SUBJECT: Contract Award – Cooper Mountain Reservoir #2 and Associated Improvements Project (CIP # 4058A)

FOR AGENDA OF: 07-17-18 BILL NO: 18157

MAYOR’S APPROVAL: 

DEPARTMENT OF ORIGIN: Public Works

DATE SUBMITTED: 07-03-18

CLEARANCES: City Attorney

MAYOR'S OFFICE

Finance

Purchasing

Engineering

PROCEEDING: CONSENT AGENDA (CONTRACT REVIEW BOARD)

EXHIBITS:
1. Proposal Summary
2. Scope of Work and Fee
3. Funding Plan
4. Project Schedule
5. CIP 4058A Project Data
6. Project Map

BUDGET IMPACT

<table>
<thead>
<tr>
<th>EXPENDITURE REQUIRED</th>
<th>AMOUNT</th>
<th>BUDGETED $500,000 *</th>
<th>APPROPRIATION REQUIRED</th>
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*Account Number 505-75-3622-683, Water Fund – Cooper Mountain (5.5 MG) Reservoir #2 (Bond) Project – Construction Engineering and Design Account. The total contract amount to be awarded is $3,118,709. The FY 2018-19 Budget includes $500,000 for this project for the amount of work that is expected to be completed by June 30, 2019. Staff will include the remaining $2,618,709 to fully fund this contract in the FY 2019-20 budget process.

RECOMMENDED ACTION:
City Council, acting as the Contract Review Board, authorizes the Mayor to sign a contract with Murraysmith, Inc. in the amount of $3,118,709 to perform engineering services for the Cooper Mountain Reservoir #2 and Associated Improvements Project (Capital Improvement Plan (CIP) Project No. 4058A) in a form approved by the City Attorney, and directs the Finance Director to include sufficient funds to complete the reservoir project design (approximately $2,618,709) in the proposed Fiscal Year 2019-20 budget process and document.

HISTORICAL PERSPECTIVE:
The City of Beaverton (City) has an existing 5.5 million gallon (MG) Cooper Mountain Reservoir which was constructed in 1994, on ten acres at the top of Cooper Mountain. The size of the parcel of land purchased in 1992 and site layout was designed for a second storage reservoir in the future. Cooper Mountain Reservoir No. 1 directly serves approximately 16,000 residents by gravity in the upper elevations of the City and indirectly provides service to an added 55,000 residents and businesses in the valley floor 410-pressure zone to help sustain operating pressures on hot days, and added backup emergency and fire storage zone serving the City’s largest water service area. The adopted 2009 water master plan by Murraysmith concluded that
future growth in water demand in the City's upper-elevation water service area may exceed the capacity of the existing 5.5 million-gallon reservoir on Cooper Mountain (Reservoir No. 1) prior to 2020. Another engineering evaluation by HDR Engineering of upper-elevation storage in 2013 confirmed that the water storage requirements for upper elevations could exceed the existing 5.5-million gallon reservoir capacity by 2020.

When full, the water surface in the Cooper Mountain No. 1 Reservoir is at 794 elevation, the highest point in Beaverton, and provides water directly to seven various pressures zones that are bounded by and served through a series of Pressure Reducing Valves (PRVs). The Cooper Mountain Reservoir is supplied from the Sexton Mountain Pump Station, located adjacent to the Sexton Mountain 15 MG Reservoir, through approximately 2.4 miles of 20-inch diameter transmission main. The reservoir and pump station are the primary source of supply for customers in the 420, 450, 470, 525, 550, 570, 675, 750, and 794 Pressure Zones.

Water demand within these City's upper pressure zones east and south side of Cooper Mountain has been increasing due to buildout in the Progress Ridge and rest of the water service area of Reservoir No. 1. In addition, 544 acres along the southern slopes of Cooper Mountain were annexed and incorporated into the City's water service area in 2014. The South Cooper Mountain (SCM) lands have been added to the existing pressure zones served by the existing reservoir. The City anticipates steep growth in water demand in SCM from urban infill within the existing boundaries of the Cooper Mountain Reservoir No. 1 pressure zones adding about 8,000 population. Additionally, a relatively undeveloped 1,200 acres of the upper elevations of South Cooper Mountain, designated Urban Reserve 6B, may potentially be added to the urban growth boundary in the next year by Metro. Urban Reserve Area 6B could add another 8,000 population to be served by the Cooper Mountain Reservoir. In order to meet these demands, staff recommends construction of a twin 5.5 MG Cooper Mountain Reservoir No. 2 to primarily serve the 550 foot, 675, 750 upper pressure zones. This construction initiative is in accordance with the recommendations made by the following City of Beaverton studies completed previously:

- Water System Master Plan, Murray Smith & Associates, 2009;
- Preliminary Geotechnical Evaluation for Conceptual Siting Analysis for Proposed Cooper Mountain Reservoir, GRI, 2012;
- South Cooper Mountain Engineering Planning & Hydraulic Modeling Project, HDR, 2013
- Upper Pressure Zones Storage Evaluation; HDR, 2014;
- Upper Pressure Zone Reservoirs, Preliminary Reservoir Siting Analysis and Property Assessment, Murray Smith & Associates, 2014;
- Cooper Mountain Reservoir No. 2 – Draft Preliminary Siting Analysis, Murraysmith, 2018 (Expected Completion Date: July 2018); and
- DRAFT Water System Master Plan, Murraysmith, 2018 (Expected Completion Date: September 2018).

The water capital improvements to be eventually constructed under this engineering design contract will be primarily funded from the recently issued 2018 Water Revenue Bonds and the balance from the City’s Water Construction Fund budget. Following is a preliminary estimate of cost.
Preliminary Construction Cost Estimate
Cooper Mt. Reservoir #2 and site work $12,000,000
24" Transmission Mains $5,500,000
ASR No 7 $5,000,000
Upper Zone (UR 6B) Booster PS $1,400,000
TOTAL $23,900,000

INFORMATION FOR CONSIDERATION:
A Qualifications Based Request for Proposals for professional engineering services was advertised on May 25, 2018. The mandatory pre-proposal conference was held on June 4, 2018 with seven consulting firms in attendance. One proposal was received and opened on June 15, 2018, at 2:00 p.m. from Murraysmith, Inc., of Portland, Oregon. The City reviewed the proposal to ensure that it met the requirements for qualifications and then negotiated a scope of work and budget with Murraysmith.

Attached are Murraysmith’s Proposal Summary (Exhibit 1), the Scope of Work and Fee (Exhibit 2), Funding Plan (Exhibit 3), Project Schedule (Exhibit 4), CIP 4058A Project Data (Exhibit 5), and Project Map (Exhibit 6).

In addition to the Cooper Mountain Reservoir No. 2, the project will include design of associated on-site and off-site improvements. Proposed on-site improvements include reservoir piping, valve and vaults, site grading, site access road expansion, reservoir drain and overflow piping, site storm water and reservoir overflow/ASR pump to waste detention facility, and landscaping and fencing. Off-site improvements include design of water transmission mains. The design of the new reservoir and other associated improvements listed will include careful seismic consideration of the predicted Cascadia Subduction Zone Earthquake.

The new reservoir will be initially supplied from the existing Sexton Mountain Pump Station and 20" transmission main. Through engineering planning developed over the last four years for the South Cooper Mountain development area, preparations are underway for a second supply source to fill both Cooper Mountain reservoirs by 2026. A connection to the Willamette Water Supply Program’s (WWSP) 66-inch diameter transmission line along SW Tile Flat Road, near Scholls Ferry Road, is also planned to be on-line by 2026. The City is expected to be a formal partner in the WWSP within a year from now with the purchase of a share to supply Beaverton with five million gallons per day by 2026.

Several segments of transmission mains that will allow the City to serve the rapidly developing South Cooper Mountain area are already under design and construction. The City is currently partnering with Washington County and a large developer on three large construction projects. Major segments of large-diameter City water mains are being constructed during summer and fall of 2018.

This design contract includes work in 2018 regarding two remaining segments of the transmission main that will allow acceleration of the City’s ability to direly serve the South Cooper Mountain area using Reservoir No. 1 prior to completion of No. 2 reservoir:
- a 24-inch diameter water transmission main that totals approximately 6,550 linear feet (LF) will extend from the reservoir site along SW Kemmer Road and SW 175th Avenue to Scholls Ferry Road; and
- A 16-inch diameter water transmission main will extend approximately 1,600 LF on Weir Road.

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This engineering contract also includes design of ASR No. 7 and the Upper Zone Booster Pump Station contingent upon Metro’s decision in January 2019 to include Urban Reserve 6B within the Urban Growth Boundary, and it will be mandatory in meeting the anticipated increase in water demands from the Urban Reserve 6B area.

Not included in this contract is design of a planned future booster pump station constructed by 2026 and located in the vicinity of Tile Flat Road, near a planned turnout from the WWSP 66-inch diameter water supply transmission line. The City’s future Tile Flat pumping station will allow supplemental supply from the WWSP system to be pumped back up these new transmission mains to the Cooper Mountain Reservoirs No. 1 and 2.
City of Beaverton

PROPOSALS RECEIVED

Request for Proposals for Professional Engineering & Design Services for Cooper Mountain Reservoir No. 2 and Associated Improvements Using a Qualified Based Selection Process

Solicitation #: 3370-18B

Closed: June 15, 2018 @ 2:00 PM

Proposals Submitted:

1. Murraysmith, Inc. – Portland, OR
SCOPE OF WORK
ENGINEERING SERVICES
FOR
COOPER MOUNTAIN RESERVOIR NO. 2
AND ASSOCIATED IMPROVEMENTS
CITY OF BEAVERTON

This scope of work details services to be provided to the City of Beaverton (City) for the Cooper Mountain Reservoir and Associated Improvements Project by Murraysmith, Inc. (Consultant).

Background and Project Description

Cities throughout the region are increasingly aware of the risk to their infrastructure from potential seismic activity. The State of Oregon developed the Oregon Resilience Plan (ORP) due to the eminent threat and extreme risk of a Cascadia Subduction Zone (CSZ) earthquake. Murraysmith is currently working with the City to complete a system wide Seismic Resilience Evaluation as part of the Water Mater Plan (WMP) update, as required by the ORP. The Cooper Mountain Reservoir No. 2 and Associated Improvements Project, located on a site within an area of low seismic hazards, offers the City a unique opportunity to take a large step in providing components of a seismically resilient water system backbone that would include:

- Two 5.5 MG water storage reservoirs: robust prestressed concrete construction with seismic design features.
- ASR No. 7: resilient groundwater supply, and secondary source that can fill the reservoirs.
- 24-inch Transmission main: New backbone conveyance to the City’s distribution system, and from future Willamette Water Supply Program (WWSP) supply.

The existing 5.5 MG Cooper Mountain Reservoir serves customers by gravity in the 794 Zone and in the other Cooper Mountain Zones through a series of Pressure Reducing Valves (PRVs). The reservoir is supplied from the Sexton Mountain Pump Station, located adjacent to the Sexton Mountain 15 MG Reservoir, through approximately 2.4 miles of 20-inch diameter transmission main. The reservoir and pump station are the primary source of supply for customers in the 470, 550, 570, 675, 750, and 794 Zones. Water demand within the City’s upper pressure zones in the vicinity of Cooper Mountain has increased due to development in the area. The City anticipates that urban infill within the existing boundaries of these pressure zones and development of newly incorporated areas will further increase water demands. The City intends to construct a 5.5 MG Cooper Mountain Reservoir No. 2 to primarily serve the 550 foot and 675 foot upper pressure zones to meet this area’s rapidly growing water storage needs.
To convey water to this newly developing area, a new 24-inch diameter water transmission main will extend from the reservoir site along SW Kemmer Road and SW 175th Avenue. A new master PRV station, currently being constructed, will be located adjacent to SW 175th Avenue, south of SW Alvord Lane, to reduce pressure from the 794 foot hydraulic grade provided by the Cooper Mountain Reservoirs. New off-site transmission main to be designed and constructed with the reservoir project will include the remaining segments of new 24-inch diameter main on SW Kemmer Road and SW 175th Avenue (approximately 6,550 LF), and 2,000 LF extension of 16-inch diameter main on SW Weir Road. The reservoir site also includes an existing groundwater well that was drilled for future development as an aquifer storage and recovery (ASR) supply source. This well, known as ASR No. 7, can potentially provide the City a dependable, seismically resilient, secondary source, directly connected to the Cooper Mountain backbone storage and transmission system that can serve the City’s existing pressure zones by gravity. Designs for ASR No. 7 will be included with the reservoir project to develop a building layout that will be combined with land use permit approval for the reservoir. The timing and completion of construction of ASR No. 7 will be dependent on the pending outcome of the City’s request for an expansion of the Urban Growth Boundary (UGB) to include Urban Reserve Area 6B. A decision from Metro on the UGB expansion is expected in January 2019.

If the UGB is expanded to include Urban Reserve 6B, a future Upper Zone pump station will be needed to serve higher elevations in the City’s expanded service area (new 860 and 920 zones). The City intends to locate this future pump station at the reservoir site, as it would provide an opportunity to use available land on an existing, secure City owned site with optimal pump suction supply from the reservoirs. Designs for the Upper Zone pump station will also be included with the reservoir project to develop a building layout plan and elevation for use in permit approval for the reservoir project. The timing and completion of construction of the Upper Zone pump station will also be dependent on the pending outcome of the City’s request for an expansion of the Urban Growth Boundary (UGB) to include Urban Reserve Area 6B.

**Anticipated City Responsibilities**

It is anticipated the City will be responsible for the following:

1. Provide a project manager who is responsible for overall project management and will provide coordination between the Consultant and the City.
2. Provide Consultant access to the site, including necessary confined space safety equipment if needed.
3. Provide the Consultant copies of all available and relevant City utility "as-built" plans, topographical maps, surveys, reports, studies, GIS mapping, etc. pertinent to the project.
4. Provide Consultant with digital copies of City’s standard construction specifications, details and “front end” bidding document sections.
5. Provide timely review and comment on all reports, drawings and specifications submitted by Consultant to City for review and approval.
6. Manage and lead easement acquisition process, including communications with landowners. (Consultant will provide property service to support the City).
7. Obtain the necessary right-of-entry from landowners for survey work.
8. Provide coordination with SCADA system integrator for system improvements and integration with the existing system.
9. Submit applications to the State, County and/or City for required permits. (Note—Consultant will prepare and may be requested to contribute project information for any such applications).
10. Maintain records and process consultant invoices.
11. Provide legal review of all contracts, bid forms, and real property.
12. Prepare, provide and distribute all public notifications.
13. Pay for all permit application fees.

DESIGN ASSUMPTIONS

Basic design assumptions are detailed below.

1. Project elements will generally include those identified in the Cooper Mountain Reservoir No. 2 – Preliminary Siting Analysis, prepared by Murraysmith (May 2018).
2. Reservoir designs assume a partially buried 5.5 MG circular prestressed concrete reservoir designed and constructed in accordance with AWWA D110 Type I standards. Subgrade conditions on which the reservoir will be founded will be competent to support a standard membrane floor slab system. The reservoir will be partially buried.
3. The reservoir overflow elevation and floor elevation will match the existing 5.5 MG Cooper Mountain Reservoir No. 1. (approximately 794 feet and 764 feet, respectively (NGVD 29)).
4. Designs will include a reservoir monitoring manhole to consolidate piping from the reservoir overflow, potable drain, ring underdrain, and foundation drain. A 30 mil PVC liner and drainage layer under the tank structure will provide hydraulic separation of groundwater or surface water flows from the ring underdrain to allow monitoring of potential tank leakage.
5. Site storm drainage, reservoir drain and potential overflows, and future ASR No. 7 pump to waste flows will be routed to a single on-site detention facility, and then conveyed off-site to the existing site drainage outfall location. On-Site stormwater designs shall meet Slopes V requirements.
6. A new 24-inch water main will extend from the reservoir site approximately 1,350 LF east on SW Kemmer Road (Transmission Main “Segment 5”) and will be included with construction of the on-site improvements.
7. A cast-in-place concrete valve vault and associated isolation/intertie and seismic valving, and metering will be included in the vicinity of proposed Reservoir No. 2. The vault will be a new rectangular cast-in-place concrete structure, fully buried, with an H-20 rated roof slab at grade. Anticipated dimensions are 30 ft by 20 ft in plan and approximately 25 ft deep. Geotechnical investigation will confirm the assumption that the site is suitable for a typical spread footing and slab floor system.
8. A smaller precast concrete valve vault and associated isolation/intertie and seismic valving, and metering will be included in the vicinity of proposed Reservoir No. 1.
9. A small (approximately 12ft x 12ft) CMU block building with standing seam metal roof will be included for housing telemetry and electrical equipment, and potentially bulk chlorine for boosting chlorine for Reservoir No. 2.
10. Electrical features are included in project designs. Telemetry designs will be coordinated with the City’s systems integrator S&B. Reservoir level, flow monitoring, and hatch intrusion alarm instrumentation will be provided.
11. Preliminary and final designs, and project permitting will include the proposed ASR No.7 and Upper Zone Booster Pump Station.
12. Permanent access road and parking facilities will be included in project designs.
13. Site landscaping will include site restoration and screening consistent with the surrounding site and development, existing and/or new fencing, on-site vegetative stormwater treatment design and irrigation design as needed.
14. It is assumed that Consultant will prepare typical traffic control plans as needed in accordance with County requirements, and the construction contractor will provide traffic control plans and details.
15. New off-site piping will be designed and bid separately from the reservoir project to obtain an early completion and commissioning date for those mains. Those elements include:
   • Approximately 5,200 LF of 24-inch diameter main along SW 175th Avenue (known as “Segment 2”). The southern limit is the existing County 175th Widening Project & the northern limit is the existing COB 175th & Weir watermain.
   • Approximately 2,000 LF of 16-inch diameter watermain along SW Weir Road, from about 600 LF east of SW 175th Avenue, ending about 300 LF east of SW Mt. Adams Drive.
16. The reaming, or upsizing, of the ASR No. 7 test well will be designed, bid and constructed separately from the reservoir project to obtain an early completion and commissioning date and allow for appropriate final sizing of ASR pump and chemical system.

PROPOSED SUBCONSULTANTS

- Peterson Structural Engineering, Inc. (PSE) - Structural Engineering;
- Geotechnical Resources, Inc. (GRI) - Geotechnical & Foundation Engineering;
- AKS Engineering & Forestry (AKS) - Surveying, Storm Drainage Design, Land Use Permitting;
- Confluence Engineering Group, LLC (Confluence) - Water Quality;
- GSI Water Solutions, Inc. (GSI) - Groundwater;
- Stantec - Chemical Treatment;
- Strongwork Architecture, LLC (Strongwork) - Architecture;
- NNA Landscape Architecture, LLC (NNA) - Landscape Architecture;
- JLA Public Involvement, Inc. (JLA) - Public Involvement Support;
- Epic Land Solutions, Inc. (Epic) - Right-of Way and Property Services
PROPOSED SCOPE OF WORK

The scope of work is presented in two phases. Phase 1 includes all the baseline work to be performed. Phase 2 includes work that will be only performed after explicit authorization by City staff. Phase 2 includes work elements that are anticipated to be authorized largely dependent upon Metro approval of the UGB expansion and economic conditions. Phase 2 also includes any contingency tasks that may be considered.

Presented below is a detailed description of the proposed scope of services by work task to be completed by the Consultant.

Phase 1 Work Elements

Task 1 – Project Management

This task includes the administration and coordination of the Consultant’s staff, subconsultants, and the interface with the City’s project manager and other City staff. Consultant will actively manage all project work to meet the project budget and schedule. For the purposes of this scope and budget, a 26-month project duration is anticipated. The following subtasks are included:

Task 1.1 - Project Administration

1. Perform general administration and project management to ensure successful completion of all tasks and elements of the Project within the established scope, schedule and budget. Manage the project to ensure efficient and coordinated completion of various design tasks and obtaining City input where needed to facilitate the project in a timely manner.

2. Coordinate with the City Project Manager on a regular basis to discuss the status and progress of various work activities and overall completion of various work elements.

3. Provide monthly billing invoices. Monthly invoices shall include a detailed breakdown of staff member hours billed by task and subtask. Include a summary of expenditures to date, percentage complete by task and subtask, budget amount remaining, and earned value per task and subtask.

4. Provide project summaries with monthly billings including review of work efforts completed, forecasted work and milestones for the next monthly period, and any encountered or projected challenges or issues.

5. Develop a schedule that incorporates all key activities. Provide updates to the project schedule as needed. Cost load the schedule and include a plot of anticipated and actual expenditures with monthly reports.
Task 1.2 - Meetings

Coordinate and attend bi-weekly status meetings by phone, and monthly meetings in person. Provide agenda and minutes for all meetings held. Design review meetings at key milestone stages will be coordinated to occur during the monthly status meeting. Thirty-three (33) total meetings under this subtask include the following:

- Project Kick-off Meeting
- Bi-weekly Status meetings by phone (25 meetings anticipated)
- Monthly Status meetings in person (25 meetings anticipated)

Task 1.3 - Maintain Project Tracking Logs

1. Milestones & Action Item Log - Develop Key project milestones and develop a list of key action items. Provide updated status of the list of key action items on a bi-weekly basis.

2. Key Deliverables Log - Develop a list of key deliverables required by the project under various categories such as Documents, Specifications, Drawings, etc. at various project stages such as 30%, 60%, 90%, etc. Provide updated status of the list of key deliverables on a bi-weekly basis.

3. Review Comment Log - Develop and maintain list of comments and response to comments on drawings at various project stages such as 30%, 60%, 90%, etc.

4. Decision Log - Document decisions as they occur during the progression of the work. Maintain a decision log throughout the project.

5. Meeting Comment Log - Coordinate, track, and implement City review and relevant meeting comments.

Task 1.4 - Quality Assurance/Quality Control (QA/QC)

Develop and implement quality assurance and quality control (QA/QC) measures for all aspects of the work. Provide a project specific QA/QC Plan.

Task 1 Deliverables:

- Invoices (monthly).
- Project summaries/progress reports (monthly)
- Project Design Schedule and updated project schedules as requested by the City.
- Meeting agendas and minutes.
- Milestones & Action Item Log
- Key Deliverables Log
- Review Comment Log
Task 1 Assumptions:

- Project management will be for design services for a period of approximately 17 months.
- Meetings will typically include the Consultant PM and two design leads as appropriate and have an approximate duration of 2 hours each.
- Meetings will be at City offices unless otherwise determined.

Task 2 – Data Collection, Review and Site Reconnaissance

Gather and review existing mapping, as-builds, design drawings, engineering reports, easements and other data related to the proposed project. Review existing reservoir, water transmission piping, valving and system operations. Perform site reconnaissance with City staff and design team to confirm existing site conditions on reservoir site and along transmission main routes.

Task 2 Deliverables:

- There are no specific deliverables associated with this task as the data will be used to complete subsequent tasks.

Task 2 Assumptions:

- It is assumed that the City will provide available data and attend site visits as needed.

Task 3 – Preliminary Engineering

Preliminary engineering will be completed under this task. Work will include topographic survey, preliminary transmission piping design alignment worksheet development, hydraulic analysis to confirm pump station capacity and storage capacity needs as well as pipe sizing, geotechnical investigations, and preliminary 30% design and report. Preliminary design will include adequate work to support characterization and sizing of the reservoir, ASR building, upper zone pump station, and telemetry/electrical building to support the land use approval process described in Task 5. Anticipated subtasks are outlined as follows:

Task 3.1 - Topographic Survey

Complete topographic survey along approximately 5,200 LF of SW 175th Avenue and 2,000 LF SW Weir Road for proposed water transmission mains; existing reservoir outfall pipe south of site (approximately 500’ x 100’), and limited supplemental reservoir site survey to pick-up data gaps, as detailed below.
• Survey, title, road, and as-built research
• Locate existing property corner monuments of record, and key section corner monuments.
• Establish property lines, right-of-way lines, and easements.
• Use NGVD 29 vertical datum.
• Establish NAD 83 2011 State Plane Coordinates.
• Coordinate public utility locates.
• Provide notice to adjoining property owners
• Field tying:
  o Above ground located utilities (e.g. sanitary, storm, water, gas, power, communications)
  o Hard surfaces (e.g. curb, sidewalk, concrete, asphalt, driveway drops, ramps)
  o Light poles and signs
  o Trees 6-inch diameter at breast height and greater
  o Possible encroachments (e.g. fences, buildings, eves, walls, significant landscaping)
  o Geotechnical borehole locations
  o Natural ground and break lines for 1-foot contours
  o Culverts
• 3D Scan by aerial drone
  o Establish a flight control plan
  o Setting ground control utilizing GPS surveying
  o Collect and process data and prepare a CAD plan with ortho mosaic photos, prepare a point cloud of the site, and prepare a 3D rendering of the site.

**Task 3.1 Deliverables:**

• Existing conditions maps showing the above items that can be used for design purposes.
• Separate 3D Scan of site.

**Task 3.1 Assumptions:**

• It is assumed that the City will obtain the necessary right-of-entry from landowner for field work on property south of reservoir site.
• Surveying does not require professional traffic control services.
• Site access for surveying will be coordinated by the City.
• Property boundary dispute resolution is outside of this scope.
Task 3.2 - Geotechnical Investigation & Site-Specific Seismic Hazard Study

Work under this subtask includes conducting a geotechnical investigation of the project site specifically for constructing a partially buried reservoir and related facilities, and installation of 8,550 lineal feet of new water transmission mains in adjacent roadways. The proposed geotechnical investigation work program for the reservoir structure is as follows:

1. Available information for the proposed reservoir and waterline project and pertinent geologic and geotechnical information site and vicinity will be reviewed. A licensed geotechnical engineer and engineering geologist from GRI will complete a reconnaissance of the reservoir site to confirm conditions have not changed since GRI's 2017 visit. A reconnaissance of the roadway and ground surface immediately adjacent to the alignment will also be completed to evaluate existing features and if potential geologic hazards exist that could affect the pipeline project. Exploration locations may be marked at this time. Details of the proposed subsurface explorations are provided below.

2. Four borings will be drilled to provide the geotechnical and seismic information necessary for reservoir design and to evaluate subsurface conditions that will be encountered during excavation and preparation of the reservoir subgrade. One boring will be made at the approximate center of the reservoir and three borings will be made at/near the perimeter of the reservoir approximately equally spaced. It is anticipated the borings will be drilled to estimated depths of 30 to 50 ft below the existing ground surface depending on location and extend at least 15 ft below the base of the reservoir.

3. A vibrating-wire piezometer will be placed in one of the drilled borings to permit measurements of depth to groundwater. A flush-mounted metal monument will be placed at the ground surface to protect the end of the piezometer cable. The vibrating-wire piezometer will be grouted into the boring and, as such, is not considered a well by the Oregon Department of Water Resources and will not require decommissioning by a licensed well driller during construction.

4. In addition to the drilling, two seismic refraction survey lines will be completed across the footprint of the planned reservoir extending through the center and oriented perpendicular to each other. The survey will provide information on the depth to rock and the shear wave velocities with depth in the rock which will be used to evaluate rock excavation characteristics and excavation volumes.

5. Three to four test pits will be excavated to evaluate subsurface materials and conditions at the location of the future booster pump station and ASR building for development criteria for foundation design and construction. Three to four test pits will also be completed around the proposed detention pond. Two to three test pits will be completed in the northeastern corner of the site at/near the location of the planned 24-in.-diameter waterline to evaluate the depth to the top of rock, which will assist in estimating rock excavation quantities during trenching for the new waterline. The test
pit excavations will be completed by a subcontractor using a track hoe. It is anticipated the test pit excavations will be in the range of 5 to 10 ft deep depending on the location of hard rock.

6. Two to three infiltration tests will be completed to support the stormwater design and permitting process. We anticipate the tests will be completed at depths on the order of 3 to 5 ft. The tests will be completed using the encased falling-head test method in substantial accordance with the 2007 On-Site Stormwater Disposal System (OSDS) Design and Construction Minimum Guidelines and Requirements document by Washington County. It is anticipated that the testing will be completed at the time of the drilling in a shallow boring made using the drill rig or with a hand auger.

7. Waterline Alignments Explorations - Limited subsurface explorations will be made in SW 175th Avenue, SW Kemmer Road, and in SW Weir Road to evaluate subsurface conditions at select locations identified by Consultant. It is anticipated that one boring will be made at the west end of Segment #5 in SW Kemmer Road and extend to a depth of 25 to 30 ft; two borings in SW 175th Avenue in Segment #2 at approximate Stations 63+00 and 75+50 to a depth of about 10 ft; and one boring at a to-be-determined location in SW Weir Road to a depth of about 10 ft.

The borings for the waterlines will be completed in the roadway and will require a single-lane closure. D&H Flagging of Portland, Oregon, will be retained to provide all required traffic control for the work. We understand the roadways are Washington County (County) jurisdiction. Therefore, an exploration work plan will be prepared for review and approval by County prior to the commencement of field work in order to obtain the required permits to work in the right-of-way. The exploration work plan memorandum for the planned work will include a scope of work, traffic control plans, and a site health and safety plan. The work plan will be provided to you for approval prior to submission to County.

It is assumed that the lane closures required for the drilling work will be permitted by the County for daylight hours between about 9:00 a.m. and 3:30 p.m. Due to this limited work time, it is assumed the drilling in the roadways will take up to about two days (assumed two borings per day).

8. Drilling and Sampling - The borings will be made with a track-mounted drill at the reservoir site and with a truck-mounted drill along the waterline alignments. The borings will be completed using mud-rotary drilling methods in the overlying soil. At the reservoir site, the borings will be advanced with continuous rock coring methods where the rock is sufficiently hard to core. In the roadways, rock will be continuously cored within the depth of planned trench excavations. Disturbed split-spoon samples and undisturbed Shelby tube samples will be obtained at about 2.5- to 5-ft intervals of depth in soil. The Standard Penetration Test will be conducted while the disturbed split-spoon samples are being taken. Disturbed grab samples of the soil and rock will be obtained from the test pits, as well as undisturbed Shelby tubes of fine-grained soil, if practical.
The drilling spoils from borings will be placed in metal drums and removed from the sites. Boreholes will be backfilled with bentonite chips or grout. Where borings penetrate pavement, the existing pavement section will be restored. The test pits will be backfilled with the excavation spoils with minimal compaction.

The borings will be subcontracted to a drilling contractor experienced in drilling and sampling soils for engineering purposes. The excavator and operator used for the test pits will also be subcontracted. The exploration work and sampling will be accomplished under the direction of experienced engineering staff from GRI who will locate the area for drilling and maintain a log of the materials and conditions uncovered during the course of the work.

All borings will be constructed, reported to Oregon Water Resources Department (ORW), and abandoned per the requirements of OAR 690-240.

9. Utility Locates and Notifications - A request to the Utility Notification Center will be made at least 48 hours prior to the start of drilling or test pit excavations. Appropriate timely notifications will be made to the City, County, and others as required prior to the start of work. A private utility locator will also be used to clear the explorations.

10. Laboratory tests will be conducted on the soil and rock samples obtained from the borings and test pits to provide data on the important physical characteristics essential for engineering studies and analyses. The laboratory tests completed on soil will include standard classification tests, such as natural water content, unit weight, Atterberg limits, and grain size determinations. If suitable rock core samples are obtained, up to 12 rock core strength tests may be completed. The rock strength data will provide important information for foundation design criteria and for development of consideration of rock excavation means and methods for construction of the reservoir and waterlines. Consolidation testing of fine-grained, undisturbed samples obtained from the test pits may also be performed to provide the information for settlement studies of the buildings at the reservoir site. Corrosivity testing on two soil samples at the reservoir site and six soil samples along the waterline alignments obtained from the explorations will be completed by a subcontracted laboratory. The corrosivity testing will include tests to evaluate chlorides, sulfates, resistivity, and pH.

11. According to the current Oregon Structural Specialty Code, the reservoir is considered an essential facility. Therefore, our scope of work includes a site-specific seismic hazard study. This work will include review of the potential seismicity of the site, development of the ground response for the site for the appropriate design-level earthquakes, and evaluation of potential geologic hazards. The seismic hazard study will include the following tasks:

   a. Conduct a detailed review of the available literature, including published papers; maps; open-file reports; seismic histories and catalogs; works in progress; and other sources of information regarding the tectonic setting, regional and local geology, and historical seismic activity that might have a significant effect on the site.
b. Conduct an in-depth examination and evaluation of subsurface data for the site and vicinity, with particular emphasis on the potential for amplification of incoming seismic energy.

c. Conduct office studies and analyses that will lead to the preparation of conclusions and recommendations concerning: (1) seismic events that might have a significant effect on the site, including the proximity and potential seismicity of known faults; (2) the potential for site-specific seismic energy amplification at the site; (3) the ground response analysis for design-level earthquakes, including estimates of the peak horizontal ground acceleration at the base of the reservoir; and (4) conclusions regarding seismic hazards, such as liquefaction, lateral spreading, slope instability, ground rupture, and ground shaking.

12. Engineering and Geologic analyses will be accomplished that will lead to the preparation of conclusions and recommendations concerning: (1) geologic hazards at the site; (2) site slope stability evaluation; (3) seismic design criteria, including a Site Class in accordance with the current International Building Code (IBC) and Oregon Structural Specialty Code; (4) methods of excavation, temporary excavation slopes, and groundwater control; (5) site preparation and grading, including wet-weather construction, structural fill, and permanent cut and fill slopes; (6) foundation support for the reservoir, including suitable bearing strata, allowable bearing pressures, base course, and subdrainage, as appropriate; (7) estimated total and differential settlements; (8) modulus of subgrade reaction for the tank floor; (9) lateral earth pressure design criteria for embedded walls; (10) design and construction criteria for temporary excavation shoring or soil nailing, and excavation and dewatering considerations; and (11) utilities.

13. A draft report will be prepared that discusses the work accomplished and presents the results of the various tests and office studies. A final report will be prepared following City review and comment. The draft and final reports will be provided in electronic format.

14. GRI will provide assistance during plan and specification preparation and will attend up to two project meetings during the design and final document preparation phases.

Task 3.2 Deliverables:

- Draft and Final geotechnical investigation and seismic hazard study report (PDF format)

Task 3.2 Assumptions:

- Cost associated with this task assume that petroleum products or other potentially hazardous materials will not be encountered during subsurface explorations.
- The City will provide access to the reservoir site and transmission pipe alignments for subsurface exploration.
It is anticipated the drilling work for the reservoir will take three days to complete and the test pits will take one day to complete.

It is anticipated that the drilling work for the transmission mains will take two days to complete.

**Task 3.3 – Reservoir Sizing Analysis**

Work under this task includes confirming Cooper Mt Reservoir No. 2 capacity based on long range service area, storage criteria, and water demand estimates for the future Cooper Mt pressure zones from the City’s 2018 draft Water System Master Plan (WSMP).

It is anticipated that ultimate water demands around Cooper Mountain will be served by both the proposed Cooper Mountain Reservoir No. 2 and a future 550 Zone Reservoir. Reservoir sizing work under this task will consider the effect of a future 550 Reservoir on total required storage capacity for the Cooper Mountain pressure zones. The City has approved a scope for a 550 Reservoir siting analysis which is anticipated to be completed in parallel with this Cooper Mt Reservoir sizing confirmation.

Projected pressure-zone level water demands within the future reservoir service area will be taken from the draft 2018 WSMP. For properties outside of the WSMP study area, water demand projections will be based on anticipated future land use.

Required storage capacity will be calculated based on criteria developed for the WSMP, except for emergency storage. Consultant will work with the City to confirm emergency storage criteria recognizing that the City may wish to increase emergency storage capacity in this reservoir as part of a long-term supply resilience strategy. It is assumed that the City will provide guidance on anticipated reservoir operation as it pertains to storage criteria, such as, supply source.

**Task 3.3 Deliverables:**

- Technical memorandum summarizing and documenting reservoir sizing criteria, alternatives, and recommended capacity.

**Task 3.3 Assumptions:**

City to provide guidance on:

- Long-range reservoir service area boundaries.
- Land use for future reservoir service area boundaries outside of the draft 2018 WSMP study area, if applicable.
- Anticipated emergency storage for supply resilience.
- Anticipated reservoir operation, such as, supply source.
Task 3.4 - ASR No. 7 Preliminary Design

This task will include coordination with City staff on key design elements, design criteria, and development of preliminary plans to the approximately 30 percent design completion level as described below.

1. Support During Transfer of ASR No. 7 to City of Beaverton – GSI and Consultant will provide technical support to the City related to the transfer of the ASR No. 7 test well to the City of Beaverton. The current test well was completed under a joint project through the Joint Water Commission (JWC) by the City of Beaverton, Hillsboro, and the Tualatin Valley Water District (TVWD). For the test well drilling, the City granted an easement to the JWC for access to the Cooper Mountain Reservoir site. The City will take the lead on requesting and finalizing the transfer of the ASR No. 7 test well to be a sole asset of the City, which allows the City to develop it as part of their ASR program independent of the JWC.

2. Preliminary Review of Past Testing of ASR No. 7 - As part of this task GSI will review previous work done to complete the ASR No. 7 test well including review of aquifer testing results to reconfirm the yield potential of ASR No. 7 and pump setting based on anticipated drawdown. Also, under a separate contract with the City, GSI will be collecting some additional data at the ASR No. 7 test well site, and this data including water quality assessment data (biological activity) will be reviewed and considered in developing the ASR No. 7 30% design recommendations. For example, the proposed completion of ASR No. 7 as an ASR pump station, may include some well rehabilitation work, if water quality data are not favorable.

3. Recommendations on the following key elements of the ASR well will be provided for development of the 30% design of the ASR No. 7 pump station.
   a. Diameter and seal depth of ASR No. 7 – this will require some wellbore profiling testing by OWRD and their concurrence prior to finalizing the seal depth.
   b. Liner options for that portion of the borehole below the seal. Work being done at the ASR 3 site, in part will be used to help determine the optimal liner option that will limit any loss in performance of the well due to turbulent head losses. For example, if a liner is used, most likely it will be a stainless steel wire wrap screen with a 50 or 100 slot openings to maximize flow while still protecting the pump chamber.
   c. Location of the wellhead that allows for easy access in the future for rehabilitation and pump maintenance.
   d. Pump to waste options based on the site discharge options.
e. Set-backs for the ASR No. 7 pump station relative to property boundary and radius of control and gravity sewer lines.

f. Assist with pump size diameter based on anticipated drawdown at the end of the pumping season. The pump size diameter also plays into the liner and final borehole diameter.

g. Prepare a proposed as-built of the final ASR 7 well for pumping up to 2.5 mgd and storing up to 250 MG.

4. A dedicated mechanical building will be designed. The building will house:

a. Piping and control valving, electrical and controls equipment;

b. Two back-up standby diesel generators, one being smaller sized for lighting, SCADA and communications; the larger sized to serve the ASR well pump and Upper Zone pump station.

c. A restroom, laboratory, and conference room.

d. Water quality monitoring instrumentation, and water treatment equipment and chemical storage (booster chlorination system; fluoride saturator system; and corrosion control system) to treat recovered water.
   - Booster chlorination system will be sized to provide chlorination for ASR recovery as well as both reservoirs.
   - Booster chlorination will assume an on-site hypochlorite generation system.
   - Final design of reservoir No. 2 booster chlorination will depend, in part, on the timing of ASR No. 7 construction. A bulk chlorination system housed in the proposed reservoir telemetry building will be assumed if the ASR facilities are not included in the reservoir construction contract.

5. A standalone, pre-fabricated well house structure will be designed to allow for removal and improved access during pump and motor maintenance activities. Approximately 10-ft x 12-ft in size, the structure will accommodate electrical, instrumentation, and controls equipment, as well as code clearances, required at the well head.

6. Water quality assessments are described in Task 3.6.

7. Well improvements will be completed under a separate well driller construction contract should the Phase 2 ASR final design tasks be performed.

Task 3.4 Deliverables:

- Preliminary floor plan, architectural elevations, and pump sizing.
• Technical memorandum or report section that documents the design recommendations for converting the ASR No. 7 test well into an ASR production well, including risks and uncertainties associated with the design recommendations.

Task 3.4 Assumptions:

• The standby generators housed in the ASR structure will also serve the reservoirs and upper zone pump station.

Task 3.5 - Upper Zone Pump Station Preliminary Design

This task will include coordination with City staff on key design elements, design criteria, and development of preliminary plans to the approximately 30 percent design completion level as described below. Evaluate alternatives for different types of pumps and pump station layouts, coordinate with City, and develop preliminary layout plans, as described below.

1. Confirmation of pump station service area, associated future build-out water demands, and required flow rate ranges is addressed in Subtask 3.9.

2. Pump type evaluation – Based on the sizing analyses results, different types of pumps will be evaluated to determine the most appropriate type of pump for the station. Anticipated pump alternatives include can-mounted vertical turbine pumps, split case centrifugal pumps, and end suction centrifugal pumps. Pumps will be identified based on the required flow and head conditions and available pump manufacturer data. Equipment will be identified and evaluated based on the required operating points and operational efficiencies of the equipment. Consultant staff will meet with City staff to identify equipment preferences based on functionality, operations and maintenance tasks and operator familiarity with equipment.

3. Preliminary pump station layout – After pump types and sizes are selected, preliminary floor plan and elevation alternatives will be developed. It is anticipated up to two (2) alternatives will be developed and sent to City for review and input. Consultant staff will meet with City staff to review and select a preferred pump station layout.

Task 3.5 Deliverables:

• Preliminary floor plan, architectural elevations, and pump sizing.
• Technical memorandum or report section that documents the design recommendations.

Task 3.5 Assumptions:

• The pump station will be served by the standby generators housed in the ASR structure.
Task 3.6 – Water Quality Assessment

There are several potential water quality issues associated with increased storage capacity within an existing distribution system as a new reservoir is brought on line. Water quality impacts could include increased water age, increased disinfection by-product formation, and difficulty maintaining chlorine residuals. The City will likely be creating two new pressure zones and developing a new aquifer storage and recovery (ASR) well, ASR No. 7. Confluence will leverage previous work to evaluate the various interrelated factors affecting water quality as part of this project. Water quality data representative of ASR No. 7 will be evaluated to identify potential water quality blending issues with the existing supply from the JWC WTP.

Task 3.6.1 – Corrosion Control Treatment Evaluation for ASR No. 7

Work under this task includes assessment of corrosion-related water quality characteristics and recommendation of corrosion control treatment for ASR No. 7, including the following subtasks:

1. Develop a data request to include water quality data for the JWC WTP supply at the City’s points of-entry and ASR No. 7 (or other representative ASR well water quality data), hydraulic modeling results and water age estimates associated with the new Cooper Mountain Reservoir No. 2, other pertinent system information, including distribution system pipe type and diameter, premise plumbing age and materials, etc.

2. Leveraging previous work at ASR No. 2 and No. 4, review the need for corrosion control treatment at ASR No. 7 using available water quality data. Using commercially-available software (WaterPro v6.50, RTW v4) and in-house models, determine corrosion control treatment requirements and chemical dosages to achieve both optimal and minimum pH conditions at the POE to the City’s distribution system.

3. Develop Draft and Final Technical Memorandum summarizing project approach, key findings, and recommendations.

Task 3.6.2 – Water Quality Blending and Water Age Study

Work under this subtask includes identifying issues and appropriate mitigation associated with increased water age due to Cooper Mountain Reservoir No. 2, blending aged water from within Cooper Mountain Reservoir No. 2 within the distribution system, and blending of recovered water from ASR No. 7 with JWC WTP supplied water, as described below:

1. Develop a water quality monitoring plan to fill any identified data gaps and to collect water quality data required for the blending study. One Confluence staff member to be on site for 1 day to conduct water quality testing and sample collection with assistance from the City. City to conduct additional sampling, if required.
2. Conduct bench-scale testing to assess water age effects, chlorine demand and decay characteristics, and disinfection by-product formation as a function of holding time. Samples for bench-scale testing to be collected while on site for water quality monitoring (see above). Bench-scale testing will be conducted at Confluence laboratory in Seattle.

3. Using commercially-available software (WaterPro v6.50, RTW v4) and in-house models, conduct blending analyses to identify potential water quality impacts over a range of blends of recovered ASR No. 7 water with the supply from the JWC WTP for the existing distribution system and new developments to be served by the Cooper Mountain Reservoir No. 2. These evaluations will consider water age, pipe type and diameter, and other water quality parameters affecting water quality.

4. Review distribution system operations and maintenance practices.

5. Develop Draft and Final Technical Memorandum summarizing project approach, key findings, and treatment/O&M recommendations.

6. Confluence team members will participate in two 2-hour WebEx meetings with Consultant and City staff.

Task 3.6.3 – Contingency Studies

Conduct additional studies, bench-scale tests, and/or assistance with preliminary design activities.

Task 3.6 Deliverables:

- Draft and Final ASR No. 7 Corrosion Control Evaluation Technical Memorandum (PDF format).
- Draft and Final Water Quality Blending and Water Age Study Technical Memorandum (PDF format).
- Meeting minutes to address water quality aspects of the project.

Task 3.6 Assumptions:

- City to conduct additional water quality sampling, if required.

Task 3.7 – Site Drainage and Stormwater Management

The reservoir site is located within the South Cooper Mountain Urban Reserve Area 6B, and its location currently falls under the jurisdiction of Washington County for stormwater management. Under the current jurisdiction, new facilities for the site will need to be designed to accommodate the increased stormwater runoff from post-development conditions, and provide stormwater detention, water quality treatment and conveyance in accordance with Washington County regulations prior to discharging downstream. The City however, is currently
applying to add Urban Reserve 6B to the UGB. With the high probability that the UGB will be expanded, the City will require that stormwater management (quantity and quality) for the reservoir site comply with the South Cooper Mountain Community Plan storm water requirements (per previous SCM land use approvals, which requires meeting City of Beaverton and SLOPES V stormwater design standards).

It is anticipated that a dry detention pond facility will be sized to accommodate stormwater runoff for the proposed and existing site development, as well as flows from both reservoir’s drains and emergency overflow piping, and future ASR No. 7 pump-to-waste operational flows. The detention facility will include an orifice-controlled outlet structure to regulate discharge volumes. Water quality treatment facilities will be integrated with overall site stormwater management strategy to meet applicable regulations.

Task 3.7 Deliverables:

- Stormwater report and engineering calculations for land use permitting, development review and preliminary design reporting (PDF format).
- Stormwater Facility Detailed Grading Plan (PDF format).
- Site Storm Drainage Plan with Profiles for Mainlines (PDF format).
- Stormwater Facility Landscape Plan (PDF format).

Task 3.7 Assumptions:

- With the high probability that the UGB will be expanded to include Urban Reserve 6B, it is anticipated that the stormwater management for the reservoir site will need to comply with the South Cooper Mountain Community Plan storm water requirements.

Task 3.8 - Transmission Main Preliminary Design

Work under this task includes preparation of preliminary plan and profile drawings for City review at the 30% completion level. The design submittal at this stage will include plan and profile drawings at a horizontal scale of 1-inch = 20 feet, for the following transmission main segments:

- 5,200 LF of 24-inch Diameter main (“Segment 2”) on SW 175th Avenue.
- 2,000 LF of 16-Diameter main on Weir Road.

Task 3.8 Deliverables:

- Preliminary plan and profile drawings included in the preliminary design report (PDF format)
**Task 3.8 Assumptions:**

- The proposed transmission main “Segment 5”, approximately 1,350 LF of 24-inch Diameter main on SW Kemmer Road, will be included with the design and construction of on-site reservoir improvements, due to the deep pipe alignment and associated rock excavation that will be similar to the level of effort and equipment required for other on-site piping and reservoir excavation.
- Further pipe sizing evaluation is not required.
- It is assumed that City’s preferred pipeline alignment will be included in the 30% design drawings.
- It is anticipated that the off-site transmission mains described above will be bid and constructed separately from the reservoir project, with construction anticipated during summer 2019.

**Task 3.9 – Hydraulic Analysis**

Work under this subtask includes the following:

1. Evaluate required reservoir and pump station capacity consistent with criteria established in the City’s DRAFT 2018 Water System Master Plan (WSMP), including:
   a. Confirm future service area boundaries and anticipated timing of growth from the draft WSMP with City staff
   b. Review projected water demands from the draft WSMP
   c. Confirm future pressure zone boundaries with City staff
   d. Review fire flow requirements for existing anticipated future development

2. Assess the impact to existing distribution system pressures from a maximum of four operational modes for the proposed Cooper Mountain facilities. Distribution system pressures will be simulated using the City’s calibrated steady-state hydraulic analysis model from the draft WSMP. Operational modes to be confirmed with City staff prior to modeling may include some combination of these operational components:
   a. Reservoir level variations
   b. One reservoir out of service
   c. ASR injection or recovery
   d. Pump station responding to an upper zone fire event
Task 3.9 Deliverables:

- Figure of existing and future service areas and pressure zone boundaries served by proposed facilities to be included in draft preliminary design report
- Sizing criteria and recommended facility capacity to be included in draft preliminary design report
- Modeled distribution pressure maps for each modeled operational mode

Task 3.10 - 30% Preliminary Design and Basis of Design Report

Work under this subtask includes preparing a preliminary design report that describes and illustrates key design criteria, schematic level designs and general facility configurations to the 30 percent completion level. A plan and cross-sectional analysis of the reservoir site will be used to establish the optimal orientation of the key project features, including reservoir, control vaults, reservoir water quality and mixing design, telemetry building, ASR No. 7 facilities, Upper Zone Booster Pump Station facilities, access road, maintenance vehicle parking, tank drainage facilities, site drainage facilities, tank overflow facilities and major piping layouts. Work also includes preparing an engineer’s estimate of probable construction costs based on prior experience on similar projects and current data relative to construction pricing trends. The itemized construction cost estimate will be for a 30 percent design completion level.

Task 3.10 Deliverables:

- 30% preliminary design package to include draft preliminary design report, 30% design drawings, table of contents of the Contract documents.
- Hard copy plans - 11”x17” (6 sets).
- Preliminary cost estimate (PDF format).
- Preliminary project construction schedule (PDF format).
- Final report package incorporating City comments (PDF format).

Task 3.10 Assumptions:

- It is assumed that 30% design drawings will contain up to 28 drawings including a reservoir site layout, reservoir site grading plan, reservoir section/elevation, reservoir site piping plan, temporary access road plan and profile sheets, off-site piping plan and profile sheets, preliminary ASR floor plan and architectural sections, preliminary pump station floor plan and architectural sections.

Task 4 – Utility & Regulatory Agency Coordination

Coordinate with all utility and regulatory agencies involved in the design, construction, and permitting for the project.
**Task 4 Deliverables:**

- Communication documents such as copies of email, telephone memos, and/or formal correspondence of significance to the project.

**Task 4 Assumptions:**

Coordination is anticipated with the following agencies:

- Washington County
- Tualatin Valley Water District
- Clean Water Services
- Oregon DEQ
- Oregon Health Authority
- Northwest Natural
- Portland General Electric
- Various Tele-comm Providers

**Task 5 – Washington County Special Use Permit Approval**

Under this task, Consultant will work with the City to obtain Washington County land use approval for the project, through a Special Use Permit Type II Application & Elevated Type III Approval Process. Generally this work will consist of preparation and submittal of Special Use Permit Type II application and supporting documentation for Washington County Type III review procedure (quasi-judicial hearing) for the reservoir and associated piping, drainage and surface features, ASR No. 7 Building and Upper Zone Pump Station Building. The Consultant team will attend the pre-application meeting, coordinate with County planning staff, attend the public hearing and prepare/coordinate obtaining materials needed to meet conditions of approval. County conditional use permit conditions will be incorporated into the final designs and construction contract documents. Consultant will prepare graphics for use in making presentations about the project and will provide representatives to discuss the project and answer questions. This work will include:

1. Prepare required materials, submit a request, schedule, and attend the County Pre-Application Conference

2. Prepare the following materials for a Washington County Special Use Permit and Development Review application to include:
   a. Complete County Development Application Form
   b. Completed County Development Review Application Form
   c. Pre-application conference notes
   d. Completed Service Availability Statements from rural service providers (Fire District and Sheriff)
   e. Written narrative addressing applicable approval criteria
f. Washington County Assessor’s Map(s)

3. Coordinate with the project team and obtain preliminary engineering plans, architectural plans, materials information, landscape plans, lighting plans (if applicable), other specialized plans (as applicable), alternatives analysis, relevant portions of the City’s Master Plan.

4. Obtain City’s signatures on all the County Development Application form and checks for the County Development Application fees.

5. Organize, compile, and make copies (hardcopy and digital) of all materials and submit the application to Washington County for review, acceptance, and processing.

6. Coordinate with County staff and project team periodically at appropriate intervals during the review process (i.e. completeness review and prior to and after issuance of the County staff report).

7. Create the County public notice sign, post the property and provide required affidavits to County staff.

8. Request, obtain, and review the County Staff Report and coordinate with County staff and the project team.

9. Prepare for and attend the County public hearing providing testimony as necessary to support approval of the application.

10. Obtain copies of and review the County Notice of Decision with the project team.

Task 5 Deliverables:

- Completed application for County Conditional Use Type II Permit Application and supporting materials, noted above.
- Presentation graphics and exhibits

Task 5 Assumptions:

- It is assumed that the approval process will be uncontested and take approximately 150 days following County determination of application completeness. Contingency services for a contested approval process are provided in Task 17.2.
- The project is allowed as a use permitted through a Type II procedure but is planned to be elevated to a public hearing (Type III review) at the City’s election.
- An impact analysis as specified in Washington County CDC 344-4.3 is not required.
Task 6 – Public Involvement and Public Meetings

Under this task, assistance with public information and input process and presentations will be provided by the Consultant and JLA. The purpose of this public involvement program is to generate a high level of understanding amongst area neighbors for the Cooper Mountain Reservoir No 2 project and to solicit feedback about the potential construction impacts and options for mitigation. The public involvement program will seek to maintain regular and consistent communications with area neighbors to build and strengthen the City’s relationships with these key constituents.

The following tools will be used to generate awareness of the project, inform and educate the community and solicit feedback about the project construction impacts and options for mitigation. Public involvement support will include the following elements:

1. **Public Involvement and Outreach Plan & Management**: Work collaboratively with the City to develop a Public Involvement and Outreach Plan that outlines the communications goals, key messages, target audiences and engagement strategies to be accomplished as part of this project.

2. **Informational Fact Sheet**: Develop an informational fact sheet to include a project overview, project purpose and benefits, description and renderings of the reservoir design, project schedule and contact information. The project fact sheet will be updated as the project progresses and the construction plans begin to take shape. The informational fact sheet will be shared during meetings with neighbors and on the project website.

   Develop a frequently asked questions sheet based upon the questions, comments and concerns that are raised following the first open house.

3. **Website**: Develop and maintain a project website to include a project overview, timeline, fact sheet, technical memoranda and renderings, announcements of public meeting dates, public meeting materials, and public comment/contact information.

4. **Open Houses and Public Involvement Summary Report**: Schedule, coordinate, attend, develop materials for and document up to three neighborhood Open Houses. Coordination of event logistics includes scheduling, securing location, meeting refreshments, set-up, take-down and travel time.

   a. **Open House #1**: Introduce the project, talk about the timeline, share information initial design information and collect feedback from the public. Information will include project renderings, construction plans, mitigation options and the project schedule.
b. Open House #2: Share and discuss the final design and construction schedule prior to construction. Announce contractor and provide contact information for construction. Solicit public feedback.

c. Open House #3: To be determined as needed.

The Consultant team will work with the City to develop up to three postcard mailings to area residents inviting them to review the project website and attend the open houses to learn more about the project. At the culmination of each open house, a summary report documenting the feedback heard from the public will be prepared.

Task 6 Assumptions:

- Project website management will be provided through the land use approval process.

Task 6 Deliverables:

- Public Involvement and Outreach Plan and schedule of tasks
- Informational fact sheet (with one update)
- F.A.Q. sheet
- Project website
- Up to 3 project mailings (mailing addresses to be provided by the City)
- Sign in sheets, comment forms and other materials for three Open House meetings
- Three Open House summary reports

Task 7 - Property Services

The proposed services to be provided for acquisition of easements are outlined as follows:

1. Property Owner Contact: Assist City with property owner contact as may be requested. Provide descriptive materials and project information to aid in introductory review conversations. Work will include:
   a. Preparation of a General Information Notice to be delivered to the property owner.
   b. Research of property owner contact information.
   c. Receive and analyze title information and legal descriptions in sufficient detail to negotiate with property owners and other parties.
   d. Correspond with and be available to the property owner in the case of any project right of way related questions or concerns.
2. **Easement Legal Descriptions**: Prepare legal descriptions for permanent easements and temporary construction purposes for the existing storm drainage outfall south of the site, as detailed below.

   a. Legal descriptions and exhibit maps will be prepared for a stormwater piping and outfall easement on the property located south of the reservoir site.

   b. Permanent easement will be 500 by 100 wide

   c. Legal descriptions will be based on templates provided by the City.

3. **Property Appraisals and Appraisal Reviews**: When the final acquisition area has been determined, Consultant will complete an appraisal to determine the fair market value of any needed real property and easements in accordance with the Federal Uniform Act, ORS and City property purchase policy and hire an independent certified appraiser to review and evaluate the appraisal. Review prospective valuations with City staff and develop proposed offer positions based on other potential property specific considerations.

4. **Offer Presentation an Negotiation Assistance**: Assist with the preparation of individual property owner offer presentation package and assist with personal offer presentation as City staff may request. Offers to be prepared following Oregon State law requirements. Assist with follow-up negotiations as may be requested and desired. Assistance is anticipated to include the following:

   a. Establish and maintain a complete and current record file of all ownerships in a form acceptable to the City.

   b. Prepare all offer letters on City-provided forms in accordance with state or federal regulations and approval of City.

   c. Present written purchase offers to owners or their representatives in person, when possible. Secure receipt of delivery of offer as practical and present and secure tenant information statements, as applicable.

   d. Follow-up and negotiate with property owner, as necessary; prepare and submit recommended settlement justifications to City for review and approval; review any independent appraisal secured by property owner and coordinate reimbursement of appraisal fees (up to $750) with City. Ongoing negotiations and settlement discussions will continue until settlement or impasse is determined.

   e. Prepare and assemble acquisition contracts, deeds, and related acquisition documents, per City provided templates, required for the acquisition of necessary property interests.
f. Maintain a diary report of all contacts made with property owners or representatives and a summary of the status of negotiations indicating attitude of owners, problem areas, and other pertinent information. Copies of all applicable written correspondence will be maintained in files.

g. Prepare justification memorandum to escalate negotiations to City management where property owner negotiations are not amenable.

h. Transmit executed acquisition documents to City. Each transmittal package shall include a fully executed and properly notarized deed(s), easement(s), or permit, fully executed acquisition contract with attachments, and a brief settlement memorandum which summarizes the pertinent data relative to the transaction.

Task 7 Assumptions:

- Title report costs will be billed directly to the City for payment outside of this scope of work.
- Consultant to provide legal description and drawing of acquisition areas.
- An appraisal review will be required.
- City to provide current offer letter and conveyance documents.
- City to facilitate closing, record documents, and make payment to property owners.
- The City will not condemn.
- The City will reimburse property owner for independent appraisal fees (up to $750).

Task 7 Deliverables:

- Appraisal and (1) appraisal review.
- Offer Package including all relevant conveyance documents and required forms.
- Fully executed acquisition contract and notarized deed upon settlement.

Task 8 – Transmission Main Final Design and Permitting

With City input on preliminary designs, Consultant will prepare final construction drawings, technical specifications, and contract documents for bidding and construction of the proposed water transmission main. Consultant will submit plans and specifications for City review at the 60%, 90% and 100% completion levels, incorporating City review comments from each prior submittal. Plan and profile drawings will be provided at a horizontal scale of 1-inch = 20 feet. Construction drawings and special technical specifications will be in accordance with City standards, policies and procedures. This includes preparing front end contract documents using the City’s most recent standard forms and technical specifications in ODOT/APWA format. Special specifications will cover conditions specific to the work. The engineer’s estimate of probable construction costs will be updated at each design submittal stage. Subtasks include:
Task 8.1 – 60% Design - Plans, Specifications and Estimates

Consultant will develop engineering plans that depict recommended waterline improvements. The plans will establish appropriate project limits, identify connection locations to the existing water system, and draft profiles. Specific work under this task include:

1. Prepare 60% construction plan/profile drawings and details as needed to clearly describe the work to be constructed. Construction plans will, at a minimum, include civil notes, details and sections, and waterline improvement plans and profiles.

2. Prepare of 60% special specifications table of contents and bid schedule to cover conditions specific to the work.

3. Prepare a 60% level cost estimate.

Task 8.1 Deliverables:

- Electronic scalable set of plans (11”x17” PDF format).
- Technical specifications table of contents and bid schedule for Contract Documents (Word and PDF format).
- Cost estimate (Excel & PDF format).

Task 8.2 – 90% Design - Plans, Specifications and Estimates

Under this task, the 90% design submittal will be advanced from the 60% design submittal, incorporating City review comments. Specific work under this task include:

1. Prepare 90% construction plan/profile drawings and details as needed to clearly describe the work to be constructed.

2. Prepare 90% contract documents. This includes preparing front end contract documents using the City’s most recent standard forms and technical specifications in ODOT/APWA format. Special specifications will cover conditions specific to the work.

3. Prepare an updated 90% level cost estimate.

Task 8.2 Deliverables:

- Electronic scalable set of plans (11”x17” PDF format).
- Contract documents and technical specifications (Word and PDF format).
- Cost estimate (Excel & PDF format).
Task 8.3 – 100% Design - Plans, Specifications and Estimates

The final 100% design submittal will be advanced from the 90% submittal, incorporating City review comments. Work under this subtask includes preparing final contract documents, technical specifications and drawings required for bidding the project.

Task 8.3 Deliverables

- Signed electronic scalable set of plans (11”x17” and 22”x34”, PDF format).
- Signed contract documents and technical specifications (Word and PDF format).
- Cost estimate (Excel & PDF format).

Task 8.4 – Other Permits and Approvals

Consultant will assist with obtaining permits and approvals for the transmission main project construction. For fee estimating purposes it is assumed that permitting processes are completed within standard anticipated time frames. It is assumed that the City will pay all required permit fees. Anticipated permits and approvals include the following:

- Oregon DEQ National Pollutant Discharge Elimination System (NPDES) Storm Water Discharge Permit #1200-C
- State of Oregon, Oregon Health Authority, Drinking Water Program Plan Review
- Washington County Utility and Right-of Way Permits

Task 9 – Transmission Main Bidding and Award Services

Under this task, Consultant will provide assistance to the City as requested during project bidding and award. City will manage contract document distribution and administer bidding. Consultant will provide the following support services:

- Respond to bidder inquiries
- Provide necessary bid addenda (assumed two addendum) to address bidder questions and/or clarify requirements of the contract documents, as needed.
- Conduct a pre-bid meeting with prospective bidders
- Attend the bid opening, assist City staff with the evaluation of bids, prepare bid tabulations, and provide letter of recommendation for award.

Task 9 Deliverables

- Bid document addenda (PDF format).
- Pre-bid meeting agenda.
- Bid Tabs (MS Excel and PDF format).
- Contract award recommendation letter (PDF format).
Task 10 – Transmission Main Construction Phase Services

Construction phase services will be provided under this task, including the following subtasks:

Task 10.1 – Preconstruction Conference

Prepare an agenda and invitation list for a preconstruction conference and coordinate with the City regarding the conference details. Conduct the preconstruction conference, prepare a written conference summary and distribute the summary to all conference attendees.

Task 10.2 – Shop Drawings and Submittals

Receive and review shop drawings and other technical submittals required by the contract documents. Provide all submittal documents and information to the City for concurrence review/approval. Maintain a submittal log and file. Consider and evaluate any alternatives or substitutions proposed by the contractor. Such reviews will be completed within 14 calendar days of receipt of submittals. Receive and review other submittals of the contractor including construction schedules, shop drawing/submittal schedules, lump sum price breakdowns, and other submittals required by the contract documents. For budgeting purposes, it is assumed that up to 50 submittals and resubmittals will be reviewed by the Consultant team.

Task 10.3 – Monthly Pay Requests

Review the contractor’s monthly requests for progress payments and recommend the appropriate amount to the City for payment to the contractor. Payment recommendations will be based upon the approved breakdown of the contractor’s lump sum contract amount and the completed quantity of unit price items. Reviews will be completed within 5 calendar days of receipt of the contractor’s monthly pay requests.

Task 10.4 – Respond to RFIs

Provide clarification of the contract documents to the contractor based upon the contractor’s written requests for information (RFI), verbal requests or as the need otherwise arises. Prepare written responses and drawings or sketches as necessary to the contractor to clarify the contract documents. Written responses to RFI will be completed within 2-3 calendar days of receipt of the contractor’s RFI, but more time may be necessary depending on the complexity of the required clarification. For budgeting purposes, it is assumed that up to 20 RFIs will need to be reviewed and processed.
Task 10.5 – Process Change Orders

Provide services related to change orders. These include preparation of change order proposal description and justification documentation, assistance with negotiation of the change with the contractor, and making recommendations to the City regarding any change orders in order for the City to process the formal change order documents. For budgeting purposes, 40 hours are budgeted to process change orders.

Task 10.6 – Construction Observation, Project Meetings, and Site Visits

Provide on-site construction observation services. For budgeting purposes it is assumed that project construction will require approximately 4 months of active construction and approximately 640 hours of field observation time will be provided. The representative will prepare written reports on the construction activities at the site, maintain a diary of activities, decisions, discussions with the contractor and other observations, conduct periodic on-site meetings with the contractor, coordinate the delivery of any materials or equipment to be delivered to the City, and other work as assigned by the Consultant. Construction observation reports shall be submitted to the City on a weekly basis.

Consultant will coordinate on-site representation field activities weekly with the City staff so as to apprise the City of current and upcoming activities and work schedules.

In addition to general construction photos, provide a web-accessible photo log over the course of construction.

Work under this subtask also includes preparing for and conducting periodic meetings on the project site with the contractor. Generally, the meetings will be weekly when significant construction work is underway. The purpose of these meetings is to identify potential issues and review project progress. Typically, the Consultant’s on-site construction representative will conduct these meetings.

Periodic site visits by Consultant’s project manager or project engineer will be conducted when significant construction is occurring, as important issues may need to be addressed, or as otherwise requested by the City. The purpose of these visits will be to address questions regarding the contract documents, assist with resolving project difficulties, review the progress of the work and review the construction work to confirm that it is proceeding in accordance with the requirements of the contract documents.

Task 10.7 – Project Files

Maintain files throughout the entire project.
Task 10.8 – Claims and Protests

Notify the City in writing of any potential or actual claims or protests of the contractor. Coordinate with the City staff and, if required, the City legal counsel regarding these matters. For budgeting purposes it is assumed that no engineering time will be allocated for this item. Any additional engineering services associated with claims or potential claims will be outside of this work program and budget.

Task 10.9 – Testing & Start-Up / Final Inspection & Project Close-Out

Coordinate with the contractor and the City for testing and start-up of the facilities. Identify substantial completion of the project and submit a certificate of substantial completion with the City concurrence. Prepare for and conduct a final inspection of the project with representatives of the City. Prepare a “punch list” of items of work remaining to achieve final completion of the project and to prepare for the City’s acceptance of the project. Recommend final payments to the contractor as appropriate. Recommend procedures and timing of acceptance of the project. Advise the City and the contractor of the dates for any warranty periods as established in the contract documents.

Task 10.10 – Record Drawings

Prepare record drawings of the project based upon the construction records of the contractor and Consultant’s on-site representative (electronic AutoCAD and PDF format).

Task 11 – Reservoir Final Design and Permitting

With City input on preliminary designs, the Consultant will proceed with the completion of final designs and prepare complete construction drawings and technical specifications for the project in accordance with City standards, policies and procedures. This includes preparing front end Contract documents using the City’s most recent standard forms based on ODOT/APWA contract format. Due to the technical complexity of this project, it is assumed the technical specifications will be based on standard Construction Standards Institute (CSI) formats, using the Consultants most recent version of 48 Division standard technical specifications. The engineer’s estimate of probable construction costs will be updated at each design submittal stage. For fee estimating purposes, it is assumed that the reservoir will be constructed with a concrete membrane type floor and a perimeter spread footing with minimal required subsurface improvements. Designs will be based on the previously noted design assumptions and will include the following major design elements:

1. Reservoir site grading, permanent access road, site piping, valving, seismic valves, flexible piping connections at the reservoir, drainage and detention facilities, precast and cast-in-place vaults, vault piping, site fencing and miscellaneous site features and utilities, and limited off-site piping (approximately 1,350 LF east on SW Kemmer Road - Transmission Main “Segment 5”).
2. Reservoir appurtenances including vents, ladders, hatches, railings, safety systems, reservoir piping (overflow, inlet, outlet, wash-down and sampling lines) and internal mixing system.

3. Provide the layout for the SCADA building, provide instrumentation recommendations and P&ID for the SCADA and control system.

4. Prestressed Concrete Reservoir structural design and detailing in accordance with AWWA D110, Type 1 standards.

5. Structural design and detailing for one CMU style SCADA building, and one cast-in-place concrete seismic valve and intertie vault.

6. Electrical and power

7. Instrumentation and control (I&C)

8. Landscaping design to include the following:
   - Minimal maintenance site landscaping.
   - Vegetative screening meeting Washington County development code requirements.
   - Stormwater treatment facility planting.
   - Specification of contractor-designed temporary irrigation system for vegetative establishment.
   - Specification of planting guarantee.

**Task 11.1 – 60% Design - Plans, Specifications and Estimates**

Consultant will develop engineering plans that depict recommended improvements including general, civil, structural, mechanical, landscaping, instrumentation and electrical information necessary for the construction of the new facilities and modification of existing facilities. Specific work under this task include:

1. Prepare 60% construction drawings and details as needed to clearly describe the work to be constructed.

2. Prepare 60% Contract documents, technical specifications and bid schedule to cover conditions specific to the work.

3. Prepare a 60% level cost estimate.

**Task 11.1 Deliverables**

- Electronic scalable set of plans (11”x17” PDF format).
Task 11.2 – 90% Design - Plans, Specifications and Estimates

Under this task, the 90% design submittal will be advanced from the 60% design submittal, incorporating City review comments. Specific work under this task include:

1. Prepare 90% construction drawings and details as needed to clearly describe the work to be constructed.
2. Prepare 90% contract documents. This includes preparing front end contract documents using the City’s most recent standard forms, and technical specifications in CSI format. Special specifications will cover conditions specific to the work.
3. Prepare an updated 90% level cost estimate.

Task 11.2 Deliverables:

- Electronic scalable set of plans (11”x17” PDF format).
- Contract documents and technical specifications (Word and PDF format).
- Cost estimate (Excel & PDF format).

Task 11.3 – 100% Design - Plans, Specifications and Estimates

The final 100% design submittal will be advanced from the 90% submittal, incorporating City review comments. Work under this subtask includes preparing final contract documents, technical specifications and drawings required for bidding the project.

Task 11.3 Deliverables

- Signed electronic scalable set of plans (11”x17” and 22”x34”, PDF format).
- Signed contract documents and technical specifications (Word and PDF format).
- Cost estimate (Excel & PDF format).

Task 11.4 – Other Permits and Approvals

Under this task, the Consultant will assist the City with obtaining permits and approvals for the reservoir project. For fee estimating purposes it is assumed that permitting processes are completed within standard anticipated time frames. It is assumed that the City will pay all required permit fees. Anticipated permits and approvals include the following:
1. Oregon DEQ National Pollutant Discharge Elimination System (NPDES) Storm Water Discharge Permit #1200-C – to be obtained by Consultant/City

2. State of Oregon, Oregon Health Authority, Drinking Water Program Plan Review – to be obtained by Consultant/City

3. Washington County Utility and Right-of Way Permits – to be obtained by Consultant/City

4. Washington County Building and Construction Permits – to be obtained by Construction Contractor

**Task 12 – ASR and Pump Station Final Design and Permitting**

With City input on preliminary designs, the Consultant will proceed with the completion of final designs and prepare complete construction drawings and technical specifications for the project in accordance with City standards, policies and procedures. It is anticipated that technical specifications will be prepared and combined with contract documents for the reservoir project. Due to the technical complexity of this project, it is assumed the technical specifications will be based on standard Construction Standards Institute (CSI) formats, using the Consultants most recent version of 48 Division standard technical specifications. The engineer’s estimate of probable construction costs will be updated at each design submittal stage.

**Task 12.1 – 60% Design - Plans, Specifications and Estimates**

Consultant will develop engineering plans that depict recommended improvements including civil, structural, mechanical, instrumentation and electrical information necessary for the construction of the new facilities. Specific work under this task include:

1. Prepare 60% construction drawings and details as needed to clearly describe the work to be constructed.

2. Prepare 60% technical specifications and bid schedule to cover conditions specific to the work. These will be incorporated with the contract documents for the reservoir project.

3. Prepare a 60% level cost estimate.

**Task 12.1 Deliverables**

- Electronic scalable set of plans (11”x17” PDF format).
- Draft technical specifications and bid schedule (Word and PDF format).
- Cost estimate (Excel & PDF format).
Task 12.2 – 90% Design - Plans, Specifications and Estimates

Under this task, the 90% design submittal will be advanced from the 60% design submittal, incorporating City review comments. Specific work under this task include:

4. Prepare 90% construction drawings and details as needed to clearly describe the work to be constructed.

5. Prepare 90% technical specifications in CSI format. Special specifications will cover conditions specific to the work.

6. Prepare an updated 90% level cost estimate.

Task 12.2 Deliverables:

- Electronic scalable set of plans (11”x17” PDF format).
- Contract documents and technical specifications (Word and PDF format).
- Cost estimate (Excel & PDF format).

Task 12.3 – 100% Design - Plans, Specifications and Estimates

The final 100% design submittal will be advanced from the 90% submittal, incorporating City review comments. Work under this subtask includes preparing final technical specifications and drawings required for bidding the project.

Task 12.3 Deliverables

- Signed electronic scalable set of plans (11”x17” and 22”x34”, PDF format).
- Signed contract documents and technical specifications (Word and PDF format).
- Cost estimate (Excel & PDF format).

Task 12.4 – Other Permits and Approvals

Under this task, the Consultant will assist the City with obtaining permits and approvals for the reservoir project. For fee estimating purposes it is assumed that permitting processes are completed within standard anticipated time frames. It is assumed that the City will pay all required permit fees. Anticipated permits and approvals include the following:

1. State of Oregon, Oregon Health Authority, Drinking Water Program Plan Review – to be obtained by Consultant/City

2. Washington County Building and Construction Permits – to be obtained by Construction Contractor
Task 13 – Reservoir Bidding and Award Services

Under this task, Consultant will provide assistance to the City as requested during project bidding and award. City will manage contract document distribution and administer bidding. Consultant will provide the following support services:

- Respond to bidder inquiries
- Provide necessary bid addenda (assumed two addendum) to address bidder questions and/or clarify requirements of the contract documents, as needed.
- Conduct an on-site pre-bid meeting with prospective bidders
- Review specialty contractor prequalifications required for Reservoir Contractor, Earthwork Contractor, and Reservoir Prestressor. Submitted contractor prequalification forms will be reviewed to confirm the listed record of experience on similar type, construction and size of water reservoirs by the contractor and their proposed key staff, as appropriate.
- Attend the bid opening, assist City staff with the evaluation of bids, prepare bid tabulations, and provide letter of recommendation for award.

Task 13 Deliverables

- Bid document addenda (PDF format).
- Pre-bid meeting agenda.
- Summary of contractor prequalification reviews, and recommended list of prequalified contractors (PDF format).
- Bid Tabs (MS Excel and PDF format).
- Contract award recommendation letter (PDF format).

Task 14 – Reservoir Construction Phase Services

Construction phase services will be provided under this task, including the following subtasks:

Task 14.1 – Preconstruction Conference

Prepare an agenda and invitation list for a preconstruction conference and coordinate with the City regarding the conference details. Conduct the preconstruction conference, prepare a written conference summary and distribute the summary to all conference attendees.

Task 14.2 – Shop Drawings and Submittals

Receive and review shop drawings and other technical submittals such as equipment, materials of construction, performance data and certifications, laboratory test results, and technical manuals submitted by the contractor which are required by the contract documents. Provide all submittal documents and information to the City for concurrence review/approval. Maintain a
Submit complete submittal files to the City upon completion of the project. Consider and evaluate any alternatives or substitutions proposed by the contractor. Such reviews will be completed within 14 calendar days of receipt of submittals. Receive and review other submittals of the contractor including construction schedules, shop drawing/submittal schedules, lump sum price breakdowns, and other submittals required by the contract documents. For budgeting purposes, it is assumed that up to 100 submittals and resubmittals will be reviewed by the Consultant team.

**Task 14.3 – Monthly Pay Requests**

Review the contractor's monthly requests for progress payments and recommend the appropriate amount to the City for payment to the contractor. Payment recommendations will be based upon the approved breakdown of the contractor's lump sum contract amount and the completed quantity of unit price items. Reviews will be completed within 5 calendar days of receipt of the contractor's monthly pay requests.

**Task 14.4 – Respond to RFIs**

Provide clarification of the contract documents to the contractor based upon the contractor's written requests for information (RFI), verbal requests or as the need otherwise arises. Prepare written responses and drawings or sketches as necessary to the contractor to clarify the contract documents. Written responses to RFI will be completed within 2-3 calendar days of receipt of the contractor's RFI, but more time may be necessary depending on the complexity of the required clarification. For budgeting purposes, it is assumed that up to 30 RFIs will need to be reviewed and processed.

**Task 14.5 – Process Change Orders**

Provide services related to change orders. These include preparation of change order proposal description and justification documentation, assistance with negotiation of the change with the contractor, and making recommendations to the City regarding any change orders in order for the City to process the formal change order documents. For budgeting purposes, 80 hours are budgeted to process change orders.

**Task 14.6 – Construction Observation, Project Meetings, and Site Visits**

Provide on-site construction observation services. For budgeting purposes it is assumed that project construction will require approximately 19 months of active construction and approximately 2,048 hours of field observation time will be provided. The representative will prepare written reports on the construction activities at the site, maintain a diary of activities, decisions, discussions with the contractor and other observations, conduct periodic on-site meetings with the contractor, coordinate the delivery of any materials or equipment to be delivered to the City, witness any factory or off-site testing as may be necessary, and other work...
as assigned by the Engineer. Construction observation reports shall be submitted to the City on a weekly basis.

Consultant will coordinate on-site representation field activities weekly with the City staff so as to apprise the City of current and upcoming activities and work schedules.

In addition to general construction photos, provide a web-accessible photo log and time lapse video of the site over the course of construction.

Work under this subtask also includes preparing for and conducting periodic meetings on the project site with the contractor. Generally, the meetings will be weekly when significant construction work is underway. The purpose of these meetings is to identify potential issues and review project progress. Typically, Consultant’s on-site construction representative will conduct these meetings.

Periodic site visits by Consultant’s project manager or project engineer will be conducted when significant construction is occurring, as important issues may need to be addressed, or as otherwise requested by the City. The purpose of these visits will be to address questions regarding the contract documents, assist with resolving project difficulties, review the progress of the work and review the construction work to confirm that it is proceeding in accordance with the requirements of the contract documents.

**Task 14.7 – Coordinate Special Inspections & Structural Observations**

Coordinate special inspections and quality assurance program in accordance with current International Building Code (IBC) requirements as required for subgrade and foundation conditions, concrete materials testing and structural certifications of concrete reinforcement. A quality control program will be required of the contractor to provide soils testing for earth compaction, and aggregate testing, and other testing procedures as required in the contract documents and in accordance with all construction permits. Consultant will coordinate the special inspection services from a local materials inspection lab provided by the City under a separate contract outside of this scope of work, specifically related to reservoir subgrade and reservoir’s structural reinforcing steel, and materials testing and inspection. It is assumed that, as part of the Consultant team, GRI will perform required geotechnical special inspections related to reservoir subgrade and backfill, and PSE will perform required structural observations. As part of this scope, Consultant will assist the City in developing a scope of work for the City to issue an RFQ for solicitation of independent special inspection services, as required by the project documents. Such assistance will include review of the City-prepared RFQ document and assisting with evaluation/selection of the special inspection firm.

**Task 14.8 – Project Files**

Maintain files throughout the entire project.
Task 14.9 – Claims and Protests

Notify the City in writing of any potential or actual claims or protests of the contractor. Coordinate with the City staff and, if required, the City legal counsel regarding these matters. For budgeting purposes it is assumed that no engineering time will be allocated for this item. Any additional engineering services associated with claims or potential claims will be outside of this work program and budget.

Task 14.10 – Testing & Start-Up / Final Inspection & Project Close-Out

Coordinate with the contractor and the City for testing and start-up of the facilities. Identify substantial completion of the project and submit a certificate of substantial completion with the City concurrence. Prepare for and conduct a final inspection of the project with representatives of the City. Prepare a “punch list” of items of work remaining to achieve final completion of the project and to prepare for the City’s acceptance of the project. Recommend final payments to the contractor as appropriate. Recommend procedures and timing of acceptance of the project. Advise the City and the contractor of the dates for any warranty periods as established in the contract documents.

Task 14.11 – Operation and Maintenance Manual

Compile an Operation and Maintenance manual of all manufacturers’ operation and maintenance manuals and material literature for the project facilities and transmit three copies to the City. Include text in the Operation and Maintenance Manual with instructions on operation of the facilities. Manuals will be provided in bound hard copy and electronic PDF formats for the City use.

Task 14.12 – Record Drawings

Prepare record drawings of the project based upon the construction records of the contractor and Consultant’s on-site representative (electronic AutoCAD and PDF format).

Task 14.13 – Warranty Inspection

Assist the City with the facilitation of a one-year anniversary inspection and the administration of potential corrective actions by the construction contractor. Report to the City and the contractor on findings and corrections. The City and the Engineer will provide a final Release from Warranty letter once all corrections are made to the satisfaction of the City.
Phase 2 Work Elements

Each Phase 2 Task will only be conducted with explicit written authorization from City staff.

Task 15 – ASR and Pump Station Bidding and Award Services

Under this task, Consultant will provide assistance to the City as requested during project bidding and award. City will manage contract document distribution and administer bidding. Consultant will provide the following support services:

- Respond to bidder inquiries
- Provide necessary bid addenda (assumed two addendum) to address bidder questions and/or clarify requirements of the contract documents, as needed.
- Conduct an on-site pre-bid meeting with prospective bidders
- Review specialty contractor prequalifications. Submitted contractor pre-qualification forms will be reviewed to confirm the listed record of experience on similar type, construction and size of project by the contractor and their proposed key staff, as appropriate.
- Attend the bid opening, assist City staff with the evaluation of bids, prepare bid tabulations, and provide letter of recommendation for award.

Task 15 Deliverables

- Bid document addenda (PDF format).
- Pre-bid meeting agenda.
- Summary of contractor prequalification reviews, and recommended list of prequalified contractors (PDF format).
- Bid Tabs (MS Excel and PDF format).
- Contract award recommendation letter (PDF format).

Task 16 – ASR and Pump Station Construction Phase Services

Work under this task will be completed in accordance with Task 14 and subtasks 14.1 through 14.13. The associated effort is presented in the fee spreadsheet represents additional work to be performed above and beyond the reservoir construction phase services level of effort identified under Task 14.

Task 17 – Contingency Tasks

Task 17.1 - Project Risk Assessment (Optional Task)

Work under this subtask includes completing a risk assessment for the project to provide an understanding of risks associated with all project elements and to define realistic risk responses
to minimize impacts to project delivery. Develop inventory of potential risks for the project, discuss potential impacts and likelihood of the identified risks with City staff, and develop risk responses to minimize impacts to project elements and project delivery. Prepare a technical memorandum documenting the risk assessment work.

**Task 17.1 Deliverables:**

- Draft and final Project Risk Assessment memorandum (PDF format).

**Task 17.2 – Land Use Approval Contingency**

Work under Task 5 assumes an uncontested land use process. Under this contingency task, approximately 50 hours are allocated to prepare responses to protests, public comments, and land use agency comments and to attend additional hearings and meetings. Approximately 100 hours are allocated for this subtask.

**Task 17.3 – ASR well drilling contract document preparation and bidding**

To support final design of the ASR facilities, it is anticipated that the well improvements to include reaming, downhole work, development and testing, would be completed by a licensed Oregon well driller under separate contract in advance of ASR facility final equipment sizing. Work under this subtask includes well improvement contract document preparation and bidding assistance.

**Task 17.4 – ASR well drilling contract oversight**

To support final design of the ASR facilities, it is anticipated that the well improvements to include reaming, downhole work, development and testing, would be completed by a licensed Oregon well driller under separate contract in advance of ASR facility final equipment sizing. Work under this subtask includes well improvement work oversight by GSI.

GSI will provide technical oversight during drilling/reaming of the ASR No. 7 borehole, and during key times related to setting the seal and casing, and the liner (if needed). Effort will also include coordinating submittals with the Oregon Health Authority (OHA) Drinking Water Program (DWP) per OAR 333-061. Specific support during completion of ASR No. 7 are as follows:

- As part of the pre-drilling effort GSI will review and up to 6 drilling and testing submittals presented by the Contractor awarded the project, and GSI will also review up to 3 change condition submittals, if needed.
- Check in daily with the driller and provide timely updates on drilling progress. Report any setbacks during drilling immediately to the City. This effort will also include bi-weekly site visits, or as needed. Assuming 3 months of drilling effort, a total of 24 four sites are assumed.
• No logging of cuttings is anticipated since it was already done during the test well drilling phase, however some cuttings of key sections will be collected and re-examined as needed. $3,300 in outside contracting support related to the cuttings review is assumed.
• Develop a quick log of the drilling progress daily and send updates to the City twice per week.
• Manage communications between the contractor and the City as needed in support of the project.

Task 17.5 – ASR Phase 1 Contingency

This subtask includes a contingency budget that is equal to 10% of the subtotal budget for GSI’s Phase 1 ASR work to cover any unforeseen changes to the project scope or schedule. Fees for this task will not be billed unless there is agreed to change in the project scope or schedule that is documented by the City.

Task 17.6 – ASR Phase 2 Contingency

This subtask includes a contingency budget that is equal to 10% of the subtotal budget for GSI’s Phase 2 ASR work to cover any unforeseen changes to the project scope or schedule. Fees for this task will not be billed unless there is agreed to change in the project scope or schedule that is documented by the City.

Fee Estimate

Consultant proposes to complete this work as detailed above on a time and expenses basis as summarized on the attached Fee Estimate Spreadsheet. Agreed “not-to-exceed” amounts are to be based on the scope of work incorporated herein and will not be exceeded without approval and written authorization by the City. Fee estimates are based upon Consultant’s current 2018 Schedule of Charges.

Schedule

We are prepared to begin work immediately upon your authorization. The design services identified in this scope of work will be completed by December 31, 2019. Bidding and construction phase services will be completed by Spring 2020. A detailed schedule for completion of services will be prepared upon receiving Notice to Proceed.
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**TOTAL** | | | | | | | 2124

City of Beaverton
123 Main St.
Beaverton, OR 97005

Municipalities, Inc.
Engineers/Planners

Cooper Mountain Reservoir No. 2
Page 1
## COOPER MOUNTAIN RESERVOIR NO. 2 AND ASSOCIATED IMPROVEMENTS

### CITY OF BEAVERTON

#### PROPOSED FEE ESTIMATE

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### Details:

- **City of Beaverton**
- **Cooper Mountain Reservoir No. 2**
- **Proposed FEE Estimate**

**City of Beaverton**

**Cooper Mountain Reservoir No. 2**

**Proposed FEE Estimate**

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# Cooper Mountain Reservoir No. 2 and Associated Improvements

## City of Beaverton

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City of Beaverton
July 2020

Munsey Architects, Inc.
Engineers/Planners

Cooper Mountain Reservoir No. 2
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City of Beaverton
July 2020

Munson Architects, Inc.
Engineers/Planners

Cooper Mountain Reservoir No. 2
Page 4
# FUNDING PLAN FOR ENGINEERING SERVICES

Cooper Mountain Reservoir No. 2 and Associated Improvements Project (CIP 4058A)

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### CITY OF BEAVERTON

**COOPER MOUNTAIN RESERVOIR NO. 2 AND ASSOCIATED IMPROVEMENTS**

**PROPOSED PROJECT SCHEDULE**

| ID | Task Name                                                                 | Start       | Finish       | 2019     | 2020     | 2021     | J An | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|----|---------------------------------------------------------------------------|-------------|--------------|----------|----------|----------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1  | Task 1 - Project Management                                              | Wed 8/18    | Fri 12/31/21 |          |          |          |      |     |     |     |     |     |     |     |     |     |     |     |
| 2  | Task 2 - Data Collection, Review, and Site Reconnaissance                | Wed 8/18    | Fri 9/21/18  |          |          |          |      |     |     |     |     |     |     |     |     |     |     |     |
| 3  | Task 3 - Preliminary Engineering                                         | Wed 8/18    | Tue 1/15/19  |          |          |          |      |     |     |     |     |     |     |     |     |     |     |     |
| 4  | Task 4 - Utility & Regulatory Agency Coordination                        | Mon 10/18   | Fri 11/15/18 |          |          |          |      |     |     |     |     |     |     |     |     |     |     |     |
| 5  | Task 5 - Washington County Special Use Permit Approval                   | Mon 12/18   | Tue 10/15/18 |          |          |          |      |     |     |     |     |     |     |     |     |     |     |     |
| 6  | Task 6 - Public Involvement and Public Meetings                          | Mon 10/18   | Wed 11/30/18 |          |          |          |      |     |     |     |     |     |     |     |     |     |     |     |
| 7  | Task 7 - Property Services                                               | Mon 10/18   | Mon 7/15/19  |          |          |          |      |     |     |     |     |     |     |     |     |     |     |     |
| 8  | Task 8 - Transmission Main Final Design and Permitting                   | Mon 10/18   | Fri 3/1/19   |          |          |          |      |     |     |     |     |     |     |     |     |     |     |     |
| 9  | Task 9 - Transmission Main Bidding and Award Services                    | Fri 3/19    | Wed 5/19     |          |          |          |      |     |     |     |     |     |     |     |     |     |     |     |
| 10 | Task 10 - Transmission Main Construction Phase Services                  | Wed 5/19    | Fri 11/19    |          |          |          |      |     |     |     |     |     |     |     |     |     |     |     |
| 11 | Task 11 - Reservoir Element Final Design and Permitting                  | Tue 1/15/19 | Tue 12/31/19 |          |          |          |      |     |     |     |     |     |     |     |     |     |     |     |
| 12 | Task 12 - ASR and Pump Station Final Design and Permitting               | Tue 1/15/19 | Tue 12/31/19 |          |          |          |      |     |     |     |     |     |     |     |     |     |     |     |
| 13 | Task 13 - Reservoir Bidding and Award Services                           | Tue 12/31/19| Mon 3/20/20  |          |          |          |      |     |     |     |     |     |     |     |     |     |     |     |
| 14 | Task 14 - Reservoir Construction Phase Services                          | Mon 3/20    | Fri 12/31/21 |          |          |          |      |     |     |     |     |     |     |     |     |     |     |     |
| 15 | Task 15 - ASR and Pump Station Bidding and Award Services                | Tue 12/31/19| Mon 3/20/20  |          |          |          |      |     |     |     |     |     |     |     |     |     |     |     |
| 16 | Task 16 - ASR and Pump Station Construction Management Services          | Mon 3/20    | Fri 12/31/21 |          |          |          |      |     |     |     |     |     |     |     |     |     |     |     |
| 17 | Task 17 - Contingency Tasks                                              | Mon 10/18   | Thu 12/31/20 |          |          |          |      |     |     |     |     |     |     |     |     |     |     |     |

**EXHIBIT 4**

City: Beaverton

Murray-Smith

July 2017
City of Beaverton
2016-2017 CIP

Project Number: 4058A
Project Name: Cooper Mountain Reservoir #2 (5 MG)
Project Description: Install Cooper Mountain Reservoir No. 2 to serve upper elevations of southwest Beaverton and approximately 8,000 feet of large diameter transmission pipelines.

Map:

Project Justification: An engineering consultant study in 2013 concluded that growth in water demand in the City's upper-elevation water service area will exceed the capacity of the existing 5.5 million gallon reservoir on Cooper Mountain (Cooper Mountain Reservoir No. 1). Approximately 15,000 of the total 70,000 residents served by Beaverton's water system receive drinking water from the existing upper-elevation water system and storage reservoir, Cooper Mountain No. 1. With the annexation of the 544-acre South Cooper Mountain area and growth in other upper-elevation areas of Beaverton, an estimated additional 21,500 people may be added to the City's upper elevation water service area by 2040.

Project Status: FY13-14: In 2013, the City's Public Work's engineering staff and a consultant completed an alternatives study of potential locations for a future water storage reservoir, which would store up to approximately 5 million gallons, located near the top of Cooper Mt (see CIP 4058). FY14-15: Completed siting evaluation. FY15-16 & FY16-17: Site selected (existing Cooper Mountain Reservoir site) and continue preliminary engineering.

Estimated Date of Completion: 2021
Estimated Project Cost: $12,500,000
First Year Budgeted: FY14/15

Funding Data:

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<th>Amount</th>
<th>FY</th>
</tr>
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<td>4058A</td>
<td>3622</td>
<td>Cooper Mountain Reservoir No. 2</td>
<td>$200,000</td>
<td>FY2016/17</td>
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Total for FY: $200,000
Geographic Information System

South Cooper Mountain Water System Concept Plan Including Cooper Mountain Reservoir #2 and Associated Improvements