

The following page contains the example Survey Data Processing InRoads QA Checklist form which will be completed and submitted, available on the GDOT ROADS webpage under the Survey Processing Guidelines section of InRoads v8i.

http://www.dot.ga.gov/PS/DesignSoftware/InRoads

Important: The CSV file deliverable is necessary in order to future-proof the survey database for the next release of design software, Open Roads Designer. A properly-formatted CSV file is necessary in order to easily import the survey data into the Field Book in Open Roads Designer. Providing this file will ensure current projects can be designed in either InRoads or Open Roads Designer.

Print Form

P.I. Number:	
QA Reviewer:	
Company:	
Contact Info (email/phone):	
Type of Database:	
Submission #:	

GDOT InRoads Survey Data Processing Quality Assurance Checklist

Instructions: For each task, make a selection for the Verification QA Status in the Verified column pull down.

DTM/Survey Data		
	TASK [reference the Consultant QA Guide for details on each task]	**VERIFIED**
1	A Maximum Triangle Length of 300.00 is used	
	The Surface Properties Symbology Preference is set to "EXISTING" for both the Cross Sections and Profiles.	
2	Standard GDOT File Naming Conventions used	
3	Resolved any errors found using GDOT feature filter *Breaklines (should be Random)*	
	Resolved any errors found using GDOT feature filter *Random (should be Breaklines)*	
	Resolved any errors found using GDOT feature filter *OldFeatureStylesNotInUse*	
	Resolved any errors found using GDOT feature filter *Survey_Control_Deltas*	
	Resolved any errors found using GDOT feature filter *Triangulate=NO (should be YES)*	
	Resolved any errors found using GDOT feature filter *Triangulate=YES (should be NO)*	
	Resolved any errors found using GDOT feature filter *UtilityFeatureStylesUsingTOPO*	
	Resolved any errors found using GDOT feature filter *Non_Standard_Features*	
4	All Features with Survey-Defined Feature Styles have descriptions	
5	All point/features in the DTM have valid, accurate elevations (i.e. not at elevation 0.00)	
	All erroneous (bad) point elevations have been resolved	
6	Bridges, catch basins, culverts, headwalls and wingwalls defined as detailed in GDOT Automated Survey Manual	
7	CSV File of survey points/alignment chains has been created	
8	All Crossing Segments and mismatched elevations are resolved	
9	The DTM has been triangulated and saved after any changes (no messages appear when viewing triangles)	
	All erroneous DTM elevation 'Spikes' have been corrected	
	All erroneous triangles are trimmed and/or removed by ensuring exterior boundary is in proper location	
10	Exterior Boundary Feature Name is XBOUNDARY (for Field Survey) or MBOUNDARY (for Mapping)	
	Only one Exterior Boundary exists and it is set to Triangulate, with a Feature Type of Exterior	
	All Boundaries (exterior and interior) are closed shape entities	
	No triangles exist outside of the Exterior Boundary OR inside of Interior Boundaries (obscured areas)	
11	Pipe sizes (and condition/function for cross drains) are included in the pipe/culvert descriptions if known	
	Pipe locations, sizes, materials and invert elevations are congruent from DTM to TOPO.DGN file	
12	Compress the DTM Surface before Submittal	
13	First Submissions: Comments entered on any issues or concerns	
	Resubmissions: QA Report issues are all addressed and comments, if needed, provided.	

Geometry/Property Data		
	TASK [reference Consultant QA Guide for details on each task]	VERIFIED
14	All Alignment have correct Feature Styles for chains, not points (no "default", PROP_E_POEL, etc.)	
	All Alignment Names have an SV Prefix (i.e. SV12) and all Alignments have Descriptions	
15	All Alignment Points have assigned Point Names AND have also been converted to COGO points	
16	All Points stored in the Geometry Project have NO Prefix	
	All points have correct Feature Styles for points, not chains (no PROP_E_PAR)	
	Includes control deltas (i.e. TOPO_E_SDCD, SLCD, SLCM) AND any PROP_E_PCF or PROP_E_RWM features	
17	All Parcels are stored clockwise and the Alignments close	
	Property Statistics Report includes InRoads Parcel Alignment Names for each Property	
18	All Alignment chains in PROP.DGN file are in ALG file and vice versa	
Final Deliverables	PI#_SDE.alg (InRoads Geometry file)	
	PI#_SDE.dtm (InRoads Digital Terrain Model file)	
	Survey Data Processing Quality Assurance Checklist	
	PI#_PSR.xls (Property Statistics Report)	
	PI#_TOPO.dgn, PI#_PROP.dgn and PI#_UTLE.dgn (v8i DGN files)	
	Scanned .PDF of property research (deeds, plats, tax maps, etc.)	
	Survey Control Package	
	Hydraulic Engineering Field Report	
	Bridge Hydraulics Study	
	Septic Tank Report	
	CSV File of Survey Points/Alignment Chains	
	Comments to address potential issues or issues raised on GDOT review	
Comments:		

I have reviewed this submittal and verify that the above information is correct and accurate and in compliance with the GDOT InRoads Survey Data Processing Guidelines and GDOT Automated Survey Manual.

QA Reviewer/Title:

(Type in name as signature)

[Georgia Department of Transportation] 2 of 2 01/31/2019

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Chapter 5. Additional Survey Enhancements - Contents

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Chapter 5. Additional Survey Enhancements

During the life of a design project - Additional Survey Enhancements may need to be incorporated into the project and the new survey data re-submitted to the Designer in order for the Designer to update the design database. This section provides a brief summary of the processing/naming of Additional Survey Enhancements and the procedures to submit the processed data to the Designer.

- All location survey data and all requests for additional survey data should be submitted to the Engineering Management Section of the Office of Design Policy and Support/Location Bureau.

The processes for incorporating "Original" Enhancements to a Mapping Project are described in the ***"Introduction to InRoads for Survey Data Processing"*** Training Tutorial in **Labs 8-9**. These same methods and processes are also utilized for incorporating Additional Survey Enhancements in a project. The process for adding additional enhancements will utilize the same procedures (except for the FWD and DTM file naming conventions which adds different alpha character(s) for enhancement tracking purposes).

Depending on what type of enhancements are collected – the SDE will process the additional survey data and send the Designer the appropriate files as required. This could result in the SDE sending the Designer all of the updated files or just certain files depending on what data were collected. See examples below:

***For Example** – if only property enhancements were collected, then the SDE would send the Designer the new processed PI#_SDE.alg file and the associated enhanced data in the PI#_PROP.dgn file.

***For Example** – if only topographical enhancements were collected, then the SDE would send the Designer the new processed PI#_SDE.dtm file and the associated enhanced data in the PI#_TOPO.dgn file.

In most cases the following files (or a combination) of these files will be submitted to the Designer for use as Additional Survey Enhancements:

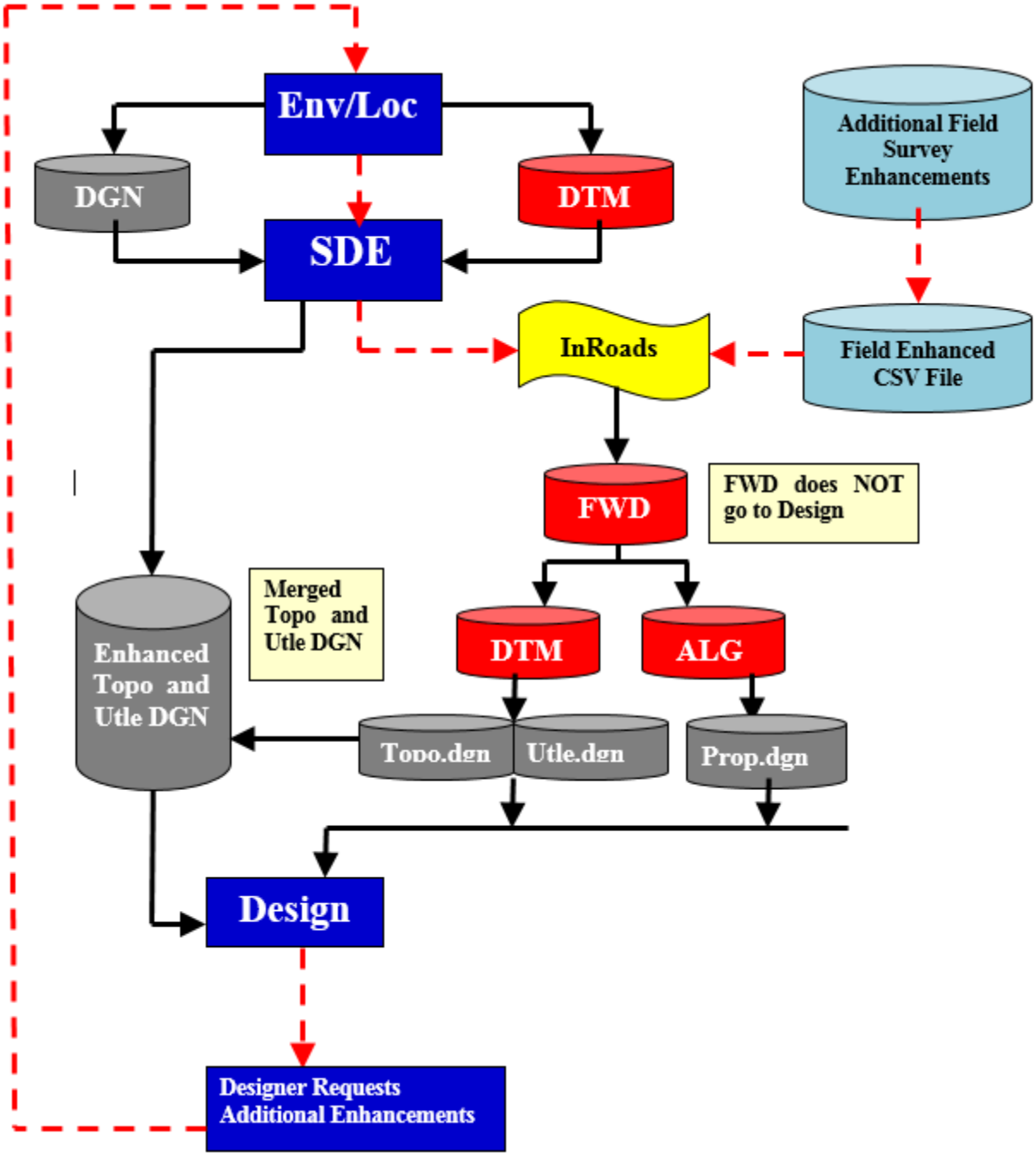
- **PI#_SDE.dtm**
- **PI#_SDE.alg**
- **PI#_TOPO. dgn** (if applicable)
- **PI#_PROP.dgn** (if applicable)
- **PI#_UTLE.dgn** (if applicable)

This section covers the following topics:

- Additional Enhancements to the Survey Field Book (FWD)
- Additional Enhancements to the Surface Project (DTM)
- Additional Enhancements to the Geometry Project (ALG)
- Additional Enhancements to the DGN Files (DGN)

Additional Survey Enhancement Process

(Red Dotted Line represents Additional Survey Enhancement Process Overview)



5.1 Additional Enhancements to the Survey Field Book (FWD)

The following section depicts an overview of the processing/naming methods utilized to add additional enhancements to the Survey Field Book (FWD) File.

When collecting the Additional Survey Data in the CSV files(s) the following naming scheme will be utilized: (See *Table 5.1*)

*Also each of the intermediate additional enhancement ASCII files should be retained in a backup folder for future project reference and record retention.

	Table 5.1	
	CSV File Naming Conventions (Enhancements)	
	File Type	**File Name**
•	**CSV– Full Field Survey File** **1st (Original) Field Survey CSV** **2nd Enhancement Field Survey CSV** **3rd Enhancement Field Survey CSV, Etc.**	 PI#A.csv PI#B.csv PI#C.csv, Etc.
•	**CSV – Mapping Enhancement File** **Original Mapping Enhancement CSV** **1st Mapping Enhancement CSV** **2nd Mapping Enhancement CSV, Etc.**	 PI#XO.csv PI#XA.csv PI#XB.csv, Etc.

When importing the Additional Survey Data in the Survey Field Books the following naming scheme will be utilized: (See *Table 5.2*)

*Also each of the intermediate additional enhancement Survey Field Book (FWD) files should be retained in a backup folder for future project reference and record retention. (The FWD files are **Never** submitted to the Designer).

	Table 5.2	
	Survey Field Book File Naming Conventions (Enhancements)	
	File Type	**File Name**
•	**FWD – Full Field Survey File** **First (Original) Field Survey File** **Second Enhancement Field Survey File** **Third Enhancement Field Survey File, Etc.**	 PI#_ A.fwd PI#_ B.fwd PI#_ C.fwd, etc.
•	**FWD – Mapping Enhancement File**	

	Table 5.2	
	Survey Field Book File Naming Conventions (Enhancements)	
	File Type	**File Name**
	Original Mapping Enhancement File **First Mapping Enhancement File** **Second Mapping Enhancement File, Etc.**	PI#_ XO.fwd PI#_ XA.fwd PI#_ XB.fwd, etc.

*****Please Note*****

This FWD File is never submitted to the Designer. The data from this Survey Field Book will be imported into InRoads where it will then be processed into the DTM Surface File and/or the ALG Geometry File.

For Detailed Step by Step instructions regarding the enhancements to the FWD File – please see the "*Introduction to InRoads for Survey Data Processing*" Training Tutorial Lab 8 – Section 8B. This Lab details the steps required to generate and process an Enhanced Survey Field Book (FWD).

5.2 Additional Enhancements to the Surface Project (DTM)

The following section depicts an overview of the processing/naming methods utilized to add additional enhancements to the Surface Project (DTM) File.

When incorporating/importing the Additional Survey Data in the DTM file`(s) the following naming scheme will be utilized: (See *Table 5.3*)

*Also each of the intermediate additional enhancement DTM files should be retained in a backup folder for future project reference and record retention. (The intermediate DTM files are Never submitted to the Designer).

	Table 5.3	
	DTM File Naming Conventions (Enhancements)	
	File Type	**File Name**
•	**Intermediate DTM – Full Field Survey File** **Note:** **(**The First Original Field Survey File is obtained from the PI#A.csv and PI#_A.fwd files. These files are incorporated as PI#_SDE.dtm during initial DTM creation –	← See Note:

	Table 5.3	
	DTM File Naming Conventions (Enhancements)	
	File Type	**File Name**
	therefore there is no intermediate DTM named PI#_A.dtm.) **2nd Enhancement Field Survey File** **3rd Enhancement Field Survey File, Etc.**	 PI#_ B.dtm PI#_ C.dtm, etc.
•	**Intermediate DTM – Mapping File** **Original Mapping Enhancement DTM** **1st Mapping Enhancement DTM** **2nd Mapping Enhancement DTM, Etc.**	 PI#_ XO.dtm PI#_ XA.dtm PI#_ XB.dtm, etc.

*****Please Note*****

- Resolve all Crossing Segments and Mismatched Elevations in the additional survey data.
- The intermediate DTM File(s) are never submitted to the Designer. The data from these file(s) are merged, incorporated and processed into the **PI#_SDE.dtm** file. This **PI#_SDE.dtm** file will be submitted to the Designer. It will be the Designer's responsibility to rename the DTM file to **PI#_Exist.dtm** and copy this file into InRoads.

For Detailed Step by Step instructions regarding the enhancements to the intermediate DTM File(s) and the incorporation/processing of the enhancement data into the original DTM (PI#_SDE.dtm) – please see the "*Introduction to InRoads for Survey Data Processing*" Training Tutorial Lab 8 – Section 8C. This Lab details the steps required to generate and process an Enhanced Survey Surface Project (DTM).

5.3 Additional Enhancements to the Geometry Project (ALG)

The following section depicts an overview of the processing/naming methods utilized to add additional enhancements to the Geometry Project (ALG) File.

When incorporating/importing the Additional Survey Data in the ALG file the following naming scheme will be utilized: (See *Table 5.4*)

	Table 5.4	
	ALG File Naming Convention (Enhancements)	
	File Type	**File Name**
•	**ALG - Geometry File**	PI#_ SDE.alg

*****Please Note*****

- There are no intermediate ALG files. All of the enhanced Geometry data (Property, Existing R/W, etc.) are imported directly into the original Geometry File (**PI#_SDE.alg**).
- There should be no conflict in points as long as the Survey Data does not use any point numbers previously collected in the original survey. The SDE will need to submit to the Surveyor a range of points to utilize for additional survey enhancements so that there will be no conflict in point names.
- After the additional survey data is merged, incorporated and processed into the original Geometry File (**PI#_SDE.alg**) -- this **PI#_SDE.alg** file will be submitted to the Designer. It will be the Designer's responsibility to utilize the InRoads LandXML Utility to incorporate the data from the **PI#_SDE.alg** file into the Design **PI#_Design.alg** file.

For Detailed Step by Step instructions regarding enhancements to the Geometry File and the incorporation/processing of data into the original Geometry File (PI#_SDE.alg) – please see the "*Introduction to InRoads for Survey Data Processing*" Training Tutorial Lab 8 – Section 8D. This Lab details the steps required to add and process additional survey data to the Geometry Project.

5.4 Additional Enhancements to the DGN Files (DGN)

The following section depicts an overview of the processing/naming methods utilized to add additional enhancements to the DGN Files.

After the Survey Enhancements are added to the InRoads database(s) (Surface and/or Geometry databases), the enhanced data from both the DTM (the topographical/utilities aspect) and the Geometry (Property information) will need to be exported from InRoads.

- The TOPO DGN enhancements will be created in "intermediate" DGN files (as needed) and then merged into the original TOPO File which will then be submitted to the Designer. The Designer will then utilize this "new enhanced" TOPO DGN.
- A "new" UTLE DGN file which includes all of the utility data, etc. (Not just the new enhancement data) will be re-created from InRoads and then submitted to the Designer. The Designer will then utilize the new UTLE DGN file.
- A "new" PROP DGN file which includes all of the property data, etc. (Not just the new enhancement data) will be re-created from InRoads and then submitted to the Designer. The Designer will then utilize the new PROP DGN file.

5.4.1 TOPO Enhancements (Topographical DGN)

When incorporating the Additional Survey Data in the "Intermediate" TOPO DGN file, the following intermediate naming scheme will be utilized: (See *Table 5.5*)

	Table 5.5	
	Intermediate TOPO DGN Files (Enhancements)	
	File Type	**File Name**
•	**Intermediate TOPO (Full Field Survey)** **1st Enhancement DGN** **2nd Enhancement DGN** **3rd Enhancement DGN, Etc.**	 P I#_A.dgn PI#_B.dgn PI#_C.dgn, etc.
•	**Intermediate TOPO (Mapping Enhancement)** **1st Mapping Enhancement DGN** **2nd Mapping Enhancement DGN** **3rd Mapping Enhancement DGN, Etc.**	 PI#_ XA.dgn PI#_ XB.dgn PI#_XC.dgn

Process to create a "Merged" PI#_TOPO.dgn file:

1. The user will incorporate the Additional Survey Data into the InRoads FWD and DTM databases. (See "***Introduction to InRoads for Survey Data Processing***" **Training Tutorial Lab 8B – Section 8C**" for detailed instructions on adding Additional Survey Data to the FWD/DTM in InRoads).
2. An intermediate TOPO DGN file -- Example (1234567_XA.dgn, 1234567_XB.dgn, etc.) will be created from the field enhanced DTM/FWD in InRoads. (See "***Introduction to InRoads for Survey Data Processing***" **Training Tutorial Lab 17 – Section 17B**" for detailed instructions on creating an Intermediate TOPO DGN file).
3. Before merging the enhanced data into the "original" PI**#**_TOPO DGN – the user will need to go to the "original" PI**#**_TOPO.dgn and clip out any conflicting or outdated MicroStation information. This includes any obscured area boundaries that need to be deleted and any data that will be in conflict with the new topographical data.
4. The TOPO enhancement DGN file will then be merged with the "original" submitted PI#_TOPO.dgn file. This will ensure that all of the original Mapping Data is represented. (See "***Introduction to InRoads for Survey Data Processing***" **Training Tutorial Lab 17 – Section 17C**" for detailed instructions on merging data into the PI**#**_TOPO.dgn file).
5. The merged and updated PI#_TOPO.dgn file is then submitted to the Designer. The Designer will then utilize the new enhanced PI#_TOPO.dgn file for use in project design. (See *Table 5.6*)

When incorporating the Additional Survey Data with the Original TOPO data in the merged TOPO DGN file, the following naming scheme will be utilized: (See *Table 5.6*)

	Table 5.6	
	Merged TOPO DGN File (Enhancements)	
	File Type	**File Name**
•	**Merged TOPO DGN File**	P I#_TOPO.dgn

5.4.2 UTLE Enhancements (Utility DGN)

When incorporating the Additional Survey Data in the UTLE DGN file, the following naming scheme will be utilized: (See *Table 5.7*)

	Table 5.7	
	UTLE DGN File (Enhancements)	
	File Type	**File Name**
•	**UTLE DGN File**	PI#_UTLE.dgn

*****Please Note*****

- There are no intermediate UTLE DGN files. All of the original and enhanced data for Utilities will be re-created from InRoads and then submitted to the Designer in a new **PI#_UTLE.dgn** file.
- The SDE will of course remove any obsolete InRoads utility data that has been replaced by new utility data as applicable. The Designer will then utilize the new **PI#_UTLE.dgn** file.
- (See "***Introduction to InRoads for Survey Data Processing*" Training Tutorial Lab 17 – Section 17D**" for detailed instructions on creating the new UTLE DGN file).

5.4.3 PROP Enhancements (Property DGN)

When incorporating the Additional Survey Data in the PROP DGN file, the following naming scheme will be utilized: (See *Table 5.8*)

	Table 5.8	
	PROP DGN File (Enhancements)	
	File Type	**File Name**
•	**PROP DGN File**	PI#_PROP.dgn

*****Please Note*****

- There are no intermediate PROP DGN files. All of the original and enhanced data for property will be re-created from InRoads and then submitted to the Designer in a new **PI#_PROP.dgn** file.
- The SDE will of course remove any obsolete InRoads Property or Existing R/W data that has been replaced by new Property and/or Existing R/W data as applicable. The Designer will then utilize the new **PI#_PROP.dgn** file.
- (See "**Introduction to InRoads for Survey Data Processing**" **Training Tutorial Lab 16** for detailed instructions on creating the new PROP DGN file).

5.5 Overview of Additional Survey Enhancements

As mentioned previously – the SDE will submit all or a combination of the following files to the Designer when Additional Survey Enhancements are required.

- **PI#_SDE.dtm**
- **PI#_SDE.alg**
- **PI#_TOPO. dgn** (if applicable)
- **PI#_PROP.dgn** (if applicable)
- **PI#_UTLE.dgn** (if applicable)

Depending on the job and the file(s) required – the SDE will submit the updated file(s) following the format listed in this Document.

For Detailed Information regarding the procedures for incorporating Additional Survey Enhancements - please see the following:

SDE Training Lab - ***Introduction to InRoads for Survey Data Processing:***

Training Tutorial Labs

Lab 8
Lab 9
Lab 16
Lab 17

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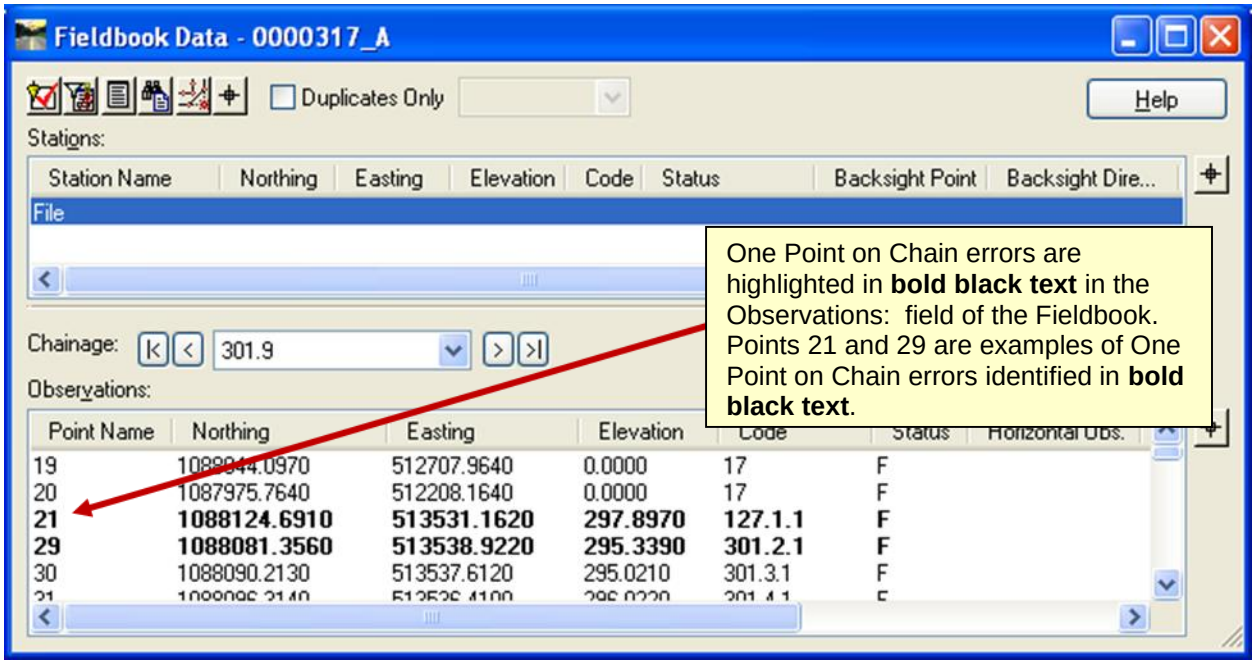
Appendix A. One Point on Chain Check

General Information:

Prior to exporting field collected data from the InRoads Survey Field Book (FWD) to an InRoads Surface DTM file and an InRoads Geometry ALG file, the data should be reviewed for a one point on chain collection error. A one point on chain error occurs during field collection when an alignment code is entered into the data collector and then only one point is collected for that code. An alignment requires the collection of two or more points to be considered an alignment. Checking for a one point on chain error may be performed in the InRoads Survey FWD file.

Procedure to Check for a One Point on Chain Error

1. Create an InRoads Survey FWD file. For detailed instructions on creating an InRoads Survey FWD file, see Lab 2 of the ***Introduction to InRoads-SDE*** Training Material.
2. Load the field collected CSV file into the InRoads FWD. For detailed instructions describing the import process of field collected survey data, refer to Lab 2 of the Intr***oduction to InRoads-SDE*** Training Material.
3. Open the InRoads Survey Field Book. This is accomplished in InRoads by selecting **Survey ► Fieldbook Data**…
4. Look for One Point on Chain errors. One Point on Chain errors are identified in the **Observations:** field of the InRoads Fieldbook in **bold black text** as shown here.



5. One point on chain errors are to be resolved in the original field surveyed CSV file prior to continuing work in InRoads.

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Appendix B. Stakeout Data Using InRoads LandXML

The following procedure is used to export Stakeout Data such as COGO Points, Horizontal/Vertical Alignments, etc. from InRoads to a LandXML file. This LandXML file can then be uploaded to the GDOT Trimble Business Center/GDOT Trimble Data Collectors for use in staking out Survey Data.

Workflow Procedure:

Open the InRoads ALG file. Then utilize the LandXML Translator to select the COGO Points and Horizontal/Vertical alignments which will be written out to create the LandXML File.

Feature Styles to Export to LandXML for Stakeout:

• **PROP_E_PAR**	• **PROP_E_ESMT**	• **PROP_E_RWE**
• **PROP_E_RWC**	• **PROP_E_RWM**	• **PROP_E_RWU**
• **PROP_E_PPC**	• **PROP_E_PCF**	• **PROP_E_POEL**
• **TOPO_E_SLCM**	• **TOPO_E_SLCD**	• **TOPO_E_SDCD**
• **TOPO_E_SBNCHMK**	• **TOPO_E_SNGSCM**	• **MAIN_P_CONSTCL**
• **MAIN_P_SIDECL**	• **REQD_P_***	

Workflow Steps:

A. **Open the Geometry Project (.ALG) in InRoads**

1. In InRoads, select **File▸ Open**
2. Set the **Files of type:** *Geometry Projects (*.alg)*
3. Select the .ALG File (Geometry Project) that contains the Cogo Points and Alignments that are to be exported to the LandXML file.

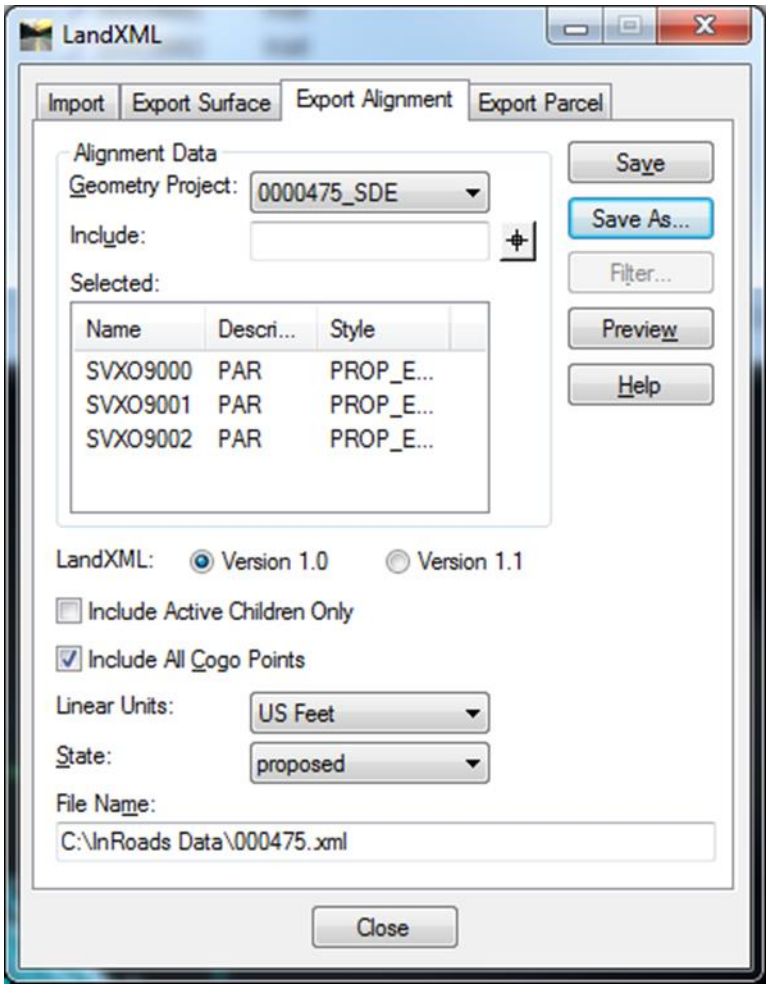
B. **Create the LandXML File**

1. In InRoads, select **File▸Translators▸LandXML Translator**
2. Select the ***Export Alignment*** tab
3. Select the ***Geometry Project:***
4. Click in the **Include**: field to activate the **Filter** button
5. The Geometry Selection Filter dialog box opens. Select all of the Alignments that are to be included in the XML file. Then click **OK**.
6. Ensure that LandXML: **Version 1.0** is selected.
7. Check the box to "***Include All Cogo Points***".

   Note: This box can be left unchecked if no Cogo Points need to be included in the LandXML file.
8. **Important** - Change the Linear Units to: ***US Feet***
9. Change the State: to **proposed**
10. Click the **Save A**s button. The **Export** dialog opens. Key in the **File Name:** and click **Save**.

11. In the **File Name:** field - the name of the file will be listed.
12. Ensure your dialog box is similar to the one depicted below:

Note: If the LandXML file is written by Survey, the ALG file Name will be PI#_SDE.
If the LandXML file is written by Design, the ALG file Name will be PI#_Design.



13. Next, click **Close** to close the dialog box.
14. The LandXML file will be created in the Path depicted in the **File Name:** field.

Appendix C. USACE 404 Permit Procedure for Perennial Streams – Culverts

General Information:

In order to conform to the United States Army Corps of Engineers (USACE) 404 Permit requirements for Perennial Streams – Culverts, GDOT has established the following standards and workflow procedures for incorporating the survey data into the InRoads Survey/Design Software. For new proposed culverts and for existing culvert replacements over Perennial Streams, an updated Survey of the area will be provided in a Digital Terrain Model format. This area of survey will encompass 100 feet upstream from the end of proposed or replacement culvert and 100 feet downstream from the end of proposed or replacement culvert for a total minimum coverage of 200 feet. For additional information regarding the field survey collection procedures, please see the GDOT Survey Manual located on the ROADS page at the following link:

http://www.dot.ga.gov/PartnerSmart/DesignManuals/SurveyManual/SurveyManual.pdf

Feature Styles for Stream Bank-Full and Stream X-Sections

Feature Style	Description	Point Type
• **TOPO_E_SBF**	• **Stream Bank-Full**	• **3D – Non-Triangulated**
• **TOPO_E_SXS**	• **Stream X-Section**	• **3D – Non-Triangulated**

Workflow Procedure:

The Perennial Stream field survey data will be provided in a .CSV file format. The .CSV file will then be imported into an InRoads Survey Field Book (.FWD file). A new DTM Surface will be created and the field book data imported into this surface. The DTM will then be triangulated and any crossing segments will be resolved. If there are multiple culverts on the project, a .CSV file will be provided for each culvert area. These .CSV files will then be imported into each respective .FWD file and .DTM file corresponding to the name of the associated .CSV file(s).

NEVER merge the 404 Permit DTM Data into the original DTM containing the Existing Surface.

The triangulated DTM containing the 404 Permit Data will be provided to the Designer.

No DGN files of the 404 Permit Topographic data will be created or provided to the Designer.

Standard File Naming Conventions:

**	File Type	File Name
•	**CSV – Field Survey for Perennial Streams** **1st Field Survey CSV** **2nd Field Survey CSV** **3rd Field Survey CSV, Etc.**	PI#CA_404 Permit.csv PI#CB_404 Permit.csv PI#CC_404 Permit.csv, Etc.
•	**FWD – Field Survey for Perennial Streams** **1st Field Survey File** **2nd Field Survey File** **3rd Field Survey File, Etc.**	PI#CA_404 Permit.fwd PI#CB_404 Permit.fwd PI#CC_404 Permit.fwd, Etc.
•	**DTM – Field Survey for Perennial Streams** **1st 404 Permit DTM** **2nd 404 Permit DTM** **3rd 404 Permit DTM, Etc.**	PI#CA_404 Permit.dtm PI#CB_404 Permit.dtm PI#CC_404 Permit.dtm, etc.

Key to Naming Conventions:

File Name	File Denotation
• **1234567CA_404 Permit**	**1234567= PI Number** **CA = Culvert Location A** **404 Permit = Type of Surface**
• **1234567CB_404 Permit**	**1234567= PI Number** **CB = Culvert Location B** **404 Permit = Type of Surface**

Workflow Steps:

The following procedure contains a brief outline of the processes used to import a CSV file into the Survey Field Book (FWD), then create and import the Survey Data into the (DTM). A triangulated DTM Surface will then be submitted to the Designer. For Detailed information regarding the FWD and DTM creation, generation and review - please see the ***Introduction to InRoads_Survey*** Training Material located on the GDOT web page at the following link:

http://www.dot.ga.gov/PartnerSmart/DesignSoftware/INROADS/Introduction%20to%20InRoads_Survey.pdf

A. **Create the (.FWD) in InRoads**

1. In InRoads, select **File▶ New**
2. Click the **Survey Data** tab.
3. In the **Name**: field enter *1234567CA_404 Permit*
4. Click **Apply** and then **Close**.

B. **Create the (.DTM) in InRoads**

1. In InRoads, select **File▶ New**
2. Click the **Surface** tab.
3. In the **Type:** pull-down, enter *Existing*
4. In the **Name:** field enter *1234567CA_404 Permit*
5. In the **Description**: field enter *404 Permit Surface*
6. In the **Maximum Length:** field enter *300*
7. In the **Preference**: field enter *Existing*
8. Click **Apply** and then **Close**.

C. **Import the .CSV file into the Survey Field Book (.FWD)**

1. In InRoads, select **File▶Import ▶Survey Data**
2. Browse to the CSV File to import (Ex. 1234567CA_404 Permit.csv)
3. Click **Import** and then click **Close**.

D. **Import the .FWD Topo Data into the Surface (.DTM)**

1. In InRoads, ensure the Filter Lock has a check mark next to it by going to **Tools▶Locks▶Feature Filter**
2. In InRoads, select **Survey▶Survey Style Filter**
3. In the **Filter Name:** field, select *DTM Surface Codes*. Then click **OK**.
4. Next, select **Survey▶Survey Data To Surface**
5. In the Surface Name: pull-down, enter *1234567CA_404 Permit*
6. Click the **Preferences..** button – then select *GDOT*, click **Load** and **Close**.

7. Then click **OK**.
8. In the **Triangulate Surface** dialog, select the *1234567CA_404 Permit* and click **Apply** and then click **Close**.

E. **Save the FWD (Survey Field Book) and DTM (Surface File)**

1. In InRoads, select **File▶Save▶Survey Data**. Then browse to a location to save the file. Click **Save** and then click **Cancel**.
2. In InRoads, select **File▶Save▶Surface**. Then browse to a location to save the file. Click **Save** and then click **Cancel**.

F. **Review the DTM Features/Triangles for any spikes and resolve any chain crossings**.

NOTE: For detailed information regarding these steps, please see Lab 4 and Lab 6 in the ***Introduction to InRoads_Survey*** Training Material. This document is located at the following link on the GDOT web page:

http://www.dot.ga.gov/PartnerSmart/DesignSoftware/INROADS/Introduction%20to%20InRoads_Survey.pdf

G. **Submit the DTM(s) to the Designer**

Note:

After reviewing the DTM and correcting any spikes or errors in the surface data - the 404 Permit Surface and/or Multiple 404 Permit surfaces (if applicable) are ready for submission to the Designer.

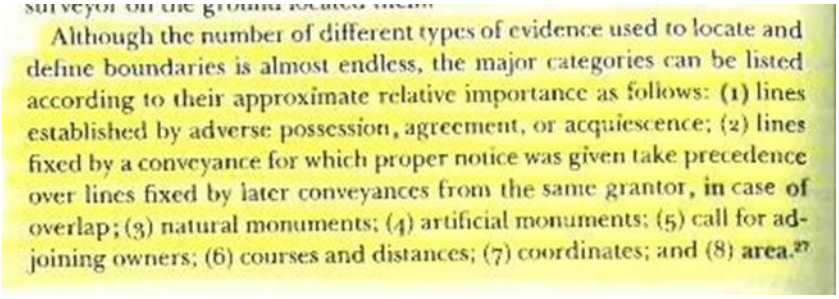
Appendix D. Property Resolution on GDOT and GDOT-Sponsored Projects

GDOT's practice to prevent conflicts, disputes and to insure accurate property databases is to hold to property pins in the resolution.

This section applies to consultants and GDOT in-house personnel who perform property and right of way resolution on GDOT sponsored projects. It has always been GDOT's in-house procedure to hold to field located monumentation that reasonably fits the deeds, plats and ROW information of the corridor parcels unless senior rights or another contrary intent indicated by a deed dictates it should not. The term "reasonably fits" would be the tolerance that a competent Georgia Registered Land Surveyor would use based on his experience and professional judgment.

With this in mind, most property owners can point out their property corners or other monumentation as it relates to their property. Neighbors often agree that a monument is their dividing corner even though it may be off 2 tenths of a foot from the deed measurement.

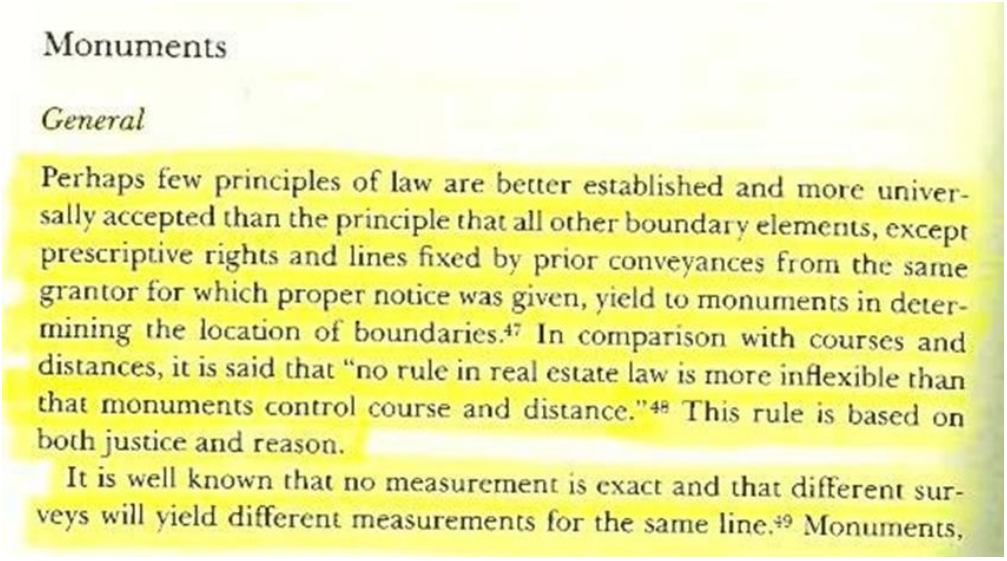
Below are excerpts from the *Georgia Land Surveying History and Law* publication written by Farris W. Cadle. Be mindful these excerpts are not ***law***, but principles for good surveys.



surveyor on the ground located them.

Although the number of different types of evidence used to locate and define boundaries is almost endless, the major categories can be listed according to their approximate relative importance as follows: (1) lines established by adverse possession, agreement, or acquiescence; (2) lines fixed by a conveyance for which proper notice was given take precedence over lines fixed by later conveyances from the same grantor, in case of overlap; (3) natural monuments; (4) artificial monuments; (5) call for adjoining owners; (6) courses and distances; (7) coordinates; and (8) area.[37]

(Page 398- Georgia Land Surveying History and Law, Farris W. Cadle, 1991 University of Georgia Press):

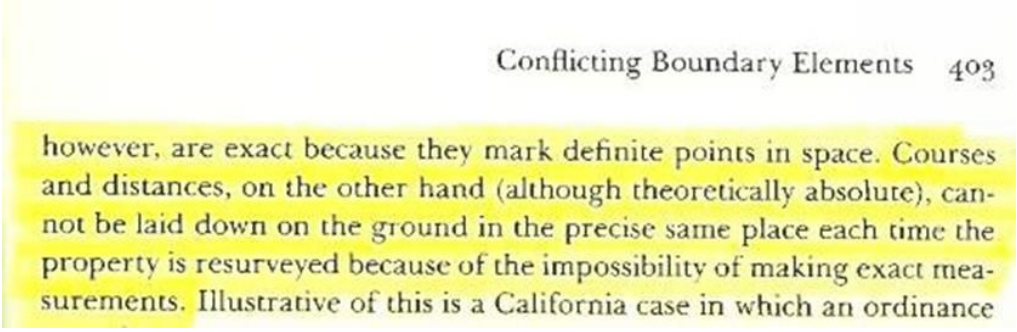


Monuments

General

Perhaps few principles of law are better established and more universally accepted than the principle that all other boundary elements, except prescriptive rights and lines fixed by prior conveyances from the same grantor for which proper notice was given, yield to monuments in determining the location of boundaries.[47] In comparison with courses and distances, it is said that "no rule in real estate law is more inflexible than that monuments control course and distance."[48] This rule is based on both justice and reason.

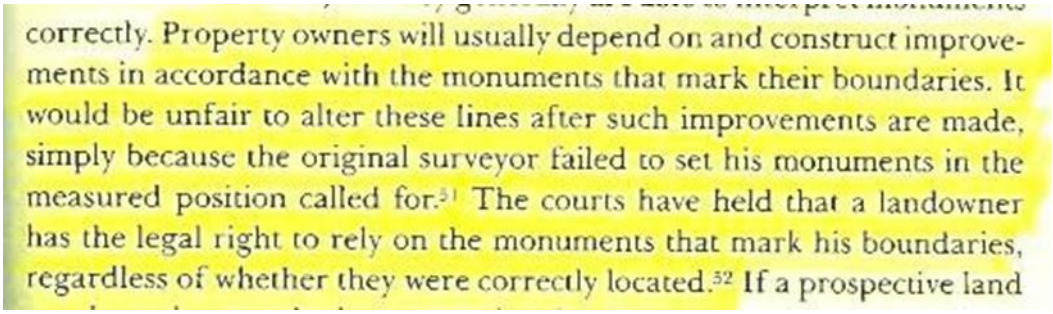
It is well known that no measurement is exact and that different surveys will yield different measurements for the same line.[49] Monuments,



Conflicting Boundary Elements 403

however, are exact because they mark definite points in space. Courses and distances, on the other hand (although theoretically absolute), cannot be laid down on the ground in the precise same place each time the property is resurveyed because of the impossibility of making exact measurements. Illustrative of this is a California case in which an ordinance

(Page 402-403 Georgia Land Surveying History and Law, Farris W. Cadle, 1991 University of Georgia Press)



correctly. Property owners will usually depend on and construct improvements in accordance with the monuments that mark their boundaries. It would be unfair to alter these lines after such improvements are made, simply because the original surveyor failed to set his monuments in the measured position called for.[51] The courts have held that a landowner has the legal right to rely on the monuments that mark his boundaries, regardless of whether they were correctly located.[52] If a prospective land

(Page 403- Georgia Land Surveying History and Law, Farris W. Cadle, 1991 University of Georgia Press)

Rotated Property Geometry

All GDOT projects are surveyed on the state plane coordinate system. With this in mind, all parcels should be individually rotated from magnetic north to grid north for the best possible property resolution.

For future in-house and consultant database checks, GDOT will be assessing if field located monuments are being held in property resolution. If a marker is not held to, GDOT may require an explanation. Checks will also be made to verify if the parcels have been rotated.

If you have any questions on this matter please contact:

GDOT Statewide Consultant Compliance Supervisor 404-699-4449
GDOT Statewide Survey Data Specialist 404-699-4446