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## D5.01 General

### D5.01(1) *Initiating a Survey*

A survey is initiated by completing the Survey Request Form by the Project Manager or designee. Chapter 14 in the WSDOT *Highway Survey Manual* has instructions for completing the Survey Request Form and providing supporting information for the survey such as:

- Project control information including source files for known monumentation
- Project datum calculations
- Any other project-specific information that may impact the surveyor

Upon receipt of the survey request, the surveyor should verify its completeness and adherence to survey request standards before proceeding.

### D5.01(2) *Data Collection and Processing*

Both the requester and the surveyor are required to adhere to the procedures for surveying defined in the WSDOT *Highway Survey Manual*.

The surveyor will use the current WSDOT standard feature codes for InRoads to identify field observations. See **Symbology 2** of this manual for more information on use of feature codes.

Field observations data must be processed and delivered to the requestor in InRoads format and comply with the specific requirements defined in this chapter.

### D5.01(3) *Data Organization*

All electronic project files and data will be organized as defined in **Deliverables 3 and 4** of this manual.

### D5.01(4) *Incremental Delivery of Survey Data*

When incremental transfer of survey data is necessary, each incremental package should include the entire survey dataset (all survey points and survey chains) collected by the surveyor to date. The requester will then overwrite the survey data in their project with the complete, updated survey dataset.

Each package should include all checklist items that apply to the latest dataset, if different from or in addition to the original package.

## D5.02 Documentation

### D5.02(1) Survey Request Form

The surveyor shall fill out the Surveyor portion of the Survey Request Form as described in Chapter 14 of the WSDOT *Highway Survey Manual* and place the completed form in the **Survey\\_Requests** project folder.

#### Survey Documentation Spreadsheet

A Survey Documentation Spreadsheet (see **Forms 2**) must be completed for the project.

The survey documentation spreadsheet will be named **projID\_Survey\_Doc.xlsx** and will be stored in the **Survey\\_SurveyDoc** project folder.

#### Project Control

Information on project control monuments that are applicable to the survey/project limits will be provided by the designer or collected by the surveyor. This documentation will be included in the **\_DatumAndControl\\_Control** folder and recorded in the survey documentation spreadsheet.

Monument documentation must include source documentation such as WSDOT Report of Survey Mark or county reports of survey documentation and will be stored in the **\_DatumAndControl\ReportsofSurveyMark** project folder.

These documents must indicate the monument designation, latitude and longitude coordinates, State Plane Coordinate (SPC) system coordinates in North American Datum (NAD 83) with proper adjustment designation per WAC 332-130-060, current North American Vertical Datum (NAVD 88) elevation (if measured), method of collection, horizontal and vertical accuracy, units, scale factor and convergence angle.

Monumentation documentation will remain in its original format and retain its original name as provided by the source. Monumentation maps may be scanned and the electronic scan treated as the source. PDF is the preferred format for scanned monumentation maps, although jpg and tif files are also acceptable.

All existing monuments used in the establishment of the project control network must have documentation as described above and have an entry recorded in the survey documentation spreadsheet.

#### Supplemental Control

Documentation on the supplemental control will be stored in the **\_DatumAndControl\\_Control** project folder.

All supplementary control points for the project must have an entry in the survey documentation spreadsheet.

Supplementary control points must have traverse adjustment notes to document the ties with project control monumentation, boundary monumentation, section corners, and any other points included in development of the project control network.

Traverse Adjustment documentation shall be compiled in either an ASCII text or Microsoft Office-compatible format and shall be named **projectID\_ fieldbook name\_Adjustment.\***.

Example: XL1234\_Trav1\_Adjustment.rpt

Project control points should be named using the Monument ID number or an alpha-numeric three-digit numeric value representing the documented source designation. When entering these points into InRoads, the monument id # or designation should be typed into the point description field along with the referenced State Route (or other street designation) and milepost. For example:

The point GP20097-15 was recorded by the WSDOT GeoMetrix Office using GPS methods. The name used in the project datum documentation will be **MON282** or **GPS15**. The point will have a description of **“GP20097-15 SR97 MP 24.659.”**

Conventional Survey Control Documentation shall include the following data:

- Names and coordinates of known primary control (Project Datum per above) to which traverse ties
- Raw, unedited observations file (or report) as collected in the field
- Traverse adjustment report
- Resultant adjusted coordinates

### **Project Datum**

Project datum calculations will be completed per the methodology defined in Chapter 6 of the *WSDOT Highway Survey Manual*. The project datum will be calculated by the regional survey support office. Where multiple combined factors are required, a map of the project datum areas will be provided and (if necessary) impacted control must be documented. The method and decision path of determining project datum coordinates for impacted control must be included in the documentation.

The State Plane to Project Datum conversion report should be in a universally readable format. ASCII Text, Microsoft Excel, or Word file formats are acceptable. This report will be stored in the **\_DatumAndControl\ProjectDatum** project folder. The report should be named **projID\_PDCalc.\***.

## **D5.03 Data Processing**

The surveyor will collect the field data and generate a raw data file. After downloading, the field data files must be processed. Survey data processed with InRoads shall conform to the format and procedures outlined in this section.

### **D5.03(1) Feature Code Use**

The surveyor will use the current WSDOT standard codes for InRoads to identify field observations. All InRoads fieldbook feature codes that are used must be in the current WSDOT standard preference file. If an observed feature cannot be defined by the standard WSDOT feature table, the surveyor will use the nonstandard codes NSP or NSL and assign a note to the observation point describing the nonstandard feature.

The surveyor may submit feature codes that are not in the WSDOT standard feature table to WSDOT CAE Support for possible addition to the standard code list.

### **D5.03(2) Fieldbooks**

Raw data files or field data file (processed data file from another application) will be imported into InRoads Survey fieldbooks (\*.fwd files). Each surveyor should create one fieldbook and import all their data files into it.

Fieldbook audit files (\*.log files) will be generated to document modifications and adjustments made to the fieldbook information. This file is initiated using the *Tools > Survey Options* dialog. Once this dialog has been revised, the survey preferences should be saved.

### **D5.03(3) Graphic Files**

The final survey planimetrics will be written to graphics to produce a MicroStation DGN file. All survey view options must be selected. This file will be named according to **Deliverables 4.02** and stored in the **Survey\Deliverables** project folder.

### **D5.03(4) Surface Files**

A surface will be created and the final survey fieldbook information will be written to it and reviewed for accuracy. This file will be named according to **Deliverables 4.02** and stored in the **Survey\Deliverables** folder.

### **D5.03(5) Geometry Project Files**

Two geometry projects will be created.

- A geometry project that contains the control points and monuments used in the survey. This file will be named according to **Deliverables 4.02** and stored in the **\_DatumAndControl\Control** project folder.
- A geometry project that contains the complete final survey fieldbook dataset and saved to an ALG file in the **Survey\Deliverables** project folder. This file will be named **P1234\_Survey.alg**.

### **D5.03(6) Raw Survey Data**

All survey data collected for the project needs to be included in its raw, unedited format. Any modifications or edits prior to import into InRoads must be done on copies of the raw files and noted in the survey documentation. Data collector applications using binary files will be stored in the **Survey\RawData** project folder.

### **D5.03(7) InRoads Survey Package Deliverables**

A complete InRoads survey package consists of all the electronic data in the project's Survey subfolder. This folder contains all files and data necessary for the requester to import and use the survey dataset in InRoads, and the supporting documentation for the survey.

The items listed below must be included in the correct directories:

#### **\\_DatumAndControl\Control**

Project Control

#### **\\_DatumAndControl\ProjectDatum**

Project Datum Documents

#### **\\_DatumAndControl\ReportsofSurveyMark**

Monumentation Documentation

#### **\Survey\\_SurveyDoc**

SurveyDocumentation Spreadsheet

Control Traverse Documents

#### **\Survey\Deliverables**

Completed InRoads Survey Dataset Checklist

Processed survey data in fieldbooks (\*.fwd)

MicroStation graphics file

InRoads Surface file

InRoads Geometry Project file

#### **\Survey\RawData**

Raw survey data files

#### **\Survey\Requests**

Survey Request Form (with Surveyor's section completed)

#### **\Survey\WorkingData**

Fieldbooks, geometry and surface data that is developed by the surveyor

The **Survey\Deliverables** folder contains all the electronic data necessary for the designer to use the survey in InRoads. This is the only data that will be used directly in the design phase. Access to the other subfolders under the Survey project folder is necessary for backup and overall project documentation.

## D5.04 Project Closure and Transition

### D5.04(1) Preparation of Deliverable Package

General requirements for the transfer, review and acceptance of the data are detailed in **Deliverables 2**.

The surveyor will prepare a complete survey package as described in this chapter by assembling all the appropriate electronic information in the Survey subfolder and notifying the requestor that the survey has been finalized.

On projects with multiple surveys delivered independently, each set of files prepared for design will either be in its own zip archive or its own subfolder within the **Survey\Deliverables** subfolder. Each separate design file set will include the submittal/revision number in its zip filename or subfolder.

Delivery can be accomplished by providing the requester access to the entire Survey folder if both surveyor and requester share a network resource and can both reference the same project folder.

If a shared network location is not an option, the surveyor will provide the requestor with a copy of the project's Survey subfolder. This can be accomplished using any medium that can reliably contain the entire folder structure. (e.g., an email, an FTP site, a compact disk or a DVD).

### D5.04(2) Data Archival

On projects where the surveyor is internal to WSDOT, it is the surveyor who is responsible for archival of the final electronic survey data per the region's policy for archival of electronic project data. When the surveyor is external to WSDOT, it is the requester who is responsible for archival of the final electronic data per the region's policy. If no regional archival policy exists, the responsible party needs to ensure the data is appropriately archived for future reference.