CITY OF West Linn

Agenda Report 2014-07-14-05

Date: July 2, 2014

To: John Kovash, Mayor
Members, West Linn City Council

From: Lance Calvert, P.E., Public Works Director/City Engineer

Through: Chris Jordan, City Manager *CJ*

Subject: Bolton Reservoir Replacement Project (PW-14-06) – Design Scope & Fee

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Purpose
To consider approving a contract with Murray Smith and Associates for Engineering Services for the Bolton Reservoir Replacement Project (PW-14-06).

Question(s) for Council:
Do the proposed design services meet the needs of the City?

Public Hearing Required:
None required.

Background & Discussion:
The Bolton Reservoir replacement has been identified as a priority capital project in the Water Master Plan. To meet this capital project need, the Council approved a resolution dedicating the $5 million payment from the Lake Oswego Tigard Water Partnership Agreement to partially fund design and construction of the Bolton Reservoir replacement. Highlighting this effort, one of the 2014 City Council Goals is to initiate the design, land use and citizen engagement process for the Bolton Reservoir.

To meet this Council goal, a request for qualifications was issued following state and local procurement requirements. A total of three proposals were received from the following firms:

1. Murray, Smith & Associates of Portland, OR
2. AECOM of Portland, OR and
3. OBEC Consulting Engineers of Eugene, OR.

Upon review of the submitted proposals Murray, Smith & Associates (MSA) was deemed to be the preferred firm for the project based upon the evaluation criteria identified in the request for qualifications. Attached is an overview of MSA's water and reservoir experience.

A detailed project scope and fee was developed with MSA upon selection as the preferred firm. The attached scope and fee outlines the details of the work they will complete which includes the project schedule. The scope of work includes project management, conditional use approval, preliminary engineering including landslide and seismic analysis, pump station roof design, Skyline Drive improvement design and off-site water main design, reservoir final design, bidding services, and reservoir construction administration.

Budget Impact:
$1,080,957 from the Water Fund and Water SDC Fund.

Council Options:

1. Review MSA design scope and fee. Upon review, final contract will be prepared for Council approval.

Staff Recommendation:
Review MSA design scope and fee for future consideration.

Potential Motion:
N/A

Attachments:

1. MSA water reservoir brochure
2. MSA proposed scope and fee for engineering services including schedule

MSA

MURRAY, SMITH & ASSOCIATES, INC.
ENGINEERS | PLANNERS

RESERVOIR EXPERIENCE

MSA Murray, Smith & Associates, Inc.
Engineers | Planners

FIRM PROFILE

Murray, Smith and Associates, Inc. (MSA) was founded in 1980 by Hal Murray and Phil Smith with the key mission of providing high-value, high-quality municipal engineering services to public agencies. This mission is reflected in all of our work products as well as our day-to-day interactions with our clients. We have worked very hard over our past 33 years of business to develop the terrific reputation which we enjoy today. This reputation has been earned through the commitment of our dependable and dedicated professional staff who diligently apply sound technical judgment with a style that recognizes and constantly respects the "people" aspect of the civil engineering profession. We know that solid public infrastructure investment begins with sound public facilities planning and that's what we're about.

WATER

- Water Supply Planning and Development
- Distribution System Master Planning
- Water Resource Management and Conservation Planning
- Hydraulic Modeling/Analyses
- Routing Studies and Design
- Water Treatment
- Reservoirs, Dams, Pump Stations and Wells
- Transmission/Distribution Pipeline
- Corrosion Control/Cathodic Protection
- Metering and Flow Control Systems
- Water Rights
- Aquifer Storage and Recovery
- River Intakes/Stream Diversions
- Hydroelectric Feasibility

WASTEWATER

- Wastewater Facilities Planning
- Collection System Analysis/Basin Modeling
- Wastewater Treatment Facilities
- Effluent and Reclaimed Water
- Wastewater Pump Stations
- Gravity Sewers and Force Mains
- Trenchless Technologies and Sewer Rehabilitation
- Innovative Technologies
- System Conversions
- NPDES Permitting and Compliance
- Biosolids Handling and Beneficial Use
- Combined Sewer Overflow
- Infiltration and Inflow Improvements
- Odor Corrosion Control

STORMWATER

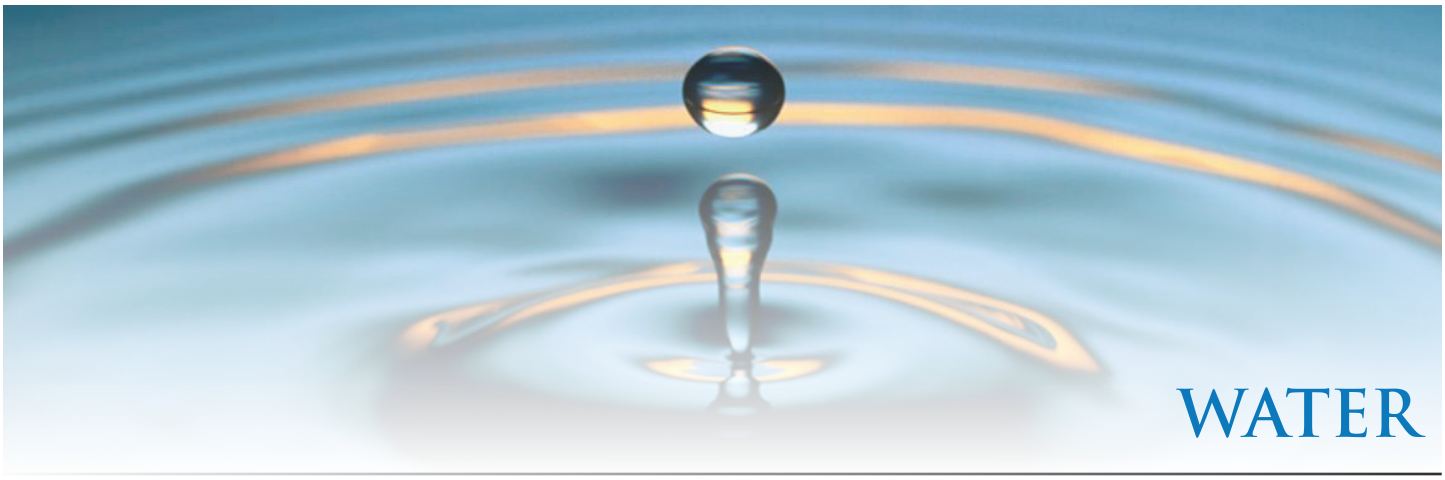
- Stormwater Basin Analysis and Master Planning
- Hydrologic and Hydraulic Modeling
- On-site Detention, Retention and Water Quality Analysis and Design
- Drainage Piping and Culvert Design
- Wetlands Design
- Combined Sewer Separation
- CSO Control/Pollution Control
- On-site Retention Systems
- Special Inlet Structures and Outfalls
- Fish Passage Design/ Rehabilitation
- Water Resource Management Planning

TRANSPORTATION

- Street, Road Planning and Design
- Traffic, Routing and Alignment Studies
- Bridge Engineering
- Downtown Plan Improvements
- Utility Undergrounding and Streetscaping
- Intersection Realignments
- Signalization Improvements
- Subsurface Utility Engineering
- Landslide Related Road Repairs
- Integrated Road and Utility Designs
- Interagency Coordination
- Road Culvert/Fish Passage Enhancements

SPECIALTIES

- On-call General Consulting
- City/District Engineering
- Program Management
- Public Works Construction Contract Administration
- Plan/Development Reviews
- Intergovernmental Agreements
- Rates, Finance, Grants and Loans
- Vulnerability Assessments and Emergency Action/ Response Planning
- Seismic Retrofits/Rehabilitation
- On-site Solar and Auxiliary Power Systems
- Commercial/Industrial Facilities
- Marine and Natural Gas Facilities
- Trenchless Technologies
- Instrumentation and Control
- CADD/Mapping/GIS
- Utility Coordination



WATER

Key Expertise

- Water Supply Planning and Development
- Distribution System Master Planning
- Water Resource Management and Conservation Planning
- Hydraulic Modeling and Analyses
- Transmission and Distribution Pipeline Routing Studies and Design
- Reservoirs, Dams, Pump Stations and Wells
- Water Treatment
- Metering and Flow Control Systems
- River Intakes/Stream Diversions
- Hydroelectric Feasibility
- Aquifer Storage and Recovery (ASR)
- Corrosion Control/Cathodic Protection
- Water Rights

Murray, Smith & Associates, Inc. (MSA) is a recognized regional leader in the water field and is experienced in all aspects of public water supply and delivery. MSA has successfully completed many complex, multifaceted, often politically sensitive, high-profile water supply system projects. MSA specializes in public facilities planning and has performed comprehensive water system analysis and master planning for numerous local area public agency clients and regional interagency consortiums throughout the Pacific Northwest.

MSA design projects include surface water impoundment upgrades and expansions; new reservoirs and reservoir rehabilitation projects; groundwater development projects; pump stations; water treatment plant projects; river intakes; distribution and transmission piping; and aquifer storage and recovery (ASR). As part of these projects, MSA has also provided assistance with water rights, permitting, public involvement, environmental mitigation, project funding through grant and loan programs, and construction management.

MSA's senior engineers are highly involved in local, regional and national activities with the American Water Works Association, and the firm provides active support to Water For People, an internationally-focused non-profit organization that provides sustainable drinking water resources and education to people in developing countries across the globe.

Storage Reservoirs

MSA is a regional leader in water reservoir planning, engineering, design and construction. Since its founding in 1980, MSA has successfully completed over 100 reservoir-related projects throughout the Pacific Northwest. MSA's expertise includes all types and styles of reservoirs: bolted steel, welded steel, pre-stressed concrete, conventional reinforced concrete, hybrid designs, buried tanks and elevated tanks.

MSA's experience includes new reservoirs and rehabilitation of existing reservoirs. MSA's engineering often begins with system planning and siting analysis and extends through design and construction, testing and start-up. Utilizing proven innovations combined with extensive direct experience, MSA efficiently delivers economical, durable, premium-quality reservoir solutions in full compliance with current AWWA standards and regulatory requirements.

"MSA's professionalism, communication, organization, attention to detail, and ability to work with the contractor were instrumental in completing the 1.2 MG Reservoir Project ahead of schedule and under budget. This has been the one of the most glitch free capital improvement projects I've been involved with."
John Krawczyk, P.E. , City Engineer, City of Rogue River

KEY EXPERTISE

- Planning, Design and Permitting
- Construction, Management, Start-Up and Testing
- Capacity and Sizing Analysis
- Site Analysis and Site Evaluations
- Ground Level, Buried, Elevated and Standpipes
- Prestressed and Reinforced Concrete
- Bolted and Welded Steel
- Water Quality and Mixing Systems
- Seismic Evaluation and Repair
- Structural Repairs and Maintenance
- Geotechnical Evaluation and Repair
- Interior and Exterior Coating
- Corrosion Control/Cathodic Protection
- Safety Systems Evaluation and Repair
- Site Drainage Evaluation and Improvements
- Cellular Installations

Concrete Reservoir Rehabilitation & Maintenance

MSA specializes in the maintenance and rehabilitation of all types of public water reservoirs. The firm is experienced with the repair, rehabilitation and seismic upgrading of distribution system reservoirs of all types, including: buried and above-ground conventional cast-in-place and prestressed/post-tensioned concrete tanks; welded steel ground level reservoirs, standpipes and elevated tanks; bolted tanks; old riveted tanks; and bermed, lined open reservoirs, as well as earth and rock fill dam surface water impoundment reservoir structures.

MSA's experience includes structural and other seismic retrofits; corrosion repairs and protection upgrades; lining and coating system replacement; safety upgrades; appurtenance upgrades; piping, valving and mechanical upgrades; upgrades for improved water circulation and water quality; flow control and instrumentation upgrades; access upgrades; upgrades to on-site pumping systems; and other miscellaneous maintenance and repairs.

"MSA team members demonstrated a professional manner, sincere attitude toward customer service, and efficient utilization of difficult project constraints to save the City of Seaside money, time and worry. Based on our experience with this project, I can recommend with confidence the firm of Murray, Smith & Associates, Inc. to approach any potential assignment with evident technical mastery and the desire to create lasting, innovative municipal work."

Neal E. Wallace, Public Works Director, City of Seaside, Oregon

KEY EXPERTISE

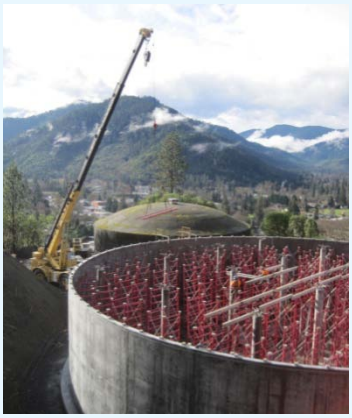
- Prestressed & Conventionally Reinforced Concrete
- Structural/Seismic Evaluations & Upgrades
- Lining & Coating Evaluations & Rehabilitation
- General Maintenance Assessments
- Foundation System Upgrades
- Special Foundation & Ground Improvements Systems
- Seismic Shut-Off Valves/Seismic Pipe Fitting Upgrades
- Specialty Concrete Rehabilitation
- Prestressing Strand Repair
- Leak Repairs & Concrete Crack Repairs
- Piping Modifications Design/Upgrades
- Electrical/Conduit/Telemetry Upgrades
- Access Road Upgrades
- Conventional & Alternate Procurement Methods
- Permitting
- Project Stakeholder/Community Coordination/ Partnering
- Contract Administration/Construction Management

New 1.3 MG Reservoir
AWWA D110 Type I
Current project

Forest Park Low Tank
City of Portland Water Bureau, OR

MSA assisted the City of Portland with preliminary siting evaluations of two proposed 1.3-million gallon (mg) reservoirs adjacent to the City's Forest Park. Special considerations were necessary during siting evaluations to site the reservoirs along the dedicated scenic Skyline Boulevard Corridor. The siting analysis included further evaluation of the selected site for potential drainage routes for site run-off, emergency reservoir overflows, and tank drainage. MSA also assisted with property acquisition for the reservoirs, which involved analyzing various reservoir orientations to facilitate the property owners' proposed development plans and to minimize visual impacts to current and future home sites. MSA is currently completing final project designs for a buried concrete reservoir structure. The project includes a new buried 1.3-mg pre-stressed concrete reservoir, a large piping and valve vault structure sized to accommodate a future booster pump station, and conditional use permitting for the proposed improvements. Site improvements include access roads, vegetated retaining walls, stormwater quality and detention facilities, on-site water and storm drainage piping, landscaping, and provisions for an additional, future 1.3-mg reservoir.

Contact: Mike Ross, Senior Engineering Associate; 503.823.7408



New 1.2 MG Reservoir
AWWA D110 Type I
Completed: 2011

1.2 MG Reservoir Project
City of Rogue River, OR

MSA recently completed siting, final design and construction for the City of Rogue River's new 1.2 million gallon (MG) pre-stressed concrete reservoir. Construction services included assisting the City with construction management, contract administration and inspection services. Final siting and preliminary engineering work confirmed reservoir capacity and orientation, and included geotechnical investigations, topographic surveys, development of construction cost estimates, development of plans and specifications, assistance with loan agency documentation, and on-call services during project bidding services. Designs included piping and access road improvements, site drainage improvements a valve vault and considerations for mixing and water quality in the new reservoir. The site presented challenges associated with a steep hillside and excavation requirements. New reservoir overflow conveyance piping was designed with capacity to accommodate both the new and existing reservoirs, and was routed to existing off-site storm drainage facilities.

Contact: Mark Reagles, City Administrator; 541.582.4401

New 4.0 MG Reservoir
AWWA D110 Type I
Completed: 2005

4.0 MG Potable Water Reservoir
Sunrise Water Authority, Portland, OR

MSA completed siting analysis and design for Sunrise Water Authority's 4.0-million gallon (mg) prestressed concrete reservoir located on Scouter's Mountain in Clackamas County. As part of the preliminary engineering work, a siting evaluation was performed to evaluate constructability, cost, economies of scale, and other factors for two alternatives that included two 2.0-mg circular prestressed concrete reservoirs and one 4.0-mg circular prestressed concrete reservoir. MSA provided final design, land use permitting, bidding and construction management services for the selected alternative, a fully buried 4.0-mg reservoir. The fully buried orientation allowed a parking lot for the Boy Scout's lodge to be constructed over the top of the reservoir to optimize site use. In addition to the cast-in-place reservoir structure, the project included aggregate pier foundation system, on-site inlet and outlet piping, overflow and drain piping, telemetry system improvements, a gravel parking lot, and site landscaping. An alternative construction contractor procurement process was also utilized for the project due to the accelerated schedule requirements. The project included design of reservoir mixing system piping in the reservoir to promote water quality.

New 3.0 MG Reservoir
AWWA D110 Type I
Completed: 2009

3.0 MG Reservoir No. 3
West Slope Water District, OR

In 2003, MSA completed a site evaluation and seismic analysis for the future construction of a partially buried concrete reservoir on the West Slope Water District's existing main reservoir site. Two 2.25-million gallon (mg) hopper-bottom, dome roof, cast-in-place reinforced concrete reservoirs were originally constructed at the site, with 1960s planning anticipating the construction of a third reservoir adjacent to the existing two. Structural assessments completed by MSA and Peterson Structural Engineers established the older Reservoir No. 1 to be in a mode of slow failure. A new reservoir was planned to replace this reservoir. MSA conducted siting analysis of two tank orientation options, one adjacent to the location originally planned for, the other replacing the existing Reservoir No. 1 in-place. As part of MSA's design work, a demolition and construction sequencing plan was developed in addition to final designs for a new 3.0-mg partially buried, pre-stressed concrete reservoir. Geotechnical "spider nails" were employed to minimize excavation disruption. MSA provided full contract administration/construction inspection.

Contact: Jerry Arnold, General Manager; 503.292.2777

New 1.0 MG Reservoir
AWWA D110 Type I
Current project

Portland Water Bureau Intertie
City of Sandy, OR

MSA recently completed planning and design services and is now conducting construction management services for the City of Sandy to meet its long-term water supply needs. This complex interagency project will allow the City to meet demands at least 50 years into the future. The project includes a 1 million gallon reservoir. MSA will provide recommendations on reservoir location, size and material after review of four potential sites and their associated hydraulic, geotechnical and seismic conditions. One site is in the City-owned Meinig Park which, if selected as the reservoir location, may lead to the development of a "hydropark" with opportunity for showcasing the new water facilities and integrating new water supply features with the park. This could include interpretive displays for public outreach and public education opportunities developed around an either buried, partially buried or fully exposed reservoir while still maintaining the level of security needed for a critical water system facility.

Contact: Michael Walker, Public Works Director; 503.668.5533

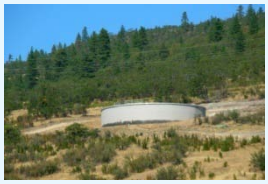
New 5.0 MG Reservoir
AWWA D110 Type I
Completed: 2014

Reservoir No. 3 Replacement,
City of Grants Pass, OR

MSA recently completed final designs for the City Grants Pass' 5.0 million gallon (mg) Reservoir No. 3 replacement project. MSA evaluated system storage needs, in conjunction with the development of preliminary designs, for the replacement of the City's 3.5 mg Reservoir No. 3 with a 5.0 mg prestressed concrete fully buried reservoir meeting American Water Works Association (AWWA) D110 standards. Reservoir replacement provides the City with a reservoir that fully meets current seismic design standards, removes a structure found to be in critical condition, and provides additional storage to meet current storage needs. Construction began in March 2013 and is anticipated to be completed in Spring 2014. MSA is performing full service construction administration and on-site field observation for this project.

Contact: Joey Wright, Project Technician; 541.450.6110

Reservoir No. 2



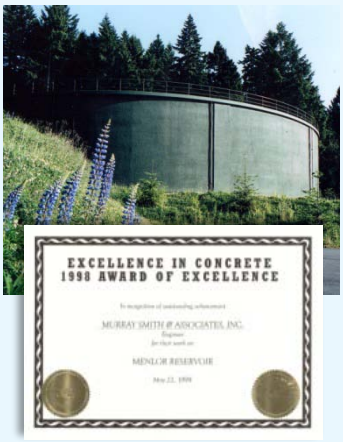
Reservoir No. 3

Two New 1.0 MG Reservoirs
AWWA D110 Type I
Completed: 2006

Lone Pine Reservoirs No. 2 and No. 3 (Completed 2005) Medford Water Commission, OR

MSA completed siting analysis and designs for two 1.0-million gallon (mg) reservoirs for the Medford Water Commission (MWC). Both reservoirs were partially buried, circular, prestressed concrete structures conforming to American Water Works Association (AWWA) D110 standards. Site access, onsite utility development, drainage and integrating the reservoir designs into planned development at each of the steep sites were among the key project challenges. MSA assisted with construction management and the project was completed in the fall of 2005, on time and within budget. The project included design of reservoir mixing system piping in the reservoir to promote water quality.

Contact: Eric Johnson, Principal Engineer; 541.774.2452



New 3.0 MG Reservoir
AWWA D110 Type I
Completed: 1999

Menlor 3.5 Million Gallon Reservoir City of Tigard, OR

MSA planned, designed and managed the construction of the City of Tigard's Menlor Reservoir project. This 3.5 million gallon prestressed concrete reservoir was needed to serve the City's main 410 Service Zone. The project required extensive access and site improvements to locate the reservoir at the desired elevation and location. The reservoir was located in a steep significant natural resource area and the access road crossed wetlands. An extensive public involvement process was conducted with local residents who were significantly impacted by the project. Project construction and access was conducted through a residential neighborhood. Rock excavation by blasting was required during the construction. Several neighborhood meetings were held to discuss the project and address community concerns. The contractor participated in the public involvement process. The project construction phase also included a partnering approach where the owner, engineer and contractor jointly developed a project mission statement. Winner of the 1998 OCAPA Excellence in Concrete Award

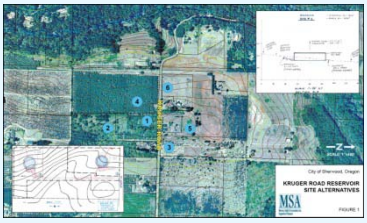
Contact: Ed Wegner, Former Public Works Director; 503.325.8631

New 4.0 MG Reservoir
AWWA D110 Type I
Completed: 2010

Water Supply Improvements Project – Sunset Reservoir #2 City of Sherwood, OR

MSA completed final designs for the Sunset Reservoir #2 project, a 4.0 mg storage facility and a new booster pumping station for the City of Sherwood. This project includes a system concept that connects the City of Sherwood with the Willamette Water Treatment Plant through new facilities constructed by the City along with joint ownership and use of existing and new facilities in coordination with the City of Wilsonville. MSA's preliminary engineering work included reservoir siting analyses, reservoir design surveys and preliminary designs, joint facility evaluation and assistance with acquisition of construction and land use permits including, site development, civil structural, architectural, mechanical and electrical designs involving grading, yard piping, frontage half street improvement and site landscaping. All improvements followed CIP recommendations set forth in the City's Water System Master Plan prepared by MSA. Winner of the 2010 PNWS-AWWA Excellence in Engineering Best Medium Engineering Works Project Award.

Contact: Craig Sheldon, Public Works Director; 503.925.2310

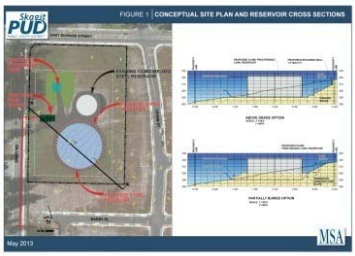


New 3.0 MG Reservoir
AWWA D110 Type I
Completed: 2002

3.0 MG Kruger Road Reservoir – Storage Analysis & Siting Study City of Sherwood, OR

Prior to completing design and construction management for the City of Sherwood's 3.0 MG Kruger Road Reservoir project, MSA performed a storage analysis and reservoir siting study for the new reservoir which serves the City's Southwest Sherwood Service Zone. This 455-foot pressure zone had previously been served by a constant pressure pump station and did not have dedicated storage. As part of this work, MSA sized the 3.0 million gallon (mg) reservoir to meet the pressure zone's future operational, emergency and fire flow storage needs. MSA identified six alternative properties for siting the reservoir and evaluated the sites based on criteria including site topography; layout of the reservoir structure, both vertically and horizontally; grading cuts and fills; O&M access needs; property size requirements; land use zoning; existing property use and potential relative cost impacts. MSA provided conceptual designs and assisted with property and easement acquisition for the preferred site alternative. MSA led the preparation of the application for Conditional Use Permit approval from Washington County for the Exclusive Farm Use (EFU) zoned property before moving on to final design.

Contact: Eugene Thomas, P.E., Former City Engineer; 503.625.2303



New 6.0 MG Reservoir
AWWA D110 Type I
Currently in design

Division Street 6.0 MG Tank and Pump Station, Skagit County PUD No. 1, WA

Skagit County PUD No. 1 (District) recently selected MSA to design a new 6.0 MG reservoir and booster pump station at the site of the District's existing Division Street 1.0 MG reservoir. During preliminary design, MSA will conduct an alternatives evaluation and life-cycle cost analysis for both welded steel and prestressed concrete reservoirs to provide recommendations and assist the District in selection of the preferred type of reservoir. MSA's work will also include the evaluation of reservoir mixing alternatives to maintain optimum water quality within the new reservoir, and design of 5,000 feet of 12-inch diameter transmission main, on-site stormwater detention facility, and site improvements to enable full use of the property by the District for storage, emergency operations, and other uses.

Contact: Mark Handzlik, P.E., Assistant Engineering Manager; 360.848.2170

Peterson Point 4.0 MG Reservoir City of Seaside, OR

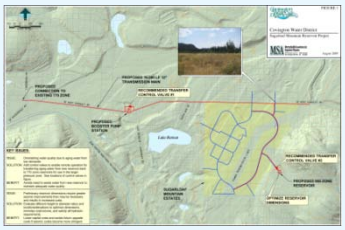
MSA completed preliminary, final designs and construction management for the City of Seaside's Peterson Point 4.0-million gallon reservoir. As part of the preliminary engineering work, siting evaluations were performed at a variety of locations to evaluate constructability and cost for partially buried and ground level tank alternatives. Project challenges included siting and constructing the reservoir in close proximity to the City's raw water open reservoir and adjacent wetlands. MSA completed final designs, land use permitting, contract administration and construction management services for the project. In addition to the reservoir structure, the project included on-site inlet and outlet piping, overflow and drain piping, telemetry system improvements, construction of access roads and parking, final site grading, and landscaping. Final designs for the welded steel reservoir included an internal mixing system and were coordinated with existing water treatment plant hydraulics. The reservoir operates as a clear well for finished water from the plant. The project was completed on schedule and under budget.

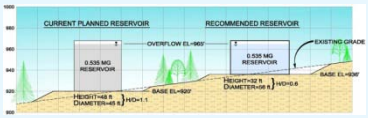
Contact: Neal Wallace, Public Works Director; 503.738.5112

Rosemont Reservoir
City of West Linn, OR

Following recommendations set forth in the City of West Linn's Water Master Plan, which was prepared by MSA, the firm assisted the City with siting evaluations, permitting, final designs and construction management for a 400,000 gallon, 110-foot high, elevated single pedestal welded steel spheroid reservoir. Work included special design for seismic performance and special inspections during construction. Permitting was complicated due to siting in an established high-value residential neighborhood. Site landscaping followed a park-style theme. Design included impressed current cathodic protection for the reservoir, telemetry provisions and SCADA system integration.

Contact: Dennis Koellermeier, Public Works Director; 503.639.4171 x2596

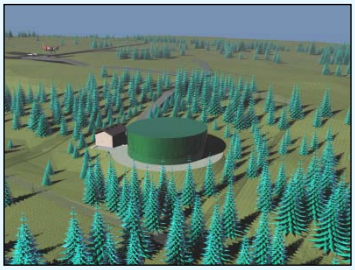




Sugarloaf Mountain Reservoir
Covington Water District, Covington, WA

MSA was selected by the Covington Water District to provide design services for a proposed 535,500-gallon welded steel reservoir for the planned Sugarloaf Mountain development, a 125-home residential development in East King County. The elevation of the Sugarloaf Mountain development is too high to serve from the District's existing pressure zones and will require a new reservoir, booster pump station and 12-inch diameter ductile iron transmission main. MSA's work also includes multi-agency coordination, permitting, public involvement and bid assistance.

Contact: Jade Sullivan, P.E., Senior Project Engineer; 253.867.0918



Apex and Chena Reservoirs and Pump Stations, Silverdale Water District, WA

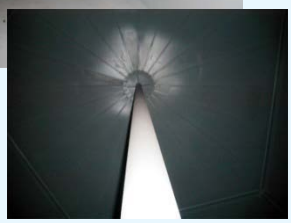
MSA is currently completing the design of the 2 MG Chena Reservoir and the 0.75 MG Apex Reservoir, in combination with two associated pump station projects, for the Silverdale Water District. Preliminary designs included reservoir type selection, site layout plans, and pump configuration alternatives. Both sites present siting, layout, access and design challenges. The Chena site required engineering coordination with Harrison Medical Group and the Apex site required an understanding of Federal Aviation Administration (FAA) siting, design and construction requirements. The final designs also include SCADA and telemetry improvements, site security plans, a transmission main from the Apex site, and power efficiency and pump performance optimization. MSA will provide construction management services as the projects are constructed in 2014.

Contact: Morgan Johnson, General Manager, 360.447.3500

1.75MG Reservoir Cathodic Protection System
City of Beaverton, OR

MSA coordinated design and construction of an impressed current cathodic protection system for the City of Beaverton's 1.75 MG standpipe. Design tasks included developing construction details and coordinating with cell phone company in locating cell phone antennae and incorporate cathodic protection system design with cell phone equipment.

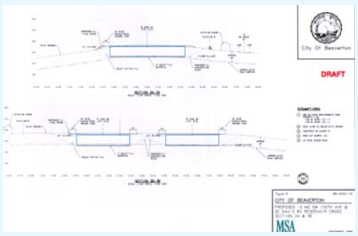
Contact: David Winship, P.E., City Utilities Engineer; 503.526.2434



Reservoir 1A and 1B Recoating
City of Washougal, WA

MSA completed reservoir coating inspections and evaluation, re-coating design and material specifications, and construction management and administration for both of the City of Washougal's two ground-level steel reservoirs (1.5 MG and 1.0 MG). The project was completed on time and under budget. The existing coating systems were analyzed for lead content and new coating systems were specified to provide proper bonding between the existing and new coating systems. Structural repair of corroded rafter hardware was completed by cutting out and modifying an existing vent hatch assembly. The work was successfully scheduled to minimize interruption of service to the City's existing water system operations.

Contact: Trevor Evers, Public Works Director; 360.835.2662



15 MG Prestressed Concrete Reservoir Conceptual Site Profile

SW 155th Avenue 15 MG Reservoir Siting Evaluation
City of Beaverton, OR

MSA completed a siting evaluation for the City of Beaverton's 15 million gallon SW 155th Avenue Reservoir. Three general reservoir locations were investigated, identifying six alternative site layouts for further consideration. Conceptual siting plans and cross sections were developed for the alternatives illustrating the proposed 15 MG prestressed concrete reservoir and related facilities, construction excavation, final grading and site access. The reservoir site layout alternatives were evaluated on constructability, amount of land required, site access, and potential for a combined use of the property. A recommended alternative was identified which provided the most cost-effective site layout when considering overall project constructability and access. This site layout also provided the best potential for combined uses of City resources through integration of recreational facilities within the reservoir site and further development of the unused property.

Contact: David Winship, P.E., City Utilities Engineer; 503.526.2434

2 MG Reservoir Structural Analysis & Seismic Retrofit
Canby Utility, Canby, OR

MSA recently completed a structural analysis of Canby Utility's 2.0 MG conventionally reinforced concrete reservoir. The findings of the structural analysis indicate that the reservoir walls are in a state of failure. Recommendations for upgrade of the reservoir to address seismic deficiencies include application of a wire wrap and shotcrete post-tensioning system and application of a fiber reinforced plastic reinforcing system on the roof and columns. MSA is currently assisting Canby Utility with FEMA grant funding applications for the recommended improvements and preparing final designs.

Contact: Matthew Michel, Assistant General Manager; 503.263.4320

Emergency Water Storage
Department of Veterans Affairs (DVA)

MSA designed a 100,000 gallon emergency supply reservoir and pump station for the DVA hospital in Portland, Oregon in the event a potential disaster disrupted current supply. Engineering included siting analyses. The design was complicated by location within an environmentally sensitive natural area. The design also included provisions for continuous cycling of reservoir water to maintain water quality during non-emergency operation. The pump station included automatic and manual operation modes and the reservoir included provisions for filling by tanker truck while in emergency operation.

Contact: Scott Fisher, Project Manager; 800.827.1000

Kirkwood Reservoir
City of Gladstone, OR

MSA completed design, permitting and construction phase services for the City of Gladstone's 0.5-mg Kirkwood Reservoir. Key design features included separate inlet and outlet connection piping to promote water quality, check value and altitude control valve vault, reservoir site drainage and overflow piping routing, security features, integration of the facility into the City's existing telemetry system, electrical system improvements, access road and site parking and existing reservoir demolition. The reservoir structure is an at-grade welded steel structure with a self-supporting domed roof. Contract specifications included a pre-bid qualification process for the reservoir supplier and coating systems subcontractor. Preliminary engineering included a siting and reservoir capacity analysis and the securing of needed land use approvals through a Type III approval process that included public notifications and a public hearing.

Contact: Ron Partch, City Administrator; 503.656.5225

400,000 Gallon Reservoir Siting Analysis and Design
City of Dundee, OR

MSA completed a reservoir siting study for the City of Dundee that included a reservoir sizing analysis, site alternatives evaluations, property surveys and geotechnical analyses. The preliminary siting work included completion of an Environmental Information Report that considered four sites, each evaluated for wetland, property ownership, engineering and local impact considerations. This work concluded with the selection of a preferred site. MSA provided design and construction management of a new 400,000 gallon welded steel reservoir which replaced the City's existing, undersized reservoir at the same location. The new reservoir design included specialty foundation treatments to minimize differential settlement and the installation of a pressure reducing/pressure sustaining valve vault that allowed the City to continue services to its customers while the reservoir was off-line during construction. The project schedule was fast-track, with designs being completed within 45 days of notice to proceed in order to take advantage of favorable market and economic conditions.

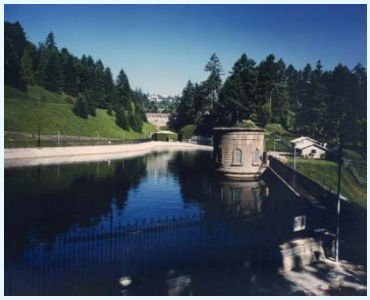
Contact: Rob Daykin, City Administrator; 503.538.3922

New Water Booster Pump Station

City Water Standpipe #3
City of Fairview, OR

MSA completed preliminary and final engineering for comprehensive water system improvements for a new reservoir, a new booster pumping station and new 16-inch diameter transmission piping. Final design was completed on a fast track basis to meet immediate service needs. Designs for the new 3.23-million gallon (mg) welded steel reservoir (standpipe) addressed the special circumstances imposed by a confined reservoir site oriented within an existing developed area. The new booster pump station dramatically expands pumping capacity to the City's Upper Service Zone. Engineering included provisions for recoating of an existing 1 mg standpipe at the site, special water circulation system for water quality and an impressed current cathodic protection system in the reservoir.

Contact: Bob Cochran, P.E. Former City Engineer/ Public Works Director; 503.594.6790



Washington Park Reservoir Replacement
City of Portland Water Bureau, OR

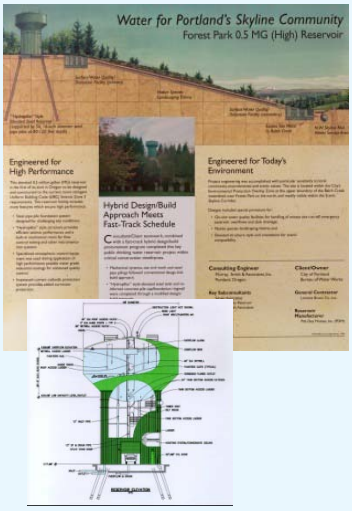
MSA is assisting the Portland Water Bureau (PWB) with upgrade/replacement feasibility analysis of the City's two open reservoirs at Washington Park. The feasibility of replacing Portland's Washington Park Reservoir No. 3 with 15 million gallons of new buried storage within the footprint of the existing facility is being considered, along with alternatives for disconnecting Reservoir No. 4 from the drinking water system and converting this reservoir into a storm water detention and emergency reservoir overflow temporary storage facility. MSA's preliminary design work is being coordinated with other City geotechnical engineering evaluations that investigate the feasibility of mitigating a massive ancient landslide that currently impacts the existing reservoir facilities.

Contact: Mike Saling, Supervising Engineer; 503.823.7411

Mt. Solo 5 MG Reservoir Exterior Shotcrete Inspection, Evaluation and Maintenance Repair, City of Longview, WA

MSA completed an inspection and evaluation of the City of Longview's Mt. Solo 5 MG Reservoir's exterior shotcrete coating system. The reservoir is a partially buried, wire-wound prestressed circular concrete reservoir built in the 1970s. Extensive areas of the outer layer of shotcrete wall coating above grade had detached and fallen from the wall exposing the inner layer of shotcrete. The evaluation revealed substantial delamination of the existing shotcrete over much of the reservoir walls above grade with surface cracking observed throughout. MSA recommended a shotcrete repair program that included removal and replacement of selected large areas of delaminated shotcrete, epoxy grout injection of voids at minor shotcrete delamination location, sealing the surface cracks and applying an epoxy/acrylate coating system over all shotcrete wall surfaces above grade. Construction contract documents were prepared to implement these repair measures. MSA completed contract and construction administration for the shotcrete repair portion of the project in Fall of 2009.

Contact: Robert J. Menzia, City Engineer; 360.442.5700



Forest Tank 0.5 MG "High" Reservoir
City of Portland Water Bureau, OR

Award Winner

This elevated 0.5-million gallon (mg) reservoir was the first of its kind in Oregon to be designed and constructed to UBC Seismic Zone 3 requirements. The "Hydropillar"-style structure provided efficient seismic performance and a built-in mechanical room for flow control valving and other instrumentation systems. Specialized atmospheric control equipment was used during coatings application and an impressed current cathodic protection system provided added corrosion protection. A fast-track hybrid design/build procurement program completed this key reservoir project for the City of Portland within critical construction time frames. Designs included special provisions for on-site water quality facilities for handling excess site run-off, emergency reservoir overflows and tank drainage. Also included in design were native species landscaping themes along with an elevated structure style and orientation for scenic compatibility. Special permitting was required for construction in an Environmental Protection Overlay Zone and the dedicated Scenic Skyline Corridor.

Contact: Mike Saling, P.E. Project Manager; 503.823.7411

2.0 MG Reservoir Mixing Improvements Shoreline Water District, WA

Shoreline Water District faced ongoing challenges in maintaining adequate water quality in one of its largest storage facilities, a 2.0 MG concrete reservoir. The District had been unable to maintain adequate chlorine residual levels in the reservoir due to its remote location, long single inlet/outlet piping, low water system demands and operational constraints. The reservoir had been operated at a significantly lower level as a temporary solution to the water quality problem. To correct this issue, MSA recommended an improvement solution that allowed the District to construct improvements without impacting the structure of the reservoir and the existing site, which is surrounded by several residences. MSA also designed a new connection on the City of Seattle's transmission main and a dedicated 12-inch diameter transmission main from this connection to the reservoir. In addition, site piping improvements created a separate inlet and outlet for the reservoir, utilizing the existing floor connections. To further increase water quality, an internal mixing manifold was designed to help maintain chlorine residuals. Along with these improvements, MSA developed electronic control valve improvements, thus allowing the reservoir to be filled at adjustable rates during varying demand conditions. In addition to design and bidding services, MSA has also provided construction management and on-site inspection services for the project.

Contact: Stu Turner, P.E.; General Manager, 206.362.8100

Maintenance Painting & Seismic Analysis of 0.5 MG Elevated Tank Palatine Hill Water District, OR

MSA prepared the design and provided construction observation assistance for maintenance painting and performed a seismic analysis for the Palatine Hill Water District's 0.5 MG elevated tank. Interior painting included removal of coal tar coating and application of epoxy polyamide system. Exterior painting included cleaning and application of epoxy and polyurethane overcoats. Seismic evaluation consisted of determining necessary bracing and foundation improvements and preparing estimates of cost for updating to current seismic design standards compared to tank replacement.

Contact: Ron Vandehey, Board Chair; 503.636.7483

HOPP Area Interagency Water System Improvements City of Oregon City, South Fork Water Board, Clackamas River Water, OR

The HOPP Area Interagency Water System Improvements Project was a joint three-party intergovernmental cooperative effort between the City of Oregon City, the Clackamas River Water District and the South Fork Water Board that followed updated water system master plan recommendations developed earlier by MSA. The project included a 1.75-million gallon, above-ground, welded steel reservoir, ductile iron piping (approximately 2,000 feet of 42-inch; 6,800 feet of 16-inch; and 2,000 feet of 12-inch diameter), installation of pressure reducing and pressure relief control valves, a 900-gallons per minute (gpm) pump station, a 2,500-gpm pump station, reservoir overflow and stormwater detention facilities, cement treated base roadway construction, and various master metering and flow control stations. MSA provided all engineering services including project planning, preliminary engineering, permitting, final design, construction management and program management. The project involved complex construction sequencing. Program management included the development of a detailed "Memorandum of Understanding" supporting intergovernmental agreements for joint use elements of the project. Preliminary engineering work included reservoir and pump station siting analyses. Design included provisions for impressed current cathodic protection, and telemetry and instrumentation and control/SCADA system upgrades and integration with existing systems.

Contact: Bob Cullison; O.C., Engineering Manager, 503.496.1561; Greg Drechsler; CRW, Former General Manager, 503.823.7405; Dan Bradley; SFWB, Former General Manager, 503.654.7765

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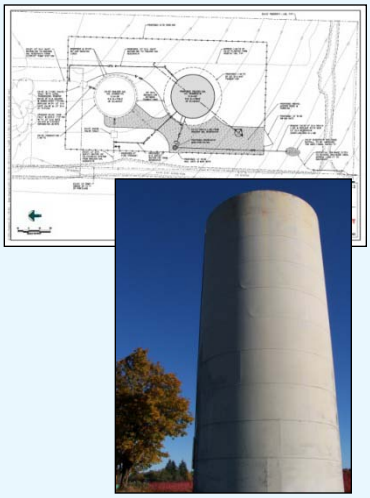
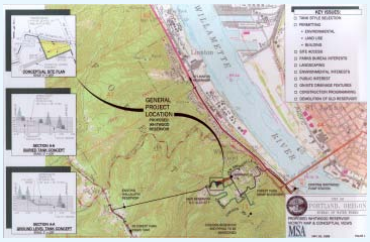


750,000 Gallon Reservoir
Pleasant Home Water District, OR

The Pleasant Home Water District intends to construct a 750,000 gallon welded steel standpipe reservoir adjacent to or near the location of the District's existing 600,000 gallon standpipe reservoir. The contemplated work consists of constructing a 750,000 gallon reservoir on District-owned property and within existing easements. Improvements associated with the construction of the new reservoir include waterline piping, upgrades to existing reservoir drainage and overflow piping, and detention and site perimeter fencing. Preliminary engineering work has been completed to confirm the new reservoir can be constructed on the site and a preliminary cost estimate for the reservoir and piping improvements has been developed. In addition, programming estimates have been developed for refurbishment and upgrade of the District's existing 600,000 gallon standpipe, incorporating preliminary concepts to improve seismic event survivability of the facility. Inspection and cleaning services for the existing 600,000 gallon reservoir have been administered as part of the project, as well.

Contact: Cassandra Lashbaugh, District Manager; 503.201.4341



Whitwood Reservoir
Construction Complete

Whitwood Reservoir
City of Portland Water Bureau, OR

MSA completed preliminary engineering and final design for a 130,000 gallon concrete drinking water reservoir situated in the City's environmentally sensitive Forest Park. Work included tank style selection, predesign reporting, permitting and final designs for construction of a new reservoir and demolition of an existing reservoir. Special considerations were given to seismic forces due to the site's proximity to mapped faults. Design of the reservoir included flexible wall base and top joint for seismic considerations. The project included design of inlet and outlet piping and valving and modifications of existing pump station piping to reduce potential reservoir overflows. Site configurations were developed to minimize the removal of trees and designs included native species landscaping schemes. Special on-site drainage features, including provisions for dechlorination, were included as part of the designs. Instrumentation and control system designs were integrated with the City's systems and master control center facilities.

Contact: Mike Saling, P.E., Supervising Engineer; 503.823.7411

Reservoir Consulting Services,
City of Enumclaw, WA

MSA recently assisted the City of Enumclaw with a phased program that included a detailed functional and structural evaluation of the City's 2.0 MG reservoir. The structure is a unique Pritzker style precast concrete reservoir, which has a history of structural deficiencies, including wall rupture failures. The reservoir was constructed in 1963 and has shown signs of leakage and structural wear. This reservoir type has failed catastrophically in the past, and the City became concerned enough to take the reservoir out of service for a structural assessment. The assessment found that the cost of repairing and rehabilitating the reservoir would exceed the cost of a new reservoir. MSA is currently assisting the City with the design of the new 2.0 MG, partially buried reservoir. The new reservoir will be an AWWA D110 Type I prestressed concrete reservoir and is scheduled to be on-line in 2015.

Contact: Scott Woodbury, P.E., Assistant City Engineer; 360.615.5728

Portland, OR

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MURRAY, SMITH & ASSOCIATES, INC.
PROPOSED SCOPE AND FEE FOR ENGINEERING SERVICES FOR
THE BOLTON RESERVOIR REPLACEMENT PROJECT
FOR
CITY OF WEST LINN

BACKGROUND AND PROJECT DESCRIPTION

The City of West Linn (City) has identified the goal of replacing the existing 2.5 Million Gallon (MG) Bolton Reservoir with a new circular, strand-wrapped, prestressed, concrete structure, capable of providing 4.0 MG of usable storage. The existing reservoir, constructed in 1913, is a concrete slab-on-grade structure, with an interior liner and floating hypalon cover. The structure and cover are nearing the end of their service life. The adjacent Bolton Pump Station pumps water from the reservoir into the distribution system's Horton Pressure Zone, and a portion of the reservoir storage is intended to serve the Bolton Pressure Zone by gravity. Approximately 0.5 MG of the total 2.5 MG volume is unusable due to the low elevation of the reservoir floor relative to the higher elevation of the reservoir outlet piping and pump station suction piping. Given the reservoir's functional limitations, condition, and age, replacement of the Bolton Reservoir was recommended in the City's previous three Water System Master Plans, including the most recent completed in 2008, in which it was considered a high priority improvement. It is expected that the new reservoir will be oriented such that its floor and overflow elevations meet hydraulic system requirements and maximize usable storage at the existing site.

CITY RESPONSIBILITIES

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. Establish the work scope and design parameters, including related standards.
3. Provide Consultant access to the site, including necessary confined space safety equipment if needed.
4. Provide the Consultant copies of all available and relevant City utility "as-built" plans, topographical maps, reports, studies, GIS mapping, etc. pertinent to the project.
5. Provide Consultant with digital copies of the City's standard construction specifications, details and "front end" bidding document sections if applicable.
6. Provide timely review and comment on all reports, drawings and specifications submitted by Consultant to City for review and approval.
7. Submit applications to the State and/or County for required permits. (Note Consultant will prepare and may be requested to contribute project information for any such applications).
8. Maintain records and process consultant invoices.
9. Provide legal review of all contracts, bid forms, and real property.

10. Prepare, provide and distribute all public notifications.
11. Coordinate and manage public involvement with adjacent property owners, and others as needed.
12. Pay for all permit application fees.
13. Provide bid advertisement and bid document printing services.

DESIGN ASSUMPTIONS

Basic design assumptions are detailed below and further illustrated on the Conceptual Site Plan attached as Figure 1.

On-Site Work

1. Reservoir designs assume a partially buried 4.0 MG circular prestressed concrete reservoir designed and constructed in accordance with AWWA D110 Type I standards. It is anticipated that the roof will not be subject to loading beyond standard environmental loads. An alternative fully buried concept will be developed as part of pre-design for City review as a potential option for rooftop park development. Final design of the fully buried option and park improvements can be completed as additional tasks beyond this scope of work.
2. Reservoir designs assume poorly compacted or compressible fill at the Bolton site, requiring soil improvements and foundation support using rammed aggregate piers and a structural mat-slab floor system.
3. The site layout designs will be coordinated with the existing Bolton Pump Station. The existing 2.5 MG reservoir and Old Bolton Pump Station will be demolished and removed.
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. Storm drainage and potential reservoir overflows may be routed to an on-site detention facility, and then off-site to the public storm drainage system approximately 800 linear feet north at Caufield Street.
6. Project designs assume 24-inch diameter transmission piping will enter the reservoir site from Skyline Circle to the east, and will be routed to connect to the existing pump station piping to allow the continued supply from the Division Street Pump Station to the Bolton Pump Station to provide limited service to the Horton Pressure Zone during the reservoir demolition and construction.
7. Bolton Pump Station bypass piping and valving will be provided to allow emergency back-feed connection from the Horton Pressure Zone to the Bolton Pressure Zone. Designs may include a surge anticipator valve inside the pump station.
8. Precast concrete valve vault and associated isolation and seismic valving, and metering will be included at the reservoir. New 8-inch diameter replacement

distribution piping will be installed north of the tank and connected to existing piping at an elevation below the reservoir floor.

9. In Skyline Circle, approximately 400 lf of existing 18-inch diameter transmission main supplying the reservoir will be replaced with a new 24-inch diameter main, and 400 lf of 4-inch diameter CI will be replaced with new 4-inch diameter DI main.
10. The existing 14-inch diameter pump station discharge main to the Horton pressure zone distribution piping in Skyline Drive can be decommissioned and abandoned.
11. Basic 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 at the reservoir site. Decommission and abandon power to demolished facilities.
12. Pervious gravel access road and parking facilities will extend from the existing site entrances at Skyline Circle and Skyline Drive.
13. Reservoir site landscaping will include site restoration and screening consistent with the surrounding site and development. Work will include evaluation of existing tree impacts, restoration using native plant material where appropriate, onsite vegetative stormwater treatment design and irrigation design as needed.
14. It is assumed that MSA will prepare typical traffic control plans as needed in accordance with City requirements, and the construction contractor will provide traffic control plans and details.
15. It is anticipated that designs will include roadway reconstruction of Skyline Circle, which is expected to be used as the primary construction access and may need to be reconstructed following major site construction activity and pipe trenching. It is assumed that a half street improvement will not be required along Skyline Drive. If required, this will be completed outside this scope of work.

Off-Site Work

1. Sidewalk will be added to the southwest side of Skyline Drive. It will start on the south end approximately 200' north of the curve by the high school and connect to the existing sidewalk just north of Firwood Street (2,700' total).
2. Approximately 800 lf of 8-inch diameter replacement water main on Skyline Drive and Clark Street, and PRV Vault on Skyline Drive.
3. Approximately 3,500 lf of 24-inch diameter replacement water main on Skyline Drive, West A Street, Easy Street ROW, and Broadway Street from Skyline Circle to Buse Street.
4. Approximately 900 lf of 18-inch diameter replacement water main on West A Street from Webb Street to Skyline Drive.
5. Approximately 600 lf of 8-inch diameter replacement water main on Broadway Street from Webb Street to Easy Street, and PRV Vault at Webb Street.
6. Approximately 300 lf of 10-inch diameter replacement water main on Broadway Street from Webb Street to Easy Street.
7. Approximately 1,000 lf of 8-inch diameter replacement water main on West A Street from Skyline Drive to Buse Street.

8. Approximately 900 lf of 8-inch diameter replacement water main on Webb Street from West A Street to Terrace Drive, and on Terrace Drive southerly from Webb Street.
9. Approximately 1,400 lf of 8-inch or 10-inch diameter replacement water main from the northwestern corner of the Bolton Site to Barclay Street, along easements and Barclay Street, with a crossing of Willamette Drive.

PROPOSED SCOPE OF WORK

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

Task 1 – Project Management

This task covers the administration and coordination of the consultant's staff, subconsultants, and the interface with the City project manager and other City staff. The effort will include the following subtasks:

1.1 Perform general administration and project management throughout Design, Bidding, Construction, and Post Construction phases to ensure successful completion of all tasks and elements of the Project within the established scope, schedule and budget.

1.2 Process and submit monthly billings with a summary of project status by task and subtask, including a summary of invoicing from subconsultants retained for this project.

1.3 Maintain the overall project schedule including adding staff subconsultants and other resources as needed to meet scheduled milestones.

1.4 Key Project Design Meetings Work under this subtask includes coordinating schedules, developing agendas and preparing presentation materials for key project meetings during the design phase to include the following meetings:

- Project Kick-off
- Design Reviews at 30 Percent Completion
- Design Reviews at 60 Percent Completion
- Design Reviews at 90 Percent Completion

Agendas and supporting information will be distributed through the City project manager in advance of any meeting. Meeting minutes will be distributed to meeting attendees and other interested parties within five business days of the subject meeting date. All meetings will be conducted at the City offices.

Task 1 Deliverables:

- Invoices (monthly).
- Project Design Schedule and updated project schedules as requested by the City.
- Meeting agendas and minutes.

Task 2 – Conditional Use Approval, Public Meetings and Presentations

Under this task, MSA will work with the City to obtain a conditional use approval for the project. It is anticipated that the approval process will take 12 months, and will include an appeal to the Planning Commission and an Appeal to the City Council. MSA will provide assistance with public meetings and coordinate with the City's public outreach consultant. MSA 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:

2.1 *Public Meetings* - Preparing for and attending meetings as needed with City staff to provide project support and expert testimony, including:

- One pre-application conference
- Two Planning Commission meetings
- One neighborhood meeting
- Two City Council Meetings during the planning process
- Two City Council Meetings during Design
- Two City Council Meetings during Construction

2.2 *Conditional Use Approval and Design Review Application* - Preparation and submittal of a conditional use approval and design review application and supporting documentation for the reservoir and associated piping, drainage and surface features. Supporting documentation may include materials such as renderings, maps and other documents as required by the City. City conditional use approval conditions will be incorporated into the final designs and construction contract documents.

2.3 *Planning Commission Appeal Process <Optional Task>* - For budgeting purposes, it is anticipated that up to 80 hours of MSA staff time will be provided during the appeal process. This task is optional, and will only be performed if required.

2.4 *City Council Appeal Process <Optional Task>*- For budgeting purposes, it is anticipated that up to 80 hours of MSA staff time will be provided during the appeal process. This task is optional, and will only be performed if required.

Task 2 Deliverables:

- Presentation graphics and exhibits.
- Conditional use approval and design review application

Task 3 – Preliminary Engineering

Preliminary engineering and will be completed under this task. Work will include data gathering, design surveys, reservoir sizing and hydraulic analysis, geotechnical investigations. Design criteria and assumptions will be developed and presented in the Preliminary Design Report. Anticipated subtasks are outlined as follows:

3.1 *Site Review and Data Gathering* – Anticipated work elements under this subtask include:

- Gather and review existing mapping, design drawings, engineering reports and other data related to the proposed reservoir site
- Review of existing site drainage and reservoir drainage, overflow and outfall facilities
- Review of existing water transmission piping, valving and reservoir operation
- Review of existing site access, site access easements and utility easements
- Review of existing site security provisions

Task 3.1 Deliverables:

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

3.2 *Reservoir Siting Alternatives Analysis* – Work under this task includes conducting a reservoir siting alternatives analysis to identify and evaluate alternative sites for additional storage to serve the Bolton Pressure Zone. Perform a broad overview of the available properties at the proper elevation using available aerial photos and tax lot and GIS mapping. Approximately four (4) alternative properties will be evaluated and reviewed with the City. Under this task, a map of the area showing the potential reservoir sites will be prepared using aerial photos and GIS mapping. It is anticipated that properties outside the City limits and UGB will not be subdivided. As such, properties without existing structures that can be purchased without subdividing will be considered likely sites for the reservoir. Conduct field reconnaissance to assess existing condition of the proposed alternative reservoir sites. Prepare preliminary conceptual site plans showing the proposed property limits, the topographic contours, and the proposed reservoir. Focus the siting analysis on the following items:

- Site topography
- Available land for the reservoir and pump station on each property.
- Accessibility to site
- Proximity to existing distribution system piping
- Environmental interests, including review of mapped wetlands, streams and vegetation in area

Conceptual construction cost estimates will be prepared for each alternative to identify budget level cost for constructing the reservoir, pump station and transmission system piping needed to integrate the new storage into the Bolton

Pressure Zone. Work completed in this task will be documented in a brief memorandum.

Task 3.2 Deliverables:

- Reservoir siting alternatives analysis memorandum

3.3 *Reservoir Sizing and Configuration* – Work under this subtask includes evaluation of the storage requirements, hydraulic constraints and the sizing of the new storage facility at the Bolton site to maximize useable storage at the site and optimize reservoir dimensions.

MSA's conceptual siting analysis proposed raising the existing reservoir overflow to approximately 450 feet, 8 feet higher than the overflow elevation of the existing reservoir. The floor elevation was recommended to be raised to 430 feet, resulting in a water depth of 20 feet. The resulting wall height of the prestressed concrete structure would be approximately 23 feet, which is not an optimum height from a construction efficiency stand point. It is anticipated that considerable construction cost savings could be achieved, on the order of 10% of the structure cost, if the operational depth could be increased to near 30 feet, thereby increasing the wall height and reducing the tank diameter. The cost savings in the smaller diameter structure are directly related to the reduction in roof and floor slab diameter and reduction in number of roof columns needed. Savings might also be achieved by reducing the amount of ground improvement beneath the smaller diameter reservoir. .

It is anticipated that this task will include hydraulic analysis, evaluation of supply system infrastructure improvement alternatives, coordination meetings with staff from the City of West Linn, South Fork Water Board (SFWB), and Oregon City, and evaluation of tank configuration concepts. The following key issues and options will be reviewed to establish elevations for the new reservoir floor and overflow, and final tank dimensions.

- Optimize floor elevation and system piping to eliminate dead storage, taking into account the depth of new and existing system piping needed to supply emergency storage to the Bolton Pressure Zone by gravity.
- Review limitations on overflow elevation due to the supply side hydraulic grade conditions and supply constraints, and optimize the upper limits of usable storage and overflow elevation. This will include a review of potential options for capacity upsizing of segments of the City's 18-inch diameter transmission main from the intersection of Buse Street and Broadway Street to the Bolton Reservoir Site, and a review of the alternatives for improving water supply to the City West Linn identified in the SFWB 2010 Water Mater Plan Update.
- Review pump suction constraints and potential suction line improvement, similar in concept to the City's prior pump suction extension, to maximize the low level volume that can be pumped to the Horton Pressure Zone

- Further optimize tank location and dimensions, taking into account possible easement opportunities or property size adjustments that may allow increased volume or improved constructability. Incorporate further constructability reviews by our technical team and a qualified tank contractor to vet adjusted tank layout options
- The results of reservoir sizing and configuration analyses will be summarized in a technical memorandum. A draft report will be provided for City review, and comments from the City will be incorporated into the final technical report.

Task 3.3 Deliverables:

- Reservoir sizing and configuration analyses technical memorandum

3.4 *Design Surveys* – Consultant shall complete surveying necessary for design, including boundary resolution and topographic survey services. The limits of the project for this scope of services shall include the following areas (as shown on the attached exhibit map):

- The Bolton Reservoir site (tax lot 7100)
- The easement between the reservoir site and Skyline Circle and all of Skyline Circle for water main design and site access.
- Skyline Drive between Webb and Firwood Drive (approx. 2,100 lf), Clark St. from Skyline to the southeast approx. 100' and the Wilderness park driveway cut for watermain design and site access.
- The southerly portion of Lots 5, 6 & 7 of Hillwood Park from the south line north to the 355' elevation, all of Tract A of Hillwood Park, the easement between Lot 5 & 6 of Hillwood Park and all of Caulfield Street from 50 feet west of Tract A easterly to the end for watermain replacement design, and overflow/stormwater facilities routed to Caufield Street.
- Sidewalk will be added to the southwest side of Skyline Drive. It will start on the south end approximately 200’ north of the curve by the high school and connect to the existing sidewalk just north of Firwood Street (2,700’ total).
- Approximately 800 lf of 8-inch diameter replacement water main on Skyline Drive and Clark Street, and PRV Vault on Skyline Drive.
- Approximately 3,500 lf of 24-inch diameter replacement water main on Skyline Drive, West A Street, Easy Street ROW, and Broadway Street from Skyline Circle to Buse Street.
- Approximately 900 lf of 18-inch diameter replacement water main on West A Street from Webb Street to Skyline Drive.
- 5. Approximately 600 lf of 8-inch diameter replacement water main on Broadway Street from Webb Street to Easy Street, and PRV Vault at Webb Street.
- Approximately 300 lf of 10-inch diameter replacement water main on Broadway Street from Webb Street to Easy Street.
- Approximately 1,000 lf of 8-inch diameter replacement water main on West A Street from Skyline Drive to Buse Street.

- Approximately 900 lf of 8-inch diameter replacement water main on Webb Street from West A Street to Terrace Drive, and on Terrace Drive southerly from Webb Street.
- Approximately 1,400 lf of 8-inch or 10-inch diameter replacement water main from the northwestern corner of the Bolton Site to Barclay Street, along easements and Barclay Street, with a crossing of Willamette Drive.

Consultant shall establish survey control and field locate existing property/right-of-way monuments within the limits of survey, review existing right-of-way records (i.e. surveys, plats, deeds and right-of-maps) and determine right-of-way/centerline locations from the above information. Topographic survey work shall include field survey of all existing above ground features (i.e. edge of pavement, curbs, sidewalks, buildings, trees, utilities, etc.) as well as elevations with one foot contour intervals. The below ground utilities will be located from one-call locate paint marks and existing as-built maps. An existing conditions base map will be prepared using the above data.

Task 3.4 Deliverables:

- An existing conditions base map will be prepared.
- CAD files to be provided to the City at the end of the project.

3.5 *Reservoir Design Geotechnical Investigation & Site-Specific Seismic Hazard Study* – Work under this subtask includes conducting a specialized geotechnical investigation of the project site specifically for constructing a partially buried reservoir and related facilities. The proposed geotechnical investigation work program for the reservoir structure is as follows:

- Available information for the existing and planned reservoir and pertinent geologic and geotechnical information for the project vicinity will be reviewed. A licensed geotechnical engineer and certified engineering geologist will examine the site and the accessible immediate vicinity to evaluate overall site conditions that may have changed since GRI's geotechnical evaluation in 2012 that could affect the design and construction of the new reservoir. Boring locations to supplement existing subsurface information will be located and marked at this time. Details of the proposed subsurface explorations are provided below.

- Two borings will be drilled to supplement existing subsurface information within the approximate footprint of the reservoir to provided information necessary for engineering and seismic studies. The borings will be drilled through the soil mantle and at least 15 ft into the underlying rock. Based on the explorations previously completed at the site, we anticipate the borings will extend to depths on the order of 70 to 75 ft below the ground surface. The total estimated drilling footage is 140 to 150 ft, depending on the depth to rock.

The borings will be made by a truck-mounted drill rig using mud-rotary drilling techniques. Disturbed split-spoon samples and undisturbed Shelby tube samples of overburden soil will be obtained at about 2.5-ft intervals in the upper 25 ft and 5-ft intervals of depth below this depth. The Standard Penetration Test will be conducted while the disturbed split-spoon samples are being taken. Hard rock, if encountered, will be continuously cored. At the completion of the drilling, the cuttings/spoils will be placed in drums and removed from the site unless a suitable location for disposal on the site is provided/approved by the City.

- In addition to the drilled borings, two or three hand-augered borings may be completed by GRI personnel along the alignment of the of the planned overflow line. The hand-augered borings will extend to depths of about 5 to 7 ft. Representative samples of the cuttings will be collected from each boring for further examination in our office.

- An observation standpipe will be placed in one of the drilled borings to permit measurements to be made of the depth to the groundwater table. The standpipe will consist of a 1.0-in.-I.D. plastic riser pipe attached at one end to a slotted pipe segment. A locking, flush-mounted metal monument will be placed over the top of the standpipe at the ground surface.

- Laboratory tests will be conducted to provide data on the important physical characteristics of the subsoils, essential for engineering studies and analyses. The laboratory tests will include standard classification tests, such as natural water content, unit weight, Atterberg limits, and grain size determinations. Consolidation testing of fine-grained samples obtained from the borings will also be performed to provide the information necessary for settlement studies. Corrosivity testing on two samples obtained from the borings will be completed by a subcontracted laboratory. The corrosively testing will include tests to evaluate chlorides, sulfates, resistivity, and pH.

- According to the 2012 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:

    - 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.

- 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.

- 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.

- Engineering analyses will be accomplished that will lead to the preparation of conclusions and recommendations concerning: (1) methods of excavation, temporary excavation slopes, and groundwater control; (2) site preparation and grading, including wet-weather construction, structural fill, and permanent cut and fill slopes; (3) foundation support for the reservoir, including suitable bearing strata, allowable bearing pressures, base course and subdrainage, and ground improvement, as appropriate; (4) estimated total and differential settlements; (5) modulus of subgrade reaction for the tank floor; (6) seismic design criteria, including potential seismic hazards that may affect the site; (7) lateral earth pressure design criteria for embedded walls; 8) design and construction criteria for temporary excavation shoring, and excavation and dewatering considerations, and (9) utilities.

- 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 your review and comment. The draft and final reports will be provided in electronic format.

Task 3.5 Deliverables:

- Geotechnical investigation and seismic hazard study report

3.6 *Evaluation of Ancient Landslide* – The existing Bolton Reservoir and proposed new reservoir site are located within a large ancient landslide mapped by the Oregon Department of Geology and Mineral Industries (DOGAMI). Work under this task, includes investigation and evaluation of the large ancient landslide. Anticipated work elements under this subtask include:

- *Review of Existing Information* – Review air photos, DOGAMI landslide maps and slide studies, prior geotechnical reports, local geologic maps, and landslide

mitigations in the vicinity of the reservoir site for background information related to landslide geometry and local geology.

- *Field Reconnaissance* – The DOGAMI landslide hazard map indicates that the Bolton reservoir site is located near the toe of a large ancient landslide that extends approximately 2,000 feet upslope (length), and 5,000 feet cross slope (width). A geologic reconnaissance of the ancient landslide terrain will be performed to evaluate for signs of historic activity. Based on visual observations and geologic understanding an initial conceptual cross section of landslide stratigraphy will be developed.

- *Qualitative Seismic Analysis of Landslide* – A qualitative analysis of seismic landslide performance will be performed, comparing the size and interpreted geometry of the landslide with comparable landslides which have undergone strong shaking. The evaluation will not include an evaluation of the seismic factor of safety or a quantitative evaluation of seismic deformations.

- *Public Meetings* – Attend up to three (3) public meetings to discuss landslide hazards in the region, observed performance of large ancient landslides in seismic events, and observations and qualitative evaluation of slide performance in the vicinity of the Bolton Reservoir. Cost for this work have been included in Task 2.1 for staff from Cornforth Consultants, assuming attendance at one (1) planning commission meeting and two (2) City Council meetings.

- *Technical Memorandum* – The results of the qualitative seismic landslide analyses will be summarized in a technical memorandum.

Task 3.6 Deliverables:

- Draft technical memorandum (PDF format).
- Submit three copies of the final report incorporating City comments.

3.7 30% *Preliminary Design and 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, 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 completion level.

Task 3.7 Deliverables:

- 30% preliminary design package to include draft preliminary design report, 30% design drawings, table of contents of the Contract documents.
- Preliminary cost estimate (PDF and Excel formats).
- Submit three copies of the final report incorporating City comments.

Task 4 – New Pitched Roof for Bolton Pump Station

Under this task, MSA will provide engineering services to construct a wood framed pitched roof over the existing Bolton Pump Station's flat reinforced concrete roof. The scope outlined in the following tasks for the roof improvement design and constructions services is based on the following assumptions:

- Roofing system will be standard standing seam metal or asphalt shingle composition construction.
- Type of work involved is assumed to be mechanical, architectural and structural with little to no electrical modifications required.
- CAD drawings of the existing pump station construction will be available from City's record drawings.

4.1 *Data Review and Site Visit* – Review existing pump station record drawings. Conduct a site visit to confirm existing conditions.

4.2 *Roof Design Concepts* – Develop concepts and prepare preliminary design architectural elevation and detail drawings for a wood pitched roof over the existing flat roof to review with the City and structural engineer.

4.3 *Roof Final Design* – Coordinate roof design with structural engineer. Develop preliminary framing concept based on anticipated roof configuration. Generation of gravity and lateral design loads. Perform analysis of existing building for support of additional loads from the new roof system. Develop HVAC and skylight modifications to accommodate new roof. New roof exhaust vents will replace existing flat roof vents, potentially utilizing gable end vents. It is assumed that the existing ceiling mounted exhaust fans will remain at current locations with no modifications required. New pump access hatches on the pitched roof will be centered over the existing skylights openings. Perform design and generation of preliminary construction documents. Provide preliminary design documents for design review submittal. Provide final structural construction drawings and calculations

4.4 *Roof Design Bidding Services* – Respond to Bidder Inquiries.

4.5 *Roof Design Construction Phase Services* – Review and respond to construction submittals, questions & RFI's. Perform three (3) structural observation site visits and observation reports.

Task 4 Deliverables:

- Design submittals in coordination with reservoir design submittals at 30%, 60%, 90% and final completion
- Electronic scalable set of plans (11"x17" PDF format).
- Contract documents including technical specifications (Word format).
- Cost estimate (PDF and Excel formats)
- Structural submittal reviews
- Structural observation site visits and observation reports

Task 5 – Skyline Drive Sidewalk Improvements and Off-Site Water Main

It is assumed that the sidewalk and off-site water main improvements will be designed, bid and constructed as a separate construction contract from the reservoir construction project. Sidewalk will be added to the southwest side of Skyline Drive. It will start on the south end approximately 200' north of the curve by the high school and connect to the existing sidewalk just north of Firwood Street (2,700' total).

Design services for off-site water main replacements will be provided for locations and extents described above in the Design Assumptions. Water main plan and profile sheets along Skyline Drive will be combined with other utility plan and profiles associated with the sidewalk improvements.

Skyline Drive is approximately 24' wide (2 – 12' lanes) within the project limits with some areas a little wider and varying unpaved shoulders. The "ultimate" street cross section will be 36' wide. Symmetrical widening (6' each side) is anticipated from Firwood Drive to Skyline Circle. From Skyline Circle to the southeast, the 12' widening is anticipated to be to the southwest towards the park. The cross section will be 6' sidewalk on the park side (south), 1.5' curb and gutter, 11' travel lane, 11.5' travel lane, 6' shoulder/bike lane (north side/uphill). Along the south edge, there are some cut areas with steep adjacent slopes. Designs will include Ultrablock retaining walls behind the sidewalk in this area with a goal of walls no taller than 4' exposed above the sidewalk. It is assumed cut slopes behind walls can be 1:1 with appropriate vegetation. If wall height exceeds 4', Consultant will review potential design revisions with the City.

Drainage will be conveyed through open ditch where possible behind the sidewalk. Some constrained areas (where retaining walls are required) may require inlets and pipes. The City may cut in drainage swales in the park outside of this project to divert some of storm water to appropriate locations to minimize flow on Skyline Drive.

The City will complete pavement core samples of the existing asphalt and determine an appropriate pavement cross section for the widening. It is assumed a 1.5" asphalt overlay will be completed across the entire road.

It is understood the final retaining wall layout and details will be designed and stamped by the Contractor using the plan and elevation information in the plans and that no geotechnical investigations will be completed as part of the wall design. The City will manage potential variability in soils during construction.

5.1 *Utility Coordination* – Road widening, sidewalk installation and retaining wall construction will require utility relocations on the southwest side of Skyline Drive. Consultant shall identify utilities within the project limits, evaluate potential utility conflicts and coordinate utility efforts for relocation of impacted facilities as necessary. Utility coordination efforts will include:

- Develop a utility contact information list and email project information letters to all utility companies involved to explain nature of the work.
- Provide project preliminary plans to each utility at 30%, 60% and 90%.
- Maintain a record of correspondence with utility companies.
- Obtain utility-provided as-built and system mapping information.
- Compare utility provided information with project base-mapping.
- Identify potential conflicts and issue conflict notices to impacted utilities.
- Coordinate with private utilities to resolve utility conflicts and finalize utility relocation requirements as appropriate. Affected utilities will be responsible for developing their relocation designs. Consultant shall review each utility's relocation plans and proposed schedule, provide written comments and issue approval.

Task 5.1 Deliverables

- Utility contact list.
- Utility project information letters and interim plan sheet distributions
- Reviewed utility relocation plans with comments and recommendations.

5.2 *30% Design* – Requirements under this task include:

- Complete a review of the City's existing mapping, as-builts, aerial photographs, topographic surveys, GIS information and other information as is available. It is assumed survey needs will be addressed in Task 3.4.
- Develop preliminary road widening designs within existing right-of-way to accommodate new sidewalk. This includes an initial 3-D model sufficient for showing the project footprint, cut/fill lines, preliminary cross sections and to support retaining wall elevation layout.
- Develop retaining wall elevation layout based on road widening designs.
- Develop stormwater conveyance concepts. It is assumed no stormwater management (treatment or detention) will be necessary.
- Develop water main replacement alignments.
- Pipeline corrosion soil resistivity analysis

- Prepare preliminary construction plans, profiles, cross sections, and details needed to clearly describe the work to be performed and establish the project footprint.
- No details, erosion control, traffic control or striping/signing plans will be submitted at this stage.
- Prepare cost estimate.

Task 5.2 Deliverables

- 30% preliminary design package to include electronic scalable set of plans (11"x17" PDF format), table of contents of the Contract documents, and cost estimate (PDF and Excel formats).

5.3 *60% Design* – The 60% design submittal shall be advanced from the 30% submittal (incorporating all review comments). Additional tasks in addition to those listed above include:

- Adjust road widening and retaining wall designs based on City comments.
- Define project footprint to confirm no right-of-way conflicts and no utility impacts exist. If such impacts exist or other coordination work is required, these can be provided as supplemental services.
- Develop preliminary stormwater conveyance designs.
- Develop preliminary water main designs, plan and profile.
- Determine number of significant trees to be removed if needed and submit tree removal permit. It is assumed no other permits will be required for the project.
- Develop details, pipeline corrosion protection, erosion control, traffic control or striping/signing plans.
- Develop preliminary technical specifications and contract documents. It is assumed the ODOT/APWA technical specifications will be used to supplement the MSA specifications as needed and standard City front end contract documents will be used in the construction contract bid package.
- Develop additional detail for other project elements as needed.

Task 5.3 Deliverables

- Electronic scalable set of plans (11"x17" PDF format), contract documents including technical specifications (Word format), and cost estimate (PDF and Excel formats) to be included in the 60% design package.

5.4 *90% Design* – The 90% design submittal shall be advanced from the 60% submittal (incorporating all review comments). Additional tasks in addition to those listed above include:

- Develop grading elevations for road widening designs and refine cross sections.
- Advance preliminary water main designs, plan and profile.

- Develop retaining wall plan, refine elevation layout and provide details.
- Develop additional detail for other project elements as needed.

Task 5.4 Deliverables

- Electronic scalable set of plans (11"x17" PDF format), contract documents including technical specifications (Word format), and cost estimate (PDF and Excel formats) to be included in the 90% design package.

5.5 *Final Design* – The final design submittal shall be advanced from the 90% submittal (incorporating all review comments).

Task 5.5 Deliverables

- Electronic scalable set of plans (11"x17" PDF format), contract documents including technical specifications (Word format), and cost estimate (PDF and Excel formats) to be included in the Final design package.

Task 6 – Reservoir Final Design

Following discussions with the City to refine the preliminary design criteria, MSA will proceed with the completion of final designs and prepare complete construction drawings and technical specifications for the project in accordance with the City standards, policies and procedures. 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. Subtasks include:

6.1 *Design Plans and Specifications Submittals* – MSA will submit plans and specifications for City review at the 60 and 90 percent completion levels, incorporating City review comments from each prior submittal. Plans will illustrate general, civil, structural, instrumentation and electrical information necessary for the modification of existing facilities and construction of the new facilities and will include the elements noted in the Design Assumptions identified above.

It is assumed the technical specifications will be based on standard Construction Standards Institute (CSI) formats, and the construction contract bid package will be prepared using either MSA (EJCDC Contract format) or standard City front end contract documents. An engineer's estimate of probable construction costs will be developed and updated at each design submittal stage.

At each completion level, three sets of draft plans and specifications will be submitted to the City for review and comment. After addressing and incorporating the 90 percent review comments, an updated plan set will be submitted for detailed review by the Oregon Drinking Water Program.

Task 6.1 Deliverables

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

6.2 *Final Plans, Specifications and Contract Documents* – The final design submittal shall be advanced from the 90 percent submittal (incorporating all review comments). Work under this subtask includes preparing final contract documents, technical specifications and drawings required for bidding the project.

Task 6.2 Deliverables

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

6.3 *Other Permits and Approvals* – Under this task, MSA will provide assistance with obtaining permits and approvals and acquiring property for the 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. Subtasks are as follows:

- *Oregon DEQ National Pollutant Discharge Elimination System (NPDES) Storm Water Discharge Permit #1200-C* – The project construction will disturb more than one acre, therefore a 1200-C Permit will be required, and administered through Clackamas County Water Environment Services (WES). It is anticipated that this permit will be obtained by the construction contractor. This permit could be submitted in advance as part of the design phase, and then transferred to the construction contractor following project bidding and award. If the permit is obtained during design, this work will be completed outside this scope of work.

- *State of Oregon Department of Human Services (DHS), Drinking Water Program Plan Review* – Project designs and specifications will be reviewed and approved through the DHS Drinking Water Plan Review program as part of the final design phase. DHS conditions will be incorporated into the final designs and construction contract documents.

- *City Public Works Permit* – The City requires a Public Works Permit for construction located within the City's ROW. City roadway interests will be incorporated into final design reflecting permit approval conditions, including traffic control, hours of operation, surface restoration and paving. Final pipeline alignments will be configured to minimize roadway and traffic impacts. It is anticipated that the application for this permit be submitted as part of the final design phase, based on an approximate 60 percent complete design. City ROW

permit conditions will be incorporated into the final designs and construction contract documents.

- *City Building Permit* – It is anticipated that the construction contractor will be responsible for preparing and submitting all trade permits to include the building permit. No MSA services are anticipated for this item.

Task 6.3 Deliverables

- Completed application for (NPDES) Storm Water Discharge Permit #1200-C.
- Submittal for (DHS), Drinking Water Program Plan Review.
- Completed application for Public Works Permit.

Task 7 – Reservoir Bidding Services

Under this task, MSA will provide assistance to the City during the publicly bid contractor selection process for the reservoir project. It is assumed the City will print and advertise the project and MSA will be the primary point of contact for bidder inquiries. Consultant services will include:

- Conduct an on-site pre-bid meeting with prospective bidders.
- Assist the City as needed in responding to all bidder inquires during the bid period.
- Review specialty contractor prequalifications required for Reservoir Contractor, Earthwork Contractor, and Reservoir Pre-stressor. Submitted contractor pre-qualification forms will be reviewed to confirm the listed record of experience on similar type construction and size water reservoirs of the contractor, superintendent and foreman, as appropriate.
- Provide necessary bid addenda (assumed two addendum) to identify list of prequalified contractors, and address bidder questions necessary or clarify the intent and/or requirements of the contract documents, as needed.
- Assist City staff with the evaluation of all bids, Provide letter of recommendation for award upon receipt of bid tabulations and bid packages.

Task 8 – Reservoir Construction Phase Services

Construction phase services for the project include periodic construction observation and a number of other services including meetings, special inspections and reviews. It is anticipated that construction staking will be provided by the reservoir construction contractor. MSA will coordinate survey control with the contractor's surveyor.

This task includes the following subtasks:

8.1 *Construction Contract Administration* – Prepare and coordinate the execution of construction contracts and associated bonds, certifications, forms and other contractual requirements and prepare other various construction contract related

communications as required to properly administer the construction contract(s) on behalf of the City.

8.2 *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.

8.3 *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. Maintain a submittal log and file. 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 75 submittals and resubmittals will be reviewed.

8.4 *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 percentage complete of unit price items. Such reviews will be completed within 5 calendar days of receipt of the contractor's monthly pay requests.

8.5 *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. Such 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.

8.6 *Process Change Orders* – Provide services related to any change orders. These include preparation of change order proposal description and justification documentation, assistance with negotiation of the change with the contractor, making recommendations to the City regarding any change orders, and processing the formal change order documents. For budgeting purposes it is assumed that no more than 4 change orders will need to be processed.

8.7 *On-Site Construction Observation, Project Meetings, Project Manager Site Visits* – Provide on-site construction observation services. For budgeting purposes it is

assumed that project construction will require approximately 17 months of active construction and that construction observation will be provided for approximately 60 percent of the time during construction activities for 9 of those months, and 25 percent of the time during the remaining 8 months, resulting in approximately 1,280 hours of field observation time. The representative will prepare written reports on the construction activities at the site, maintain a diary of his/her activities, decisions, discussions with the contractor and other observations, conduct the periodic on-site meetings with the contractor, document the preconstruction conditions and construction work by photographs and/or video tapes, 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. MSA will coordinate on-site representation field activities weekly with City staff so as to appraise the City of current and upcoming activities and work schedules.

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 any potential field problems and other issues regarding the project as well as to review the project progress versus the project schedule and to notify the City of any potential or actual claims or protests of the contractor or other matters of importance. Typically MSA's on-site construction representative will conduct these meetings.

Periodic site visits by MSA's project manager or project engineer will be conducted when significant construction is occurring or as important issues may need to be addressed. The purpose of these visits will be to answer 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.

8.8 *Special Inspections* – Coordinate and provide 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. In addition to the coordination services provided in this task, the MSA will provide the special inspection services required by IBC, specifically related to reservoir subgrade and reservoir's structural reinforcing steel, and a materials testing and inspection provided from a local materials inspection lab.

8.9 *Final Inspection* – 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 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.

8.10 *Project Files* – Maintain files throughout the entire project.

8.11 *Claims and Protests* – Notify the City in writing of any potential or actual claims or protests of the contractor. Coordinate with City staff and, if required, 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.

8.12 *Testing & Start-Up/Project Close-Out*– Coordinate with the contractor and the City for final testing and start-up of the facilities. Identify substantial completion of the project and submit a certificate of substantial completion with City concurrence. Recommend final payments to the contractor as appropriate.

8.13 *Operation and Maintenance Manual* – Compile all manufacturers' operation and maintenance manuals on the project facilities and transmit five copies to the City. Include text in the operation and maintenance manual with instructions on operation of the facilities. Manuals will be provided as a hard copy for City use.

8.14 *Record Drawings*– Prepare record drawings of the project based upon the construction records of the contractor and MSA's on-site representative. Submit one set of full-sized record drawings on mylar and electronic AutoCAD and pdf format files to the City.

8.15 *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.

Proposed Subconsultants

- HDJ Design Group, PLLC (HDJ) – Survey;
- Peterson Structural Engineering (PSE) – Structural Engineering;
- Geotechnical Resources, Inc. (GRI) - Site Geotechnical & Foundation Engineering;
- Cornforth Consultants, Inc. (Cornforth) – Ancient Landslide Evaluation;
- R&W Engineering, Inc. (R&W) – Electrical Engineering
- Susan Oman (SO) - Landscape Architect;
- Cascade Corrosion Consulting Services (CCCS) - Pipe Corrosion Engineering;
- ACS Testing, Inc. (ACS) - Concrete Inspection & Testing.

Proposed Project Fee Estimate

MSA proposes to perform this work on a time and expenses basis with a total not to exceed amount of $ $1,080,957 which includes design and construction support services. The proposed fee estimate is attached as Exhibit A.

Proposed Project Schedule

MSA proposes to complete the work as indicated in the Proposed Project Schedule attached as Exhibit B.

Preliminary Drawing List

GENERAL

G-1 Cover and Index Sheet
G-2 Location and Vicinity Maps
G-3 Symbols and Legend
G-4 Abbreviations
G-5 General Notes

EROSION AND SEDIMENT CONTROL

ESC-1 Cover Sheet and Erosion Control Notes
ESC-2 On-site ESC Plan
ESC-3 Off site ESC Plan
ESC-4 ESC Details

CIVIL

C-1 Existing Conditions and Demolitions Plan
C-2 Site Layout Plan
C-3 Site Grading Plan
C-4 Erosion Control Plan and Tree Removal and Protection Plan
C-5 Site Piping Plan
C-6 Reservoir Floor Plan
C-7 Reservoir Section and Details
C-8 Reservoir Access Road Plan
C-9 Reservoir Access Road Cross-sections
C-10 Roadway Details
C-11 Waterline Plan and Profile – 24" W STA A7+50 to 12+50 (Skyline Circle)
C-12 Waterline Plan and Profile – 4" W STA B0+00 to 5+00 (Skyline Circle)
C-13 Waterline Plan and Profile – 8" W STA C0+00 to 5+00 (to NW property corner)
C-14 Waterline Details
C-15 Reservoir Bypass Facilities
C-16 Overflow/Drain Plan and Profile – STA 0+00 to 5+00

C-17 Overflow/Drain Plan and Profile – STA 5+00 to 7+50
C-18 Miscellaneous Site Details – 1
C-19 Miscellaneous Site Details – 2
C-20 Traffic Control Plan Detour Map
C-21 Typical Traffic Control Plan and Road Closure

ARCHITECTURAL – RESERVOIR

A-1 Pump Station Roof Sections and Elevation
A-2 Pump Station Roof Architectural Sections and Elevation

STRUCTURAL – RESERVOIR

S-1 Reservoir General Structural Notes
S-2 Reservoir Quality Control Plan
S-3 Roof and Floor Plans
S-4 Reservoir Section and Column Details
S-5 Roof Slab Reinforcing Details
S-6 Prestressed Wall Sections and Details
S-7 Prestressed Wall Elevations and Details
S-8 Miscellaneous Details and Prestressing Notes
S-9 Foundation and Pipe Block Details
S-10 Hatch and Vent Details
S-11 Ladder and Access Details
S-12 Inlet Piping and Outlet Piping Details
S-13 Miscellaneous Pipe Details
S-14 Pump Station Roof Plan
S-15 Pump Station Roof Structural Sections and Details

MECHANICAL

M-1 Reservoir Inlet Mixing System Details
M-2 Reservoir Miscellaneous Pipe and Hatch Details
M-3 Pump Station Roof Mechanical

ELECTRICAL

E-1 Electrical Abbreviation, Symbols and General Notes
E-2 Partial One Line Diagram
E-3 Electrical Site Plan and Demolition Plan
E-4 Control System Connection Details
E-5 Electrical Details and Wiring Schedules

LANDSCAPING

L-1 Planting Plan

L-2 Planting Details

OFF-SITE WORK:

GENERAL

G-1 Cover and Index Sheet
G-2 Location and Vicinity Maps
G-3 Symbols and Legend
G-4 Abbreviations
G-5 General Notes

EROSION AND SEDIMENT CONTROL
ESC-1 Cover Sheet and Erosion Control Notes
ESC-2 ESC Plan (1" = 20', stacked)
ESC-3 ESC Plan (1" = 20', stacked)
ESC-4 ESC Plan (1" = 20', stacked)
ESC-5 ESC Details

CIVIL
C-1 Alignment and Grading Plan STA 0+00 to 10+00 (1" = 20', stacked)
C-2 Alignment and Grading Plan STA 10+00 to 20+00 (1" = 20', stacked)
C-3 Alignment and Grading Plan STA 20+00 to 27+00 (1" = 20', stacked)
C-4 Street Improvements Plan STA 0+00 to 10+00 (1" = 20', stacked)
C-5 Street Improvements Plan STA 10+00 to 20+00 (1" = 20', stacked)
C-6 Street Improvements Plan STA 20+00 to 27+00 (1" = 20', stacked)
C-7 Utilities Plan & Profile STA 0+00 to 5+00 (1"=20')
C-8 Utilities Plan & Profile STA 5+00 to 10+00 (1"=20') (w/ 8" W, STA 7+00 to 12+50)
C-9 Utilities Plan & Profile STA 10+00 to 15+00 (1"=20') (w/ 24" W, STA 12+50 to 15+00)
C-10 Utilities Plan & Profile STA 15+00 to 20+00 (1"=20') (w/ 24" W)
C-11 Utilities Plan & Profile STA 20+00 to 25+00 (1"=20') (w/ 24" W)
C-12 Utilities Plan & Profile STA 25+00 to 27+00 (1"=20') (w/ 24" W)
C-13 Waterline Plan and Profile – 4" W STA 0+00 to 5+50 (In park parallel to Skyline Dr)
C-14 Waterline Plan and Profile – 24" W STA A27+00 to 30+00 (Skyline Dr to West A St)
C-15 Waterline Plan and Profile – 24" W STA A30+00 to 34+50 (Skyline Dr to West A St)
C-16 Waterline Plan and Profile – 8" W STA C3+00 to 8+00 (from NW of site to HWY 43)
C-17 Waterline Plan and Profile – 8" W STA C8+00 to 13+00 (from NW of site to HWY 43)
C-18 Waterline Plan and Profile – 8" W STA C13+00 to 16+00 (from NW of site to HWY 43)
C-19 Waterline Plan and Profile – 8" W STA D0+00 to 3+00 (Clark St from Skyline Dr)
C-20 Waterline Plan and Profile – 8" W STA E0+00 to 5+00 (Broadway - Webb to Easy St)
C-21 Waterline Plan and Profile – 8" W STA E5+00 to 10+00 (Broadway - Webb to Easy St)
C-22 Waterline Plan and Profile – 24" W STA E10+00 to 15+00 (Broadway - Easy to Buse St)
C-23 Waterline Plan and Profile – 24" W STA E15+00 to 18+50 (Broadway - Easy to Buse St)
C-24 Waterline Plan and Profile – 24" W STA F0+00 to 2+70 (Easy St - Broadway to West A St)
C-25 Waterline Plan and Profile – 18"&24" W STA G0+00 to 5+00 (W. A St – Webb to Easy St)
C-26 Waterline Plan and Profile – 18"&24" W STA G5+00 to 10+00 (W. A St - Webb to Easy St)

C-27 Waterline Plan and Profile – 8" W STA G10+00 to 15+00 (W. A St - Easy to Buse St)
C-28 Waterline Plan and Profile – 8" W STA G15+00 to 19+50 (W. A St - Easy to Buse St)
C-29 Waterline Plan and Profile – 8" & 10" W STA H0+00 to 5+00 (Webb St - Broadway to NW K St)
C-30 Waterline Plan and Profile – 8" W STA H5+00 to 10+00 (Webb St - Broadway to NW K St)
C-31 Waterline Plan and Profile – 8" W STA H10+00 to 12+00 (Terrace Dr)
C-32 Skyline Drive PRV Vault
C-33 Broadway Street PRV Vault
C-34 Highway 43 Waterline Crossing Details
C-35 Street Typical Sections
C-36 Civil Details
C-37 Civil Details
C-38 Civil Details
C-39 Civil Details
C-40 Waterline Details

TRAFFIC CONTROL
TC-1 Traffic Control Staging Plan

STRIPING & SIGNING
S-1 Striping & Signing Plan STA 0+00 to 10+00 (1" = 20', stacked)
S-2 Striping & Signing Plan STA 0+00 to 10+00 (1" = 20', stacked)
S-3 Striping & Signing Plan STA 0+00 to 10+00 (1" = 20', stacked)

EXHIBIT A
BOLTON RESERVOIR REPLACEMENT
CITY OF WEST LINN
PROPOSED FEE ESTIMATE

Task Summary	Estimated Fees
Task 1 – Project Management	
	$ 67,646
Task 1 Subtotal	**$ 67,646**
Task 2 – Conditional Use Approval, Public Meetings and Presentations	
2.1 Public Meetings	
o One pre-application conference	$ 1,051
o Two Planning Commission meetings	$ 4,861
o One neighborhood meeting	$ 8,695
o Two City Council Meetings during the planning process	$ 2,679
o Two City Council Meetings during Design	$ 2,615
o Two City Council Meetings during Construction	$ 2,348
2.2 Conditional Use Approval and Design Review Application	$ 16,989
2.3 Planning Commission Appeal Process <Optional Task>	$ 10,907
2.4 City Council Appeal Process <Optional Task>	$ 10,907
Task 2 Subtotal	**$ 61,053**
Task 3 – Preliminary Engineering	
3.1 Site Review and Data Gathering	$ 10,401
3.2 Reservoir Siting Alternatives Analysis	$ 14,592
3.3 Reservoir Sizing and Configuration	$ 20,304
3.4 Design Surveys	$ 49,840
3.5 Reservoir Design Geotechnical Investigation & Site-Specific Seismic Hazard Study	$ 41,155
3.6 Evaluation of Ancient Landslide	$ 23,078
3.7 30% Preliminary Engineering and Design Report	$ 46,103
	$ -
Task 3 Subtotal	**$ 205,474**
Task 4 – New Pitch Roof for Botlton Pump Station	
4.1 Data and existing conditions review	$ 1,929
4.2 Preliminary Design	$ 3,881
4.3 Final Design	$ 19,007
4.4 Services During Bidding	$ 1,266
4.5 Services During Construction	$ 10,449
Task 4 Subtotal	**$ 36,532**
Task 5 – Skyline Drive Sidewalk Improvements and Off-site Water Main	
5.1 Utility Coordination	$ 9,369
5.2 30% Design	$ 39,109
5.3 60% Design	$ 61,157
5.4 90% Design	$ 51,711
5.5 Final Design	$ 32,283
Task5 Subtotal	**$ 193,629**
Task 6 – Reservoir Final Design	
6.1 Design Plans and Specifications Submittals	$ 127,229
6.2 Final Plans, Specifications and Contract Documents	$ 36,282
6.3 Other Permits and Approvals	$ 5,246
	$ -
Task 6 Subtotal	**$ 168,758**
Task 7 – Reservoir Bidding Services	
	$ 15,029
Task 7 Subtotal	**$ 15,029**
Task 8 – Reservoir Construction Phase Services	
8.1 Construction Contract Administration	$ 591
8.2 Preconstruction Conference	$ 3,111
8.3 Shop Drawings and Submittals	$ 36,446
8.4 Monthly Pay Requests	$ 8,570
8.5 Respond to RFIs	$ 16,851
8.6 Process Change Orders	$ 4,090
8.7 On-Site Construction Observation, Project Meetings, Project Manager Site Visits	$ 195,434
8.8 Special Inspections	$ 35,615
8.9 Final Inspection	$ 4,160
8.10 Project Files	$ 4,185
8.11 Claims and Protests (None Anticipated)	$ -
8.12 Testing & Start-Up/Project Close-Out	$ 4,363
8.13 Operation and Maintenance Manual	$ 3,904
8.14 Record Drawings	$ 13,820
8.15 Warranty Inspection	$ 1,698
Task 8 Subtotal	**$ 332,837**
TOTAL - ALL TASKS	***$ 1,080,957***

EXHIBIT A
BOLTON RESERVOIR REPLACEMENT
CITY OF WEST LINN
PROPOSED FEE ESTIMATE

	LABOR CLASSIFICATION (HOURS)															ESTIMATED FEES										
	Principal Engineer VI $210 TLB	Principal Engineer II $180 MLH	Principal Engineer I $172 JSJ	Professional Engineer IX $164 TPB	Professional Engineer IX $164 BMG	Professional Engineer VII $148 GEC	Construction Inspector $108 TBD	Professional Engineer IV $125 MLM	Professional Engineer IV $125 AHG	Professional Engineer III $117 RER	Engineering Designer II $108 JHF	Tech. IV $120	Tech. I $79	Admin. I $69	Total Hours	Labor	Subconsultants								Expenses	Total
																	HDJ	PSE	GRI	Cornforth	R&W	SO	CCCS	ACS		
Task 1 – Project Management																										
	24			240		40		120						24	448	$ 66,976									$ 670	$ 67,646
Task 1 Subtotal	**24**	**0**	**0**	**240**	**0**	**40**	**0**	**120**	**0**	**0**	**0**	**0**	**0**	**24**	**448**	**$ 66,976**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 670**	**$ 67,646**
Task 2 – Conditional Use Approval, Public Meetings and Presentations																										
2.1 Public Meetings																										
o One pre-application conference				3				3							6	$ 867									$ 184	$ 1,051
o Two Planning Commission meetings	4			6								4			14	$ 2,304				$ 2,420					$ 137	$ 4,861
o One neighborhood meeting	2			8		4		4				8			26	$ 3,784				$ 4,620					$ 291	$ 8,695
o Two City Council Meetings during the planning process	2			6	4							4			16	$ 2,540									$ 139	$ 2,679
o Two City Council Meetings during Design	2			6		4						4			16	$ 2,476									$ 139	$ 2,615
o Two City Council Meetings during Construction	2			8								4			14	$ 2,212									$ 136	$ 2,348
2.2 Conditional Use Approval and Design Review Application				24				40			50	16		2	132	$ 16,394									$ 595	$ 16,989
2.3 Planning Commission Appeal Process <Optional Task>	2			24				24			12	12	4	2	80	$ 10,546									$ 361	$ 10,907
2.4 City Council Appeal Process <Optional Task>	2			24				24			12	12	4	2	80	$ 10,546									$ 361	$ 10,907
Task 2 Subtotal	**16**	**0**	**0**	**109**	**4**	**8**	**0**	**95**	**0**	**0**	**74**	**64**	**8**	**6**	**384**	**$ 51,669**	**$ -**	**$ -**	**$ -**	**$ 7,040**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 2,344**	**$ 61,053**
Task 3 – Preliminary Engineering																										
3.1 Site Review and Data Gathering				12	4			16			24		4		60	$ 7,532		$ 1,800				$ 880			$ 189	$ 10,401
3.2 Reservoir Siting Alternatives Analysis	2			32				40			24		12		110	$ 14,208									$ 384	$ 14,592
3.3 Reservoir Sizing and Configuration	2	4		24	12			40			24		16	2	124	$ 16,038		$ 3,800							$ 466	$ 20,304
3.4 Design Surveys				2				8			8		8		26	$ 2,824	$ 46,860								$ 156	$ 49,840
3.5 Reservoir Design Geotechnical Investigation & Site-Specific Seismic Hazard Study				4				4			2			1	11	$ 1,441			$ 39,700						$ 14	$ 41,155
3.6 Evaluation of Ancient Landslide	2	2		8				4							16	$ 2,592				$ 20,460					$ 26	$ 23,078
3.7 30% Preliminary Engineering and Design Report	2	4		34	8			68			110	8	48		282	$ 33,160		$ 5,700			$ 2,370	$ 3,520			$ 1,353	$ 46,103
															0	$ -									$ -	$ -
Task 3 Subtotal	**8**	**10**	**0**	**116**	**24**	**0**	**0**	**180**	**0**	**0**	**192**	**8**	**88**	**3**	**629**	**$ 77,795**	**$ 46,860**	**$ 11,300**	**$ 39,700**	**$ 20,460**	**$ 2,370**	**$ 4,400**		**$ -**	**$ 2,589**	**$ 205,474**
Task 4 – New Pitch Roof for Bolton Pump Station																										
4.1 Data and existing conditions review			5					8								$ 1,860									$ 69	$ 1,929
4.2 Preliminary Design	1		8	1				12				4				$ 3,730									$ 151	$ 3,881
4.3 Final Design	1		10	2				25					10			$ 6,173		$ 12,562							$ 272	$ 19,007
4.4 Services During Bidding			2					2								$ 594		$ 616							$ 56	$ 1,266
4.5 Services During Construction			4	1			8	8								$ 2,716		$ 7,656							$ 77	$ 10,449
															0	$ -										$ -
Task 4 Subtotal	**2**	**0**	**29**	**4**	**0**	**0**	**8**	**55**	**0**	**0**	**0**	**4**	**10**	**0**	**0**	**$ 15,073**	**$ -**	**$ 20,834**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 625**	**$ 36,532**
Task 5 – Skyline Drive Sidewalk Improvements and Off-site Water Main																										
5.1 Utility Coordination						12			60						72	$ 9,276									$ 93	$ 9,369
5.2 30% Design				20		17		40	38	60	50		80		305	$ 34,286							$ 3,200		$ 1,623	$ 39,109
5.3 60% Design				40		38		60	76	90	70		140		514	$ 58,334									$ 2,823	$ 61,157
5.4 90% Design				40		23		60	46	60	70		100		399	$ 45,694							$ 3,960		$ 2,057	$ 51,711
5.5 Final Design	2			20		17		40	34	30	50		80		273	$ 30,696									$ 1,587	$ 32,283
Task 5 Subtotal	**2**	**0**	**0**	**120**	**0**	**107**	**0**	**200**	**254**	**240**	**240**	**0**	**400**	**0**	**1563**	**$ 178,286**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 7,160**	**$ -**	**$ 8,183**	**$ 193,629**
Task 6 – Reservoir Final Design																										
6.1 Design Plans and Specifications Submittals	8	20		120	4			200			240	48	160	30	830	$ 97,006		$ 17,100			$ 3,970	$ 4,730			$ 4,423	$ 127,229
6.2 Final Plans, Specifications and Contract Documents	2	8		28	4			48			65	16	40	12	223	$ 26,036		$ 5,700			$ 1,580	$ 1,760			$ 1,206	$ 36,282
6.3 Other Permits and Approvals				4				8			24		8	2	46	$ 5,018									$ 228	$ 5,246
															0	$ -									$ -	$ -
Task 6 Subtotal	**10**	**28**	**0**	**152**	**8**	**0**	**0**	**256**	**0**	**0**	**329**	**64**	**208**	**44**	**1099**	**$ 128,060**	**$ -**	**$ 22,800**	**$ -**	**$ -**	**$ 5,550**	**$ 6,490**	**$ -**	**$ -**	**$ 5,858**	**$ 168,758**
Task 7 – Reservoir Bidding Services																										
	1	4		16				32			32		8	8	101	$ 12,194		$ 1,800			$ 440	$ 220			$ 375	$ 15,029
Task 7 Subtotal	**1**	**4**	**0**	**16**	**0**	**0**	**0**	**32**	**0**	**0**	**32**	**0**	**8**	**8**	**101**	**$ 12,194**	**$ -**	**$ 1,800**	**$ -**	**$ -**	**$ 440**	**$ 220**	**$ -**	**$ -**	**$ 375**	**$ 15,029**
Task 8 – Reservoir Construction Phase Services																										
8.1 Construction Contract Administration				1				1						4	6	$ 565									$ 26	$ 591
8.2 Preconstruction Conference				4			4	4			8			2	22	$ 2,590		$ 460							$ 61	$ 3,111
8.3 Shop Drawings and Submittals		4		16				100			50				170	$ 21,244		$ 10,000	$ 1,280		$ 2,200	$ 1,500			$ 222	$ 36,446
8.4 Monthly Pay Requests				10				20			40				70	$ 8,460									$ 110	$ 8,570
8.5 Respond to RFIs				20				20			40				80	$ 10,100		$ 3,200	$ 1,280		$ 1,720	$ 440			$ 111	$ 16,851
8.6 Process Change Orders				8				8			16				32	$ 4,040									$ 50	$ 4,090
8.7 On-Site Construction Observation, Project Meetings, Project Manager Site Visits	2	4		24			1110	100			40				1280	$ 141,776			$ 39,150		$ 970	$ 1,320			$ 12,218	$ 195,434
8.8 Special Inspections							16	4							20	$ 2,228		$ 4,650	$ 3,290					$ 25,400	$ 47	$ 35,615
8.9 Final Inspection				4			8	8							20	$ 2,520		$ 620	$ 640			$ 330			$ 50	$ 4,160
8.10 Project Files								4			32			2	38	$ 4,094									$ 91	$ 4,185
8.11 Claims and Protests (None Anticipated)															0	$ -									$ -	$ -
8.12 Testing & Start-Up/Project Close-Out				4			16	8							28	$ 3,384					$ 580	$ 330			$ 69	$ 4,363
8.13 Operation and Maintenance Manual				4				8			20				32	$ 3,816									$ 88	$ 3,904
8.14 Record Drawings							20	8				12	40		80	$ 7,760		$ 3,570			$ 580				$ 1,910	$ 13,820
8.15 Warranty Inspection				4				8							12	$ 1,656									$ 42	$ 1,698
Task 8 Subtotal	**2**	**8**	**0**	**99**	**0**	**0**	**1174**	**301**	**0**	**0**	**246**	**12**	**40**	**8**	**1890**	**$ 214,233**	**$ -**	**$ 22,500**	**$ 45,640**	**$ -**	**$ 6,050**	**$ 3,920**	**$ -**	**$ 25,400**	**$ 15,094**	**$ 332,837**
TOTAL - ALL TASKS	***65***	***50***	***29***	***856***	***36***	***155***	***1182***	***1239***	***254***	***240***	***1113***	***152***	***762***	***93***	***6114***	***$ 744,286***	***$ 46,860***	***$ 79,234***	***$ 85,340***	***$ 27,500***	***$ 14,410***	***$ 15,030***	***$ 7,160***	***$ 25,400***	***$ 35,737***	***$ 1,080,957***

Notes:

1. Subconsultant fees shown include 10 percent MSA markup.
2. Subconsultants: **HDJ (Survey)**: HDJ Design Group, PLLC; **PSE (Structural)**: Peterson Structural Engineering; **GRI (Reservoir Geotech/Foundation)**: Geotechnical Resources, Inc.; **Cornfort**h **(Landslide)**: Cornforth Consultants, Inc.; **R&W (Electrical)**: R&W Engineering, Inc.; **SO: Susan Oman,** Landscape Architect; **CCCS (Pipe Corrosion):** Cascade Corrosion Consulting Services; **ACS (Concrete Insp & Testing)**: ACS Testing, Inc.
3. Expenses include mileage.

Exhibit B

City of West Linn
Bolton Reservoir Replacement Project
Proposed Project Schedule

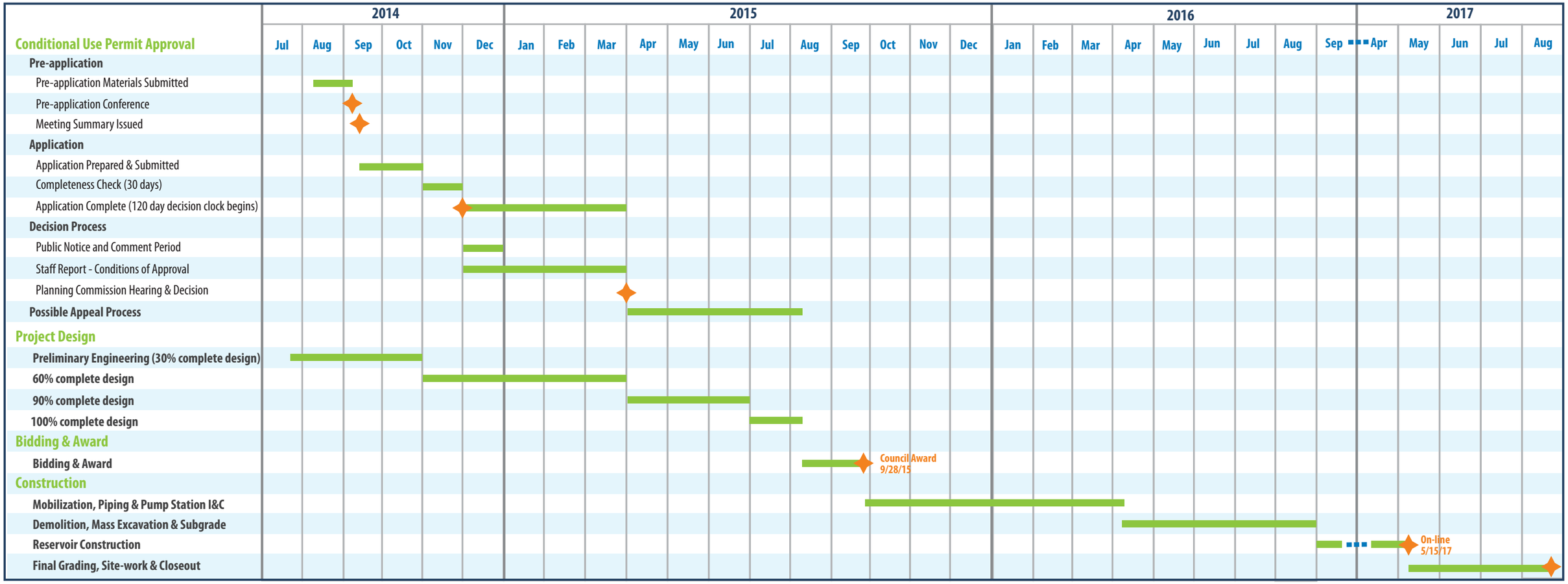
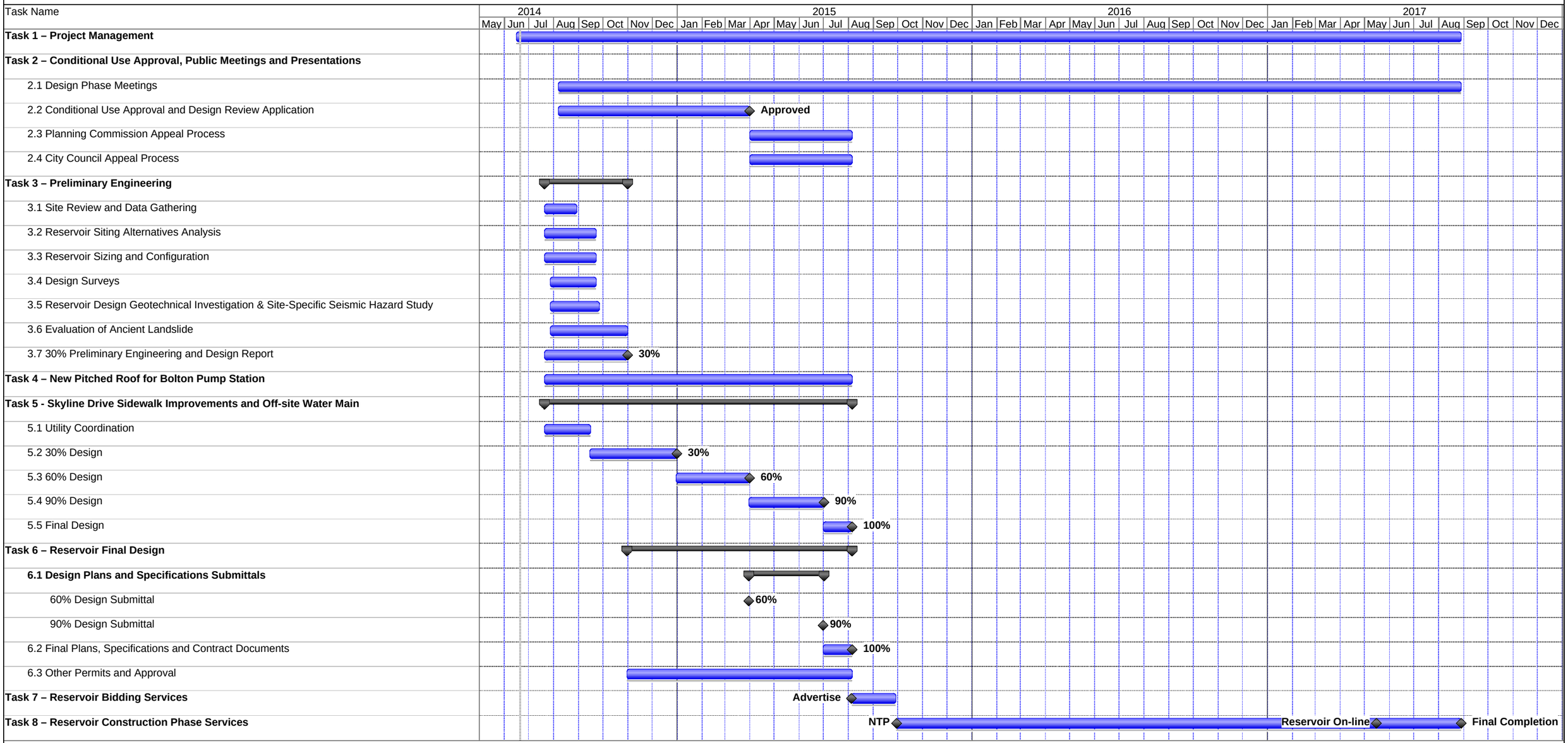


Exhibit B

CITY OF WEST LINN
BOLTON RESERVOIR REPLACEMENT PROJECT
PROPOSED PROJECT SCHEDULE



BD-0298
June 2014
\\ad.msa-ep.com\Portland\PDX_BD\Clients\West Linn\Bolton Reservoir Replacement 3-14\scoping\schedule\MS Project - Schedule by task\Bolton Reservoir Replacement Proposed Schedule.mpp

Murray, Smith & Associates, Inc.
Engineers/Planners

Bolton Reservoir
City of West Linn