

Appendix A

Basic Services of Engineer

Section 1. Engineer's Rights and Duties.

- A. To furnish all labor, materials, equipment, supplies, and incidentals necessary to conduct and complete the Engineer's portion of the project as defined in the scope of work and to prepare and deliver to Billings all plans, specifications, bid documents, and other material as designated herein.
- B. Ascertain such information as may have a bearing on the work from local units of government, utility companies, and private organizations and shall be authorized to procure information from other authorities besides Billings, but shall keep Billings advised as to the extent of these contacts and the results thereof.
- C. Prepare and present such information as may be pertinent and necessary in order for Billings to pass critical judgment on the features of the work. The Engineer shall make changes, amendments or revisions in the detail of the work as may be required by Billings. When alternates are being considered, Billings shall have the right of selection.
- D. Engineer's work shall be in accordance with the standards of sound engineering and present City, State, and National standards and policies currently in use.
- E. Conform to the requirements of the Montana Code Annotated Title 18 "Public Contracts" and more particularly Sections 18-2-121 and 18-2-122, and all other codes of the State of Montana applicable to providing professional services including codes and standards nationally recognized.
- F. The Engineer shall certify with the submission of final plans that the plans are in conformance with applicable sections of Title 69, Chapter 4, Part 5, of the Montana Code Annotated as pertaining to existing utilities.
- G. To perform professional services in connection with the project and will serve as Billings' representative in those phases of the project to which this agreement applies.
- H. Where Federal funds are involved, the necessary provisions to meet all requirements will be complied with and documents secured and placed in the bidding documents.
- I. Submit an estimated progress schedule as to time and costs at the beginning of the work, and monthly progress reports thereafter until complete. The reports will include any problems, potential problems, and delays as foreseen by the Engineer. Reports will be submitted in a timely manner to permit prompt resolution of problems.
- J. Contract administration duties will include review of contractor certified payrolls for wage rate compliance. Discrepancies in certified payrolls will be resolved with the Contractor. A signed Engineer's Payroll Check Sheet (included in the Standard Modifications to MPWSS) will be submitted as proof of this review with one copy of each payroll.

- K. Name a Task Director who shall be the liaison between Billings and the Engineer. For this project the Task Director designated for the Engineer is Chad Raisland working under the Principal-in-Charge, Shawn Bisch.

Section 2. Billings Rights and Duties.

- A. To furnish all labor, materials, equipment, supplies, and incidentals necessary to conduct and complete Billings' portion of the project as designated in the scope of work.
- B. Name a Task Director who shall be the liaison between the Engineer and Billings. For this project, the Task Director designated is Will Robbins, working under the City Engineer, Debi Meling.

Section 3. Scope of Work.

The project consists of professional engineering services for the design, bidding, and construction administration for the City of Billings W.O. 18-32 – Landfill Slope Stability. The scope of work includes completing the following tasks: (1) Project Management, (2) Geotechnical Evaluation and Materials Testing, (3) Slope Reinforcing Structure Design, (4) Stormwater Channel Design and Improvements, (5) Road Reconstruction and Widening, (6) Construction Administration including Inspection and Project Survey. Work to be performed under each task is further described below.

Task 1 - Project Management

For this task we will manage all elements of the project and make sure resources are coordinated efficiently. This includes communicating with the City, managing and scheduling the work, and tracking the budget. Our project manager will also periodically submit informal progress reports to the City that show the work progress and costs. We will coordinate all site work schedules and tasks with the appropriate City staff.

Task 2 – Geotechnical Evaluation and Materials Testing

Work under this task includes performing a subsurface geotechnical investigation of the slope, channel, and roadway using a track mounted drill rig. We anticipate advancing a maximum of six (6) boreholes to investigate the slope and four (4) boreholes to evaluate the channel and roadway for geotechnical design purposes. We will subcontract a suitable drill rig capable of negotiating uneven terrain and advancing the test borings. However, due to the project site's steep and broken terrain we may not be able to access the slope and channel without an excavator or dozer to create suitable roads for the drill rig. If this becomes necessary, we would ask the City to provide this equipment and an operator to cut in adequate access roads prior to the drill rig arriving on site. We have assumed maximum borehole depths of 40 feet on the slope. This will vary in response to the depth of the landslide. We will require boreholes that penetrate 20 feet below the bottom of the landslide for all slope boreholes. Road boreholes are anticipated to be a maximum of 20 feet in depth. A cost adjustment will be necessary for boreholes deeper than 40 feet on the slope or 20 feet on the road. We have assumed the City can supply a nearby water source for drilling and mixing of grout. Pioneer will supply the grouting materials. Our scope and fee proposal do not include rock coring and if it becomes necessary a revision in cost will be necessary. Rock coring would occur if bedrock that is resistant to conventional drilling is encountered or correlation of stratigraphy is necessary for proper site evaluation. We propose a sample collection rate of 1 Standard Penetration Test (SPT) split spoon or thin-walled sample every 2.5 feet in each borehole's upper 15 feet followed by a sampling rate of 1 SPT split spoon or thin-walled sample every 5 feet from depths of 15-40 feet.

Drill cuttings and samples will be used to identify lithology changes between samples. An engineer from Pioneer will be on-site full-time during drilling to direct and monitor the drilling and sampling. Pioneer will select materials for index testing to characterize subsurface conditions which may include the following;

- Mechanical Grain Size Analysis with Hydrometer (ASTM D422);
- Atterberg Limits (ASTM D4318);
- Moisture Contents (ASTM D2216);
- Consolidation w/ 2 Time Deflection, 1 Unload (ASTM D2435);
- (3 pts) Consolidated Undrained Triaxial w/ PWP (ASTM D2435);
- Soluble Sulfate Content (MT 232-04/EPA 300.0);
- Corrosivity pH (AASHTO 289);
- Soil Resistivity (AASHTO 288); and,
- Unconfined Compressive Strength (ASTM D5731).

We anticipate the need to install piezometers and possible slope inclinometers as necessary to further evaluate the landslide feature and determine on-site groundwater conditions, which will be critical for proper design consideration of the slope retaining system.

Task 3 – Slope Reinforcing Structure Design

Based on the results of the geotechnical evaluation, Pioneer will develop a design for the slope stabilization and any reinforcing structures or anchors. The design will incorporate slope stability analyses and an evaluation of reinforcing structure types and slope reconfigurations necessary for stabilization of the slope and redesign of the channel. The design is anticipated to include changes in slope configuration, removal of portions of the slope, possible mechanical anchors, and potential stabilizing berms as the design dictates. The road and ditch will be incorporated into this design. Construction drawings and technical specifications will clearly describe the details of the drainage, earthwork, materials, construction, compaction requirements and geometry. If necessary, Pioneer will assist the City with coordinating and submitting design documents to the Montana Department of Environmental Quality (MDEQ). We assume coordination and permitting with the MDEQ will be minimal and the general contractor will be responsible for preparing and administering a MDEQ Stormwater Pollution Prevention Plan (SWPPP) for the project. Cost estimates will be developed for different design scenarios if necessary and for the final design configuration.

Task 4 – Stormwater Channel Design and Improvements

Building upon the preliminary design described in the Evaluation of Corrective Action Alternatives Final Report, Pioneer will perform hydraulic calculations and modelling, using the flows and channel dimensioning specified in the 1995 SWMM report. We will refine the channel/road profile and geometry to balance earthwork volumes as part of the design, factoring in the up- and down-slope constraints and the slope reinforcing structure design. The channel lining will be designed to prevent future erosion. Construction drawings and technical specifications will clearly describe the details of the drainage, earthwork, materials, construction and geometry. If necessary, Pioneer will assist the City with coordinating and submitting design documents to the Montana Department of Environmental Quality (MDEQ). We assume coordination and permitting with the MDEQ will be minimal and the general contractor will be responsible for preparing and administering a MDEQ Stormwater Pollution Prevention Plan

(SWPPP) for the project. Cost estimates will be developed for different design scenarios, if necessary, and for the final design configuration.

This task also includes coordinating with Great West Engineering (Great West) to ensure the stormwater channel design and improvements coincide (e.g. design and schedule) with the channel lining project Great West is completing for the City under a separate Work Order as part of the Cell 3 Closure.

Task 5 – Road Reconstruction and Widening

As part of the overall slope reinforcement and drainage channel realignment/design, Jellison Road will be reconfigured to the necessary width with a berm or barrier along the northern edge of the road to prevent future discharges onto the neighboring Blain Mobile Home Court property. All necessary surfacing and base course will be included in the design, construction drawings and technical specifications. Construction details along with materials and compaction specifications, in coordination with the Yellowstone County Public Works Roadway Standards, will be included. Pioneer will submit applicable permit documents to the Yellowstone County Public Works Department for review and approval. We assume coordination and permitting with the Yellowstone County Public Works Department will be minimal, since Jellison Road is an existing road right-of-way. As with the other parts of the design, cost estimates will be developed for the road work.

Task 6 – Construction Administration including Inspection and Project Survey

Pioneer will assist the City with procuring a Contractor and will perform construction administration including inspection. We will develop a bid package complete with all the necessary bidding documents, construction drawings, and technical specifications for review by the City. Following review and approval of the bid package, Pioneer will assist the City in the bidding process. We will attend a pre-bid meeting, respond to questions from prospective bidders and, if warranted, issue written clarifications and addendums, review bids, provide a recommendation for award to the City, and assist the City in preparing a notice of award to the selected Contractor.

Pioneer will conduct a pre-construction conference to discuss the following:

- Identify representatives attending the meeting.
- Liability insurance certificates.
- Payment and performance bonds.
- Contract documents.
- Identification of subcontractors.
- Communication procedures.
- Utility locates.
- Identify and discuss potential construction conflicts.
- Contractor's pre-construction documentation requirements.
- Contractor's project control techniques and reporting requirements.
- Contractor's planned work hours and schedule.
- Pioneer's role and responsibilities for oversight.
- Submittal procedures.
- Documentation requirements.
- Traffic control requirements and plans.

- MDEQ SWPPP preparation and administration responsibilities.
- Health and safety issues and responsibilities.
- Pay application process and schedule.

We will prepare pre-construction conference meeting minutes that will become part of the project record.

We will review technical submittals to assure materials proposed by the Contractor meet the requirements of the technical specifications provided in the bid package and complete submittal review forms. Copies of these forms will be forwarded to the City and Contractor.

Prior to construction, we will provide construction staking and establish survey control points with a survey-grade GPS and/or conventional surveying equipment.

During construction, Pioneer will provide construction inspection services to assure the work is being completed according to the construction drawings and technical specifications. We will keep a field logbook to record the Contractor's progress. We will attend construction progress meetings with the City and Contractor during the course of construction. The Contractor's progress, schedule, delivery schedule, and other topics will be discussed and reviewed during each progress meeting.

Pioneer will review the Contractor's request for progress payments and, ultimately, request for final payment. Pioneer will resolve any discrepancies in the request for payment and, once in agreement with the Contractor, will forward a recommendation for payment to the City.

When construction of the project is near completion, Pioneer will schedule and conduct a substantial completion walk-through. During the walk through, a punchlist of work necessary before final completion is granted will be developed. Once the punchlist is completed by the Contractor, we will recommend granting final completion and release of the Contractor's bonds and retainage to the City.

At the close of the project, we will perform an as-built topographic survey and prepare as-built "record" drawings. A final report will be prepared and submitted to the City documenting construction activities to include:

- Description of construction activities.
- Construction quantities.
- Project documentation and schedule.
- Deviations.
- Project Costs.
- As-built "record" drawings.
- Photo documentation of the work.