

Scope of Work

Contract General Description

The purpose of this contract is to provide the State with professional surveying services at various locations throughout District 7 including, but not limited to:

- Project Management
- Quality Assurance/Quality Control (QA/QC)
- Design/Location Surveys
- Right-of-Way Surveys
- Public Land Surveys
- Construction Surveys
- Control surveys for aerial photography (setting targets/photo control)

The contract work involves all technical and surveying work tasks needed to perform any and all of the tasks listed above. Field surveying will be required and dependent on individual work assignments, may include office research, collection of alignment monuments, collection of plat monuments, and locating PLS Corners.

All reports, drawings and documentation for each corridor will follow the guidelines set forth in the State's Right of Way Manual and State Surveying and Mapping manual, located on the State's Office of Land Management Web site and with information supplied by the State, through the State's Office of Land Management and the State's District 7 office. All work will conform to State Computer Aided Drafting and Design standards and will be completed in US Survey Feet using the respective County Coordinate System NAD83, 2011 adjustment or as directed by District 7 staff.

Contractor will provide data in the following formats;

- a) All field located data and office computed data in GeoPak file format.
- b) Electronic text files of all found monuments in a Point Number, Easting, Northing, Elevation, Description format.
- c) Electronic, raw data files from the survey controllers generated during the course of the project.

Work Assignments

Location of work, tasks and deliverables will be detailed in each work assignment. Work will be authorized by individual Work Assignments and will begin upon work assignment execution/notice to proceed. The Contractor will closely coordinate activities with the State District 7 Office of Land Management (OLM) staff.

Terms, Abbreviations and Acronyms

The following terms, abbreviations and acronyms will commonly be used in this Scope of Services.

R/W	Right-of-way
TH	Trunk Highway
CADD	Computer Aided Drafting and Design
SP	State Project
B-point	Right-of-way boundary point
District	State's District 7 -Mankato
PLS	Public Land Survey

Resources:

The Contractor will use the following resources as needed to accomplish the work:

- A. The following State manuals are located at: <http://www.dot.state.mn.us/manuals/index.html>

- Bituminous Manual
 - Bridge Manuals
 - Concrete Manual
 - Construction Tools Manual
 - Contract Administration Manual
 - Drainage Manual
 - Grading and Base Manual
 - Manual on Uniform Traffic Control Devices
 - Pavement Design Manual
 - Right of Way Manual
 - Road Design Manual
 - Standard Plates
 - Standard Plans
 - Standard Signs Manual
 - Surveying and Mapping Manuals
 - Traffic Engineering Manual
- B. State Technical Memorandums <https://techmemos.dot.state.mn.us/techmemo.aspx>
- C. Computer Aided Design and Drafting (CADD) Data Standards
<http://www.dot.state.mn.us/caes/files/pdf/mndot-caddstandardsdocumentation.pdf>
- D. State Standard Specifications for Construction <http://www.dot.state.mn.us/pre-letting/spec/index.html>
- E. Technical Manual <http://ihub/designsupport/standards/tech-manual/techmanual.html>

State Provided

The following information will be provided by the State as needed, based on Work Assignment:

- A. State Right of Way Maps
- B. Access to State records
- C. State Geodetic Database
- D. State District Database
- E. Minnesota Land Surveying Statutes
- F. County Surveyor Database
- G. State Project Contract Documents
- H. Construction Surveying Work plan Schedule
- I. Staking Information Sheets

1.0 Task 1, Design/Location Surveys (Source type 1040; Source Type 1021 (for alignment only))

1.1 Description

Design/Location Surveys is defined as the collection and the compilation of field location data necessary to the project design process. The field location data is supported through reports including graphic and data files in formats prescribed by State standards and policies.

1.2 Standards and Specifications

- 1.2.1 All work produced meets specifications in accordance to the standards listed in Work Type Inputs.
- 1.2.2 Project Report hard copy containing correlating field and data files.
- 1.2.3 Traffic control devices are furnished and installed according to the current Field Manual
- 1.2.4 Temporary Traffic Control Zone Layouts
- 1.2.5 Minnesota Manual on Uniform Traffic Control Devices (MN MUTCD)
- 1.2.6 Field operations are in accordance with Occupational and Safety Health Administration (OSHA) regulations and District safety practices

1.3 Provided by Contractor

Deliverables to be supplied by the consultant for a project may include the following:

- 1.3.1 Design/Location Survey, consisting of a graphical representation of one or more of the following work items:
 - 1.3.1.1 In-place Alignments
 - 1.3.1.2 In-place Topographical Features
 - 1.3.1.3 In-place Utilities
 - 1.3.1.4 Establishment of Horizontal and Vertical control for Aerial Mapping
- 1.3.2. Specific examples of deliverables:
 - 1.3.2.1 Report providing detailed information pertaining to the methods, procedures, and rationality affecting final product
 - 1.3.2.2 Appropriate maps, drawings, etc. in hard copy and/or electronic formats when requested
 - 1.3.2.3 MicroStation and GeoPak are required electronic formats

2.0 Task 2, Right-of-Way Surveys (Source Type 1225)

2.1 Description

Right of Way Surveys includes all surveying duties, both field and office, needed for the development of a final right of way base map. Field work includes field location of alignment, property, and right of way monuments. Office work includes data processing, computations, research of old records, spotting title ownership, reviewing and interpreting legal documents, and base map preparation.

2.2 Standards and Specifications

Standards and specifications required for a project under this work type will include the following: Work must comply with State standards, local and state statutes and laws on surveying.

2.3 Provided by Contractor

Deliverables to be supplied by the consultant for a project may include the following:

- 2.3.1 Right of way base map and survey report.
- 2.3.2 Specific examples of deliverables:
 - 2.3.2.1 Certified base map signed by a Licensed Land Surveyor.
 - 2.3.2.2 Certified survey report signed by a Licensed Land Surveyor.
 - 2.3.2.3 Base map is to be both electronic, per State standards, and hard copy.
 - 2.3.2.4 The survey report is to be a bound report.

3.0 Task 3 Land Surveys (Source Type 1032)

3.1 Description

Land Survey is defined as the research and analysis of record and non-record information regarding section corner monuments of the Public Land Survey System. It includes the collection and compilation of field location data and the production of reports with supporting graphical and data files in compatible formats prescribed by State standards and policies.

3.2 Standards and Specifications

Standards and specifications required for a project under this work type will include the following: All survey work is done in accordance to the State statutes and State standards.

3.3 Provided by Contractor

Deliverables to be supplied by the consultant for a project may include the following:

- 3.3.1 A Land Survey report.
- 3.3.2 Specific examples of deliverables:
 - 3.3.2.1 Certified survey report signed by a Licensed Land Surveyor.

4.0 Task 4, Construction Surveying (Source Type 1802)

4.1 Description

Construction Surveying is defined as accurately providing all necessary computations, stakes and marks to establish lines, slopes, elevations, points, and continuous profile grades in accordance with State Specification 1508 and the requirements shown in the Plan for Construction Staking; so that the construction contractor is able to perform all the required work for the project in accordance with the construction contract requirements; and so that State is able to complete all necessary inspection and Contract Administration duties. The surveying generally requires frequent, separate project visits by Contractor's personnel to the Project to accommodate the various stages of construction and inspection activities that occur.

4.2 Standards and Specifications

Standards and specifications required for a project under this work type may include the following:

- 4.2.1 All work performed in accordance with applicable specifications, rules & regulations;
- 4.2.2 All stakes and marks are set according to the Staking Information Sheets included in the plan according to Plan, Proposal, Standard Specifications and State Surveying and Mapping Manual
- 4.2.3 Traffic control devices are furnished and installed according to the current Field Manual for Temporary Traffic Control Zone Layouts (MN MUTCD);
- 4.2.4 Field operations are in accordance with Occupational Safety & Health Administration (OSHA) regulations and accepted safety practices.
- 4.2.5 Construction Surveying of all project construction is as indicated in State Specification 1508;
- 4.2.6 Reference points installed as needed for the use of any public utility crews that are accomplishing utility relocation or construction associated with the Construction Contract.
- 4.2.7 Bridge and Structure Construction staking (which includes setting and re-establishing Working Points and Reference Points by XYZ coordinates).

4.3 Provided by Contractor

Deliverables to be supplied by the consultant for a project may include the following:

- 4.3.1 Construction Surveying project-specific reports and documents.
- 4.3.2 Coordinates and reference ties for final alignment monumentation;
- 4.3.3 Reference ties for control station monumentation; minimum of two permanent monuments set;
- 4.3.4 Field notes that were used to set construction stakes, control the Project, and document monument location;
- 4.3.5 Survey data; Utility as-builts and changes to plan, in 3rd order accuracy;
- 4.3.6 Pay Item Quantity Documentation; Clear and Grub, rock excavation, muck, earth and gravel, seeding and sodding, etc.

5.0 Task 5, Photo Control – Aerial Photography (Source Type 1012)

5.1 Description

Aerial photography and photogrammetrics are used to begin the three-dimensional location data collection required for transportation projects. Flights are made in the spring and fall over specific corridors to address the aerial photography needs of specific projects. This task is to provide the required targets for the photography.

5.2 Provided by MnDOT

- 5.2.1 Map of target placements, plotted to scale
- 5.2.2 Latitude and longitude of target locations
- 5.2.3 Control Point information that is not available on the State's website
- 5.2.4 Notification to proceed with target removal

5.3 Provided by Contractor

- 5.3.1 Notification letter to Landowners
 - 5.3.1.1 Contact landowners for permission to enter their land for target placement, by letter.
 - 5.3.1.2 Research county records for land owner names.
- 5.3.2 Control Survey
 - 5.3.2.1 Coordinate with the flying contractor about weather, targeting completion and targeting pickup.
 - 5.3.2.2 Physically place and maintain photo control targets, as specified by State to control aerial photography. Establish x,y,z coordinate for each of the targets using the datum and adjustment specified by the department. Targets will be double stubbed and merged together using MnMultShot software with a merge report provided.
 - 5.3.2.3 Provide all materials necessary for placement of targets including but not limited to paper targets, paint, lath, and survey markers.
 - 5.3.2.4 Remove targets when notified by the State that the flying contractor has successfully completed the photography.
 - 5.3.2.5 Complete test data shots, Center Data Points (CPRO) and Random Test shots (TPRO). CPRO are single stub observation every 200' along the flight line. TPRO are double stub random test points. Approximately 10-20 per mile to a maximum of 200 total locations per job. TPRO observations will be merged together using MnMultshot software with a merge report provided.
- 5.3.3 Contractor Deliverables
 - 5.3.3.1 Comma-delimited files of final target coordinates and merge report.
 - 5.3.3.2 These deliverables will be presented in a clearly labeled electronic format specified by the Project Manager.
 - 5.3.3.3 One survey report, including but not limited to table of contents, project location and map, flight targeting layout, landowner correspondence, target condition upon removal, survey control list, flying contractor correspondence. The report will be in a suitable electronic format specified by the Project Manager.

5.4 Schedule

- 5.4.1 Completion of the aerial photography will be the spring of the year, as weather conditions permit. The Contractor will closely coordinate activities with the State, including the District 7-Mankato Survey Department.
- 5.4.2 Contractor will deliver all deliverables (see: 5.3.3 Contractor Deliverables), no more than 4 weeks after targets are removed.

THE REMAINDER OF THIS PAGE IS INTENTIONALLY LEFT BLANK