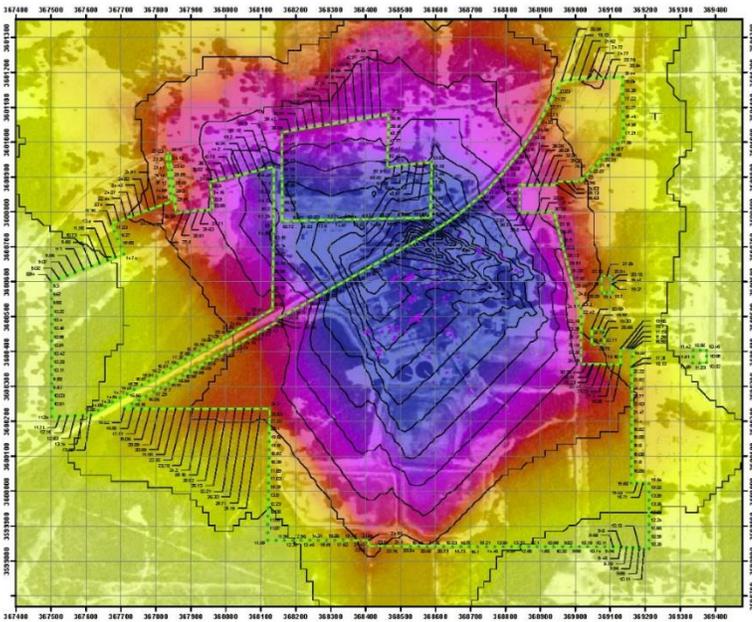# STATEMENT OF QUALIFICATIONS

GEOGRAPHIC INFORMATION SYSTEM (GIS) & DATA MANAGEMENT SERVICES

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GIS/DATA MANAGEMENT SERVICES

Our Geographic Information System (GIS) / Data Management services cover the following primary areas:

Geographic Information Systems (GIS)

Providence maintains a full in-house service for advanced mapping, drafting, imaging, and geographical information system (GIS) capabilities. The GIS/Drafting group utilizes the industry leaders in GIS/Drafting modeling and mapping software. Our GIS professionals have an extensive knowledge base in integrating spatial data from various sources such as Trimble Global Positioning Systems (GPS), ESRI ArcGIS, AutoCAD Civil 3D, AutoCAD Land Development, ERDAS Imagine, and Global Mapper; designing and managing relational databases; database querying and statistical analyses; web-site hosting using Interactive Mapping Systems (IMS) for delivering dynamic maps and GIS data and services via the World Wide Web and topographic, aerial and satellite imagery interpretation and geo-referencing.

Global Positioning Systems (GPS) and Data Collection

Providence utilizes global positioning system (GPS) technology for a variety of mapping needs. GPS allows for a very accurate mapping; customized programming for data loggers ensure accurate and complete collection; relational databases allow more efficient and error-free data storage and query; and pulling them all together in a GIS allows spatial analysis, visualization and comparison with other data. Providence is an industry leader in the application of GPS technology in environmental natural resource, planning, and economic studies in information of GIS databases. Providence uses a variety of handheld units, data loggers running customized input interfaces, real-time submeter units, and survey grade systems depending on the application and accuracy required.

Environmental Data Management Systems (EDMS)

Providence has assembled an array of computer software and a team of professionals with expertise in computer and database programming, GIS, and image processing that provides cost-effective turn-key solutions for facility and project management. Providence also develops database supported web-based applications for environmental data management. This includes enterprise-wide software applications for environmental management information systems (EDMS). The development of the EDMS involved a detailed requirements analysis to incorporate user needs and functionality. The requirements analysis was used to define the database platform and define the software architecture. The data collected using the system was used to develop environmental regulatory reports and documentation for submission to regulatory agencies.

Remote Sensing Applications

Remote sensing is the art and science of making measurements of the earth using sensors on airplanes or satellites. These sensors collect data in the form of images and provide specialized capabilities for manipulating, analyzing, and visualizing those images. Remote sensed imagery is integrated within a GIS. The GIS and Environmental departments at Providence work very closely with each other using Remote Sensing Applications to provide clients the state of the art in environmental management and analysis. All NEPA investigations, corridor surveys and sampling efforts are augmented with GPS for mapping and data capture and subsequently, all data sets are stored in a GIS for data management as well as analysis and data presentation. The GIS Department has also conducted several environmental GIS projects such as

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forest cover type mapping, watershed delineation, habitat and home range analysis for endangered species, predictive modeling for unique habitat occurrences, water quality monitoring databases, resources demand studies, and cultural and historic resources databases.

Web-Based Mapping

Providence utilizes the latest web-site hosting applications using ESRI Arc Server Interactive Mapping Systems (IMS) for delivering dynamic maps and GIS data and services via the World Wide Web. Providence also has designed in-house, proprietary software which allows for real-time data delivery. The AIM (Active and Intelligent Monitoring) System is a proprietary technology that is owned and operated by Providence. The AIM System is fully customizable to a wide variety of data management applications, including water resources data management. In an ambient monitoring application of the AIM system, real-time data is collected from analytical instruments and meteorological sensors by a datalogger. The real time data in the datalogger are then transferred to a SQL server database. Providence has developed a web-based software application that allows the user to analyze the data and display it in graphical format (over aerial photographs) and as time series concentration plots. The data can also be downloaded in a format specified by the user. The entire system (including hardware infrastructure and software applications) was developed, implemented, and deployed by Providence. The system is capable of generating notifications and transmitting them via email and through wireless communications devices for important environmental events based on trigger levels that are programmed within the system.

Mapping

The Providence Team has developed a comprehensive collection of data resources to support large-scale projects to support all mapping needs and requirements for all projects. Vector data resources relevant to these projects include state-wide data pertaining to wetlands, flood plains, water quality, threatened and endangered species, natural and scenic streams, public lands, recreational resources, cultural and historical resources, geologic formations, soil types, land use patterns, environmental justice, air quality, and hazardous and solid waste sites. In addition to vector data, the Providence team has developed an extensive resource of raster data that includes statewide aerial photography and access to visible/infrared satellite data, radar imagery, and digital terrain models. Furthermore, the Providence team works closely with aerial imagery and satellite providers to obtain raster data specific to client's individual requirements.

Computer-aided Design (CAD)

Providence utilizes the latest CAD software to prepare drawings and topographical and relief maps used in major construction or civil engineering projects, such as highways, bridges, pipelines, flood control projects, and water and sewage systems. Providence is very experienced utilizing CAD in civil land development (site grades, parking lots, etc.), landfill design (construction drawings and specifications, volume calculations, cut and fill estimates, elevation contours, leachate collection and surface drainage design drawings, facility closures etc.), pond design (cut and fills, contours, closures, drainage plans, etc.), and pipeline and roadway design drawings (right-of-ways, cross-sections, layouts, etc.).