

**AMENDMENT NO. 2**  
**TO**  
**CONTRACT FOR PROFESSIONAL ENGINEERING SERVICES**  
**W.O. 19-12**  
**WEST END RESERVOIR PROJECT**

THIS AGREEMENT, made and entered into on \_\_\_\_\_, by and between the following:

CITY OF BILLINGS, a Municipal Corporation,  
Billings, Montana 59103,  
Hereinafter designated the City

and

HDR Engineering, Inc.  
970 South 29<sup>th</sup> Street West  
Billings, Montana 59102  
Hereinafter designated the Contractor

WITNESSETH:

WHEREAS, the City and Contractor have entered into a contract dated April 2, 2019, for Contractor to provide engineering services to the City for Work Order 19-12 West End Reservoir Project, and;

WHEREAS, the City has need for additional engineering services, and;

WHEREAS, the City has authority to contract for consulting engineering services, and;

WHEREAS, the Contractor represents that he is qualified to perform such services, is in compliance with Montana Statutes relating to the registration of professional engineers and is willing to furnish such services to the City;

NOW, THEREFORE, in consideration of the terms, conditions, covenants and performance contained herein, or attached and incorporated herein, the Parties hereto agree as follows:

Appendix A, Section 3. Add the following to the Scope of Work

- Provide Phase II Geotechnical Investigation and Topographic Survey services in support of the design of the West End Reservoir project for the following major elements of work:
  - **Phase II Geotechnical**
    - Borings and Test Pits
    - Material Sampling and Testing
    - Design Phase Laboratory Testing
    - Special Laboratory Tests for Shale Materials
  
  - **Phase II Topographic Survey**
    - Verification of topography in areas of heavy vegetation around reservoir site
    - Verification of topography & location of two concrete areas in north cell
    - Locating geotechnical bore holes and test pits as part of the Phase II Geotechnical services

Appendix A, Section 3. Add the following to the Scope of Work after Task 1700.

#### DETAILED SCOPE OF SERVICES

The scope of services that will be utilized on the Phase II Geotechnical Investigation and Topographic Survey is presented in Tasks 1800-2000. The scope of services is organized as follows:

<u>Task Series</u>	<u>Description</u>
1800	Project Management
1900	Phase II Geotechnical
2000	Phase II Topographic Survey

Scope items to be added by future amendment include but are not limited to:

- Reservoir Design services
- Reservoir Bidding services
- Reservoir Construction services
- Startup and training services related to the reservoir
- SCADA programming services related to the reservoir
- Warranty services related to the reservoir

## **TASK SERIES 1800 – PROJECT MANAGEMENT**

### **Task 1810 – Design Services Project Management**

As part of this task, the Engineer's Project Manager will lead coordination of the design team and subconsultants with the City as well as supervise the subconsultant activities to obtain the desired information from the field. Project Manager and Accountant will monitor project status, maintain project schedule and prepare financial documents.

Deliverables:

- Monthly invoices and project progress updates

## **TASK SERIES 1900 – PHASE II GEOTECHNICAL INVESTIGATION**

### **Task 1910 – Borings and Test Pits**

Design phase boreholes are planned to bring up the investigation frequency to at least one geotechnical investigation every 500-feet along the embankment alignment. Soil and rock encountered in the boreholes shall be classified in the field using visual-manual procedures. Rock Quality Designation (RQD) values shall be calculated and reported for the rock cores. Packer tests are planned to be conducted at 5-foot intervals within the rock encountered in select boreholes.

The additional embankment boreholes proposed are:

- Twenty-one (21) boreholes along the North Embankment alignment
- Four (4) boreholes in the North reservoir area to characterize the borrow material
- Ten (10) boreholes along the South Embankment alignment
- Three (3) boreholes within the South reservoir area to characterize the borrow material

Additional borings are planned for design of each of the following appurtenant structures:

- North Reservoir Weir (1 borehole)
- North Reservoir Inlet structure (1 borehole)
- North Reservoir Overflow and Outlet structure (1 borehole)
- South Reservoir Weir (1 borehole)
- South Reservoir Inlet structure/Discharge Area (1 borehole)
- South Reservoir Outlet structure (1 borehole)
- Waterway connection between North and South Reservoir (1 borehole)
- Assumed two abutments and a single pier associated with the bridge along Hesper Road (2 boreholes)
- WTP Intake Pump Station (1 borehole)
- Canyon Creek Structure (1 borehole)

For planning purposes, it is estimated that 28 test pits will be excavated as part of these activities.

### **Task 1920 – Material Sampling and Testing**

Includes rock coring and sampling, shale sampling, packer testing, shear wave velocity measurements and installation of six stand pipe piezometers.

### **Task 1930 – Design Phase Laboratory Testing**

The flowing laboratory tests shall be conducted for all overburden soil samples and shale samples that are collected:

1. Index Properties
2. Compaction
3. Consolidation
4. Strength Properties
5. Permeability Tests

### **Task 1940 – Special Laboratory Tests for Shale Materials**

In addition select rock core samples shall be tested for drained residual shear strength using the Torsional Ring Shear test. Processed shale samples shall be tested for disparity potential testing using the Soil Conservation Service (SCS) double hydrometer test and slake durability. To summarize, the additional laboratory tests for the shale samples are:

- Intact shale rock cores
  - Torsional Ring Shear Test
- Processed Shale Samples
  - Slake Durability Test
  - SCS double hydrometer test

### **Task 1950 – Quality Assurance**

Tasks 1910 and 1940 will be reviewed by the design team for quality assurance.

## **TASK SERIES 2000 – PHASE II TOPOGRAPHIC SURVEY**

### **Task 2010 – Verification of topography in areas of heavy vegetation**

Field survey crews will use existing survey/mapping control to obtain topographic information in the areas where heavy vegetation exists. Task includes two days of field work to complete this work. Time also includes survey office support for data processing and QA/QC and delivery of point data for surface updates.

Deliverables:

- Topographic survey of vegetative areas

### **Task 2020 – Verification of topography & location of two concrete areas in north cell**

This task involves obtaining of topographic information within the concrete wash and disposal areas located in the north cell (approximately 16 acres).

Topographic data will include the various sampling locations per HDR field investigation so it can be accurately catalogued and depicted on the master site plan. Task includes two days of survey field time, office support for crew line out, data processing, QA/QC and data delivery.

Deliverables

- Topographic survey of the two concrete areas in the north reservoir cell

**Task 2030 - Locating bore holes and test trenches as part of the Phase II Geotechnical services**

This task requires the location of geotechnical bore and trench locations throughout the site. It is anticipated that two days of field survey assistance will be needed as these bores & trenches are dug. Time included is for survey crew, office support and data transfer.

Deliverables:

- Coordinates of bore and trench locations associated with Phase II Geotechnical services.

Appendix B, Section 1, Paragraph A. Add paragraph 10, Phase II Geotechnical Investigation and Topographic Survey and update the total with the following:

15. TASK SERIES 1800 – PROJECT MANAGEMENT	\$6,803
16. TASK SERIES 1900 – PHASE II GEOTECHNICAL INVESTIGATION	\$680,276
17. TASK SERIES 2000 – PHASE II TOPOGRAPHIC SURVEY	\$11,321
<b>Total</b>	<b>\$698,400</b>

Appendix E. Add Paragraphs K-L:

- |   |             |
|---|-------------|
| K. Complete Phase II Geotechnical Investigation | August 2020 |
| L. Complete Phase II Topographic Survey         | August 2020 |

CONSULTANT

NAME: \_\_\_\_\_

BY: \_\_\_\_\_

TITLE: \_\_\_\_\_

DATE: \_\_\_\_\_

CITY OF BILLINGS, MONTANA

BY: \_\_\_\_\_

Mayor

DATE: \_\_\_\_\_