



Job Specification

Position Title: GEOMATICS PLAN TECHNICIAN
Job Code: OPSEU - Data Processing Technician 7, 31512
Job ID: 13463

Purpose of Position:

To produce, edit, process, prepare and review survey, Geographic Information Systems (GIS) and mapping projects and deliverables for the planning, design, construction and operation of transportation facilities; to provide technical expertise and assistance to Ministry staff and to consultants.

Duties/Responsibilities:

- 1) Producing deliverables such as legal and engineering survey drawings, GIS themes, maps, digital terrain models, cross-sections and horizontal alignments from manual and digital field notes, digital images, photogrammetric plans and other spatial data. This is accomplished using least squares adjustment software, coordinate geometry software, GIS software and computer assisted drafting software, and by applying sound principles of geometry, legal and engineering surveying, coordinate/datum systems, cartography, GIS and scale factors and by searching for and investigating internal files, plans and documents for applicable information.
- 2) Producing and maintaining Engineering and Title Records and other map products using plans, deeds, as-constructed contract drawings, building and entrance permits, utility relocates, digital maps, relational databases and other spatial data from ministry sources and outside agencies. This is accomplished using coordinate geometry software, computer assisted drafting software, GIS software and by searching internal files, plans and documents.
- 3) Providing assistance to project management staff for internal projects and consultants for consultant assignments by: searching for plans and reviewing documents, compiling information, reviewing the scope of work, providing time estimates; reviewing reports, plans, cross-sections, maps and other data sets for accuracy and content for conformance to relevant legislation, ministry standards and terms of reference; communicating findings and project updates to project management staff and consultants.
- 4) Archiving plans, alignments, cross-sections and other data sets into file management systems.
- 5) Communicating guidance and feedback to Ministry staff and consultants regarding technical issues such as Ministry standards, processes and survey/engineering/GIS software, under the supervision of project management staff.

Knowledge:

Knowledge of engineering survey principles, practices and procedures in order to prepare, process and assess in-house and consultant survey products (e.g. cross-sections, volumes, profiles, contours, digital terrain models (DTMs), 3D models, engineering plans such as bridge site, pipeline crossing, railway crossing plans; base maps) by interpreting digital and manual field notes, by applying engineering standards and specifications and by using specialized computer software (e.g. AutoDesk Land Desktop) to support the planning, design, construction and operation of transportation facilities.

Knowledge of field survey principles and practices, data collection procedures and related survey equipment used to gather field data both digitally (e.g. total station and Global Positioning System receivers) or manually (e.g. measuring tape/chain, rod & level and transit/theodolite) in order to understand the method, accuracy, sources of error found within each project and how to analyse, extract, and process field data to produce and process legal, engineering and GIS products.
 Knowledge of Federal and Provincial Acts (e.g. Surveys Act, Land Titles Act, Registry Act, Public Transportation and Highway Improvement Act, Public Lands Act, Boundaries Act, Navigable Waters Protection Act, Mining Act), Regulations, Ministry policies, directives, procedures and standards) in order to prepare and assess in-house and consultant legal plans (e.g. Reference, Expropriation and Crown Land Plans) and Jurisdictional plans (e.g. Designation, Transfer and Road Closing Plans) acceptable for registration in Land Registry Offices for the acquisition, disposal and management of ministry lands by selecting and applying specific relevant requirements.

Knowledge of mathematics (e.g. Geometry, coordinate geometry, trigonometry, closure techniques and

statistical analysis using least square adjustments) in order to produce and assess in-house and consultant legal and engineering survey drawings, closure reports, adjustment reports and horizontal alignments by using hand calculators and/or computer application software (e.g. AutoDesk Land Desktop) to calculate angles (e.g. Grid/astronomic quadrangle bearings), distances, property limits, areas, curve radii, changes, plan dimensioning, horizontal simple and spiral curve data, combined scale factors, meridian convergence, intersections/interchange coordinate layouts, and closures for the purpose of highway planning and design.

Knowledge of legal and engineering survey and GIS software applications such as computer assisted drafting software (e.g. AutoCAD), surveying and engineering design software (e.g. AutoDesk Land Desktop with Survey and Civil Design modules), GIS software (e.g. ArcGIS), word processing and email in order to evaluate consultant deliverables and prepare legal and engineering survey drawings, GIS themes, maps, digital terrain models, 3D models, cross-sections and horizontal alignments by processing data gathered in the field and producing hardcopy drawings.

Knowledge of legal survey plans, jurisdictional plans, documents (e.g. Reference plans, Expropriation Plans, Crown Land Plans, Road Closing Plans, Ontario Municipal Board Road Closing Plans, Assumption Plans, Designation Plans, and Deeds) and Engineering Plans in order to produce and maintain the ministry's Title Record drawings by reviewing internal/external records, plans documents and updating to reflect current ownership/interest status.

Knowledge of the ministry's Title Record system (a land inventory consisting of hardcopy and/or colour drawings depicting types of ownership/interest with an associated database recording details of all land transactions) in order to provide ownership information for corridor management purposes for both internal and external inquiries and to produce up-to-date engineering drawings and maps illustrating current extent of land ownership and type of interest for land acquisition purposes.

Knowledge of Ministry consultant acquisition and management principles, roles and responsibilities of all parties in order to assist project management staff in the preparation of the terms of reference for Request for Quotations/Proposals by gathering and organizing information, evaluating deliverables and by providing technical expertise.

Knowledge of digital and paper based file management systems and relational databases in order to archive, search and retrieve engineering and legal survey drawings and products by entering and storing attributes of engineering and legal survey drawings and documentation.

Knowledge of project control and geodetic elements and principles such as coordinates, combined scale factors, central meridians and zones, and horizontal datums such as North American Datum 1927 (NAD 27), NAD 83 and Canadian Spatial Reference System (CSRS), and vertical datums such as North American Vertical Datum 1929 (NAVD 29), and map projections such as Universal and Modified Transverse Mercator (UTM and MTM) in order to produce maps and legal and engineering products by reviewing existing products (e.g. Engineering plates, B-plans, C-plans, Horizontal and Vertical Control Sheets.) and vertical and horizontal databases (e.g. CSIS, COSINE, Route Books, Natural Resources Canada Quad books) to ensure that horizontal coordinates and elevations are compatible (same system and adjustment) with adjacent or existing plans, maps, design and construction data that may be attained from multiple sources.

Skills:

Analysing skills to interpret survey data from internal and external sources and survey software reports, such as survey field notes, to determine relevant field measurements and evidence to be shown on plans; least squares adjustment reports (statistical analysis) of survey project control networks to determine what angles, distances, coordinates should be rejected and/or recommend additional measurements be taken; and complex mathematical highway alignments to ensure Ministry standards are maintained (e.g. spiral and compound curves, interchanges).

Analysing skills to identify, isolate and correct errors in 3-dimensional ground models, such as crossing break lines and erroneous equipment heights, by evaluating and making adjustments to original electronic field measurements and to determine what issues are to be referred to a supervisor for direction/resolution.

Evaluating skills to determine if consultant deliverables are acceptable and adhere to Ministry standards and terms of reference such as whether CAD drawing layers conform to Ministry standards; whether cross-sections are in an acceptable format; whether cross-sections and ground model accurately represent ground conditions; and what issues are to be referred to a supervisor for direction/resolution.

Searching, analysing and interpreting skills to produce/review survey and GIS products such as legal survey drawings (Expropriation Plans, Crown Land Plans, Reference Plans), maps, GIS themes, engineering survey drawings, property mark-ups and to provide assistance to project management staff by interpreting property descriptions (metes and bounds, Property Identification Number (PIN) descriptions), survey plans and documentation from Land Registry Office title searches and other sources

of spatial data; by searching for archived documents; and by analysing old survey reports and field notes.

Capable of working to applicable Ministry standards, practices and legislation to produce or review engineering survey/legal plans and data pertinent to acquisitions and disposals of land and the planning, design, construction and operation of transportation facilities.

Capable of applying some latitude to make independent decisions (e.g. determining scale for plan production, whether CAD drawings conform to Ministry standards, whether cross-sections are in an acceptable format, whether cross-sections and ground model accurately represent ground conditions, what issues are to be referred to a supervisor) when checking in-house products and various deliverables from consultants for accuracy, content, applicability, and conformity with Ministry standards, practices, procedures, legislation, geometric design standards, and assignment terms of reference. Most in-house work is accepted as technically accurate and is subject to general review only, however, significant deviations from Ministry policy, unique or complex problems are referred to the supervisor for resolution.

Oral communication skills, using technical (e.g. legal, engineering and control survey) terminology, to explain procedures to staff of internal sections (e.g. Geomatics, Planning & Design, Property), external agencies (e.g. municipalities, utility companies and railway authorities) and consultants to request information and to provide guidance and feedback on Ministry standards, processes and survey/engineering/GIS software.

Written communication skills, using technical (e.g. legal, engineering and control survey) terminology, to write memos and reports to internal sections (e.g. Planning & Design, Property), consultants and external agencies (municipalities, utility companies and railway authorities) to request information and to provide guidance and feedback on Ministry standards, processes and survey/engineering/GIS software.

Interpersonal skills to tactfully provide guidance and feedback to, and make and respond to inquiries from, staff employed by internal sections (e.g. Planning & Design, Property), consultants and external agencies (municipalities, utility companies and railway authorities) regarding Ministry standards, processes and survey/engineering/GIS software.

Organizational skills to coordinate and organize own work activities on multiple projects with varying levels of complexity in order to produce and complete assignments in a timely fashion in accordance with priorities assigned by supervisor.

Ability to adapt to new technological changes, new application software and new business processes.

Freedom of Action:

Required to work with applicable ministry standards and legislation to produce or review GIS and survey data, plans and maps pertinent to the planning, design, construction and operation of transportation facilities; required to make independent decisions when checking survey field notes, plans and notes from consultants or surveyors for accuracy, content and applicability; required to decide when to reconcile, report or refer to the supervisor problems or discrepancies discovered while carrying out production activities or checking functions.