OAK LODGE WATER SERVICES

BOARD OF DIRECTORS

NOVEMBER 21, 2023

OAK LODGE
WATER SERVICES

PUBLIC MEETING
OAK LODGE WATER SERVICES
BOARD OF DIRECTORS
NOVEMBER 21, 2023 at 6:00 p.m.

1. Call to Order

2. Call for Public Comment

3. Presentation of Drinking Water Intertie with the City of Milwaukie

4. Consent Agenda

   a. September 2023 Financial Report
   b. Approval of October 17, 2023 Board Meeting Minutes

5. Consideration of Funding Increase for Financial Assistance Utility Rate Relief Program

6. Presentation of Quarterly Capital Projects Prioritization Report

7. Consideration of Resolution No. 2023-0022 Approving Amended and Restated Intergovernmental Agreement of Regional Water Providers Consortium

8. Consideration of Resolution No. 2023-0023 Approving a FY 2024 Budget Transfer

9. Consideration of Purchase of Five-Yard Dump Truck

10. Consideration of Engineering Contract with AKS Engineering for Oatfield Road Water Main Replacement Project Design

11. Business from the Board

12. Department Reports

    a. Administration
    b. Finance
    c. Public Works
    d. Plant Operations

13. Adjourn Meeting

OAK LODGE
WATER SERVICES

AGENDA ITEM

Title Call to Order
Item No. 1

Summary

The Chair will call the meeting to order with a quorum of the Board at the noticed time.

The Chair may request participation in a nonpartisan acknowledgement of their choosing.

The General Manager will review the meeting protocols before business is discussed.

OAK LODGE
WATER SERVICES

AGENDA ITEM

Title	Call for Public Comment
Item No.	2
Date	November 21, 2023

Summary

The Board of Directors welcomes comment from members of the public.

Written comments may not be read out loud or addressed during the meeting, but all public comments will be entered into the record.

The Board of Directors may elect to limit the total time available for public comment or for any single speaker depending on meeting length.

OAK LODGE
WATER SERVICES

AGENDA ITEM

To	Board of Directors
From	Brad Albert, Public Works Director/District Engineer
Title	Presentation of the Emergency Water Intertie Preliminary Design
Item No.	3
Date	November 21, 2023

Summary

Oak Lodge Water Services (OLWS) provides potable drinking water to approximately 28,400 residents in Clackamas County. The potable drinking water is supplied by the North Clackamas County Water Commission (NCCWC) Water Treatment Plant which has a single source of surface water from the Clackamas River. The potable water is pumped through a single 24" diameter cast iron (other than a small section of ductile iron located beneath I-205) transmission main that was built in 1965 and fills OLWS's two 5-million-gallon (MG) tanks at the Valley View Reservoir Site also known as the Lower Zone Reservoirs.

Oak Lodge Water Service is entirely dependent upon water being pumped through the single 24" diameter transmission main. As stated in the 2020 OLWS Water Master Plan additional system improvements are required to provide a secondary supply source for OLWS to mitigate risks of an outage of the single water supply pipeline. Three potential "Disaster Scenarios" were identified that would impact OLWS's ability to supply water to their customers and are listed below.

- Transmission Pipeline Outage (Conveyance Disruption)
- Clackamas River Contamination (Lack of Available Surface Water)
- Clackamas River Curtailment (Lack of Available Surface Water)

Using the 2020 OLWS Water Master Plan as a basis for beginning this work, two viable partners were identified to supply water to OLWS during the three disaster scenarios listed above. The viability of the partner's water source was determined based on the partners' water availability, type of water supply, and proximately to OLWS. The two potential partners are Clackamas River Water (CRW) and the City of Milwaukie (City). Both potential partners were approached about entering into an intergovernmental agreement for an emergency intertie. OLWS and WSC held meetings with both CRW and the City of Milwaukie to explore the potential interest, constraints, and feasibility of an emergency intertie.

After engaging in discussions with CRW, it was determined that pursuing an intertie partnership between CRW and OLWS at this time would not be suitable but should be contemplated later. As a result, a CRW emergency intertie has not been pursued at this time. However, an emergency intertie with the City of Milwaukie showed substantial promise, due to the mutually beneficial nature of the emergency intertie and increased benefit to OLWS through greater water reliability.

Due to the difference in hydraulic grade between the OLWS and City of Milwaukie distribution systems, an Emergency Intertie Booster Pump Station (BPS) is necessary as part of an emergency intertie to supply OLWS. During discussions with the City and early project coordination two Emergency Intertie BPS sites were identified for consideration.

Upon identifying a connection location to the City of Milwaukie system that can provide the desired capacity for OLWS, an alternative was identified that could locate an Emergency Intertie BPS on a property owned by OLWS within the City at the site of a former emergency intertie pump station with the Portland Water Bureau. The 18-inch diameter ductile iron suction pipeline would connect to a 12-inch diameter City distribution main on SE Lake Road in the City's Zone 2 pressure zone. The 12-inch diameter distribution main is capable of supplying substantial flow to the BPS and is adequate for station operation. From the connection point, the alignment will continue in SE Where Else Lane to the proposed site (owned by OLWS). The site is located at 4267 SE Bowman Street. The existing property was an old emergency intertie BPS between OLWS and the Portland Water Bureau in the Lake Road Neighborhood of the City of Milwaukie. Additionally, the alignment could use part of an existing easement for the pipeline alignment already owned by OLWS for the previous emergency intertie.

The proposed alignment would require easements and likely trenchless pipe installation to cross Kellogg Creek. In the OLWS system, the proposed 16-inch diameter ductile iron transmission main will connect to a 12-inch diameter pipeline in the OLWS Upper Zone near the intersection of SE Hill Road and SE View Acres Road. The View Acre Reservoirs are roughly 1,600 feet from the connection point and could be filled using the intertie, with water supplied to the Lower Zone through existing pressure reducing valves in the distribution system.

Since this project is mutually beneficial to both OLWS and the City of Milwaukie, both sides should work on an Intergovernmental Agreement to sort out particulars of cost sharing of final design and construction. During the preparation of the agreement, some items that the two agencies should consider to avoid confusion once the site is operational is as follows:

- Which agency will fund which portion of the design and construction.
- Which agency will provide water when and under what circumstances. Limitations to both systems should be documented. These decisions will guide the operational programming.
- Which agency will be responsible for the maintenance of what portions of the intertie and its connections.
- What each agency will charge the other for each gallon consumed in both emergency (unplanned) and non-emergency (planned) and how that rate will be adjusted over time.

- Which agency plans to acquire easements or if they will be jointly acquired.
- How communications will occur when either emergency or non-emergency use are requested.
- How communications regarding changes to the agreement will occur in the future and how often both agencies would like to revisit the document together.

Attachments

1. Preliminary Intertie Report

DRAFT - Emergency Intertie

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DRAFT - Emergency Intertie

NOVEMBER 2023

Preliminary Design Report

Prepared by Water Systems Consulting, Inc

WSC

ACKNOWLEDGEMENTS

The Preliminary Design Report was prepared by Water Systems Consulting, Inc. The primary authors are listed below.

Jason Rice, PE

Scott Duren, PE

Phillip Medlock, PE

Water Systems Consulting, Inc. would like to acknowledge the significant contributions of Oak Lodge Water Services. The primary contributors are listed below.

Brad Albert, PE – District Engineer

Brad Lyon – Water Operations Supervisor

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ACROYNMS & ABBREVIATIONS

ADD	Average Day Demand
BPS	Booster Pump Station
C-factor	Hazen Williams pipe roughness coefficient
CI	Cast Iron
CIP	Capital Improvement Program
CMLC	Cement Mortar Lined & Coated Steel
CRW	Clackamas River Water
DI	Ductile Iron
DIP	ductile iron pipe
EMD	Emergency Demand
FF	Fire Flow
fps	feet per second
ft	Feet
GIS	Geographic Information Systems
GPCD	gallons per capita per day
gpm	gallons per minute
HAAS	Haloacetic acids
HGL	Hydraulic Grade Line
HP	Horsepower
IGA	Intergovernmental Agreement
in	inch
MDD	Maximum Day Demand
MG	Million Gallons
MGD	Million Gallons per Day
NCCWC	North Clackamas County Water Commission
OLWS	Oak Lodge Water Service

PHD	Peak Hour Demand
PLC	Programmable logic controller
PRV	Pressure Reducing Valve
psi	Pounds per Square Inch
PWB	Portland Water Bureau
SCADA	Supervisory Control and Data Acquisition
SE	Southeast
SF	Square Feet
VFD	Variable Frequency Drive
WMCP	Water Management and Conservation Plan
WSMP	Water System Master Plan
WSC	Water Systems Consulting
WTP	Water Treatment Plant

Executive Summary

The 2020 Oak Lodge Water Services (OLWS) Water Master Plan states OLWS's system has a single water supply source which presents the risk of a potential extended supply outage unless an emergency supply source is available. If the 24" diameter transmission main feeding OLWS fails or if the North Clackamas County Water Commission Treatment facility was unable to treat Clackamas River Water, OLWS will be relying solely on their available emergency storage which can only provide enough volume for a few days depending on the level of systemwide demand. Both the City of Milwaukie (City) and Clackamas River Water were presented as potential partners for an emergency intertie. During the preliminary design phase, it was determined that an emergency intertie with the City was the most feasible in the short-term.

The emergency intertie project between the City and OLWS will provide a solution to both agency's water supply challenges. The proposed emergency intertie can provide 2.7 million gallons per day (MGD) to meet emergency demands through 2037 from the City of Milwaukie to OLWS during an emergency event at an average 24-hour pumping flow rate of 1,875 gallons per minute (gpm). The City of Milwaukie will also be able to receive water from OLWS through the intertie. The project will enhance both agencies' access to different water sources allowing for greater water supply resiliency for both communities. An outage in the OLWS system that lasted longer than one week could exceed the ability of the City to supply the full 2.7 MGD due to limited well production, treatment, and storage in the City system, however the City could use an emergency intertie with the Portland Water Bureau to augment supply and meet the combined emergency demands of both agencies. During final design, available water production in the City's system should be confirmed.

The proposed Emergency Intertie Booster Pump Station (BPS) would be located on an existing lot owned by OLWS at 4267 SE Bowman Street. Additional easement or property acquisition may be necessary from adjacent private properties to accommodate maintenance access and construction activities. The proposed station will operate with one lead and one lag pumping unit. The proposed pumping units are 150 horsepower (HP) and allow for a full 2.7 MGD daily pumping redundancy. Variable frequency drives will be used to allow flexibility in providing emergency supply to OLWS while accommodating varying demands within the City system without impacting City service pressures.

A new 18" diameter ductile iron pipeline is proposed from the City's Pressure Zone 2 to the proposed Emergency Intertie BPS site. The pipeline alignment lies within Where Else Lane from SE Lake Road to 4267 SE Bowman Street for an approximate length of 1,800 linear feet.

A new 16" ductile iron pipeline is also proposed from the proposed Emergency Intertie BPS site to SE Hill Road in OLWS Upper Zone system. The proposed alignment is approximately 4,700 linear feet and requires easements and trenchless pipe installation to cross Kellogg Creek. The alignment goes through an unimproved right-of-way (ROW) along SE Kuehn Road and requires one easement from a property on SE Aldercrest Road to reach SE Hill Road for a length of approximately 1,200 linear feet.

The preliminary engineer's opinion of probable construction cost of the emergency intertie project between the City and OWLS is approximately $8,395,000 and summarized in Table ES-1.1-1.

Table ES-1.1-1

Item	Cost
Mobilization/Insurance, Permits and Bonds	$ 590,000
Pump Station	$ 1,740,500
City of Milwaukie Alignment (18" DIP) Pipeline	$ 765,000
OLWS Alignment (16" DIP) Pipeline	$ 1,880,000
Land Acquisition and Site Demo	$ 405,600
Total	$ 5,321,100
Contingency 30%	$ 6,917,430
Engineering, Design and CM Services (20%)	$ 1,399,000
Subtotal	**$ 8,395,000**

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1.0 Introduction

1.1 Purpose for Emergency Intertie

Oak Lodge Water Services (OLWS) provides potable drinking water to approximately 28,400 residents in Clackamas County. The potable drinking water is supplied by the North Clackamas County Water Commission (NCCWC or Commission) Water Treatment Plant which has a single source of surface water from the Clackamas River. The potable water is pumped through a single 24" diameter cast iron (other than a small section of ductile iron located beneath I-205) transmission main that was built in 1965 and fills OLWS's two 5-million-gallon (MG) tanks at the Valley View Reservoir Site also known as the Lower Zone Reservoirs.

OLWS is entirely dependent upon water being pumped through the single 24" diameter transmission main. As stated in the 2020 OLWS Water Master Plan additional system improvements are required to provide a secondary supply source for OLWS to mitigate risks of an outage of the single water supply pipeline. Three potential "Disaster Scenarios" were identified that would impact OLWS's ability to supply water to their customers and are listed below.

1. Transmission Pipeline Outage (Conveyance Disruption)

   The 24" transmission pipeline could potentially be damaged during a seismic event, be accidentally damaged during installation of other utilities, or simply fail due to old age. And in some locations, unique access challenges arise and may lengthen repair times.

2. Clackamas River Contamination (Lack of Available Surface Water)

   An accidental contamination of Clackamas River may result in reduced supply from NCCWC to OLWS due to disruptions to treatment processes. Accidental contamination may be caused by a nearby accident on a traveled way (roads or railways) disposing harmful material into the river or cyanotoxins from algal blooms, all of which reduce treatment capacity.

3. Clackamas River Curtailment (Lack of Available Surface Water)

   Local environmental restrictions to the volume of water withdrawal. During the later summer and early fall, withdrawals from the river could be curtailed to provide minimum flows for fishery health.

These disaster scenarios would be mitigated by an Emergency Intertie providing access to treated non-Clackamas River water. As concluded in the next section, a connection to the City of Milwaukie (City) became favorable due to their adjacency to OLWS, readiness for the project and willingness to provide water in the most likely disaster scenarios.

1.2 Background

On January 3, 2021, OLWS contracted WSC to support discussions with CRW and Milwaukie regarding emergency interties, for the purposes of providing to the OLWS Board a defined emergency intertie concept so that an informed decision can be made as to whether OLWS should proceed into detailed design and if federal funding support should be sought.

Using the 2020 OLWS Water Master Plan as a basis for beginning this work, that document identified two viable partners to supply water to OLWS during the three disaster scenarios listed in Section 1.1. The viability of the partner's water source was determined based on the partners' water availability, type of water supply, and proximate to OLWS. The two potential partners are Clackamas River Water (CRW) and the City of Milwaukie (City). Both potential partners were approached about entering into an intergovernmental agreement for an emergency intertie. OLWS and WSC held meetings with both CRW and the City of Milwaukie to explore the potential interest, constraints, and feasibility of an emergency intertie.

Clackamas River Water

At the time CRW was contacted regarding this project, Executive Staff were negotiating for their own needs with the City of Portland and could not invest the time needed to partner with OLWS on this project. They did, however, leave the door open to future communications regarding an emergency intertie between the two agencies.

City of Milwaukie

Since the initial discussions of the 2020 OLWS Water Master Plan, the City has maintained a responsive and supportive attitude towards establishing a mutually beneficial emergency intertie.

The City did express two main concerns with an emergency intertie with OLWS.

1. The City wanted to make sure they could still meet their customers' reasonable demands, and
2. The City was concerned about helping financially and what it could afford to participate.

Further discussions with the City were productive in identifying partnership options such as:

1. Land donation or property sharing
2. Cost sharing
3. Applying for grants on behalf of the project
4. Assisting on the City's Land Use and Building Permit process

1.3 Summary

After engaging in discussions with CRW, it was determined that pursuing an intertie partnership between CRW and OLWS at this time would not be suitable but should be contemplated later. As a result, a CRW emergency intertie will not be pursued at this time. However, an emergency intertie with the City of Milwaukie showed substantial promise, due to the mutually beneficial nature of the emergency intertie and increased benefit to OLWS through greater water reliability.

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2.0 Emergency Intertie Hydraulic Design Criteria

Due to the difference in hydraulic grade between the OLWS and City distribution systems, an Emergency Intertie BPS is necessary as part of an emergency intertie to supply OLWS. During discussions with the City and early project coordination two Emergency Intertie BPS sites were identified for consideration. To assess the best potential pipeline alignments that benefit both OLWS and the City, the following preliminary design criteria were established.

2.1 Emergency Intertie Booster Pump Station Flow Rate

The Emergency Intertie BPS design flow will be based on the OLWS emergency demand of 2.7 million gallons per day (MGD) as detailed in the OLWS 2020 Master Plan. The City distribution system hydraulic model was used to establish the available flow in the City's system at three connection points and at two Emergency Intertie BPS locations. The available flow will be compared to the OLWS emergency system demand and future flows from the 2020 OLWS Master Plan. Our objective is to determine the benefits of increasing the Emergency Intertie BPS capacity without incurring significant improvements in either system or escalating the project costs substantially. In essence, our design approach seeks to balance the current system infrastructure with OLWS demand scenarios while being cost-efficient. In summary the Emergency Intertie BPS will be based on the following:

- OLWS Minimum Emergency System Demand
- OLWS Future Flows
- Hydraulic Availability in the City of Milwaukie's System and OLWS System without improvements

2.1.1. Minimum Flow Rate

The Emergency Intertie BPS at a minimum shall supply the emergency demand (EMD) established in the 2020 OLWS Master Plan. The emergency demand is defined as the 2037 average day demand (ADD) in winter months and therefore represents household demands with minimum irrigation across the service area. The ADD in winter months is approximately 17% less than the 2037 yearly ADD (3.25 MGD). Therefore, we can assume OLWS can reduce summer ADD demands to winter month ADD demands. OLWS will ask their customers to reduce water usage through public outreach and water use restrictions such as discouraging irrigation until the 24-inch line is repaired or the Clackamas River is available.

If pumping at a constant rate over a 24-hour period, the minimum average pumping rate at the Emergency Intertie from City of Milwaukie to OLWS must be 1,875 gpm. The pumping rate Table

ES-1.1-1 below shows different pumping rate over different pumping periods to meet the 2037 EMD of 2.7MGD.

Table 2-1 Pump Rate per Hours of Operation to Meet 2037 Emergency Demand

2037 Emergency Demand EMD	Pump Rate per Hours of operation to meet 2037 Emergency Demand			
	24-Hours GPM	20-Hours GPM	18-Hours GPM	12-Hours GPM
2.70 MGD	1,875 gpm	2,250 gpm	2,500 gpm	3,750 gpm

Ideally, the station would be capable of pumping approximately 2,500 gpm over 18-hours. To meet a daily demand of 2.7 MGD, the actual instantaneous pumping rate may need to be lower during peak hour demands in the City system to avoid negatively impacting the City system and then increasing the pumping rate during periods of low demand when the system can convey more flow.

The design flow is 2,800 gpm for hydraulic analysis.

2.2 System Hydraulic Criteria

The system hydraulics shown in Table ES-1.1-1 below were established to determine the available flow in the City's system and size the pipelines.

Table 2-2 System Hydraulic Criteria

Item	Criteria
City of Milwaukie System Pressure	Maintain operating pressures of no less than 20 psi at all service connections during Peak Hour Demand (PHD), Max Day Demand (MDD), and Average Day Demand (ADD). Emergency Intertie programming will not allow operation during fire flow as City distribution system currently experiences pressure deficiencies and cannot supply OLWS with concurrent fire flow
Pipeline Velocities Through City of Milwaukie Suction Line	Maximum of 5 fps
Pipeline Velocities Through OLWS Discharge Line	Maximum of 8 fps

Item	Criteria
Well and Pumps	Pump Station W6 near Stanley Reservoir “ON”. To supply both OLWS and City of Milwaukie system demands.

The Emergency Intertie is reliant on Pump Station W6 near Stanley Reservoir operating. If Pump Station W6 is off, then the emergency intertie cannot operate without dropping City distribution system pressures below 20 psi in high elevation areas.

2.3 Design Flow Range

A design flow of 2,800 gpm was used to determine the pipeline diameter size for both the City and OLWS system. This flow rate was used because it represents 16 hours of pumping per day, which is reasonable to expect while avoiding peak hourly demands. The systems were modeled with a 12”, 16”, and 18” ductile iron pipe (DIP) with a Hazen-William coefficient of 130 (see Table E.1 in Appendix E for flows and head loss information).

The preliminary pipeline sizes are 18” DIP for the City of Milwaukie's system and 16” DIP for the OLWS system.

Table E.1 in Appendix E showing the various flow rates with their associated head loss for 12, 16 and 18-in pipelines.

3.0 Booster Pump Station Siting

Once the design criteria were established, specific siting of the pump station was explored. Three potential Emergency Intertie BPS alternative locations were discussed with the City and shown in Figure 3-1. Each Emergency Intertie BPS and associated pipeline alignment were determined based on available land, flow, and proximity to OLWS system. A preliminary pumping capacity (available flow) was determined using the City of Milwaukie's Zone 2 Reservoirs at three-quarter full (282.4 feet HGL) at MDD and Zone 1 Reservoir at three-quarter full (201 feet HGL) at MDD. The three alternatives are summarized below in

Table 3-0-1. Figure 3-1 depicts each of the alternatives.

Table 3-0-1 Alternative Summary

Item	Alternative 1	Alternative 2	Alternative 3
BPS Location	Island Station	Island Station	4267 SE Bowman Street
BPS Landowner	City of Milwaukie	City of Milwaukie	Oak Lodge Water Service
BPS Suction Zone	City of Milwaukie's Zone 1	City of Milwaukie's Zone 2	City of Milwaukie's Zone 2
Milwaukie's Pipeline Length	950 feet	4,200 feet	1,800 feet
Milwaukie's Alignment	In ROW – Land Acquisition not Required	Needs additional land acquisitions	Needs additional land acquisitions
BPS Discharge Zone	OLWS Lower Zone	OLWS Lower Zone	OLWS Upper Zone
OLWS's Pipeline Length	2,650 feet	1,600 feet	4,700 feet
OLWS's Alignment	In ROW, Land Acquisition not Required	Needs additional land acquisitions	Needs additional land acquisitions
Available Flow @ MDD in City of Milwaukie's System @ Reservoirs ¾ full	469 gpm @ 18-hrs (0.9 MGD)	2,430 gpm @ 18-hrs (2.6 MGD)	2,640 gpm @ 18-hrs (2.8 MGD)

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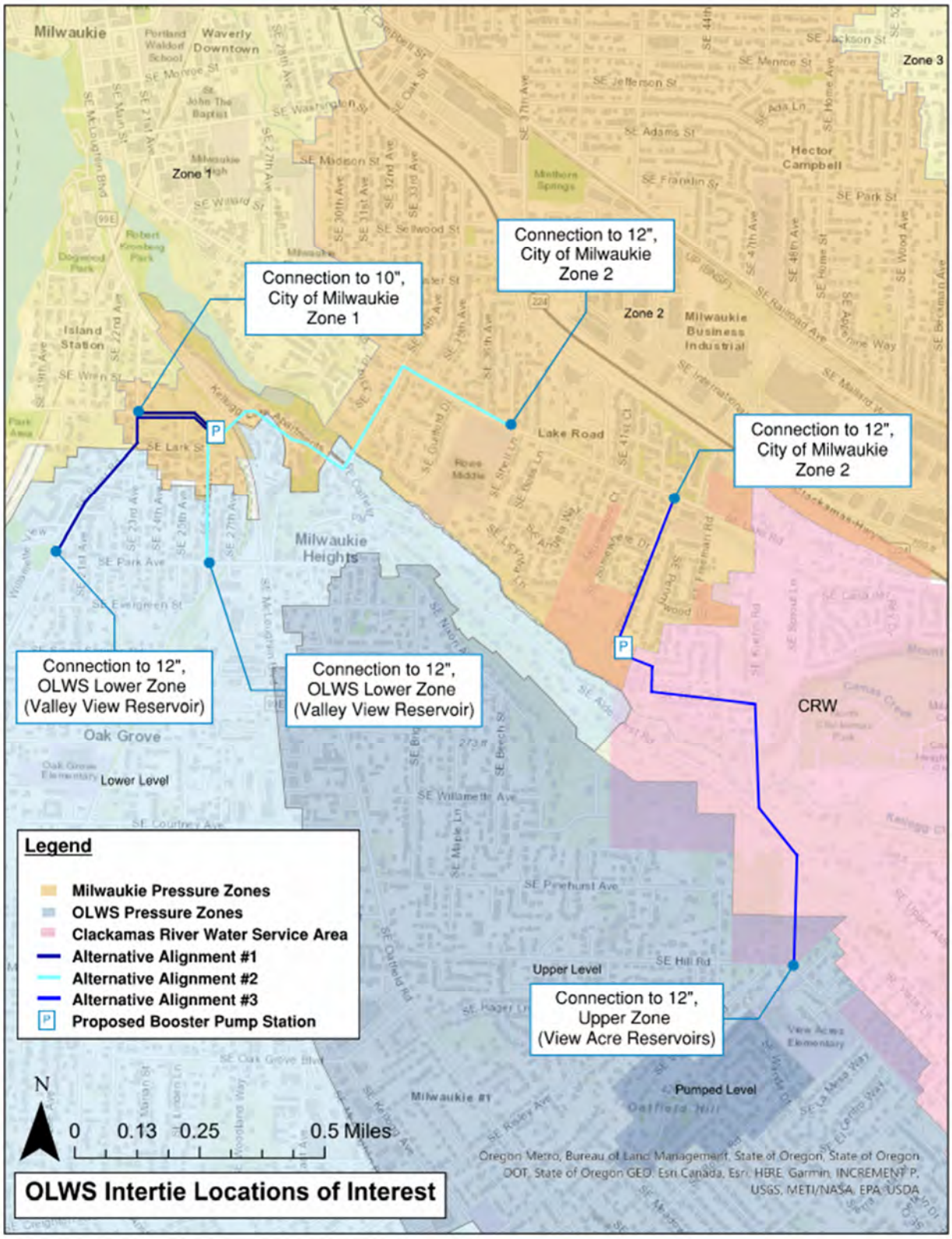

Figure 3-1 Alternative Locations 1, 2, and 3

3.1 Alternative1

Alternative 1 proposes to connect OLWS to Milwaukie's Zone 1 with a 16-inch pipeline. The connection is made in SE 23rd Avenue to a 10-inch pipeline, the closest access point to the largest pipeline in the Island Station neighborhood of the City. The City owns property near the TriMet light-rail tracks that could be used for siting the Emergency Intertie PS.

In the OLWS system, the 16-inch discharge pipeline will connect near the intersection of SE River Road and SE Park Ave to a 12-inch pipeline. This provides the added benefit of acting as a dual-purpose pipeline, upgrading OLWS secondary distribution backbone system while providing a transmission main for the Emergency intertie.

However, due to the City of Milwaukie's system constraints and the system hydraulic criteria, this alternative does not provide adequate flow for the project. However, before eliminating it as an alternative, approximate alignments along with Class 5 cost estimates were provided for comparison purposes.

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Figure 3.2: Alternative 1

3.2 Alternative 2

Similar to Alternative 1, an existing City property could be used to site the Emergency Intertie BPS in the Island Station neighborhood, but an alternative connection to the City's distribution system could provide significantly more capacity. Alternative 2 proposes to connect a 16-inch pipeline to Milwaukie's Water Pressure Zone 2, which has a higher available head and larger transmission mains. The alternative connects to the City's 12-inch diameter pipeline adjacent to Rowe Middle School in Lake Road. The construction of suction piping in the City would add costs compared to Alternative 1, as this alternative would require obtaining easements and trenchless pipe installation for crossing McLoughlin Boulevard and Trimet light rail tracks.

In OLWS' system, the 16-inch discharge pipeline will connect near the intersection of SE 26th Ave and SE Park Ave to a 12-inch pipeline. This provides the added benefit of acting as a dual-purpose pipeline, upgrading OLWS secondary distribution backbone system while providing a transmission main for the Emergency intertie. the alignment would serve as a dual-purpose pipeline upgrading OLWS secondary distribution system while providing a transmission main for the Emergency intertie.

For the purposes of comparing alternatives, this scenario was titled "Alternative 2" and is shown in Figure 3-3.

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Figure 3.3: Alternative 2

3.3 Alternative 3

Upon identifying a connection location to the City system that can provide the desired capacity for OLWS, an additional alternative was identified that could locate an Emergency Intertie BPS on a property owned by OLWS within the City at the site of a former emergency intertie pump station with the Portland Water Bureau. The 18-inch diameter ductile iron suction pipeline would connect to a 12-inch diameter City distribution main on SE Lake Road in the City's Zone 2 pressure zone. The 12-inch diameter distribution main is capable of supplying substantial flow to the BPS and is adequate for station operation. From the connection point, the alignment will continue in SE Where Else Lane to the proposed site (owned by OLWS). The site is located at 4267 SE Bowman Street. The existing property was an old emergency intertie BPS between OLWS and the Portland Water Bureau in the Lake Road Neighborhood of the City of Milwaukie. Additionally, the alignment could use part of an existing easement for the pipeline alignment already owned by OLWS for the previous emergency intertie.

The proposed alignment would require easements and likely trenchless pipe installation to cross Kellogg Creek. This alternative is depicted in Figure 3-4.

In OLWS' system, the proposed 16-inch diameter ductile iron transmission main will connect to a 12-inch diameter pipeline in the OLWS Upper Zone near the intersection of SE Hill Road and SE View Acres Road. The View Acre Reservoirs are roughly 1,600 feet from the connection point and could be filled using the intertie, with water supplied to the Lower Zone through existing pressure reducing valves in the distribution system.

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Figure 3.4: Alternative 3

3.4 Alternatives Cost Analysis

Once the project team had narrowed the alternatives to these three pump station sites and identified the major costs associated with each, high-level cost analyses were prepared for each and are provided in Table 3.4 below. After discussing these anticipated costs with the City of Milwaukie and OLWS, Alternative 3 was selected due to having the highest modeled capacity and the lowest cost per million gallons. Therefore, Alternative 1 and 2 will no longer be assessed in this report.

Table 3.4 Alternatives Cost Analysis

	Alternative 1	Alternative 2	Alternative 3
Total Available Flow (MGD)	0.90 MGD	2.6 MGD	2.8 MGD
Total Cost $	$ 2,854,500	$ 5,541,000	$ 5,285,400
Cost per MGD ($/MGD)	$3,172,000	$2,052,222	$1,957,555

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4.0 Preferred Alternative Hydraulics

After Alternative 3 was identified as the preferred option for the Emergency Intertie project, additional model runs were performed to assess the available pumping rate through different conditions in the City's and OLWS' system. The City PHD and MDD system demands severely limits the available supply to the BPS. There are a few homes on Island Station that are restricting the flow to the BPS due to their high elevation of approximately 186 feet. When the Zone 2 reservoirs are half full (277.4 feet), the Island Station area has approximately 39.6 psi of static pressure, thereby only allowing 45.2 feet of head loss (19.6 psi) to this area during a PHD or MDD condition. To exacerbate the issue, Island Station is far from the Zone 2 reservoirs and the City's Model assumes roughly 29 feet (12.6 psi) of head loss after leaving the reservoir at PHD. Simply replacing small diameter pipe in Island Station will not fix the low-pressure problem and provide more flow to the BPS. Two solutions are proposed to alleviate the low pressure and restricted flow to the BPS.

One, install a PRV station between OLWS and the City of Milwaukie at the Island Station. The PRV station will open during an emergency event when pressure at the Island Station drops to approximately 20 psi. This will protect the homes when OLWS has an emergency and needs to draw water from the City. Additionally, if there is a fire flow event in Island Station the PRV station would open and maintain 20 psi for the City's customers on Island Station. The City of Milwaukie's 2021 Master Plan indicates the Island Station area does not meet the required fire flow even without the Emergency Intertie (see Figure 4-4 of the City's Master Plan). Therefore, a PRV station would eliminate an existing system deficiency in the City system.

Two, have OLWS permanently provide water for the homes south of SE Lark St from the City of Milwaukie. OLWS would serve these homes from their Lower Zone. The homes would have an approximate static pressure of 73 psi to 58 psi if under OLWS' jurisdiction rather than 46 psi to 39 psi with the City.

Eliminating the Island Station low pressure issues allows more flow to the proposed Emergency Intertie. Without addressing this problem, the Island Station homes run the risk of dropping below 20 psi during Emergency BPS operation and would require the station to not pump below a suction pressure of 65 psi, which would limit flow to the BPS during all City flow conditions. Further analysis assumes this issue will be resolved by one of the two solutions described above.

Preliminary maximum flow rate when both the City's Reservoir and OLWS's Reservoir are half full and assuming a set City system pressure (maintain a set suction pressure at the station) are shown in Table 4 below. A dynamic simulation and model calibration is recommended in the final design to confirm the preliminary maximum flow rates.

Table 4-0-1 Available Flow at Different City of Milwaukie Demand Conditions

City of Milwaukie's Demand Condition	Available Flow	Pumping 24-hours	Pumping 16-hours	Pumping 8-hours
PHD	1,400 gpm	2.02 MGD	1.34 MGD	0.69 MGD
MDD	2,300 gpm	3.31 MGD	2.21 MGD	1.10 MGD
ADD	2,800 gpm	4.03 MGD	2.69 MGD	1.34 MGD
0.50*ADD	3,000 gpm	4.32 MGD	2.88 MGD	1.44 MGD

Note, depending on the City of Milwaukie reservoir levels and system demand conditions, the City of Milwaukie may only have limited supply to assist OLWS during an emergency event. More specifically if the City has a max day condition the intertie could not be used for extended periods unless the City of Milwaukie's system is augmented with CRW or PWB water.

The City of Milwaukie has a total emergency storage requirement to meet three (3) times ADD which includes well credits. However, the 2021 City of Milwaukie's Master Plan indicate the City of Milwaukie's has a deficiency of 0.3 MGD at projected 2040 Demands per Table 7-4 of the City of Milwaukie Master Plan. The total City storage is approximately 6.0 MGD without well credits.

OLWS has a total emergency storage requirement to meet 2 times the 2037 ADD (6.49 MGD) plus a surplus of 5.82 MG storage (total 12.31 MGD – see Table 5-12 of 2020 OLWS Water Master Plan). Therefore, OLWS has adequate storage for approximately 3.8 days. After approximately 3 days both the City and OLWS may only have adequate capacity for a limited number of days.

In the final design, water availability from the City of Milwaukie should be assessed in more detail at different scenarios and more precise well production/treatment, storage, water loss, data from the City and OLWS.

5.0 Preliminary Facility Design

Analysis of alternative 3's BPS site is provided below. The conceptual layout is provided at the end of Section 5 to summarize the preliminary design.

5.1 Existing Site Description

The existing site is owned and maintained by OLWS and is in the City of Milwaukie's Lake Road Neighborhood. The site address is 4267 SE Bowman Street and is approximately 50'(E-W) X 33.27'(N-S) (~1,600 sf) with the southeast corner of the property removed (See Figure 5-1). The site was once an Emergency Intertie BPS between OLWS and the Portland Water Bureau and has since been abandoned.

The existing site is "landlocked", meaning OLWS cannot access the site without crossing private property. To the north of the site is a vacant property owned by the City of Milwaukie. The property is in the early design phases to be developed into a neighborhood park. To the East and South of the site is private property (Parcel 2, 3300 address 4200 SE Bowman St and 3, 3302, 4206 SE Bowman St). To the west of the site is an easement. The easement was obtained for the Emergency Intertie BPS pipeline that has since been abandoned. However, near Where Else Lane there is a segment of land that is considered private property and does not allow for a continued path from public ROW to the existing site. Approximately 3,560 square footage of land acquisition is required if all the recommended design elements described in this section are implemented.

There are multiple trees on the site that will need to be removed if all facilities are to be placed within the current site boundaries (see Conceptual Layout). Even if the trees are to be removed, the facilities will be close together, making it challenging for operators to access the pumping units, fuel the standby generator, and access equipment. During final design, the extent of land acquisition will need to be discussed. The current proposed Emergency Intertie site creates the following design challenges:

- Minimize impact to the neighborhood via noise post tree removal
- Provide easy access for operates to maintain the facilities
- Fit all facilities within the site boundaries
- Secure site with a fence or wall

All challenges will be addressed below.

Figure 5-1 Existing Property and Proposed Land Acquisition

5.2 Existing Abandoned Emergency Intertie BPS Assessment

WSC visited the site on November 9, 2022, to see if any of the existing facilities were salvageable for the new Emergency Intertie BPS (See site visit photos in Appendix I). The facilities were corroded and the building weathered. The site only has access to single phase power, and the existing main control panel is weathered and damaged. Additionally, the existing piping is insufficient for vertical pumping units (see Section 5.4.2 for proposed pumping unit) and would require removing and replacing even if the existing facilities were in pristine condition. Lastly, the building is too small to house the larger pumping units.

WSC recommends the existing Emergency intertie BPS be demolished. The final design team needs to include a demo plan of the site in the final design.

5.3 Type of Pumping Units

Short set canned vertical turbine pumping units are recommended for use given the high head and flow. Horizontal end suction and above grade inline pumping unit will not provide sufficient flow and head. Please instruct the final designer if OLWS has a preferred manufacturer, otherwise, WSC would recommend Xylem Goulds or Pentair as pump manufacturers in the final design of the station.

5.4 Pump Station Configuration

Four pump configurations were assessed and are organized based on number of pumps, type of drive, and flow rate and are provided in the below Table .

Table 5.4-1 Pump Configuration Alternatives

Alternative	Pump Configuration	Drive Type	Approximate Flow and Head	Pumping Unit Estimated HP
1	2 Duty 1 Standby	Constant	950 gpm @ 230'TDH	100 HP
2	2 Duty 1 Standby	Variable	950 gpm @ 230'TDH	100 HP
3	1 Lead 1 Lag	Constant	1,400 gpm @ 220'TDH	125 HP
4	1 Lead 1 Lag	Variable	2,000 gpm @ 230'TDH	150 HP

5.4.1 Number of Pumping Units

A two duty and one standby (3 pumps) and a one duty and one standby (2 pumps) pump configuration were both assessed. More pumping units allow for greater flexibility, smaller unit size, and adequate redundancy. However, the 3-pump configuration was abandoned due to the sites small size. The building would be difficult to fit on the proposed site and the increase in facilities would increase the cost of the station without much benefit to OLWS or the City of Milwaukie.

WSC recommends the final designer optimize pump selection.

5.4.2 Type of Drive

Constant speed and variable speed pumping operation were considered for the station operation. Due to the uncertainty in the City of Milwaukie's system model, a variable speed pumping strategy is recommended. A variable speed drive has the added benefits of increased emergency pumping redundancy, minimized impact to City of Milwaukie's system, lower surge potential in both systems, and will result in a more efficient daily pumping strategy. During final design a lead lag variable speed pumping strategy and a lead lag constant speed pumping strategy should be assessed with a calibrated City of Milwaukie model.

It should also be noted that when this variable speed emergency intertie is needed during a max day period, the City's system will be operating in way that will require significant coordination from both OLWS and the City. Both alternative 3 and 4 pump selections are provide in the below pump and system curve figures.

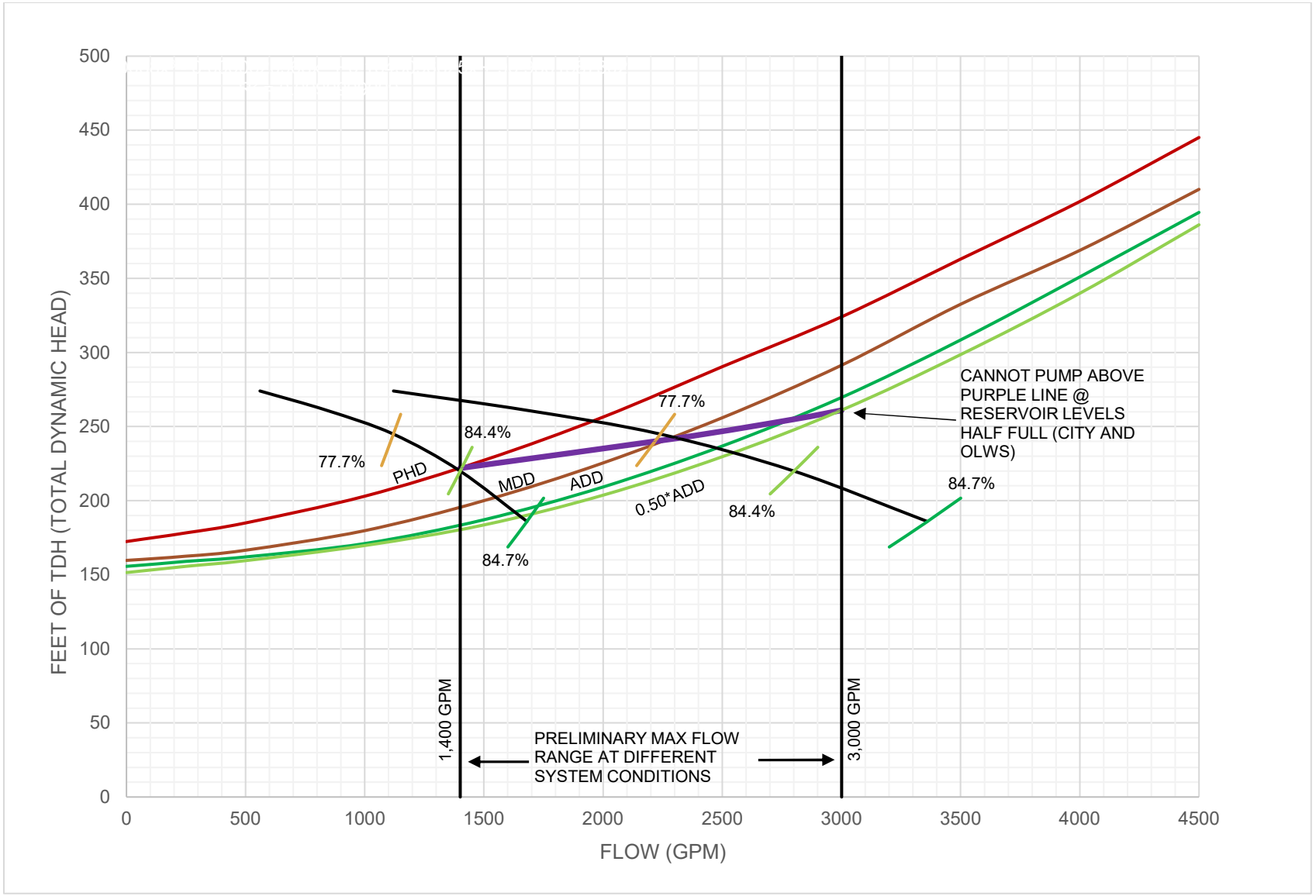

Figure 5-2 XYLEM GOULDS 14RJLO (STAGES:3) 1800 RPM VERTICAL TURBINE PUMPING UNIT 100 HP CONSTANT SPEED

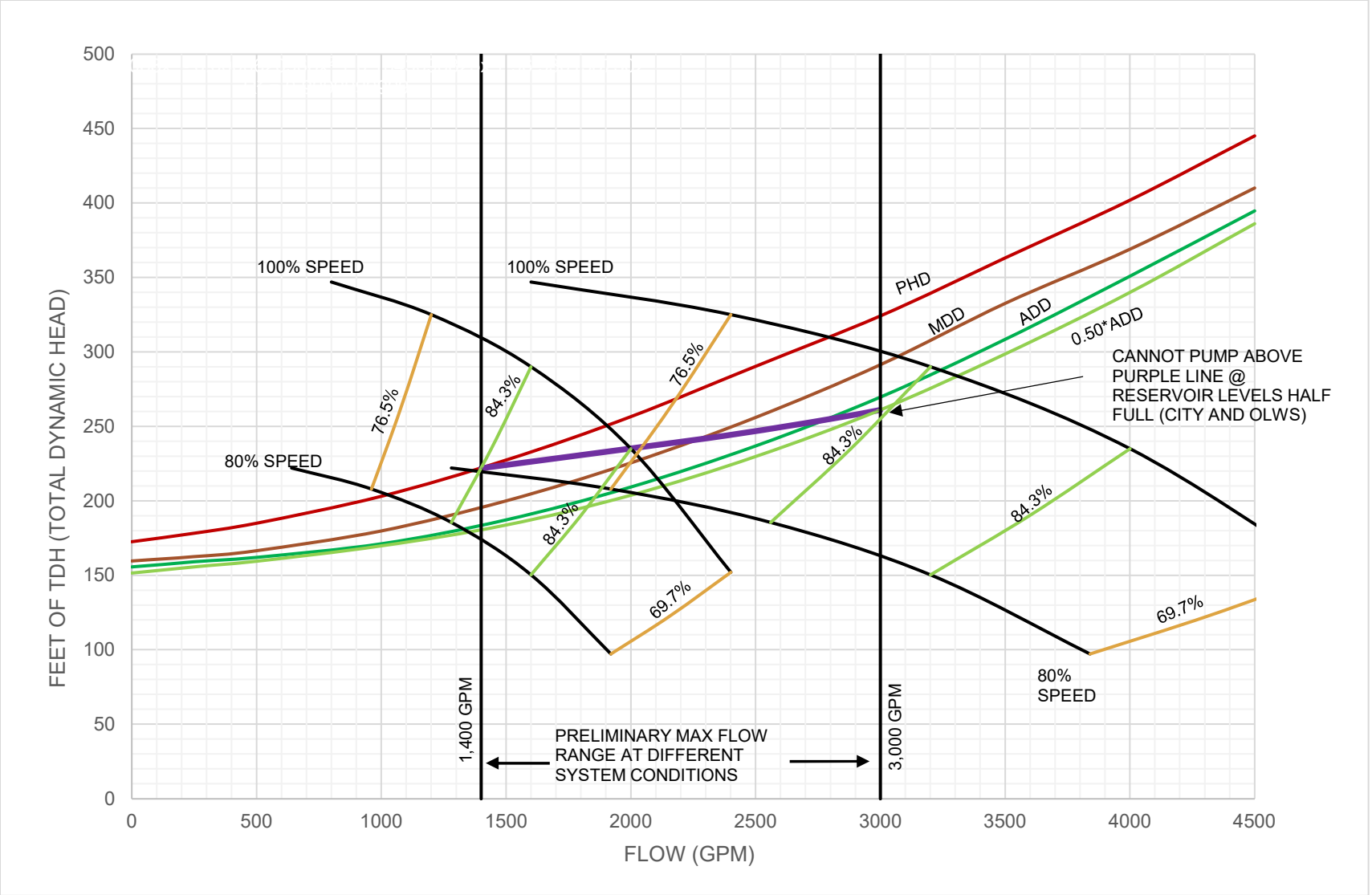

Figure 5-3 XYLEM GOULDS 14RJMO (STAGES:4) 1800 RPM VERTICAL TURBINE PUMPING UNIT - 150 HP VARIABLE SPEED

5.5 Designed Pressure and Flow Rate Considerations

A 150 HP pumping unit with a variable speed drive will provide the maximum amount of flow and operation flexibility. If system improvements occur in the City of Milwaukie's system, then the BPS can adjust to produce more flow while still ensuring 20 psi in the City of Milwaukie's system.

With VFD operation the lead pump is capable of supplying 2.7 MGD operating 24/7 with full station redundancy.

Due to the high head and flow of the emergency intertie BPS, a surge analysis needs to be performed in the final design. The analysis should include simulations for power failure and startup of the proposed pumping units at high head/low flow and low head/high flow conditions. Surge protection methods include, but are not limited to, pressurized surge tanks, vacuum relief valves, pressure/surge relief/anticipator valves, or a combination thereof. However, surge risks are significantly reduced with VFD operation.

Due to the elevation of the proposed Emergency Intertie BPS site, working pressure at the site can be approximately 200 psi (HGL = 535 feet, site elevation = 89 feet). Therefore, facilities are required to be of a higher-pressure rating. In lieu of 125/150 rated flanges and valves, 250/300 rated flanges and valves will be required. Additional facilities and appurtenances will need to be rated for the higher pressure as well. Note, these materials are readily available (not custom), however, they are more expensive. The final design team needs to be aware of the high discharge pressure at the BPS station when specifying facilities.

5.6 City of Milwaukie Pressure Reducing Valve

The City of Milwaukie's water supply is groundwater with access to both PWB and CRW. The City would like access to OLWS water supply during a City emergency condition or maintenance event. To ensure the emergency intertie project is mutually beneficial, a bypass line will be installed at the station. A combination pressure reducing/sustaining, and solenoid control valve has been selected for the desired goal.

The reducing feature burns head to an appropriate level for the City's system. The sustaining feature ensures OLWS system is not drained below OLWS system requirements (set minimum upstream pressure). The solenoid control valve is an electrical method of shutting down the bypass line if the City or OLWS request it to close during operation. Flow through the valve will vary based on upstream pressure conditions (View Acre Reservoir levels and demands in OLWS system) and downstream City demand conditions. The combination pressure reducing/sustaining, and solenoid control design parameters are defined in Table 5.6-1. The selected pressure reducing/sustaining, and solenoid control valve size will be 10-inch. Flow range, and final upstream and downstream pressure set point will need to be confirmed in the final design to ensure proper operation in both the City of Milwaukie's and OLWS' distribution system.

Table 5.6-1 10-inch Combination Pressure Reducing/Sustaining, and Solenoid Control Valve

10" PRV Condition	Description
PRV Upstream Set Points	Highest Pressure – 165psi (View Acre Reservoirs HWL of 470 feet) Close Set Point – 150 psi (Not to go below mid water of View Acre Reservoirs MWL =437 feet)
PRV Upstream Set Points	Maximum Discharge Pressure – 88 psi (City of Milwaukie's 292.4 feet) Verify in Final Design Minimum Discharge Pressure is dependent on System Demand (Verify in Final Design)
Flow Range	Maximum Flow – 4,900 gpm (7.06 MGD) Predicted Flow – 3,200 gpm (4.61 MGD) Minimum Flow – 35 gpm (0.5 MGD)

5.7 Electrical Facility Preliminary Design

5.7.1 Electrical Utility Service

The existing site currently does not have three phase 480VAC power. A new electric service is required to power the pumping units and station. Running the station purely from the standby generator was considered, but for the purposes of defining the project we have assumed that both a new 480/277 VAC service and an emergency generator will be provided. The electrical service and standby generator provide power redundancy to the station.

The electrical service will be supplied from Portland General Electric's (PGE) distribution system. A 480/277 VAC, three phase, 600-amp service will be provided. It is assumed the utility transformer will be pad mounted, to be determined by PGE. Electrical Utility Service preliminary footprint is 5'-6" x 3'-0" and will have a minimum of 4'-0" clearance in front of the transformer. The preliminary metering panel with main disconnect will be located on the exterior of the building, PGE shall review and approve of the location in the final design. The extent of the power distribution system is unknown and should be considered for the final design of the station. Excessive costs to extend 480/277 VAC to the property may not be warranted for a station that will likely not operate most of the year.

5.7.2 Standby Generator

In the event of an earthquake, both the 24" transmission main supplying OLWS and power to the BPS site may experience a failure. Therefore, the Emergency Intertie BPS site needs a standby generator onsite. During past extreme weather conditions, it was difficult to find diesel fuel in the greater Portland area. Therefore, to provide additional redundancy to the site, a dual fuel source generator (natural gas and diesel) was considered and assessed. After discussions with suppliers and representatives, WSC determined the cost and size to procure a dual fuel source generator was excessive and may not provide the best value for OLWS. For the purposes of defining the project, a diesel-powered standby generator is assumed. The proposed diesel standby generator is sized for the following:

- All Ancillary Lighting and Instrumentation
- 150 HP Duty Pump Running with VFD
- 150 HP Standby Pump Starting (In-Rush with VFD) at a 30% voltage dip

Based on a preliminary load calculation, the standby generator KW rating is 300 KW with a footprint of 15'-0" x 7'-0".

The diesel standby generator will be equipped with the following:

- Sound Enclosure (Reduce Noise)
- Anti-Vibration/Vibration Isolators (Reduce Noise)
- Place exhaust and engine away from neighbors

In final design the local air quality management district shall be coordinated with regarding emission standards for emergency standby generation.

5.7.3 Electrical Distribution and Motor Control Equipment

The motor control center (MCC) shall reside within the BPS Building and be the standard 90" high by 21" deep, mounted on a housekeeping pad. The MCC shall include an automatic transfer switch, power quality meter, surge protection device, phase monitor relay, variable frequency drives with motor circuit protectors and line reactors and local controls at each pump, 480 VAC feeder breakers, 15 kVA 3 phase transformer connected to 120/208VAC 42 circuit panelboard, and integral 30" wide MCC section for programmable logic controller (PLC) and operator interface panel (OIT). PLC and OIT hardware shall be provided and programmed by the installing contractor.

The building will have interior convenience receptacles, and exterior GFCI receptacle.

5.7.4 Instrumentation and Control Functionality

The emergency intertie BPS preliminary control strategy will be to monitor the City of Milwaukie's distribution system pressure and maintain a minimum set suction pressure via VFD speed control of the pumping units. Additional pressure control and monitoring will be installed on OLWS' distribution system to protect their infrastructure. A local PLC with interface panel shall be used by the operator to set desired pressure range, automate pump alternation, trend flow and pressure rates, tabulate pump run times and flow totals based on selected time periods.

Hard-wired back-up pump controls (high pressure switches) for the duty and standby pumps are recommended.

Two magnetic flowmeters are proposed. One to monitor flow from the City of Milwaukie to OLWS and the other to monitor flow from OLWS to the City of Milwaukie.

PLC system will include communication for remote monitoring. Additionally, a radio survey may need to be performed for both the City and OLWS for SCADA communications.

5.8 Civil Site Work Preliminary Design

Both OLWS and the City strive to be good neighbors to the communities in which infrastructure facilities like the Emergency Intertie BPS are located. A land use application is anticipated to be necessary for the proposed Emergency Intertie BPS since the pump station is not a residence and will be sited in a residential zone. The conditional land use application process may identify some conditions that would drive the station's ultimate design. The City is currently planning improvements at the adjacent Bowman Brae Park and the new pump station facility may need to blend into the park aesthetics to meet land use approvals. Below, Table lists a few assumptions for final design and potential conflicts.

Table 5.8-1 Civil Site Work Preliminary Design

Facilities	Description	Potential Conflicts/Considerations
Grading	Will Match Existing Grade	City is Unable to Share Proposed Park Storm Water Swale
Site Security	Block Wall with Retaining Wall or Chain-Link Fence	Does not Fit with Proposed Park Aesthetic and Reduces Site Access
Site Drainage	The building will be equipped with scuppers and discharge to the north towards the City's proposed park storm water swale. site drains will collect and drain to the storm water swale as well.	If the city is unable to share the proposed park storm water swale, site does not meet current stormwater requirements and retrofitting existing site may trigger stormwater bmps. There might not be sufficient room for stormwater bmps.
Site Access	Access from SE Bowman St. through 3,560 sf of Land Acquisitions	Existing private property owner(s) will not negotiate sell of property

Parking/ Crane Access	South of Existing Site	Existing private property owner(s) will not negotiate sell of property
Landscaping	Due to the size of the site no landscaping is recommended. The site is proposed to have concrete with site drains	Required to Install BMPs for Site Drainage

5.9 Ancillary Mechanical Preliminary Design

The following types of piping and mechanical equipment shown in Table are recommended by WSC. If OLWS has a preference on any of the following recommendations, please discuss them with the final design team.

Table 5.9-1 Mechanical Preliminary Design

Facilities	Description	Potential Conflicts/Considerations
Below Grade Suction Piping	18” DIP Class 250 up to suction header, Suction header – 18” Special Thickness Class 53 for Flanged Spools double cement thickness per AWWA C110	None
Above Grade Discharge Piping	12” DIP Special Thickness Class 53 field coated polyurethane	None
Below Grade Discharge Piping	16” DIP Class 350 double cement thickness per AWWA C110	May require thicker pipe near station (special class 53) depending on surge analysis
HVAC	Exhaust Fan and Louvers (per 2021 International Building Code Section 1202 Ventilation and removal or heat caused by VFD)	Noise may cause a problem
Water Quality Monitoring	Chlorine Residual Controller and Analyzer (Hach Equipment)	None
Pressure Reducing Station	10” Combination Pressure Reducing/Sustaining, and Solenoid Control Valve	Anti-cavitation trim may be required

5.10 Geotechnical, Survey, and Structural

5.10.1 Geotechnical

During the beginning of final design, a geotechnical site investigation should be performed and summarized in a geotechnical report. Due to the emergency nature of the facility the structural design for the building shall be Risk Category IV. Bore holes should be minimum of 20 feet for below grade canned vertical turbine pumping units.

5.10.2 Survey

A control survey will need to be conducted for the BPS Station and alignment control. Additionally, a route survey shall be performed for each pipeline alignment.

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5.10.3 Structural

The following building and structural components shown in Table 5.10.3, are anticipated to be included in the Emergency Intertie BPS.

Table 5.10.3-1 Structural Preliminary Design

Facilities	Description	Potential Conflicts/Considerations
Building Material	Footprint 23'-4"x 27'-4" Wall – CMU, Height = 12 feet with 2 feet of Parapet around the perimeter of the building Shallow Foundation – concrete Rick Category IV	Building footprint too large, other facilities cannot fit, building footprint may be reduced if pipe through wall is acceptable
Building Egress	1 x Double Leaf Door 1 x Single Leaf Door	None
Security System	Smoke Alarm for Building No Cameras Intrusion Alarm No Motion Detections Lights (Manual on/off) Lighting above doors	None
Roof	Roof –Waterproof Membrane Roofing Material, low pitch with parapet and scupper drain(s) with 2x skylights (roof hatches for pumps)	May be Living Roof if City does not allow sharing of Storm Water Swale

6.0 Schedule

Historically, OLWS has used the traditional design, bid, and build concept to complete projects of this size, as well as 30, 60, 90 complete design reviews. WSC prepared an ambitious schedule using those frameworks, while adding in time for land acquisition and procurement of items with lengthy lead times. It should be noted that because of these lead times, some items should be purchased by OLWS directly once the 60% Review meeting is held when those items have been agreed upon to be included within the project.

PROJECT TITLE	START DATE	DURATION
Emergency Intertie Project	11/01/23	737 days
		24 months
CLIENT NAME	**END DATE**	
Oak Lodge Water Service	11/07/25	

WBS	TASK NAME	STATUS	%	START DATE	END DATE	DURATION
1	**Proposal Phase**	**Not Started**	**0%**	**11/01/23**	**01/17/24**	**77**
1.1	Advertise Request for Proposals	Not Started	0%	11/01/23	12/01/23	30
1.2	Receive Proposals	Not Started	0%	12/01/23	12/01/23	0
1.3	Evaluate Proposals	Not Started	0%	12/15/23	12/31/23	16
1.4	Staff Reporting	Not Started	0%	12/15/23	12/31/23	16
1.5	Board Approval	Not Started	0%	01/16/24	01/16/24	0
1.6	Notice of Award	Not Started	0%	01/17/24	01/17/24	0
2	**Contract Negotiation Phase**	**Not Started**	**0%**	**01/17/24**	**02/19/24**	**33**
2.1	Contract Negotation	Not Started	0%	01/17/24	02/17/24	31
2.2	Contract Signing	Not Started	0%	02/18/24	02/18/24	0
2.3	Notice to Proceed	Not Started	0%	02/19/24	02/19/24	0
3	**Design Phase**	**Not Started**	**0%**	**02/19/24**	**12/12/24**	**297**
3.1	30% Design Delivery	Not Started	0%	02/19/24	05/31/24	102
3.2	30% Design Review	Not Started	0%	05/31/24	06/21/24	21
3.3	30% Design Review Meeting	Not Started	0%	06/21/24	06/21/24	0
3.4	60% Design Delivery	Not Started	0%	06/21/24	08/26/24	66
3.5	60% Design Review	Not Started	0%	08/26/24	09/16/24	21
3.6	60% Design Review Meeting	Not Started	0%	09/16/24	09/16/24	0
3.7	90% Design Delivery	Not Started	0%	09/16/24	10/19/24	33
3.8	90% Design Review	Not Started	0%	10/19/24	11/09/24	21
3.9	90% Design Review Meeting	Not Started	0%	11/09/24	11/09/24	0
3.10	100% Documents Submittal	Not Started	0%	11/09/24	12/12/24	33
4	**Property Acquisition Phase**	**Not Started**	**0%**	**09/16/24**	**02/13/25**	**150**
4.1	Negotiation	Not Started	0%	09/16/24	02/13/25	150
5	**Procurement Phase**	**Not Started**	**0%**	**09/16/24**	**06/21/25**	**278**
5.1	Pumping Units	Not Started	0%	09/16/24	06/21/25	278
5.2	Standby Generator	Not Started	0%	09/16/24	06/21/25	278
5.3	Main Control Panels	Not Started	0%	09/16/24	06/21/25	278
5	**Bidding Phase**	**Not Started**	**0%**	**01/06/25**	**02/19/25**	**44**
5.1	Bid Period	Not Started	0%	01/06/25	02/06/25	31
5.2	Staff Reporting	Not Started	0%	02/01/25	02/10/25	9
5.3	Board Approval	Not Started	0%	02/18/25	02/18/25	0
5.4	Notice of Award	Not Started	0%	02/19/25	02/19/25	0
5	**Construction Phase**	**Not Started**	**0%**	**02/19/25**	**11/07/25**	**261**
5.1	Submittal Review	Not Started	0%	02/19/25	05/20/25	90
5.2	Site Demolish and Tree Removal	Not Started	0%	03/01/25	03/22/25	21
5.3	OLWS 16" pipeline	Not Started	0%	05/20/25	06/19/25	30
5.4	City of Milwaukie 18" pipeline	Not Started	0%	05/20/25	07/19/25	60
5.5	Pump Station	Not Started	0%	05/20/25	09/17/25	120
5.6	Connections	Not Started	0%	09/17/25	10/17/25	30
5.7	Testing/Commissioning	Not Started	0%	10/17/25	11/07/25	21

7.0 Anticipated Costs

A more refined cost estimate was prepared after Alternative 3 was selected. The costs outlined are based on the presented conceptual layout.

Table 7.1 Alternative 3 Level 5 Project Cost Estimate

	Unit Cost	Unit	Quantity		Cost
Mobilization/Insurance, Permits and Bonds	7%			$	590,000
Mechanical					
Booster Station Piping	$ 400	LF	120	$	48,000
12" Check Valve	$ 18,750	EA	2	$	37,500
10" PRV Valves	$ 22,500	EA	1	$	22,500
12" BFV	$ 6,000	EA	5	$	30,000
16" BFV	$ 18,750	EA	2	$	37,500
6" GV with Hydrant	$ 10,000	EA	1	$	10,000
12" Flowmeter	$ 12,000	EA	2	$	24,000
Pumping Unit	$ 255,000	EA	2	$	510,000
Electrical					
VFD	$ 45,000	EA	2	$	90,000
Standby Generator with ATS	$ 250,000	EA	1	$	250,000
Main Control Panel	$ 100,000	EA	1	$	100,000
PLC, SCADA, and Instrumentation	$ 30,000	EA	1	$	30,000
Conduit and Conductors	$ 30,000	EA	1	$	30,000
Building Mounted Antenna	$ 5,000	EA	1	$	5,000
Electrical Utility Service	$ 20,000	LS	1	$	20,000
Three-Phase Power to Site	$ 80,000	LS	1	$	80,000
Integration and Start-up	$ 50,000	LS	1	$	50,000
Water Quality Controller with Analyzer	$ 25,000	LS	1	$	25,000
Civil/Structural					
CMU Building	$ 300	SF	637.8	$	191,328
Site Work	$ 150	SF	1000	$	150,000
Pipelines					
City of Milwaukie Alignment (18" DIP)	$ 425	LF	1800	$	765,000
OLWS Alignment (16" DIP)	$ 400	LF	4700	$	1,880,000
Other					
Site Demo	$ 20.00	SF	1600	$	32,000
Land Acquisition Easement	$ 63.00	SF	4800	$	302,400
Land Acquisition Site	$ 20.00	SF	3560	$	71,200
Total				$	5,381,000
Contingency 30%				$	6,995,300
Engineering, Design and CM Services (20%)				$	1,399,060
Subtotal				**$**	**8,394,000**

8.0 Funding and Financing Considerations

One particular grant that the City is eligible for is the Building Resilient Infrastructure and Communities (BRIC) Grant; a program administered by the Federal Emergency Management Agency (FEMA). The BRIC Program seeks to support states and local communities, tribes, and territories as they undertake hazard mitigation projects, reducing the risks they face from disasters and natural hazards. Other grants are available for this type of project, but those would need to be sought out and applied for as well.

9.0 Recommendations for Intergovernmental Agreement

Because this project is mutually beneficial to both OLWS and the City of Milwaukie, there will undoubtably be an Intergovernmental Agreement negotiated prior to its construction. During the preparation of this document, WSC documented the following items that we think the two agencies should consider to avoid confusion once the site is operational.

- Which agency will fund which portion of the design and construction.
- Which agency will provide water when and under what circumstances. Limitations to both systems should be documented. These decisions will guide the operational programming.
- Which agency will be responsible for the maintenance of what portions of the intertie and its connections.
- What each agency will charge the other for each gallon consumed in both emergency (unplanned) and non-emergency (planned) and how that rate will be adjusted over time.
- Which agency plans to acquire easements or if they will be jointly acquired.
- How contributions to the Bowman and Brae Park Project will occur and when.
- How communications will occur when either emergency or non-emergency use are requested.
- How communications regarding changes to the agreement will occur in the future and how often both agencies would like to revisit the document together.

References

City of Milwaukie 2021 Master Plan

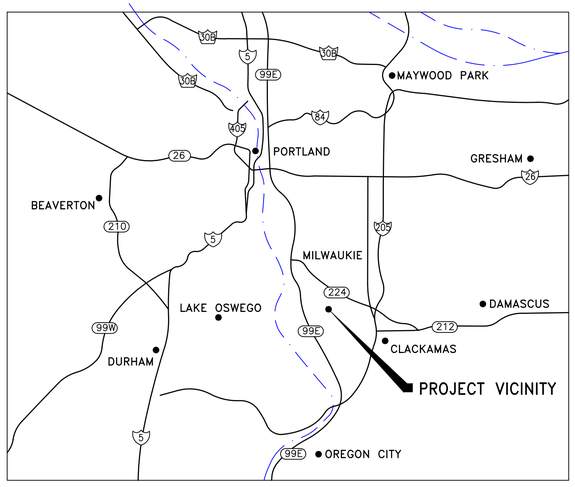
Oak Lodge Water Service 2020 Master Plan

Appendix A Preliminary Plans

OAK LODGE WATER SERVICES

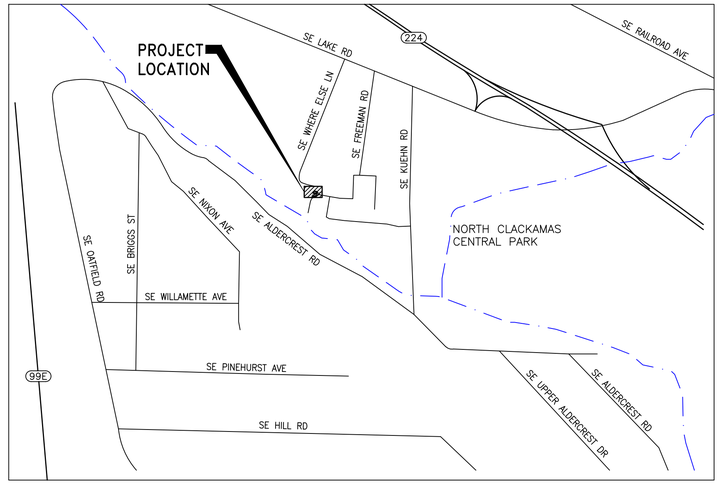
OAK LODGE
WATER SERVICES

CONSTRUCTION PLANS FOR
EMERGENCY INTERTIE BOOSTER PUMP STATION



VICINITY MAP
NTS

INDEX OF SHEETS



LOCATION MAP
NTS

SITE ADDRESS:
4267 SE BOWMAN ST
MILWAUKIE, OR 97222

48 hours BEFORE excavation
1–800–422–4133
CALL Underground Service Alert

DRAFT - NOT FOR CONSTRUCTION

REV	DATE	BY	DESCRIPTION

WARNING
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

DESIGNED PLM
DRAWN MAH
CHECKED ###
SCALE AS NOTED

PREPARED BY:
ENGINEER NAME DATE
RCE No.: #####

WSC
805 AEROVISTA PLACE, SUITE 201 SAN LUIS OBISPO, CA 93401
PHONE: (805) 457–8833 FAX: (805) 888–2764

OAK LODGE WATER SERVICES DISTRICT
14611 SE RIVER RD OAK GROVE, OR 97267

APPROVED:
_____ – _____– POSITION DATE

OAK LODGE WSD EMERGENCY INTERTIE BOOSTER PUMP STATION

TITLE, SHEET INDEX, VICINITY MAP, AND LOCATION MAP

DRAWING
G–1
SHEET 1 OF####
PROJECT # –

W:\3.0 Clients\Oak Lodge Water Services District OR 1100\10070 Emergency Intertie Preliminary Design Report\6.0 Working Files_CAD\OLWS-Intertie.dwg 8/17/2023 1:31 PM Mary Harrington

DRAFT - NOT FOR CONSTRUCTION

REV	DATE	BY	DESCRIPTION

WARNING
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

DESIGNED PLM
DRAWN MAH
CHECKED ###
SCALE 1"=10'

PREPARED BY:
ENGINEER NAME DATE
RCE No.: #####

WSC
805 AEROVISTA PLACE, SUITE 201 SAN LUIS OBISPO, CA 93401
PHONE: (805) 457-8833 FAX: (805) 888-2764

OAK LODGE WATER SERVICES DISTRICT
14611 SE RIVER RD OAK GROVE, OR 97267

APPROVED:
_____ _ _____ POSITION DATE

OAK LODGE WSD EMERGENCY INTERTIE
BOOSTER PUMP STATION

EXISTING SITE

DRAWING
C-1
SHEET 2 OF####
PROJECT # _

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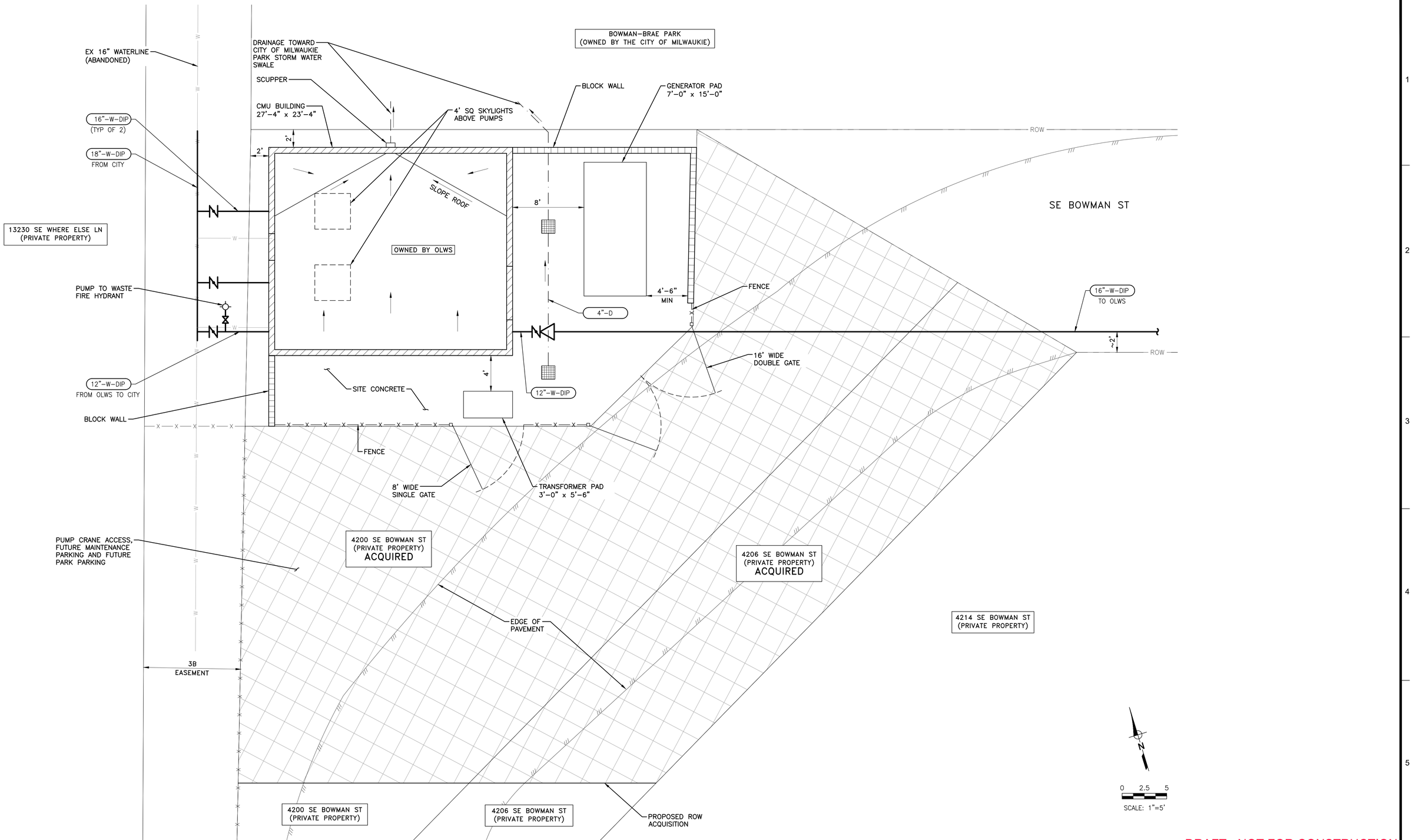

DRAFT - NOT FOR CONSTRUCTION

REV	DATE	BY	DESCRIPTION

WARNING
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

DESIGNED PLM
DRAWN MAH
CHECKED ###
SCALE 1"=5'

PREPARED BY:

ENGINEER NAME DATE
RCE No.: #####

WSC
805 AEROVISTA PLACE, SUITE 201 SAN LUIS OBISPO, CA 93401
PHONE: (805) 457-8833 FAX: (805) 888-2764

OAK LODGE WATER SERVICES DISTRICT
14611 SE RIVER RD OAK GROVE, OR 97267

APPROVED:

POSITION DATE

OAK LODGE WSD EMERGENCY INTERTIE
BOOSTER PUMP STATION

BOOSTER PUMP STATION
BUILDING LAYOUT

DRAWING
C-2
SHEET 3 OF ####
PROJECT # –

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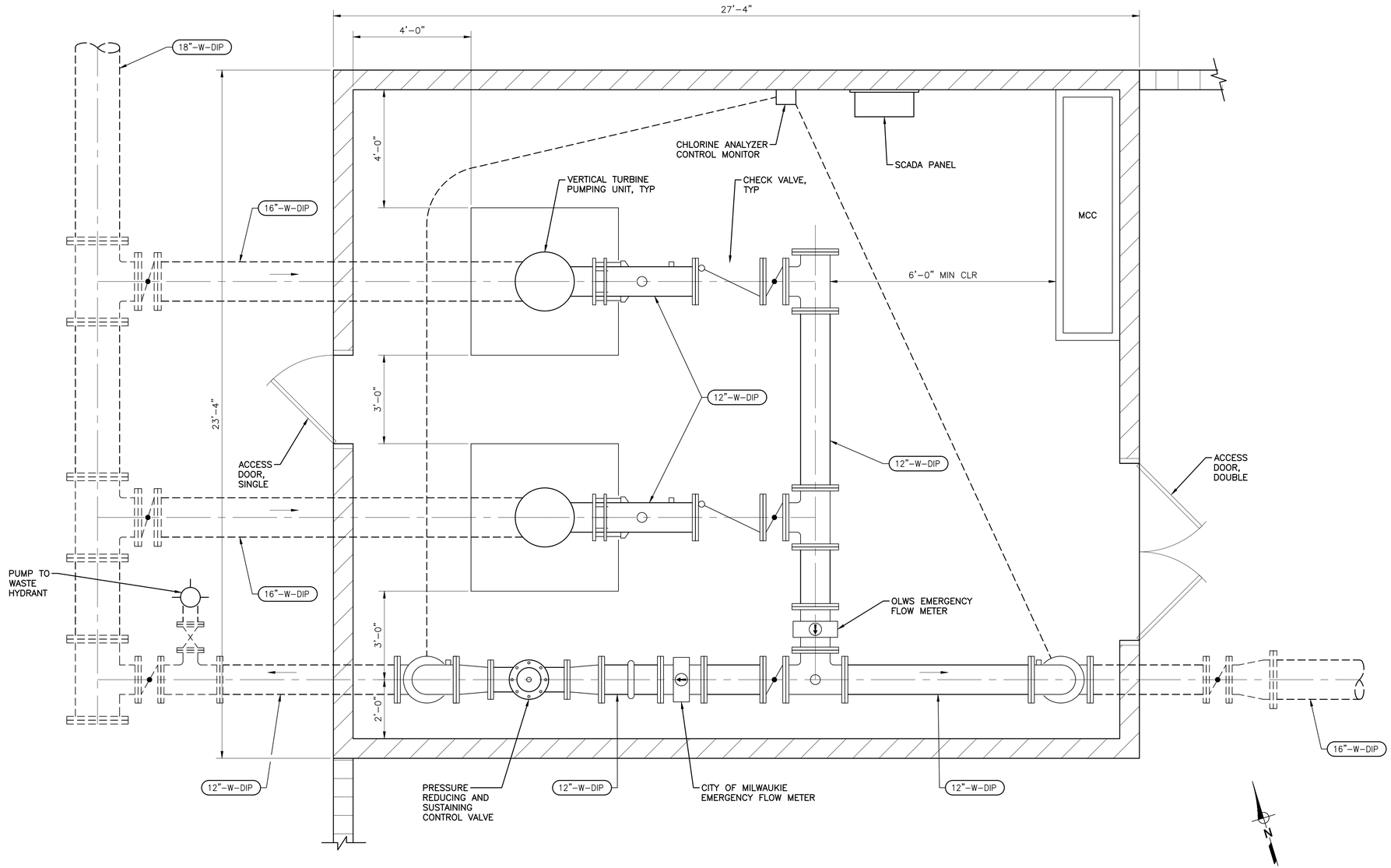

MECHANICAL PLAN

1/2"=1'-0"

DRAFT - NOT FOR CONSTRUCTION

REV	DATE	BY	DESCRIPTION

WARNING
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

DESIGNED PLM
DRAWN MAH
CHECKED ###
SCALE 1/2"=1'-0"

PREPARED BY:
ENGINEER NAME DATE
RCE No.: #####

WSC
805 AEROVISTA PLACE, SUITE 201 SAN LUIS OBISPO, CA 93401
PHONE: (805) 457-8833 FAX: (805) 888-2764

OAK LODGE WATER SERVICES DISTRICT
14611 SE RIVER RD OAK GROVE, OR 97267

APPROVED:
_____ - _____- POSITION DATE

OAK LODGE WSD EMERGENCY INTERTIE
BOOSTER PUMP STATION

BOOSTER PUMP STATION
BUILDING LAYOUT

DRAWING
M-1
SHEET X OF ####
PROJECT # _

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Appendix B Hydraulic Information

Table B.1 – Flow Rate versus Head Loss per Diameter of Pipe

	12-in		16-in		18-in	
Flow Rate (gpm)	fps	headloss (ft/1,000 feet)	fps	headloss (ft/1,000 feet)	fps	headloss (ft/1,000 feet)
1,000	2.8	2.54	1.6	0.62	1.3	0.35
1,500	4.3	5.37	2.4	1.32	1.9	0.75
2,000	5.7	9.15	3.2	2.25	2.5	1.27
2,500	7.1	13.84	4.0	3.41	3.2	1.92
3,000	8.5	19.39	4.8	4.78	3.8	2.69
3,500	9.9	25.8	5.6	6.35	4.4	3.58
4,000	11.3	33.04	6.4	8.14	5.0	4.58

System Curve Description

Figure B.1 shows four (4) different system curves as described in Table B.2 at varying City of Milwaukie system demand conditions with the assumption the Island Station issue is resolved. The purple line is a flow boundary condition to maintain adequate pressure in the City's system. There is a low-pressure area at the intersection of SE King Road and SE 41st Court (approximate elevation = 193' or 36.5 psi) limiting the flow to the BPS. Pumping above the purple on the system curves will result in pressure at the SE King Road and SE 41st Court to drop below 20 psi and will be avoided through the pump station operation strategy.

Table B.2 City of Milwaukie System Curves

System Curve No.	City of Milwaukie's System Demand Conditions	City of Milwaukie's Reservoir Level	OLWS Reservoir Level
1	PHD	MWL = 277.4 Feet	MWL = 437 Feet
2	MDD	MWL = 277.4 Feet	MWL = 437 Feet
3	ADD	MWL = 277.4 Feet	MWL = 437 Feet
4	0.50*ADD	MWL = 277.4 Feet	MWL = 437 Feet

OLWS System Model Description

Different system demands (PHD, MDD, ADD) in OLWS were checked with the proposed BPS operation. High demands were modelled in OLWS system, PHD and MDD, and compared to simulating all the demand flowing to the Reservoir. Each model run produced similar results. The difference between modelling the system with system demand or simply filling the reservoir were negligible, and therefore, we simplify the model runs by modelling OLWS system by pumping from the proposed BPS to the existing View Acre Reservoirs, which is a slightly more conservative approach.

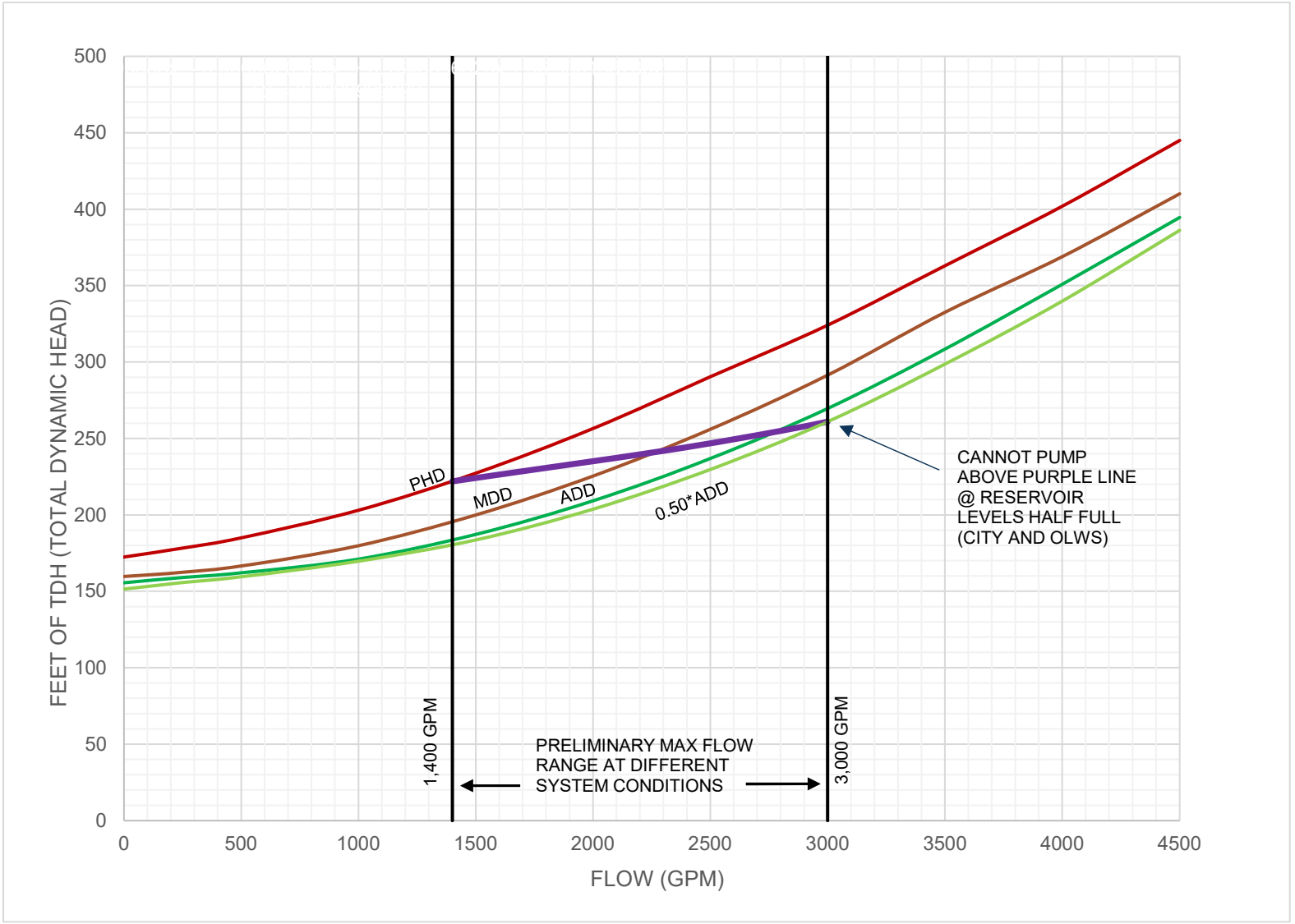


Figure B.1 System Curves at Reservoirs Half Full and Vary City of Milwaukie System Demands

City of Milwaukie Limited Supply Analysis

During emergency operations the available flow will vary depending on the City's ability to supply both their system demand and OLWS demands through well production. Based on the 2021 City of Milwaukie Water Master Plan the available flow from wells is approximately 4,070 gpm (5.86 MGD @ 24-hours operation) and is bottled necked by well treatment (see Table 1-6 and 1-7 from the City of Milwaukie's 2021 Master Plan). The City of Milwaukie's 2025 ADD and MDD demands are 2.2 MGD and 4.5 MGD respectively. Therefore, a 2025 MDD event (4.5 MGD) in the City of Milwaukie's system and an emergency condition in OLWS system (supplying OLWS 2.7 MGD emergency demand) will exceed the available flow from the City's well production by approximately 23% (7.2 MGD exceed 5.86 MGD). The City of Milwaukie's wells cannot keep up with a 2025 MDD and emergency event in OLWS system and will have to rely on emergency storage.

Constant Speed Versus Variable Speed Drive Analysis

Pumping over a 24-hour period is required with constant speed drives and may be avoided with variable speed drives. With constant speed pumping, the lead pump will operate below 1,875 gpm while the lag pump will turn on during off peak hours to meet the emergency demand (2.7 MGD). A lead lag pumping strategy would not be a fully redundant system for emergency demand. The approximate redundancy of a lead lag operation is anticipated to be 2.2 MGD (approximately 81%).

Variable speed pumping allows for more flexible operation by varying the speed of the pump depending on the City of Milwaukie's system pressure (suction pressure) and OLWS system pressure (discharge pressure). The pumping unit can be sized to be slightly larger than emergency demand and ramp down to allow for adequate pressure during peak hour demands in the City of Milwaukie's system. The ability to speed up or slow down the pumps allows for greater flow over a 24-hour period at the station and the flexibility to pump during low demand events while being a fully redundant pump operation (the duty pump can pump 2.7 MGD). A typidal one duty operation flow range would be 1,400 gpm for 4 hour, 1,900 gpm for 12 hours and 2,100 gpm for 8 hours for a total of 2.71 MGD 100% of emergency demand.

Table B.3 - Constant Speed Pros and Cons

Constant Speed Pros	Constant Speed Cons
Simple	Not flexible (ON or OFF)
More Economical	inefficient at Peak Times (may not operate)
does not take a 3% efficiency reduction (VFD Losses)	Higher water hammer/surge potential leading to more facilities to protect against water hammer/surge
easier to troubleshoot	Cannot Adjust BPS flow according to the City of Milwaukie's system
less maintenance (easier for operators)	Increased Pump Wear when operating outside of POR (preferred operating range) and AOR (allowable operating range) Oversized Pumps to Pump more during Off Peak Hours

Table B.4 – Variable Speed Pros and Cons

Variable Speed Pros	Variable Speed Cons
Flexible Operation can Ensure City of Milwaukie's Pressure is maintained	More Expensive
Can operate multiple pumps at different speed to achieve greater efficiencies (operate over 24-hours at low speeds i.e., lower head loss versus one speed)	Qualified Personnel to Operate VFD
Greater Range of Flows for Future Demands	Sensitivity to Power Quality
Reduced Water Hammer	Complex/ Software Issues
Sized Appropriate to System	Dependent on Electronics to Operate
	Requires additional ventilation compared to Constant Speed

City of Milwaukie System Curves

Condition = MDD in City of Milwaukie
MWL in ZONE 2 = 277.4'
16" DIP PIPELINE

CURVE 1

Suction Head Curves

HGL	277.4	Feet

GPM at BPS	Available Suction Head (feet) at BPS	Available Suction Pressure (PSI) at BPS	Lowest Node Pressure (psi)	Low Pressure Node ID	Low Pressure Node Elevation (ft)
0	277.3	82	23	N10741	148
250	275.5	81	23	N10741	148
500	272.4	79	23	N10741	148
1000	263.1	75	23	N10741	148
1500	250.0	70	23	N10741	148
2000	233.5	63	23	N10741	148
2500	**213.9**	**54**	**20**	**N10345B**	**186**
3000	191.5	44	13	N10345B	186
3500	166.4	34	6	N10345B	186
4000	147.0	25	2	1370	168
4500	124.9	16	-4	1370	168

Emergency Intertie BPS		
Station Elev. =	89	feet
Assumed HW Roughness Coeff of 16" WM	110	
City of Milwaukie ZONE 2 HWL =	292.4	feet
City of Milwaukie ZONE 2 LWL =	262.4	feet

City of Milwaukie System Curves

Condition = MDD +FF @
MWL in ZONE 2 = 277.4'
16" DIP PIPELINE

CURVE 2

Suction Head Curves

HGL	277.4	Feet

GPM at BPS	Available Suction Head (feet) at BPS	Available Suction Pressure (PSI) at BPS	Lowest Node Pressure	Low Pressure Node ID	Low Pressure Node Elevation (ft)
0	257.1	73	-4	N10345B	186
250	250.6	70	-7	N10345B	186
500	244.5	67	-8	N10345B	186
1000	232.9	62	-8	N10345B	186
1500	218.8	56	-10	N10345B	186
2000	201.1	49	-12	N10345B	186
2500	180.4	40	-15	N10345B	186
3000	159.9	31	-19	N10345B	186
3500	135.5	20	-23	N10345B	186
4000	112.4	10	-28	N10345B	186
4500	88.1	0	-33	N10345B	186

Emergency Intertie BPS		
Station Elev. =	89	feet
Assumed HW Roughness Coeff of 16" WM	110	
City of Milwaukie ZONE 2 HWL =	292.4	feet
City of Milwaukie ZONE 2 LWL =	262.4	feet

City of Milwaukie System Curves

Condition = PHD in City of Milwaukie
MWL in ZONE 2 = 277.4'
16" DIP PIPELINE

CURVE 3

Suction Head Curves

HGL	277.4	Feet

GPM at BPS	Available Suction Head (feet) at BPS	Available Suction Pressure (PSI) at BPS	Lowest Node Pressure	Low Pressure Node ID	Low Pressure Node Elevation (ft)
0	264.5	76	22	N10741	148
250	259.7	74	22	N10741	148
500	253.9	71	22	N10741	148
1000	**239.8**	**65**	**22**	**N10741**	**148**
1500	222.6	58	19	N10345B	186
2000	202.5	49	12	N10345B	186
2500	179.6	39	5	N10345B	186
3000	158.8	30	1	N10345B	186
3500	135.9	20	-5	1370	168
4000	114.0	11	-12	1370	168
4500	89.9	0	-20	1370	168

Emergency Intertie BPS		
Station Elev. =	89	feet
Assumed HW Roughness Coeff of 16" WM	110	
City of Milwaukie ZONE 2 HWL =	292.4	feet
City of Milwaukie ZONE 2 LWL =	262.4	feet

City of Milwaukie System Curves

Condition = ADD in City of Milwaukie
MWL in ZONE 2 = 277.4'
16" DIP PIPELINE

CURVE 4

Suction Head Curves

HGL	277.4	Feet

GPM at BPS	Available Suction Head (feet) at BPS	Available Suction Pressure (PSI) at BPS	Lowest Node Pressure	Low Pressure Node ID	Low Pressure Node Elevation (ft)
0	281.3	83	23	N10741	148
250	278.9	82	23	N10741	148
500	276.9	81	23	N10741	148
1000	271.8	79	23	N10741	148
1500	262.8	75	23	N10741	148
2000	249.7	70	23	N10741	148
2500	233.1	62	23	N10741	148
3000	**213.3**	**54**	**23**	**N10345B**	**186**
3500	190.5	44	16	N10345B	186
4000	165.0	33	9	N10345B	186
4500	140.3	22	2	1370	168

Emergency Intertie BPS		
Station Elev. =	89	feet
Assumed HW Roughness Coeff of 16" WM	110	
City of Milwaukie ZONE 2 HWL =	292.4	feet
City of Milwaukie ZONE 2 LWL =	262.4	feet

City of Milwaukie System Curves

Condition = 0.5*ADD in City of Milwaukie
MWL in ZONE 2 = 277.4'
16" DIP PIPELINE

CURVE 5

Suction Head Curves

HGL	277.4	Feet

GPM at BPS	Available Suction Head (feet) at BPS	Available Suction Pressure (PSI) at BPS	Lowest Node Pressure	Low Pressure Node ID	Low Pressure Node Elevation (ft)
0	285.5	85	23	N10741	148
250	282.3	84	23	N10741	148
500	279.5	83	23	N10741	148
1000	273.2	80	23	N10741	148
1500	266.3	77	23	N10741	148
2000	255.2	72	23	N10741	148
2500	240.2	66	23	N10741	148
3000	221.9	58	23	N10741	148
3500	**200.4**	**48**	**21**	**N10345B**	**186**
4000	176.0	38	14	N10345B	186
4500	148.8	26	6	1370	168

Emergency Intertie BPS		
Station Elev. =	89	feet
Assumed HW Roughness Coeff of 16" WM	110	
City of Milwaukie ZONE 2 HWL =	292.4	feet
City of Milwaukie ZONE 2 LWL =	262.4	feet

OLWS Discharge Curves through Different Sized Transmission Mains

12-inch

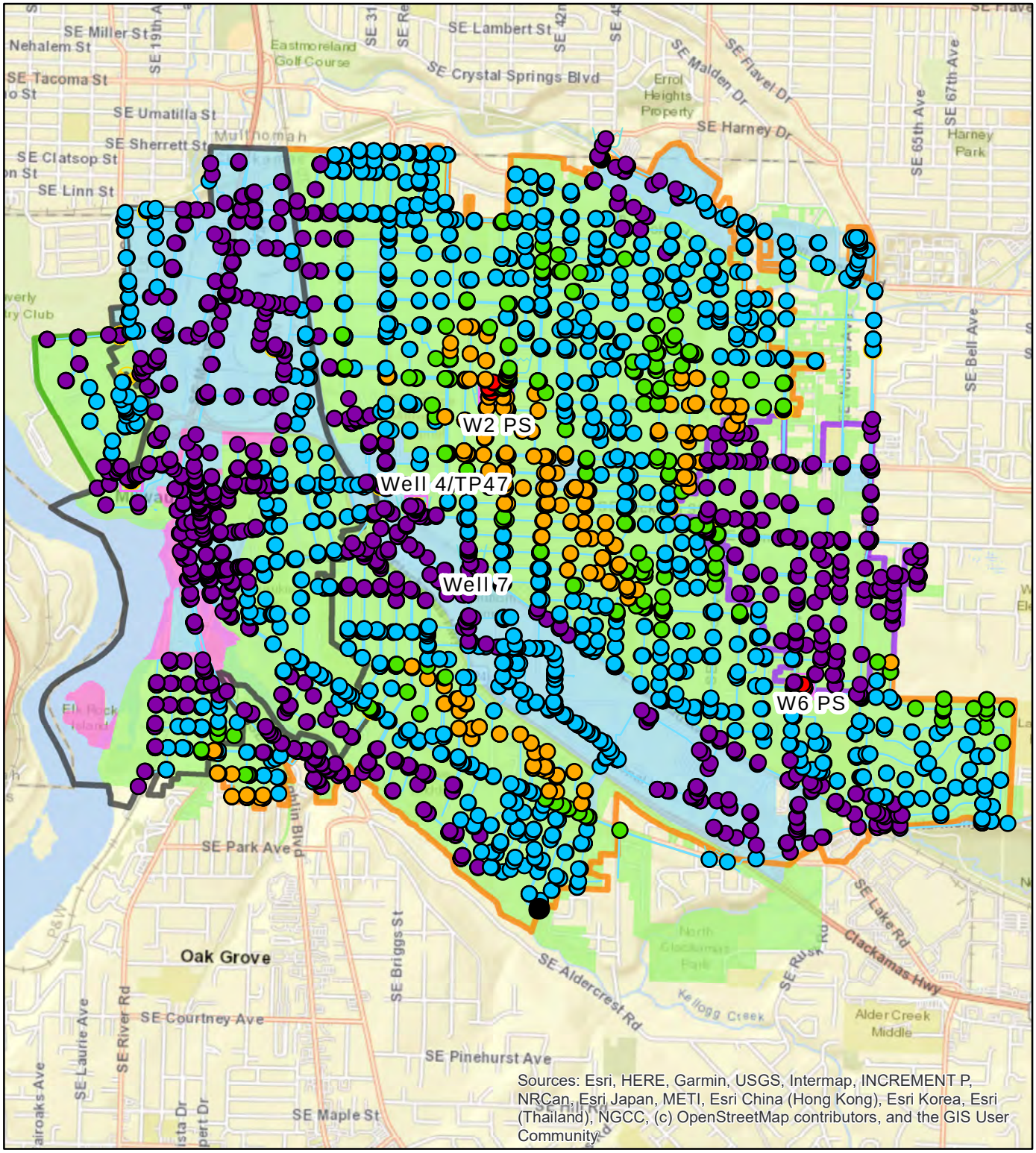
Flow (gpm)	HGL Tank Node (ft) = 437	HGL BPS (ft)	Headloss (ft / 1,000 ft)
0	437	437	
250	437.75	439	0.25
500	437.48	442	0.7
1000	437.7	454	2.54
1500	437.47	472	5.37
2000	437.17	496	9.15
2500	437.08	526	13.84
3000	437.37	562	19.39
3500	437.19	603	25.8
4000	437.68	650	33.04
4500	437.93	702	41.09

16-inch

Flow (gpm)	HGL Tank Node (ft) = 437	HGL BPS (ft)	Headloss (ft / 1,000 ft)
0	437	437	
250	437.54	438	0.05
500	437.34	439	0.17
1000	437	443	0.62
1500	437.28	450	1.32
2000	437.34	459	2.25
2500	437.25	470	3.41
3000	437.1	483	4.78
3500	437.94	499	6.35
4000	437.81	516	8.14
4500	437.75	535	10.12

18-inch

Flow (gpm)	HGL Tank Node (ft) = 437	HGL BPS (ft)	Headloss (ft / 1,000 ft)
0	437	437	
250	437.65	438	0.03
500	437.74	439	0.1
1000	437.47	442	0.35
1500	437.39	447	0.75
2000	437.64	454	1.27
2500	437.27	462	1.92
3000	437.33	472	2.69
3500	437.88	484	3.58
4000	437.94	497	4.58
4500	437.54	511	5.7



Legend

Pressure

- < 20
- 20 - 35
- 35 - 40
- 40 - 60
- > 60

- Pressure Zone 1
- Pressure Zone 2
- Pressure Zone 3
- Pressure Zone 4

- Residential Zones
- Institutional Zones
- Industrial/Commercial Zones
- Pump
- Reservoir
- Tank
- Valve
- Pipes
- Intertie Location

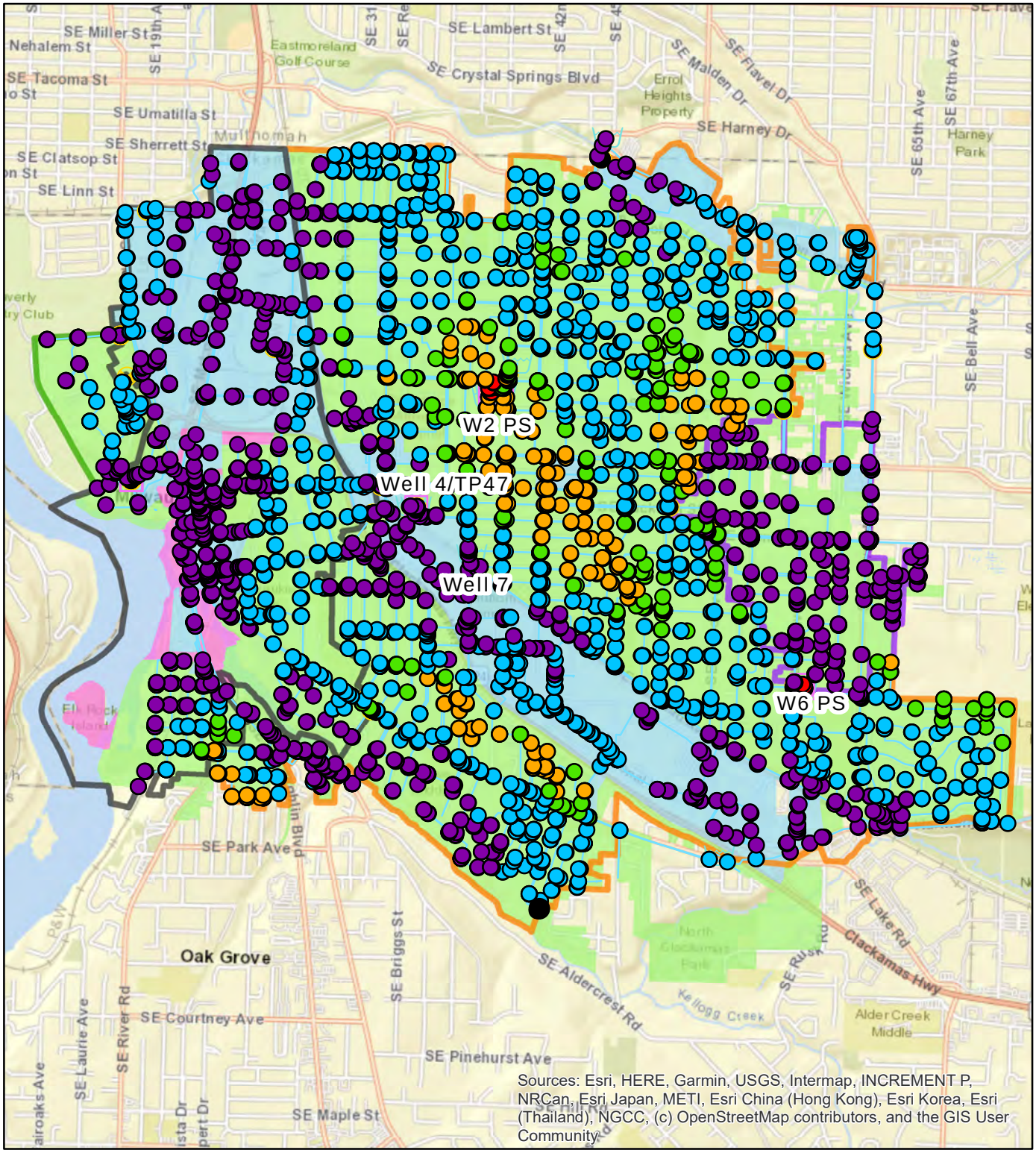
N

0 1,000 2,000

Scale in Feet

City of Milwaukie
Oak Lodge Emergency Intertie

5.0 MGD Intertie Demand under Milwaukie Half Average Day Demand Conditions with Zone 2 HGL at 277.4 Feet and W6 On



Legend

Pressure

- < 20
- 20 - 35
- 35 - 40
- 40 - 60
- > 60
- Pressure Zone 1
- Pressure Zone 2
- Pressure Zone 3
- Pressure Zone 4

- Residential Zones
- Institutional Zones
- Industrial/Commercial Zones
- Pump
- Reservoir
- Tank
- Valve
- Pipes
- Intertie Location

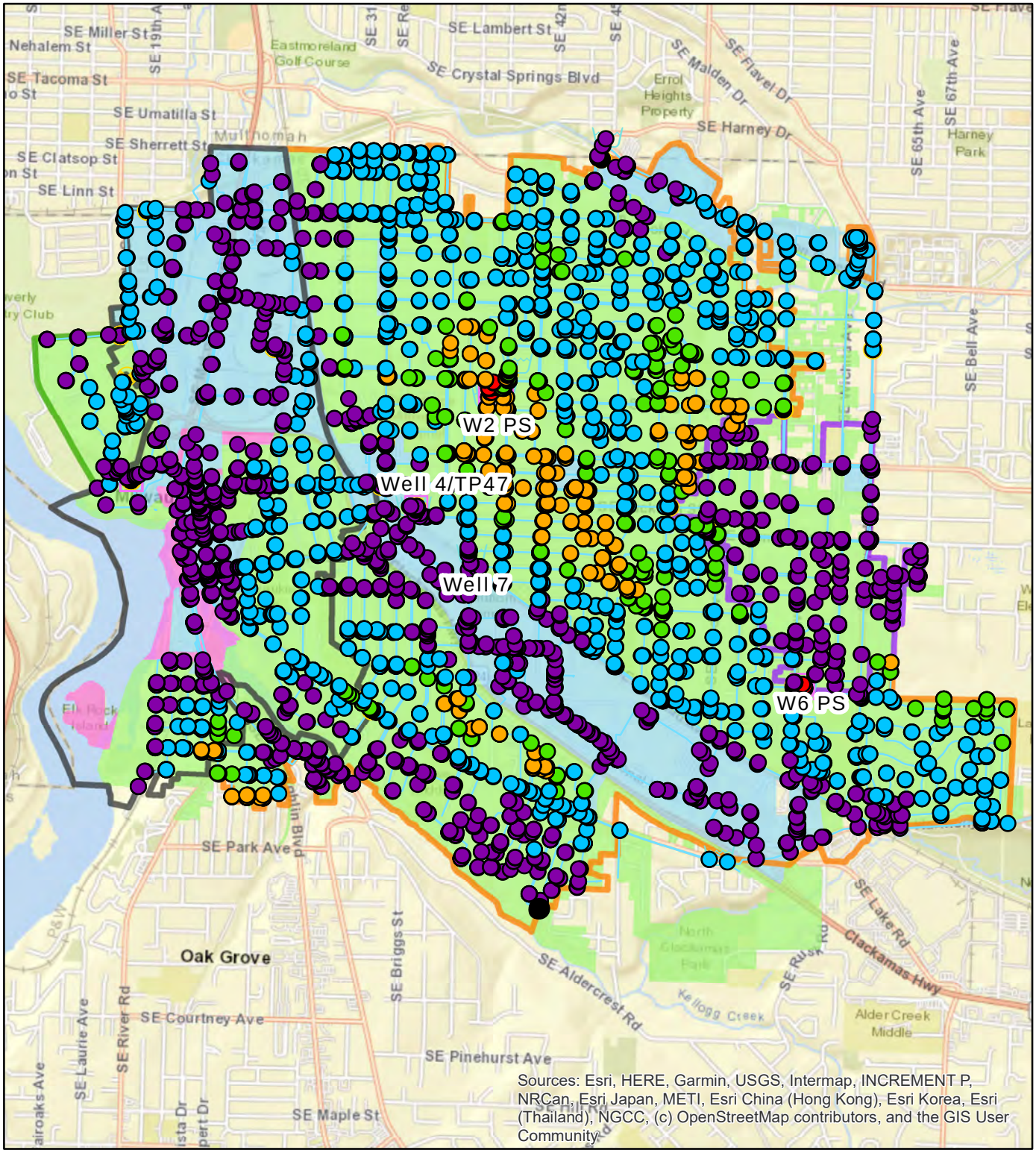
N

0 1,000 2,000

Scale in Feet

City of Milwaukie
Oak Lodge Emergency Intertie

4.3 MGD Intertie Demand under Milwaukie Average Day Demand Conditions with Zone 2 HGL at 277.4 Feet and W6 On



Legend

Pressure

- < 20
- 20 - 35
- 35 - 40
- 40 - 60
- > 60
- Pressure Zone 1
- Pressure Zone 2
- Pressure Zone 3
- Pressure Zone 4

- Residential Zones
- Institutional Zones
- Industrial/Commercial Zones
- Pump
- Reservoir
- Tank
- Valve
- Pipes
- Intertie Location

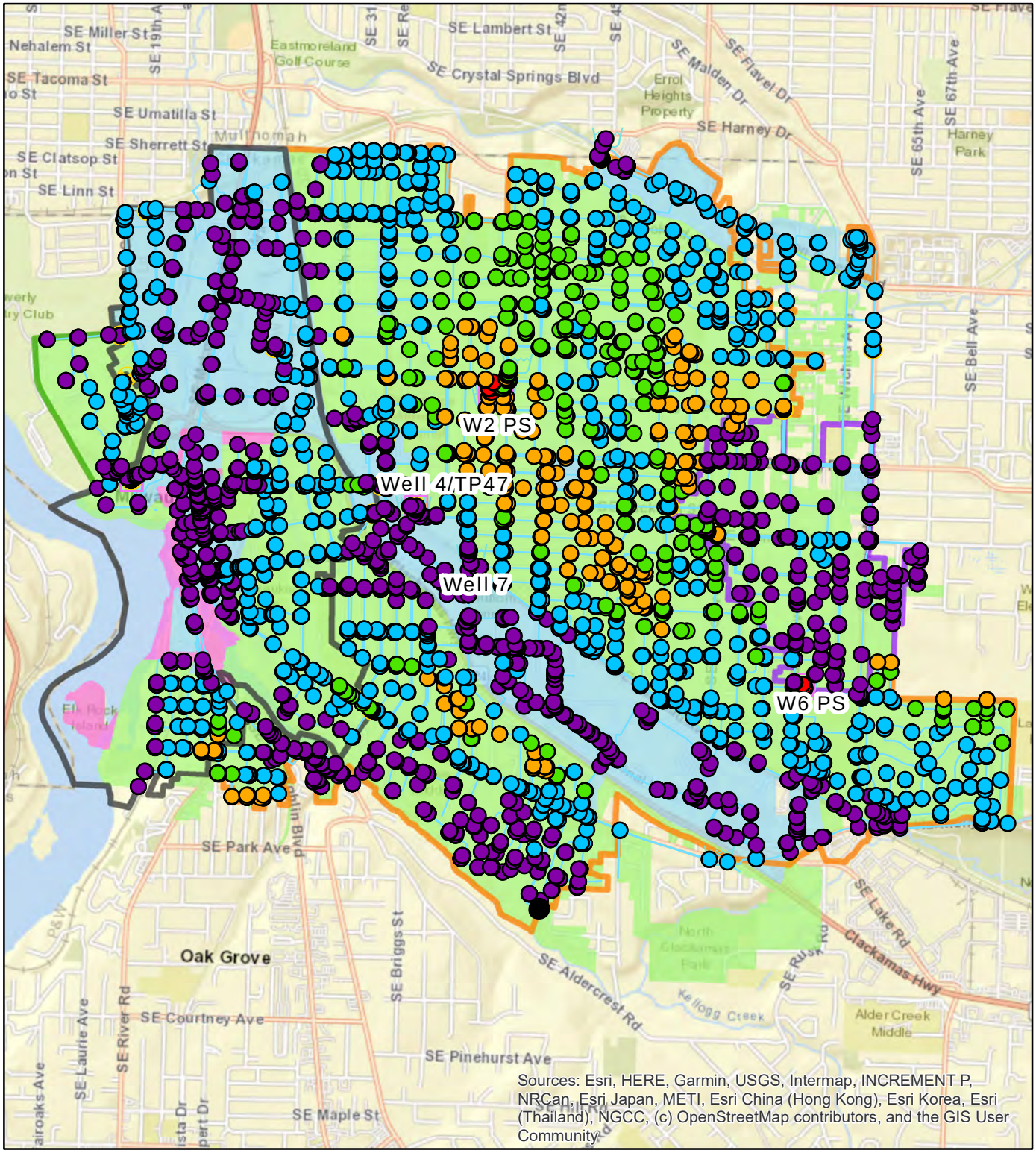
N

0 1,000 2,000

Scale in Feet

City of Milwaukie
Oak Lodge Emergency Intertie

2.8 MGD Intertie Demand under Milwaukie Maximum Day Demand Conditions with Zone 2 HGL at 277.4 Feet and W6 On



Legend

Pressure

- < 20
- 20 - 35
- 35 - 40
- 40 - 60
- > 60
- Pressure Zone 1
- Pressure Zone 2
- Pressure Zone 3
- Pressure Zone 4

- Residential Zones
- Institutional Zones
- Industrial/Commercial Zones
- Pump
- Reservoir
- Tank
- Valve
- Pipes
- Intertie Location

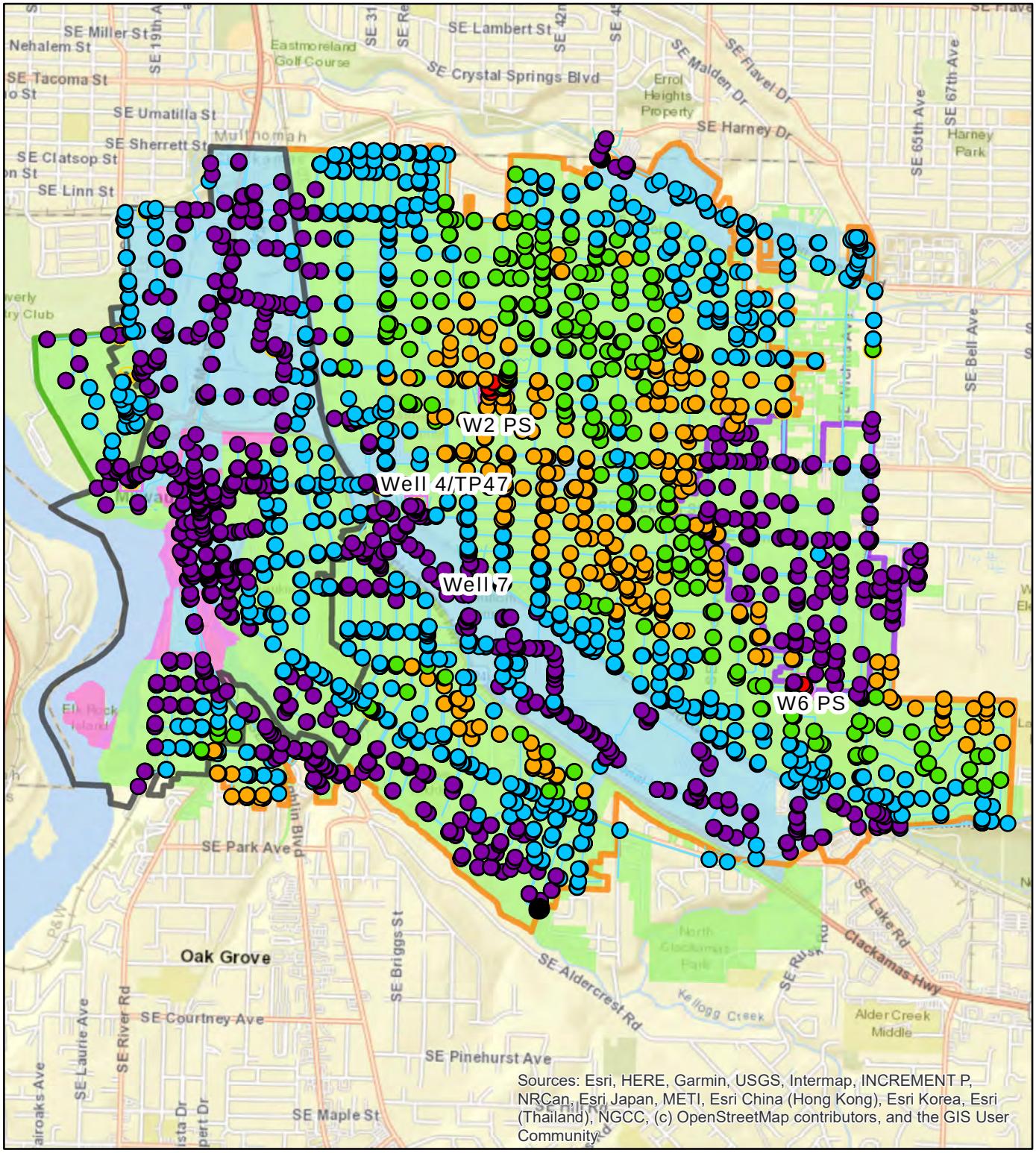
N

0 1,000 2,000

Scale in Feet

City of Milwaukie
Oak Lodge Emergency Intertie

1.4 MGD Intertie Demand under Milwaukie Peak Hour Demand Conditions with Zone 2 HGL at 277.4 Feet and W6 On



Legend

Pressure

- < 20
- 20 - 35
- 35 - 40
- 40 - 60
- > 60

- Pressure Zone 1
- Pressure Zone 2
- Pressure Zone 3
- Pressure Zone 4

- Residential Zones
- Institutional Zones
- Industrial/Commercial Zones
- Pump
- Reservoir
- Tank
- Valve
- Pipes
- Intertie Location

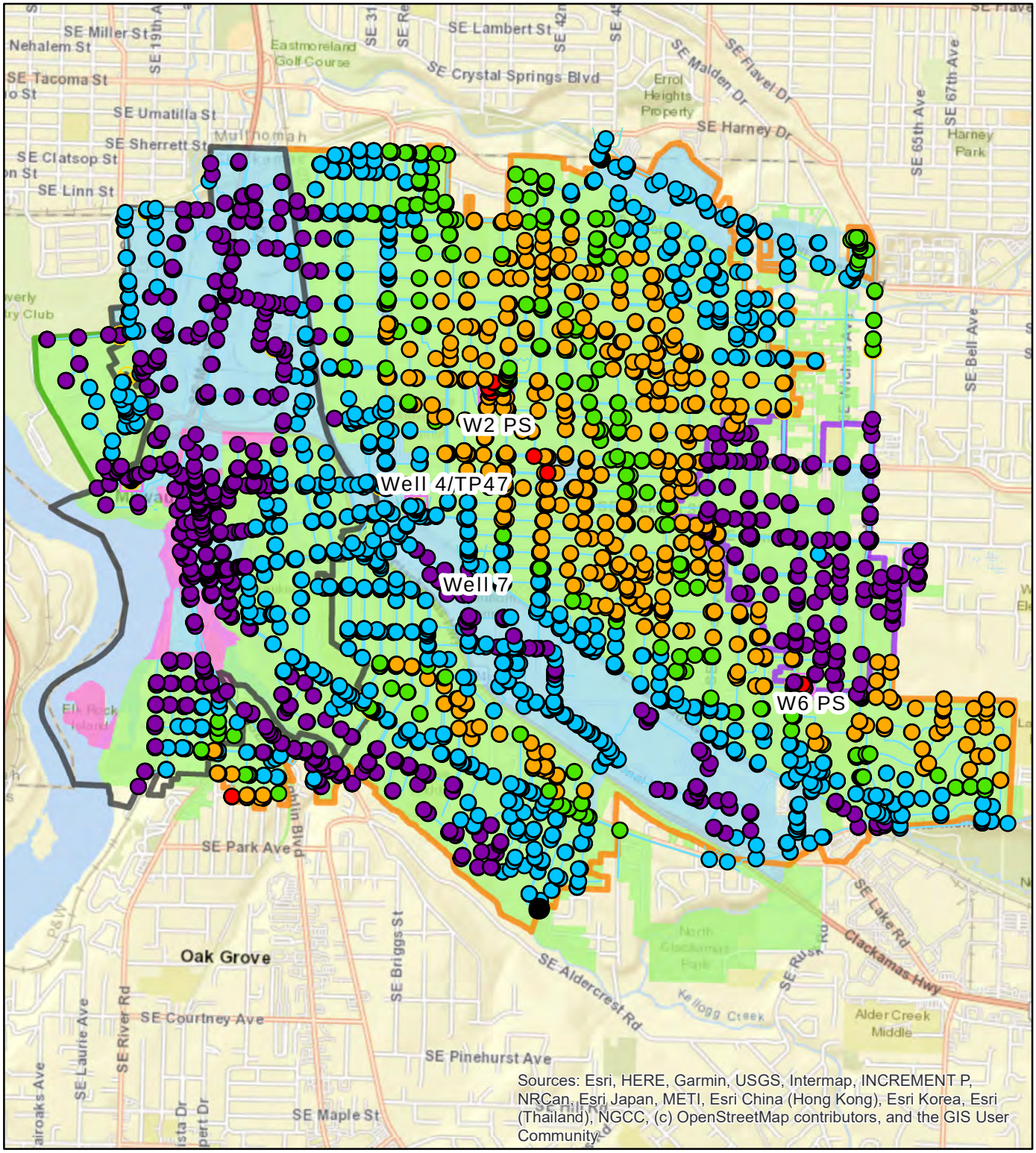
N

0 1,000 2,000

Scale in Feet

City of Milwaukie
Oak Lodge Emergency Intertie

2.5 MGD Intertie Demand under Milwaukie Half Average Day Demand Conditions with Zone 2 HGL at 277.4 Feet and W6 Off



Legend

Pressure

- < 20
- 20 - 35
- 35 - 40
- 40 - 60
- > 60

- Pressure Zone 1
- Pressure Zone 2
- Pressure Zone 3
- Pressure Zone 4

- Residential Zones
- Institutional Zones
- Industrial/Commercial
- Pump
- Reservoir
- Tank
- Valve
- Pipes
- Intertie Location

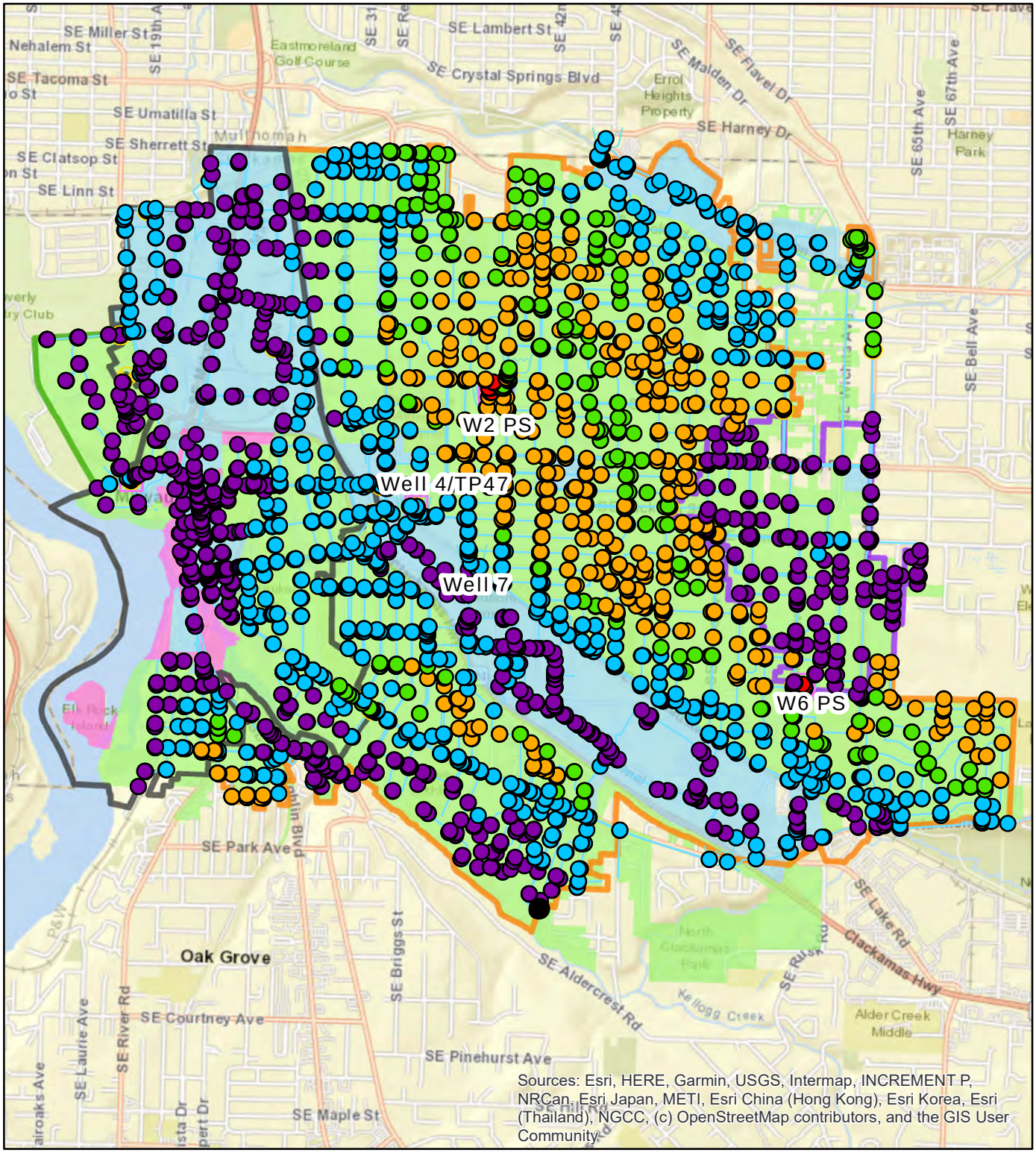
N

0 1,000 2,000

Scale in Feet

City of Milwaukie
Oak Lodge Emergency Intertie

2.2 MGD Intertie Demand under Milwaukie Average Day Demand Conditions with Zone 2 HGL at 277.4 Feet and W6 Off



Legend

Pressure

- < 20
- 20 - 35
- 35 - 40
- 40 - 60
- > 60

- Pressure Zone 1
- Pressure Zone 2
- Pressure Zone 3
- Pressure Zone 4

- Residential Zones
- Institutional Zones
- Industrial/Commercial Zones
- Pump
- Reservoir
- Tank
- Valve
- Pipes
- Intertie Location

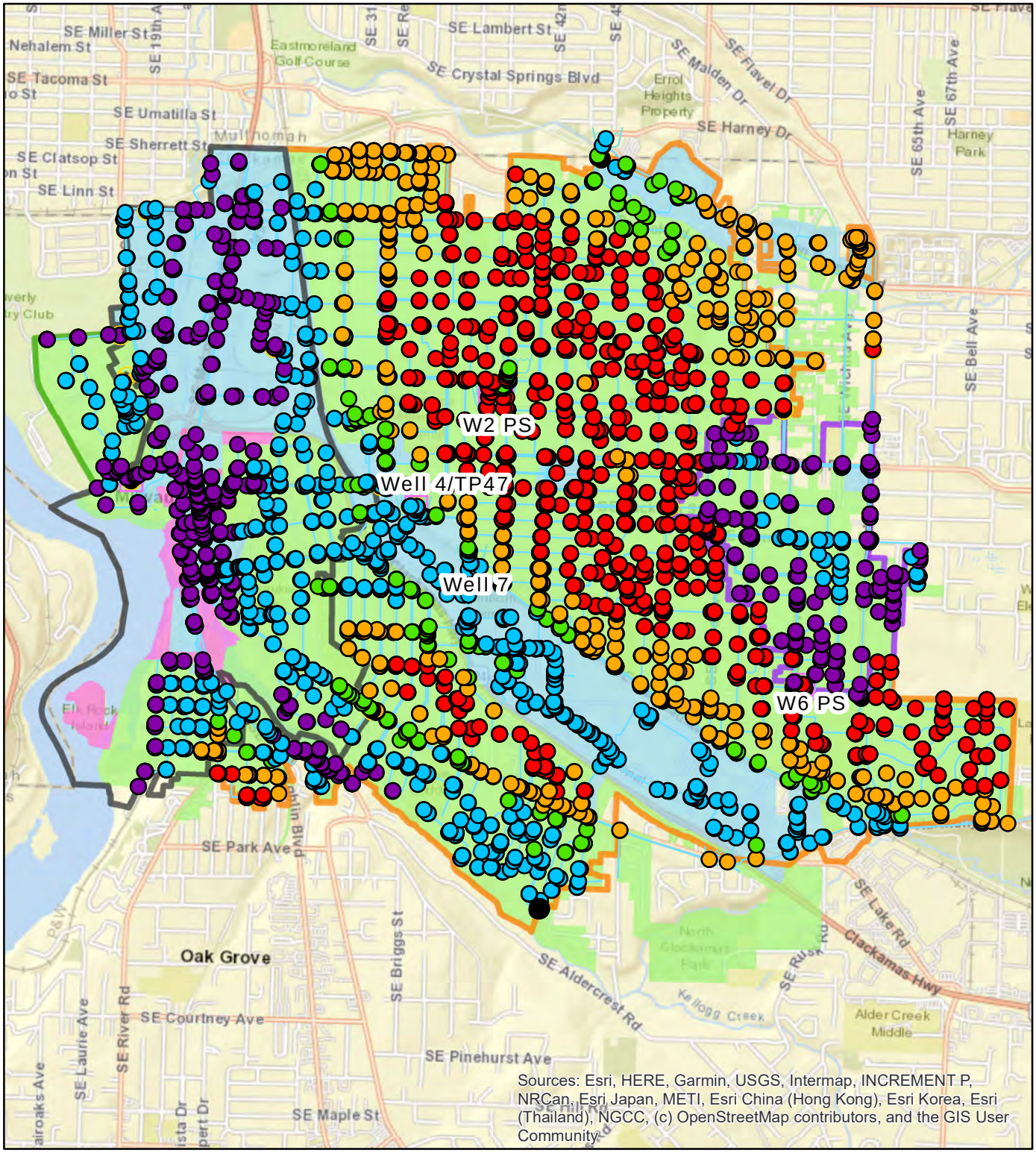
N

0 1,000 2,000

Scale in Feet

City of Milwaukie
Oak Lodge Emergency Intertie

0.7 MGD Intertie Demand under Milwaukie Maximum Day Demand Conditions with Zone 2 HGL at 277.4 Feet and W6 Off



Legend

Pressure

- < 20
- 20 - 35
- 35 - 40
- 40 - 60
- > 60

- Pressure Zone 1
- Pressure Zone 2
- Pressure Zone 3
- Pressure Zone 4

- Residential Zones
- Institutional Zones
- Industrial/Commercial Zones
- Pump
- Reservoir
- Tank
- Valve
- Pipes
- Intertie Location

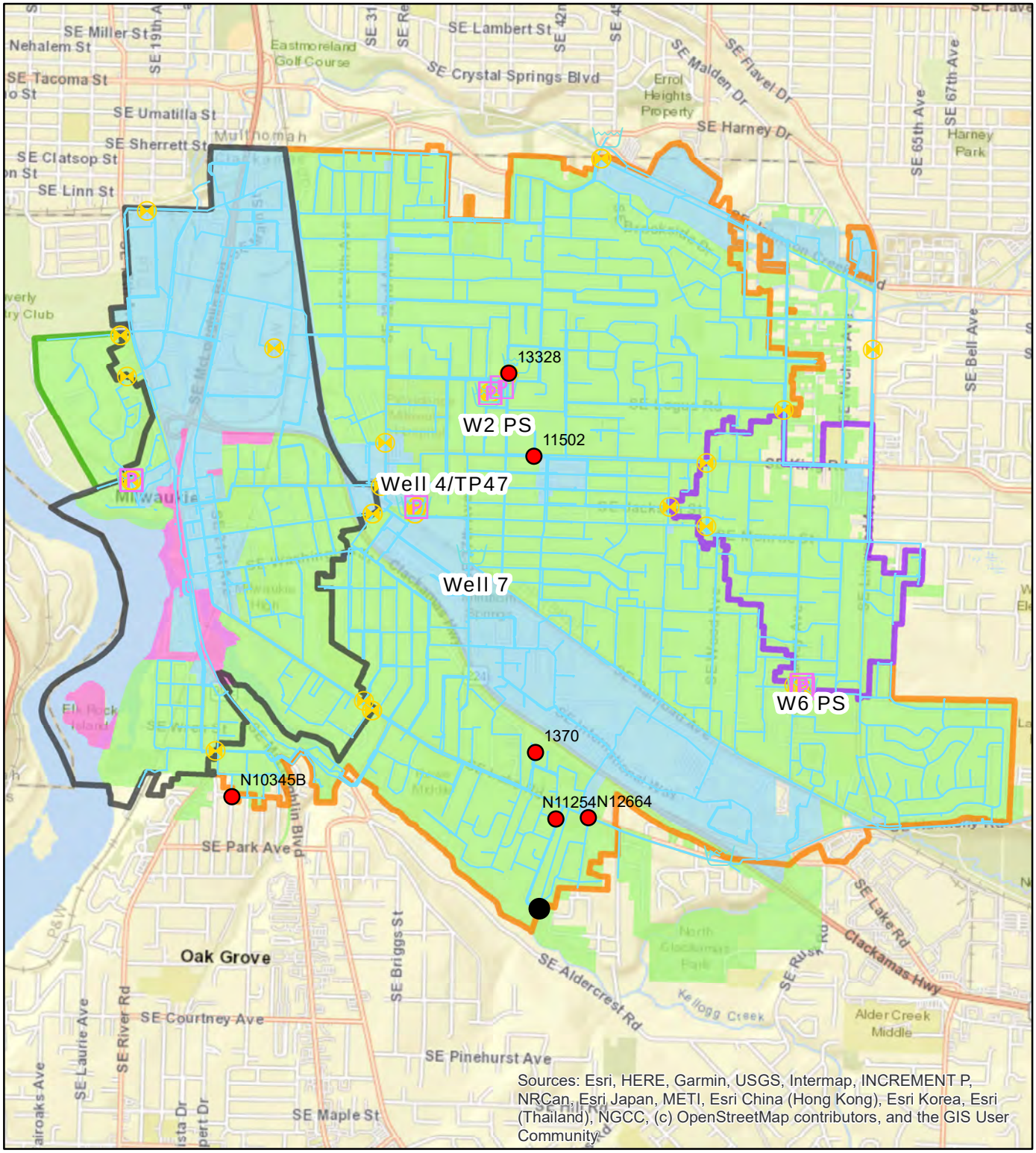
N

0 1,000 2,000

Scale in Feet

City of Milwaukie
Oak Lodge Emergency Intertie

0.0 MGD Intertie Demand under Milwaukie Peak Hour Demand Conditions with Zone 2 HGL at 277.4 Feet and W6 Off



Legend

- Fire Flow Nodes
- Pressure Zone 1
- Pressure Zone 2
- Pressure Zone 3
- Pressure Zone 4
- Residential Zones
- Institutional Zones
- Industrial/Commercial Zones
- Pump
- Reservoir
- Tank
- Valve
- Pipes
- Intertie Location

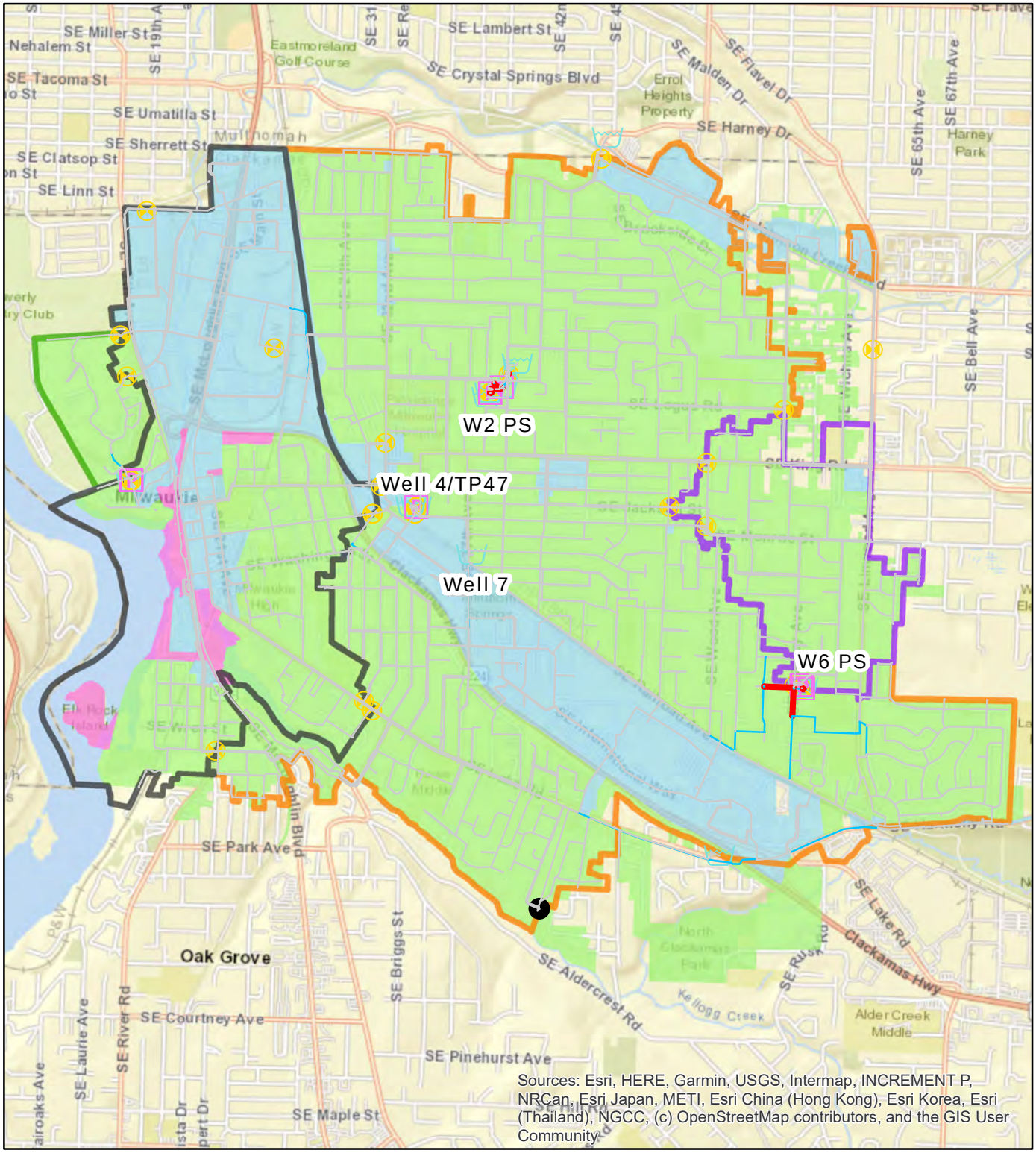
N

0 1,000 2,000

Scale in Feet

City of Milwaukie
Oak Lodge Emergency Intertie

Fire Flow Node Locations



Legend

Velocity (fps)

- < 2
- 2 - 5
- > 5

- Residential Zones
- Institutional Zones
- Industrial/Commercial Zones
- Pump
- Reservoir
- Tank
- Valve
- Intertie Location

- Pressure Zone 1
- Pressure Zone 2
- Pressure Zone 3
- Pressure Zone 4

N

0 1,000 2,000

Scale in Feet

City of Milwaukie
Oak Lodge Emergency Intertie

1.4 MGD Intertie Demand under Milwaukie Peak Hour Demand Conditions with Zone 2 HGL at 277.4 Feet and W6 On

Appendix C Pumping Units Cut Sheets

Pump Data Sheet - Turbine 60 Hz

Company: WSC
Name: Phillip Medlock
Date: 08/13/2023

Customer:

GOULDS WATER TECHNOLOGY
a xylem brand

Pump:

Size:	14RJLO (stages: 3)	Dimensions:	
Type:	Lineshaft	Suction:	---
Synch Speed:	1800 rpm	Discharge:	---
Dia:	9.375 in	Vertical Turbine:	
Curve:	E6416DHPCO	Eye Area:	
		Bowl Size:	13.6 in
		Max Lateral:	1.25 in
		Thrust K Factor:	16.2 lb/ft

Search Criteria:

Flow:	1400 US gpm	Near Miss:	---
Head:	220 ft	Static Head:	0 ft

Pump Selection Warnings:

None

Fluid:

Name:	Water		
SG:	1	Vapor Pressure:	0.256 psi a
Density:	62.4 lb/ft³	Atm Pressure:	14.7 psi a
Viscosity:	1.1 cP		
Temperature:	60 °F	Margin Ratio:	1

Pump Limits:

Temperature:	---	Sphere Size:	1.06 in
Wkg Pressure:	---		

Motor:

Standard:	NEMA	Size:	100 hp
Enclosure:	WPI	Speed:	1800 rpm
Frame:	404		
Sizing Criteria:	Max Power on Design Curve		

--- Duty Point ---

Flow:	1400 US gpm
Head:	220 ft
Eff:	84.4%
Power:	92.2 hp
NPSHr:	15.2 ft
Speed:	1770 rpm

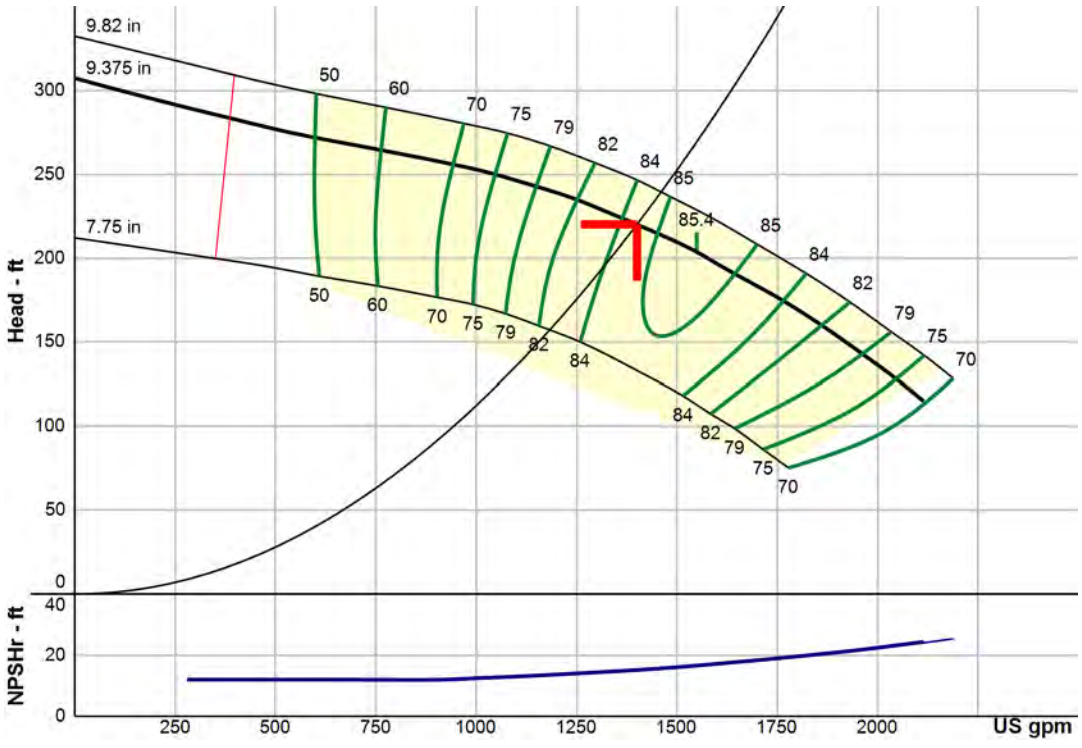
--- Design Curve ---

Shutoff Head:	307 ft
Shutoff dP:	133 psi
Min Flow:	387 US gpm

BEP: 85.4% @ 1549 US gpm
NOL Power:
93.4 hp @ 1549 US gpm

--- Max Curve ---

Max Power:
105 hp @ 1700 US gpm



Performance Evaluation:

Flow	Speed	Head	Efficiency	Power	NPSHr
US gpm	rpm	ft	%	hp	ft
1680	1770	186	84.7	93	18.1
1400	1770	220	84.4	92.2	15.2
1120	1770	245	77.7	89.2	13.2
840	1770	261	64.3	85.8	12
560	1770	274	46.7	82.9	12

Selected from catalog: Xylem.TTO.Goulds Lineshaft.60 MOC, Vers 4.1.5

Pump Data Sheet - Turbine 60 Hz

Company: WSC
Name: Phillip Medlock
Date: 08/13/2023

Customer:

GOULDS WATER TECHNOLOGY
a xylem brand

Pump:

Size:	14RJMO (stages: 4)	Dimensions:	
Type:	Lineshaft	Suction:	---
Synch Speed:	1800 rpm	Discharge:	---
Dia:	9 in	Vertical Turbine:	
Curve:	E6416RAPP1	Eye Area:	
		Bowl Size:	13.6 in
		Max Lateral:	1.25 in
		Thrust K Factor:	16.2 lb/ft

Search Criteria:

Flow:	2000 US gpm	Near Miss:	---
Head:	230 ft	Static Head:	0 ft

Pump Selection Warnings:

None

Fluid:

Name:	Water		
SG:	1	Vapor Pressure:	0.256 psi a
Density:	62.4 lb/ft³	Atm Pressure:	14.7 psi a
Viscosity:	1.1 cP		
Temperature:	60 °F	Margin Ratio:	1

Pump Limits:

Temperature:	---	Sphere Size:	1.06 in
Wkg Pressure:	---		

Motor:

Standard:	NEMA	Size:	150 hp
Enclosure:	WPI	Speed:	1800 rpm
Frame:	444		
Sizing Criteria:	Max Power on Design Curve		

--- Duty Point ---

Flow:	2000 US gpm
Head:	235 ft
Eff:	84.3%
Power:	141 hp
NPSHr:	21.6 ft
Speed:	1770 rpm

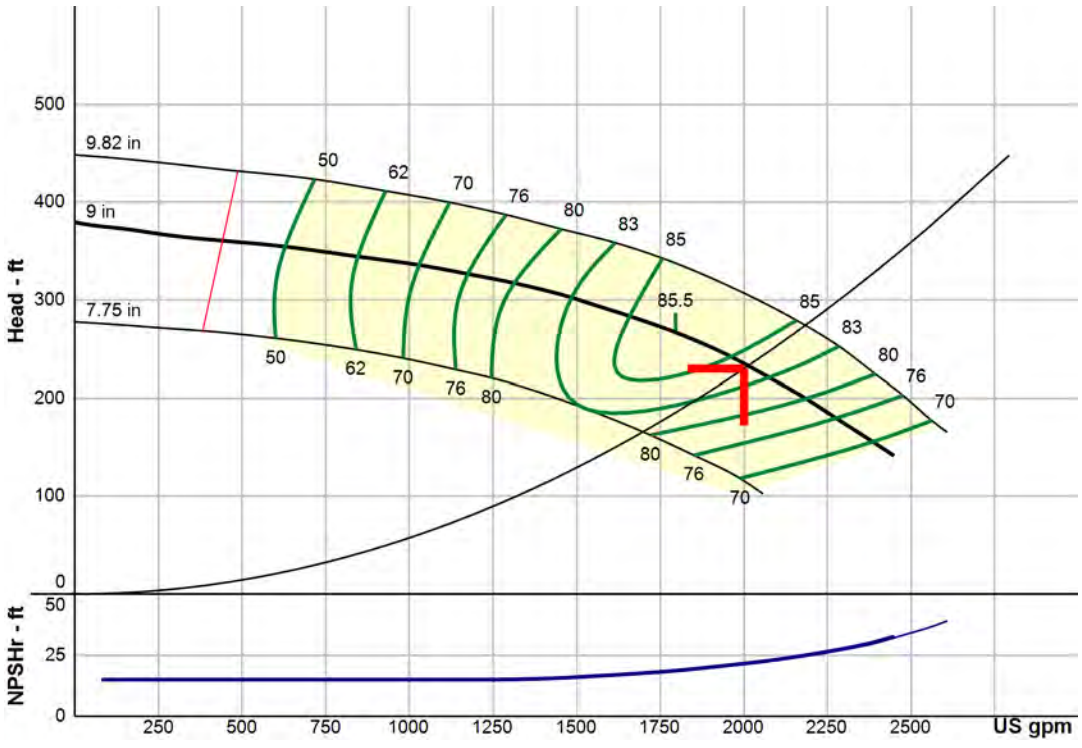
--- Design Curve ---

Shutoff Head:	380 ft
Shutoff dP:	164 psi
Min Flow:	449 US gpm

BEP: 85.5% @ 1797 US gpm
NOL Power:
142 hp @ 1797 US gpm

--- Max Curve ---

Max Power:
181 hp @ 1950 US gpm



Performance Evaluation:

Flow	Speed	Head	Efficiency	Power	NPSHr
US gpm	rpm	ft	%	hp	ft
2400	1770	152	69.6	133	30.8
2000	1770	235	84.3	141	21.6
1600	1770	290	84.3	139	16.8
1200	1770	325	76.5	129	15
800	1770	347	59.4	118	15

Appendix D Standby Generator Cut Sheets

Cat® D300 GC
Diesel Generator Sets

Standby : 60 Hz

Image shown may not reflect actual configuration.

Engine Model	Cat® C9 In-line 6, 4-cycle diesel
Bore x Stroke	112 mm x 149 mm (4.4 in x 5.9 in)
Displacement	8.8 L (538 in³)
Compression Ratio	16.3:1
Aspiration	Turbocharged Air-to-Air Aftercooled
Fuel Injection System	HEUI
Governor	Electronic ADEM™ A4

Model	Standby	Emission Strategy
D300 GC	300 ekW, 375 kVA	EPA Certified for Stationary Emergency Application

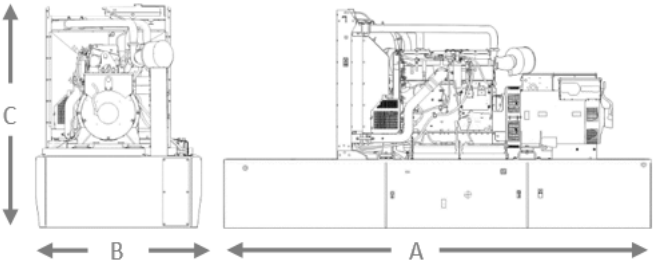
PACKAGE PERFORMANCE

Performance	Standby
Frequency	60 Hz
Genset Power Rating	375 kVA
Genset power rating with fan @ 0.8 power factor	300 ekW
Emissions	EPA TIER 3
Performance Number	DM8168
Fuel Consumption	
100% load with fan, L/hr (gal/hr)	86.0 (22.7)
75% load with fan, L/hr (gal/hr)	58.8 (15.5)
50% load with fan, L/hr (gal/hr)	43.8 (11.6)
25% load with fan, L/hr (gal/hr)	33.1 (8.7)
Cooling System[1]	
Radiator air flow restriction (system), kPa (in water)	0.12 (0.48)
Radiator air flow, m³/min (cfm)	497 (17551)
Engine coolant capacity, L (gal)	14 (3.69)
Radiator coolant capacity, L (gal)	25 (6.6)
Total coolant capacity, L (gal)	45 (11.88)
Inlet Air	
Combustion air inlet flow rate m³/min (cfm)	24.6 (868.7)
Max. Allowable Combustion Air Inlet Temp, °C (°F)	49 (120)
Exhaust System	
Exhaust stack gas temperature, °C (°F)	495 (923)
Exhaust gas flow rate, m³/min (cfm)	69.7 (2461)
Exhaust system backpressure (maximum allowable) kPa (in. water)	10.0 (40.0)
Heat Rejection	
Heat rejection to jacket water, kW (Btu/min)	120 (6838)
Heat rejection to exhaust (total), kW (Btu/min)	320 (18223)
Heat rejection to aftercooler, kW (Btu/min)	92 (5239)
Heat rejection to atmosphere from engine, kW (Btu/min)	23 (1312)
Heat rejection from alternator, kW (Btu/min)	22 (1245)
Emissions (Nominal)[2]	
NOx, mg/Nm³ (g/hp-hr)	2196.0 (4.00)
CO, mg/Nm³ (g/hp-hr)	115.5 (0.2)
HC, mg/Nm³ (g/hp-hr)	23.1 (0.06)
PM, mg/Nm³ (g/hp-hr)	12.7 (0.03)

D300 GC Diesel Generator Sets
Electric Power

Alternator[3]			
Voltages	480V	208	600V
Motor starting capability @ 30% Voltage Dip, skVA	705	549	1117
Current Amps	451	1041	361
Frame Size	M2774L4	M3115L41	M2774L4
Excitation	S.E	S.E	AREP
Temperature Rise, °C	105°C	105°C	105°C

WEIGHTS & DIMENSIONS – OPEN SET



FUEL TANK CAPACITY

Tank Design	Total Capacity L (gal)	Useable Capacity L (gal)
Integral	2270 (600)	2059 (554)

Base	Length "A" mm (in)	Width "B" mm (in)	Height "C" mm (in)	Generator Set Weight kg (lb)
Skid (Wide Base)	3950 (155.5)	1440 (56.7)	1706 (67.2)	2503 (5518.2)
Integral Tank Base	3950 (155.5)	1430 (56.3)	2202 (86.7)	3143 (6929.1)

Note: General configuration not to be used for installation. See general dimension drawings for detail.

APPLICABLE CODES AND STANDARDS:

AS1359, CSA C22.2 No100-04, UL142, UL489, UL869, UL2200, NFPA37, NFPA70, NFPA99, NFPA110, IBC, IEC60034-1, ISO3046, ISO8528, NEMA MG1-22, NEMA MG1-33, 2006/95/EC, 2006/42/EC, 2004/108/EC.
Note: Codes may not be available in all model configurations. Please consult your local Cat Dealer representative for availability.

STANDBY: Output available with varying load for the duration of the interruption of the normal source power. Average power output is 70% of the standby power rating. Typical operation is 200 hours per year, with maximum expected usage of 500 hours per year.

RATINGS: Ratings are based on SAE J1349 standard conditions. These ratings also apply at ISO3046 standard conditions.

FUEL RATES: Based on fuel oil of 35° API [16° C (60° F)] gravity having an LHV of 42 780 kJ/kg (18,390 Btu/lb) when used at 29° C (85° F) and weighing 838.9 g/litre (7.001 lbs/U.S. gal.). Additional ratings may be available for specific customer requirements, contact your Caterpillar representative for details.
For information regarding Low Sulfur fuel and Biodiesel capability, please consult your Cat dealer.

DEFINITIONS AND CONDITIONS

[1] For ambient and altitude capabilities consult your Cat dealer. Air flow restriction (system) is added to existing restriction from factory.

[2] Emissions data measurement procedures are consistent with those described in EPA CFR 40 Part 89, Subpart D & E and ISO8178-1 for measuring HC, CO, PM, NOx. Data shown is based on steady state operating conditions of 77° F, 28.42 in HG and number 2 diesel fuel with 35° API and LHV of 18,390 BTU/lb. The nominal emissions data shown is subject to instrumentation, measurement, facility and engine to engine variations. Emissions data is based on 100% load and thus cannot be used to compare to EPA regulations which use values based on a weighted cycle.

[3] UL 2200 Listed packages may have oversized generators with a different temperature rise and motor starting characteristics. Generator temperature rise is based on a 40° C ambient per NEMA MG1-32.

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LEHE2024-05 (09/22)

Cat® GC ENCLOSURES

Image shown may not reflect actual configuration.

D250 GC – D600 GC Sound Attenuated Enclosures

60 Hz

Features

Robust/Highly Corrosion Resistant Construction

- Factory installed on skid base or tanks base
- Environmentally friendly, polyester powder baked paint
- Enclosure constructed with 18-gauge steel
- Interior zinc plated fasteners
- Internally mounted exhaust silencing system
- Comply with ASCE /SEI 7 for Wind loads up to 100 mph
- Designed and tested to comply with UL 2200 Listed generator set package

Excellent Access

- Large cable entry area for installation ease.
- Accommodates side mounted single or multiple breakers.
- Two doors on both sides.
- Vertically hinged allow 180° opening rotation
- Radiator fill cover.

Security and Safety

- Lockable access doors which give full access to control panel and breaker.
- Cooling fan and battery charging alternator fully guarded.
- Fuel fill, oil fill and battery can only be reached via lockable access.
- Externally mounted emergency stop button (Optional).
- Designed for spreader bar lifting to ensure safety.
- Stub-up area is rodent proof.

Sound Attenuated Level 2

- Caterpillar white paint
- UL Listed integral fuel tank with 24 hours running time capacity (Optional).
- DC lighting package (Optional)

Enclosure Package Operating Characteristics

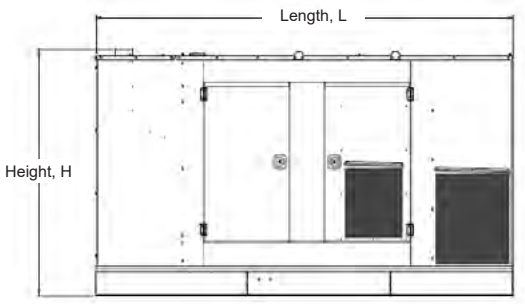
Enclosure Type	Standby	Cooling Air Flow Rate		Ambient Capability*		Sound Pressure Levels (dBA) at 7m (23 ft)
	ekW	m^3/s	cfm	°C	°F	100% Load
Level 2 Sound Attenuated Enclosure (Steel)	250	6.4	13561	57	135	74
	300	6.4	13561	51	125	74
	350	7.4	15680	57	134	71
	400	7.4	15680	53	127	71
	450	8.4	17692	54	130	73
	500	8.4	17692	50	122	73
	550	11.2	23731	56	133	73
	600	11.2	23731	53	127	73

*Cooling system performance at sea level. Consult your Cat® dealer for site specific ambient and altitude capabilities.
Note: Sound level measurements are subject to instrumentation, installation and manufacturing variability, as well as ambient site conditions

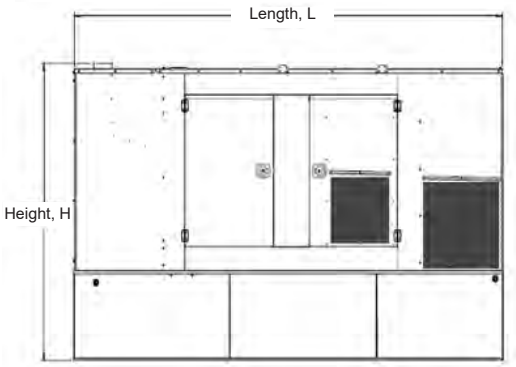
Cat® GC ENCLOSURES

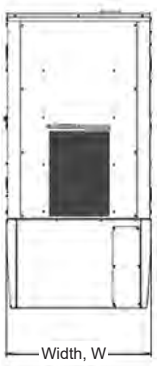
Weights and Dimensions

Enclosure Type	Standby Ratings	Length, L		Width, W		Height, H		Package Weights	
	ekW	mm	in	mm	in	mm	in	kg	lb
Sound Attenuated Enclosure on Skid Base	250	3958	155.8	1440	56.7	1991	78.4	2857	6298.6
	300							2945	6492.6
	350	4633	182.4	1630	64.2	2227	87.7	3983	8781.0
	400							4017	8856.0
	450	4823	189.8	1630	64.2	2227	87.7	4408	9718.0
	500							4457	9826.0
	550	4980	196.1	1865	73.4	2172	85.5	4754	10480.8
	600							4837	10663.8
Sound Attenuated Enclosure on UL Listed Integral Fuel Tank Base	250	3958	155.8	1440	56.7	2487	97.9	3497	7709.6
	300							3585	7903.6
	350	4633	182.4	1630	64.2	2644	104.1	4765	10505.0
	400							4799	10580.0
	450	4823	189.8	1630	64.2	2777	109.3	5345	11783.7
	500							5394	11891.7
	550	4980	196.1	1865	73.4	2723	107.2	5973	13168.2
	600							6056	13351.2
Sound Attenuated Enclosure on UL Listed Extended Integral Fuel Tank Base	250	4608	181.4	1430	56.3	2379	93.7	3590	7914.6
	300							3678	8108.6
	350	5251	203.7	1620	63.8	2561	100.8	4876	10749.7
	400							4910	10824.7
	450	5909	232.6	1620	63.8	2612	102.8	5497	12118.8
	500							5546	12226.8
	550	6759	266.1	1865	73.4	2487	97.9	6237	13750.2
	600							6320	13933.2



Sound Attenuated Enclosure on Skid Base





Sound Attenuated Enclosure on a UL Listed Integral Fuel Tank Base

Image shown may not reflect actual configuration

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LEHE2014-05 (06/22)

Jacket Water Heater (WHHH01/ WHHH03)

Appropriate when the generator set is to be sited in a low ambient environment, the heater maintains the engine coolant at a temperature [typically 38°C (100°F)] which facilitates rapid starting and load acceptance. The heater assembly uses UL compliant components (to UL1030) and has CSA certification which is to both CSA and UL Standards.

The heater itself is powered by a 240V for 60 Hz AC auxiliary supply. A thermostatic controller is included to regulate the output temperature to within safe limits. When the generator set is not running the heater is automatically connected to the AC supply through a power relay mounted in the control panel.

Upon receiving a start signal the AC supply is automatically disconnected by the power relay and automatically reconnected when the start signal is removed, and the engine has stopped.

Features

- Uniform heat distribution
- Reduces wear from cold spots
- Improves startability
- Thermostatically controlled and protected
- 6’ (1.8m) cord length (577-1758)
- 16.4’ (5.0m) cord length (578-9355).
- Ensures generator is at optimal starting temperature and ready to accept load
- Durable pump with non-magnetic impeller that does not attract metal debris
- Robust die cast aluminum housing improves sealing of the hoses, eliminates leaking and breakage
- Corrosion resistant steel brackets for superior strength and durability
- Reduces thermal stress on coolant hoses
- Element designed for long life with maximum heat transfer
- IP44 Ingress Protection Rating
- No evaporation of coolant from hoses
- Reduces low coolant level alarms because coolant does not boil

Part No	Outlet Location	Watts	Volts	Amps	Regulating Thermostat	Safety Thermostat
577-1758/578-9355	Right	2700	240	11.25	On 90°F (32°C) Off 115°F (46°C)	210°F (98°C)

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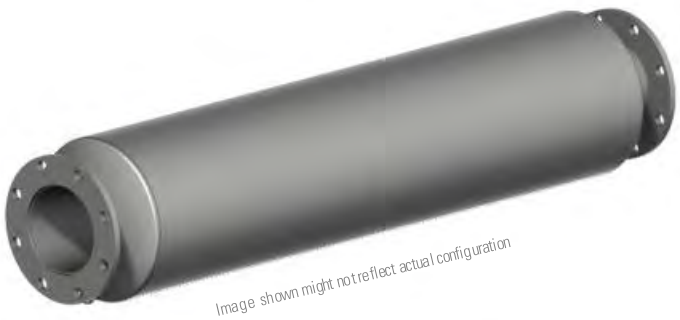
Silencers

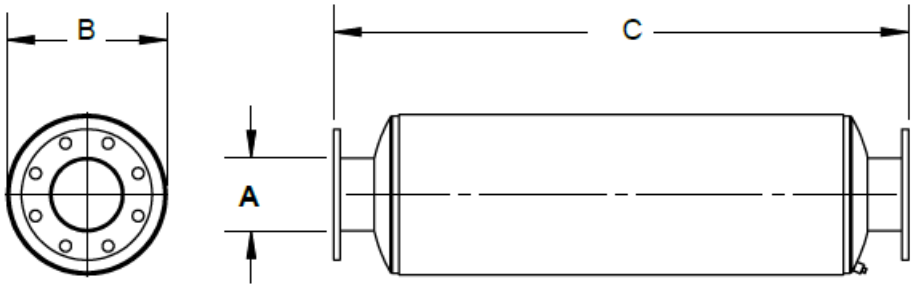


25 dBA Grade

Silencers for DE250GC to DE600GC

STANDARD FEATURES

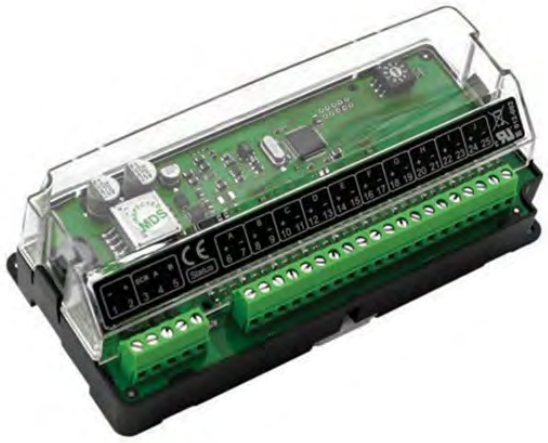
- End Inlet / End Outlet can be adapted to different exhaust configurations for ease of installation
- Coated with satin black paint rated to 1200°F to retain appearance and corrosion resistance over time
- Connection ANSI flanges are readily adaptable to other hardware providing ease of installation
- Complete with condensate drain and plug
- Aluminized steel all welded construction for heavy duty application and corrosion resistance



Residential Silencer – 25dBA

Generator Model	Frequency	Sound Attenuation @ 100% Load	Dimensions			Weight
	Hz	dBA	Length (C) mm	Width (B) mm	Inlet Diameter (A) mm	Kg
DE250GC – DE300GC	60	25	2047	453.0	157	123.7
DE350GC – DE400GC	60	25	1663	554.2	219	123.6
DE450GC – DE500GC	60	25	1676	554.2	211	123.6
DE550GC – DE600GC	60	25	1676	554.2	211	147.9

Input Expansion Module



Picture shown may not reflect actual configuration.

Input Expansion Module

The Ratiometric Input Expansion module is used in conjunction with supported controllers to provide additional, flexible, input functionality. The module's ID switch is configurable from the module and the 10 inputs can be configured from within the 'host controller'.

The ratiometric inputs can be configured in a number of ways to connect to digital switches, resistive sensors, 0 – 10 V DC signals or 4 – 20 mA signals.

LED indication is provided for 'Power On' and 'Link Lost'.

Features

- Power On/Link Lost LED
- 10 inputs configurable for digital/resistive 4 – 20 mA and 0 – 10 V DC
- A maximum of 4 modules can be connected to 1 host control module to provide up to 40 additional configurable inputs
- Works up to 1.2 km (0.75 miles) from the host controller
- Terminal strip connection for quick and easy set-up

ENVIRONMENTAL TESTING STANDARD

ELECTRO-MAGNETIC COMPATIBILITY

BS EN 61000-6-2
EMC Generic Immunity Standard for the Industrial Environment
BS EN 61000-6-4
EMC Generic Emission Standard for the Industrial Environment

ELECTRICAL SAFETY

BS EN 60950
Safety of Information Technology Equipment, including Electrical Business Equipment

TEMPERATURE

BS EN 60068-2-1
Ab/Ae Cold Test -30 °C BS EN 60068-2-2
Bb/Be Dry Heat +70°C

VIBRATION

BS EN 60068-2-6
Ten sweeps in each of three major axes
5 Hz to 8 Hz @ +/-7.5 mm, 8 Hz to 500 Hz @ 2 gn

SHOCK

BS EN 60068-2-27
Three shocks in each of three major axes 15 gn in 11 Ms

HUMIDITY

BS EN 60068-2-30
Db Damp Heat Cyclic 20/55°C @ 95% RH 48 Hours
BS EN 60068-2-78
Cab Damp Heat Static 40°C @ 93% RH 48 Hours

DEGREES OF PROTECTION PROVIDED BY ENCLOSURES BS EN 60529

IP21

SPECIFICATION

CONTINUOUS VOLTAGE RATING

8 V to 35 V Continuous

CRANKING DROPOUTS

Able to survive 0 V for 50 mS, providing supply was at least 10 V before dropout and supply recovers to 5 V. This is achieved without the need for internal batteries. LEDs light will not be maintained during cranking.

MAXIMUM OPERATING CURRENT

292 mA at 12 V, 167 mA at 24 V mA at 24 V

MAXIMUM STANDBY CURRENT

101 mA at 12 V, 167 mA at 24 V

INPUTS

10 inputs configurable for digital/resistive (3k ohms) 4 – 20 mA and 0 – 10 V DC

DIMENSIONS OVERALL

165 mm x 76 mm x 49 mm

STROAGE TEMPERATURE RANGE

-40°C to + 85°C

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LEHE2019-01 (03/23)

Output Expansion Module

Picture shown may not reflect actual configuration.

Output Expansion Module

Output relay expansion module for use with compatible control modules. The Output Expansion module has been designed to extend a host module's output capabilities.

A maximum of 10 Output Expansion modules can be connected to an individual module at any one time. All outputs are configurable via the host controller.

The module will work up to 1 KM (0.6miles) from the host control module.

Features

- Power On/Link Lost LED ID SWITCH
- 10 expansion modules can be connected to 1 host controller at a time
- 8 configurable relay contacts with LED indicators
- 4 Normally Open (N/O)
- 4 Change Over (C/O)
- Terminal strip connection for quick and easy set-up

ENVIRONMENTAL TESTING STANDARD

ELECTRO-MAGNETIC COMPATIBILITY

BS EN 61000-6-2
EMC Generic Immunity Standard for the Industrial Environment
BS EN 61000-6-4
EMC Generic Emission Standard for the Industrial Environment

ELECTRICAL SAFETY

BS EN 60950
Safety of Information Technology Equipment, including Electrical Business Equipment

TEMPERATURE

BS EN 60068-2-1
Ab/Ae Cold Test -30 °C BS EN 60068-2-2
Bb/Be Dry Heat +70°C

VIBRATION

BS EN 60068-2-6
Ten sweeps in each of three major axes
5 Hz to 8 Hz @ +/-7.5 mm, 8 Hz to 500 Hz @ 2 gn

SHOCK

BS EN 60068-2-27
Three shocks in each of three major axes 15 gn in 11 Ms

HUMIDITY

BS EN 60068-2-30
Db Damp Heat Cyclic 20/55 °C @ 95% RH 48 Hours BS EN 60068-2-78
Cab Damp Heat Static 40 °C @ 93% RH 48 Hours

SPECIFICATION

CONTINUOUS VOLTAGE RATING

8 V to 35 V Continuous

CRANKING DROPOUTS

Able to survive 0 V for 50 mS, providing supply was at least 10 V before dropout and supply recovers to 5 V. This is achieved without the need for internal batteries. LEDs and backlight will not be maintained during cranking.

MAXIMUM OPERATING CURRENT

325 mA at 12 V, 152 mA at 24 V

MAXIMUM STANDBY CURRENT

70 mA at 12 V, 32 mA at 24 V

AUXILIARY RELAY CONTACTS

2 Amp DC rated voltage free

DIMENSIONS OVERALL

165 mm x 76 mm x 49 mm
6.5" x 3" x 1.9"

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LEHE2020-01 (03/23)

Cat® GC INTEGRAL FUEL TANKS

INTEGRAL FUEL TANKS
D250 GC – D600 GC

FEATURES

- UL Listed for United States (UL 142) and Canada (CAN/ULC S601)
- Facilitates compliance with NFPA 30 code, NFPA 37 and 110 standards and CSA C282 code
- Dual wall
- Low fuel level warning standard, customer configurable warning or shutdown
- Primary tank leak detection switch in containment basin
- Tank design provides capacity for thermal expansion of fuel
- Fuel supply dip tube is positioned so as not to pick up fuel sediment
- Fuel return and supply dip tube is separated by an internal baffle to prevent immediate re-supply of heated return fuel
- Pressure washed with an iron phosphate solution
- Interior tank surfaces coated with a solvent-based thin-film rust preventative
- Heavy gauge steel gussets with internal lifting rings
- Primary and secondary tanks are leak tested at 20.7 kPa (3 psi) minimum
- Compatible with open packages and enclosures
- Gloss black polyester alkyd enamel exterior paint
- Welded steel containment basin (minimum of 110% of primary tank capacity)
- Direct reading fuel gauge with variable electrical output
- Emergency vents on primary and secondary tanks are sized in accordance with NFPA 30.

INTEGRAL

- Integral diesel fuel tank is incorporated into the generator set base frame
- Robust base design includes linear vibration isolators between tank base and engine generator.

OPTIONS

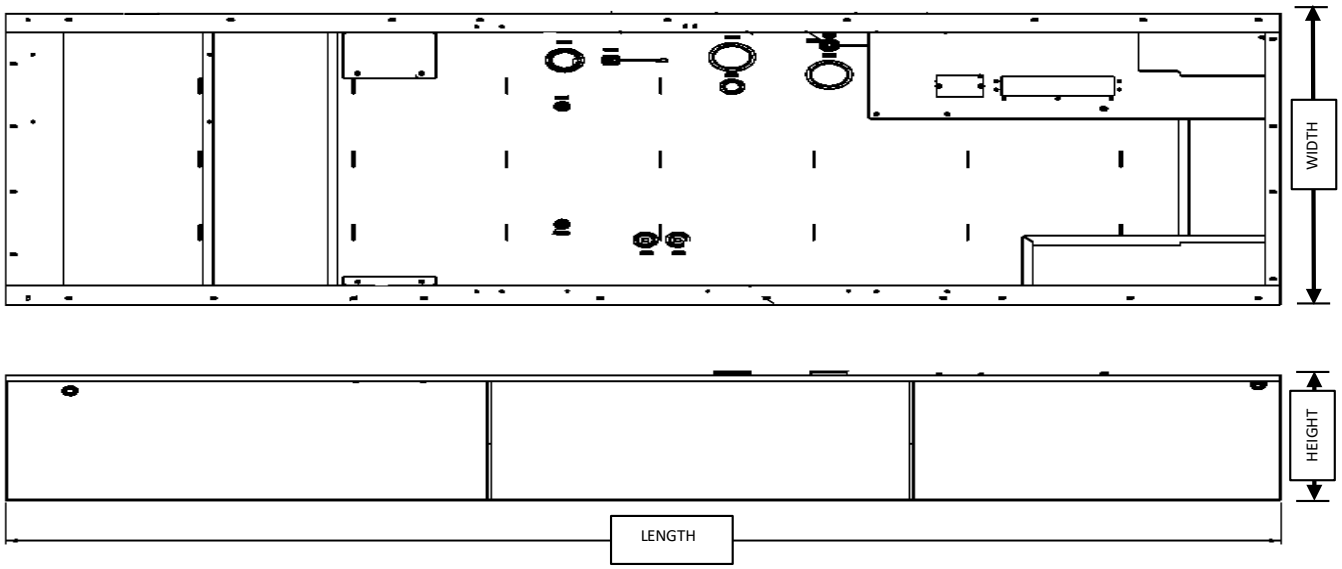
- Audio/visual fuel level alarm panel
- 5gal (18.9 L) spill containment*
- Locking Fuel Fill
- Overfill prevention Valve*

*Applicable for D350GC-D600GC Models only

Cat® GC INTEGRAL FUEL TANKS

Integral Fuel Tank Base Useable Capacities with Fuel Tank Dimensions & Weights

Standby ekW	Width mm	Width in
250-300	1430	56.3
350-400	1630	64.1
450-500	1630	64.1
550-600	1865	73.4



The heights listed above do not include lumber used during manufacturing and shipping

A. Open Set & Sound Attenuated Enclosure

Tank Design	Feature Code	Total Capacity		Useable Capacity		Tank Only						Overall Package Height with Tank			
						Dry Weight		Height 'H'		Length 'L'		Open		Enclosure	
		Litre	Gallon	Litre	Gallon	kg	lb	mm	in	mm	in	mm	in	mm	in
Integral Tank	FTDW035	2270.7	599.8	2059.9	543.9	970	2138	762.4	30.0	3958	155.8	2202	86.7	2487	97.9
	FTDW036	2820	744.9	2553	674.4	1165	2568	818.8	32.2	4625	182.1	2584	101.7	2644	104
	FTDW037	3671	969.7	3323	877.8	1331	2934	668.2	26.3	4622	181.9	2456	96.7	2644	104
	FTDW038	4292	1133.8	3889	1027.3	1657	3653	816.4	32.1	4980	196	2560	100.7	2721	107.1

B. Estimated Run Time (Hours)

Tank Design	Feature Code	Standby Ratings (kVA)						
		ekW	100%		75%		50%	
			Hrs	L/hr	Hrs	L/hr	Hrs	L/hr
Integral Tank	FTDW035	250	28.1	73.3	35	58.8	47	43.8
		300	24	86.0	30.8	66.8	40	51.5
	FTDW036	350	27.1	94.3	31.2	81.9	42.4	60.2
		400	24.1	105.9	28.1	90.7	38.6	66.2
	FTDW037	450	25.2	131.7	31.3	106.1	42.0	79.1
		500	24.3	137	30.1	110.5	46.6	71.3
	FTDW038	550	25.7	151.1	32.9	118.1	45.2	86.1
		600	24.1	161.6	30.0	129.6	42.4	91.7

Tanks with full electrical stub-up area include removable end channel. Tanks with RH stub-up include stubup area directly below the circuit breaker or power terminal strips.

Fuel tanks and applicable options facilitate compliance with the following United States NFPA Code and Standards:

NFPA 30: Flammable and Combustible Liquids Code

NFPA 37: Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines

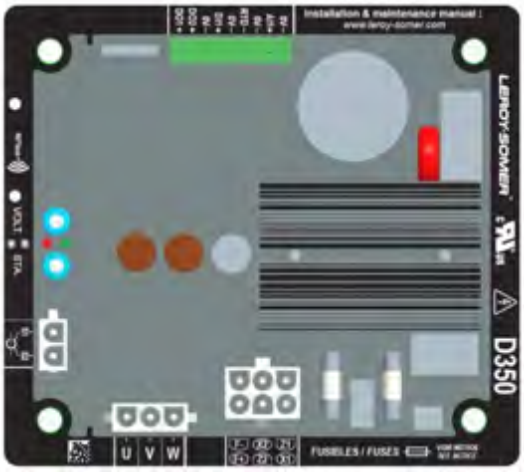
NFPA 110: Standard for Emergency and Standby Power Systems

Fuel tanks and applicable options facilitate compliance with the following Canadian Standard and Code:

CSA C282 – Emergency Electrical Power Supply for Buildings

CSA B139-09 – Installation Code for Oil-Burning Equipment

Automatic Voltage Regulator



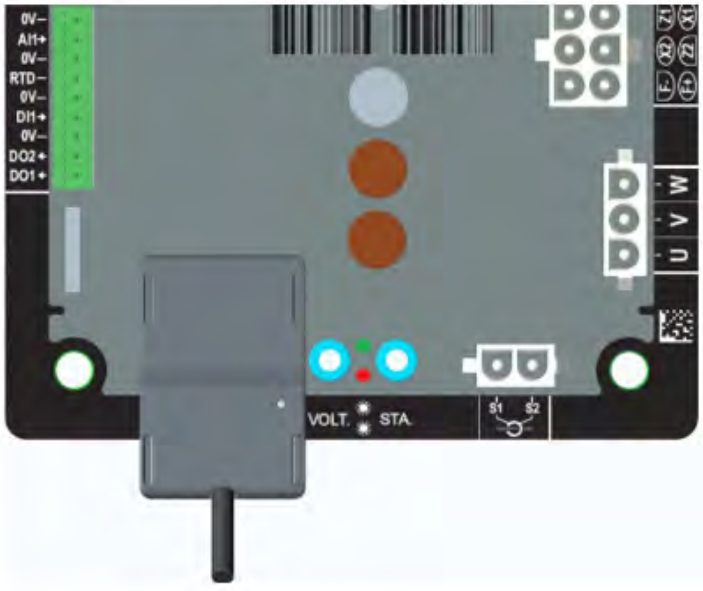
D350AVR

The D350, Digital Voltage Regulator is used to regulate alternators with a field current of less than 5 A in continuous operations, and 10 A maximum in the event of short-circuit for 10 seconds maximum.

Its design is in accordance with mounting in a generator terminal box or a control cabinet. It is required, at a minimum, to follow the local protection and safety standards, especially those specific to electrical installations for voltages of 300 VAC phase-to-neutral maximum.

NFLink™ configuration module

The D350 is equipped with NFC technology for communication and configuration purposes. The configuration module is placed over the two dedicated positioning holes on the plastic enclosure as shown below. Once the configuration is done, the NF Link must be removed as it is not supposed to be left on the D350 when it is in continuous operation.



Technical Characteristics

D350 regulator can be used to perform the following functions:

Voltage regulation

- With or without reactive droop compensation (Reactive droop to allow parallel operation)
- With or without line droop compensation

Regulation of the field current, or manual mode, which allows direct control of the field current.

The D350 can also be used to:

- Adjust the reference for the regulation mode in progress, using an analogue input (0 – 10V and potentiometer)
- Monitoring of temperature sensor (Pt100 or CTP)
- Limit the minimum field current delivered to the exciter field
- Monitoring of the maximum stator current limit
- Loss of voltage sensing
- Withstand a sudden short-circuit for 10 seconds maximum in AREP, PMG
- Signals monitoring (events logger)
- 2 digital outputs for various trip, regulation mode and measurement data

Alternator voltage sensing:

- 3 phases without neutral, 2 phases or 1 phase with neutral
- Three-phase range 0 – 530 VAC
- Consumption < 2 VA

Stator current measurement with CT:

- Range 0 –1A or 0 – 5A
- Consumption < 2 VA

Power supply:

- 4 terminals for PMG, AREP, SHUNT
- Range 50 – 277 VAC
- Consumption max < 3000 VA

Field excitation:

- Rated 0 – 5A
- Short-circuit 10A max

Frequency:

- Range 10-100 Hz
- Regulation accuracy: +/-0.25% of the average of the three phases on a linear load, with harmonic distortion less than 5%
- Voltage adjustment range: 0 to 150% of the rated voltage
- Quadrature droop adjustment range: -20% to 20%
- Under frequency protection: integrated, adjustable threshold, slope adjustable from 0.5 to 3V/Hz in steps of 0.1 V/Hz
- Excitation ceiling: adjustable by configuration at 3 points
- Environment: ambient temperature from -40°C to +65°C, relative humidity of less than 95% non-condensing, mounted in a cabinet or in a terminal box

Easy Reg Advanced:

- All the D350 settings are entered/configured using the "EasyReg Advanced" software
- This program is only compatible with computers running WINDOWS® versions Windows 7 and Windows 10 operating systems

Dimensions:

- Height: 52.9 mm
- Width: 125 mm
- Length: 140 mm

Mounting:

- Holes spacing on the Length: 115 mm
- Holes spacing on the width: 100 mm

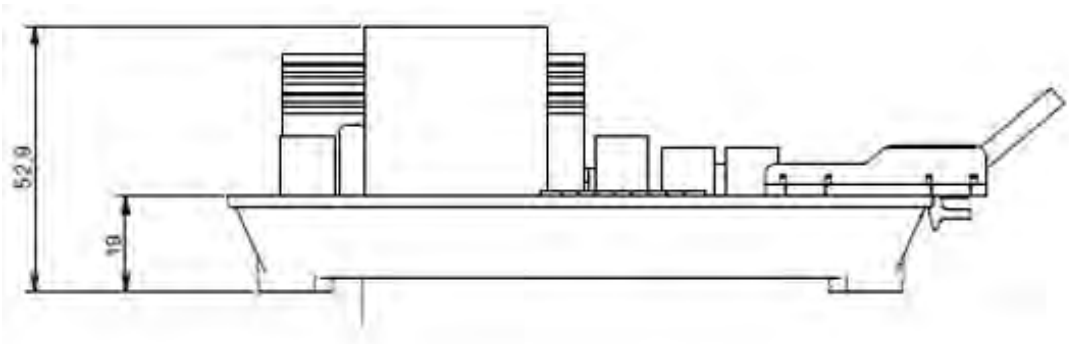
Weight:

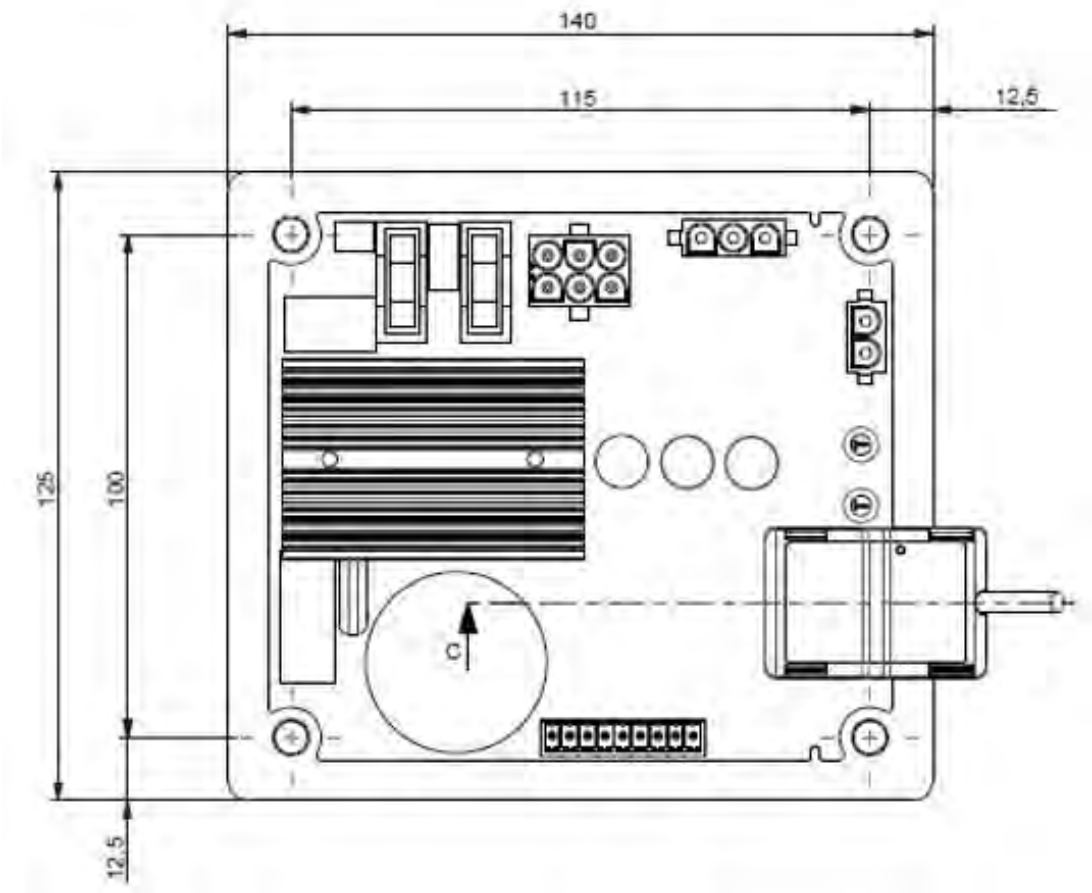
- 0.45 kg

Conformity to standards:

- EMC: IEC 61000-6-2, IEC 61000-6-4
- Humidity: IEC 60068-1 and test in accordance with IEC 60068-2-14
- Dry heat: IEC 60068-2-2
- Damp heat: IEC 60028-2-30
- Cold: IEC 600068-2-1

D350 AVR and NFLink™ Dimensions





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LEHE1923-00 (03/23)

Image shown may not reflect actual package.

LED Lights

Features

DC Lighting Kit

- Low voltage, low energy circuit and operation
- Installation includes two LED lights

Technical Data	
Theoretical Lumens Output	1600 lm
Operational Lumens Output	1000 lm
Color Temperature	5700 K
Lens	PC
Body	Aluminum
Weight	0.6 kg
IP Rating	IP68, IP6K9K
EMC	CISPR 25 Class 3, EN 12895, ISO 13766, ISO 14982, ISO 7637-2
Operating Temperatures	-40°C to +85°C (Overheat protected)

Cat® PL444 4G LTE Radio (Model: PL444 NA) Telematics Hardware

Product Description

The Caterpillar PL444 system is a Telematics product that is designed to record and store data from multiple datalinks (CAN J1939, Modbus RS485) present on higher level systems, then transmit the data offboard via wireless communications (cellular) to back office systems for end customer use.

Features

Design Specifications:

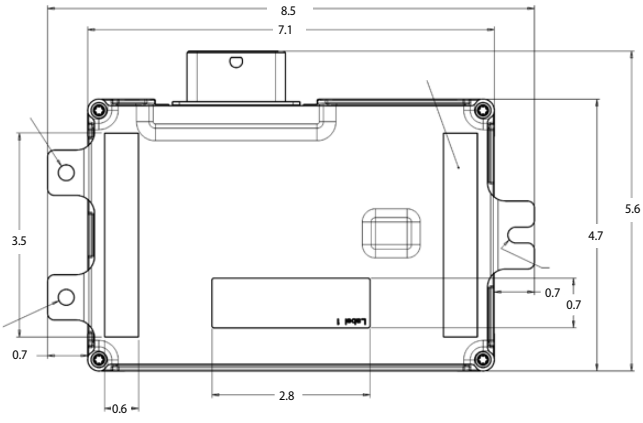
- 4G LTE Category 4 Radio
- GNSS signal tracking
- CAN datalink communication
- Modbus datalink communication
- Durable IP66/67-rated enclosure

Radio Connections / Pinout

	A	B	C	D	E	F	G	K	L	M
1	CAN_H	CAN_L	Not used	Not used	Not used	Not used	Not used	Not used	KSW	Batt+
2	Not used	Not used	Not used	Not used	Not used	Not used	Not used	Wireless Disable	Not used	Batt-
3	RS485 RTN	Not used	Not used	Not used	Not used	Not used	LSD1	Not used	Not used	Not used
4	RS485_A	RS485_B	Not used	Not used	Not used	Not used	Not used	Not used	Not used	Not used

CAN_H: CAN High
CAN_L: CAN Low
KSW: Keyswitch (Ignition) – Wakes the device up when tied to Batt+ voltage
Batt+: 12/24V Input
Batt-: Ground/Return
Wireless Disable: When pulled to ground, disables all RF transmissions (Cellular)
LSD1/2: Low Side Drivers 1 and 2. Connects a load with a voltage source, to ground when enabled, completing the circuit
RS485 RTN: RS-485 Shield
RS485A/B: RS-485 Modbus connections

Radio Dimensions



*All dimensions are in inches.

Technical Specifications

Input Voltage
Voltage Range ..... 9 to 32V DC
Protection ..... Reverse polarity

Current Consumption
Idle Current (non-transmitting) ..... < 300 mA
Peak Current ..... < 6A
Sleep Current ..... <3 mA

Physical Specifications
Enclosure Material ..... Plastic (PBT+ASA GF30 FR)
Aluminum (AlMg2.5 / H22; H23)
Dimensions (in) ..... 8.5 x 5.6 x 1.4
Weight ..... 0.45 kg
Interface Connectors ..... 48 pin Molex

Environment
Operating/Storage Temp ..... -40°C to +85°C
Ingress Protection IP66/67
Humidity ..... SAE J1455
Vibration ..... 9.8 Grms random (24-2000 Hz), up to 0.5 g^2/Hz

Regulatory Compliance
FCC, IC, CE RED, EN/UL/CSA 62368-1, RoHS, WEEE, REACH

LEDs
Orange — GNSS (Solid: GNSS Fix, 1Hz: Searching/no lock, Off: Fault)
Blue — Datalink (Flashing: Activity on J1939 or Modbus Off: Fault or No Connection)
Yellow — Cellular (Solid: Data connection established, Flashing: Searching for signal, Off: Modem off or Fault)
White — Bluetooth® (Solid: Connection established, Flashing: Advertising mode, Off: Bluetooth off or Fault)

Secure Key Injection
Security ..... Unique and cryptographic identity

Communications
Datalink J1939/CAN
Datalink ..... Modbus (RS-485)
Wireless ..... 4G LTE with 2G/3G fallback
Wireless ..... Bluetooth®/BLE 5.0

I/O
Low Side Drivers (300 mA max) 2
Switch to Ground 1
Keyswitch 1

Positioning (GNSS)
Signal Tracking ..... GPS/Galileo/GLONASS/BeiDou
Antenna ..... Internal

Cellular Communications

LTE Bands/Frequencies

Band	Frequencies (Uplink / Downlink) (MHz)
2	1850-1910 / 1930-1990
4	1710-1755 / 2110-2155
5	824-849 / 869-894
7	2500-2570 / 2620-2690
12/17	699-716 / 729-746
13	777-787 / 746-756

3G (UMTS) Bands/Frequencies

Band	Frequencies (Uplink / Downlink) (MHz)
2	1850-1910 / 1930-1990
4	1710-1755 / 2110-2155
5	824-849 / 869-894

2G (GSM) Bands/Frequencies

Band	Frequencies (Uplink / Downlink) (MHz)
2	1850-1910 / 1930-1990
5	824-849 / 869-894

Antennas ..... 2x internal (Primary + Diversity) to support 2x2 MIMO
SIM ..... eUICC chip
Operating Temperature ..... -30°C to +70°C

Bluetooth® Communications
Frequencies ..... 2402 – 2480 MHz
Version ..... BLE 5.0
Antenna ..... internal

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LEHE20361-00 (06/21)

Attachments

Image shown might not reflect actual configuration

BATTERY CHARGER

The intelligent battery charger has been developed with safety, usability, optimised battery performance and maximum battery lifetimes in mind.

A comprehensive range of input and output protections ensures a continued safe charging environment also enabling the use of the charger as a power supply.

FEATURES

- Intelligent two, three and four stage charging profiles
- Configurable to suit most battery types (12V/24V)
- Adjustable current limit
- Can be used as a battery charger, power supply or both at the same time
- Automatic or Manual boost and storage charge functions to help maintain battery condition
- Digital Microprocessor Technology
- Temperature compensation for battery charging
- Low Output Ripple and superb line regulation
- Three LED Indicators
- AC input Under voltage
- AC input Over voltage
- Battery charger output Over voltage
- Battery charger output Over current
- Optional battery temperature compensation with over temperature protection
- Output short circuit and Inversion polarity with auto recovery
- Configurable charge termination
- UL1236 /UL1564 Compliant

Automatic Boost Mode

- Boosts and equalises cell charge improving battery performance and life

Power Save Mode

- Once the battery is fully charged the chargers switch to Eco-Power to save energy

Communication

- Can be integrated into external systems through MODBUS RTU using RS485
- Fully configurable via PC Software

BENEFITS

- Fully flexible to maximise the life of the battery
- Suitable for a wide range of battery types
- Switched mode design
- Minimum 86% efficiency throughout full operating range
- No external intervention for boost mode
- Multiple chargers can be linked together to provide larger current output
- Can be permanently connected to battery and mains (utility) supply. No need to disconnect through high load conditions.

SPECIFICATION

AC SUPPLY
VOLTAGE RANGE 90 V to 305 V (L-N)

FREQUENCY RANGE
48 Hz to 64 Hz (L-N)

DC OUTPUT RATING
10 A DC at 24 V DC

RIPPLE AND NOISE
<1%

EFFICIENCY
>86%

REGULATION LINE
<0.5%

LOAD
2%

TEMPERATURE SENSOR INPUT
PT1000

PROTECTIONS
Short Circuit
DC Over Voltage
DC Over Current
Reverse Polarity
Over Temperature
AC Under & Over Voltage

CHARGE FAILURE RELAY
3 A at 30 V DC volt free relay

DIMENSIONS OVERALL
70 mm x200 mm x 130 mm
2.7" x 7.9" x 5.1"

WEIGHT
0.75 kg

OPERATING TEMPERATURE RANGE
-30 °C to +80 °C
-22 °F to +176 °F

STORAGE TEMPERATURE RANGE
-40 °C to +70 °C
-22 °F to +158 °F

LEHE2022-02 (10-20)

Annunciators

Picture shown may not reflect actual configuration.

Remote Annunicator Moduel

It is an LED expansion module that can be used with compatible control modules. The module has been designed to display a maximum of eight individual LED indications up to a maximum distance of 1 KM (0.6 miles).

The Annunciator will consist of two modules to provide a 16 Channel Fault annunciation.

It is presented in a vertical enclosure. It includes an alarm sounder that is triggered when the host controller detects an alarm condition. The alarm can be muted using the front push button.

The Panels will be fitted with removable label cards which can be used to identify the standard NFPA alarms if desired.

It includes individual LEDs for each channel and a 'Power On' LED that flashes when the link with the host controller is lost.

Features

- The Remote annunciator has an integral Sounder/Horn
- Eight configurable LEDs (per module)
- Works up to 1 KM (0.6 miles) from the host controller
- A single controller can support five Caterpillar configured remote annunciator control boxes

ENVIRONMENTAL TESTING STANDARD

ELECTRO-MAGNETIC COMPATIBILITY

BS EN 61000-6-2
EMC Generic Immunity Standard for the Industrial Environment
BS EN 61000-6-4
EMC Generic Emission Standard for the Industrial Environment

ELECTRICAL SAFETY

BS EN 60950
Safety of Information Technology Equipment, including Electrical Business Equipment

TEMPERATURE

BS EN 60068-2-1
Ab/Ae Cold Test -30 °C BS EN 60068-2-2
Bb/Be Dry Heat +70°C

VIBRATION

BS EN 60068-2-6
Ten sweeps in each of three major axes
5 Hz to 8 Hz @ +/-7.5 mm, 8 Hz to 500 Hz @ 2 gn

SHOCK

BS EN 60068-2-27
Three shocks in each of three major axes 15 gn in 11 Ms

HUMIDITY

BS EN 60068-2-30
Db Damp Heat Cyclic 20/55 °C @ 95% RH 48 Hours
BS EN 60068-2-78
Cab Damp Heat Static 40 °C @ 93% RH 48 Hours

DEGREES OF PROTECTION PROVIDED BY ENCLOSURES BS EN 60529

IP65 – Front of module when installed into the control panel with the supplied sealing gasket.

SPECIFICATION

CONTINUOUS VOLTAGE RATING

8 V to 35 V Continuous

CRANKING DROPOUTS

Able to survive 0 V for 50 mS, providing supply was at least 10 V before dropout and supply recovers to 5 V. This is achieved without the need for internal batteries. LEDs and backlight will not be maintained during cranking.

MAXIMUM OPERATING CURRENT

112 mA at 12 V, 53 mA at 24 V

MAXIMUM STANDBY CURRENT

74 mA at 12 V, 35 mA at 24 V

DIMENSIONS OVERALL

355 mm x 369 mm x 90 mm
13.6" x 14.5" x 3.5"

PANEL CUT-OUT

286 mm x 326 mm x 93 mm
11.2" x 12.8" x 3.6"

MAXIMUM PANEL THICKNESS

8 mm
0.3"

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GENERATOR DATA

GENERATOR DATA

Selected Model

Engine	C9	**Generator Frame:**	M2774L4	**Genset Rating(kW):**	300.0	**Line Voltage:**	480
Fuel	Diesel	**Generator Arrangement:**	5652322	**Genset Rating(kVA):**	375.0	**Phase Voltage:**	277.0
Frequency	60	**Excitation Type:**	Self Excited	**Pwr.Factor:**	0.8	**Rated Current:**	451.1
Duty	STANDBY	**Connection:**	SERIES STAR	**Application:**	EPG	**Status:**	Current
						Version:	42423 /44642 /43655 /8538

Spec Information

Generator Specification

Frame:	M2774L4	**Type**	SR500	**No.of Bearings:**	1
Winding Type:	RANDOM WOUND			**Flywheel:**	14.0
Connection:	SERIES STAR			**Housing:**	1
Phases	3			**No.of Leads:**	12
Poles:	4			**Wires per Lead:**	0
Sync Speed:	1800			**Generator Pitch:**	0.6667

Generator Efficiency

Per Unit Load	kW	Efficiency %
0.25	75.0	90.9
0.5	150.0	93.6
0.75	225.0	94.2
1.0	300.0	94.0

Reactances	Per Unit	Ohms
SUBTRANSIENT - DIRECT AXIS X" d	0.0993	0.0610
SUBTRANSIENT - QUADRATURE AXIS X"q	0.1217	0.0748
TRANSIENT - SATURATED X'd	0.1242	0.0763
SYNCHRONOUS - DIRECT AXIS X'd	2.6001	1.5975
SYNCHRONOUS - QUADRATURE AXIS X'q	1.3260	0.8147
NEGATIVE SEQUENCE X'2	0.1105	0.0679
ZERO SEQUENCE X'0	0.0052	0.0032

Time Constants	Seconds
OPEN CIRCUIT TRANSIENT - DIRECT AXIS T'd0	2.0941
SHORT CIRCUIT TRANSIENT - DIRECT AXIS T'd	0.1000
OPEN CIRCUIT SUBSTRANSIENT - DIRECT AXIS T"d0	0.0124
SHORT CIRCUIT SUBSTRANSIENT - DIRECT AXIS T"d	0.0100
OPEN CIRCUIT SUBSTRANSIENT - QUADRATURE AXIS T"q0	0.1089
SHORT CIRCUIT SUBSTRANSIENT - QUADRATURE AXIS T"q	0.0100
EXCITER TIME CONSTANT Te	0.0170
ARMATURE SHORT CIRCUIT Ta	0.0150

Short Circuit Ratio:0.49	Stator Resistance=0.0176Ohms	Field Resistance=0.762Ohms

Voltage Regulation

Voltage level adjustment:+/-	**5.0%**
Voltage regulation,steady state:+/-	**0.8%**
Voltage regulation with 3% speed change: +/-	**0.8%**
Waveform deviation line - line, no load: less than	**2.0%**
Telephone influence factor: less than	**50%**

Generator Excitation

	No Load	Full Load, Series	(rated)pf Parallel
Excitation Voltage:	12.57Volts	45.94Volts	Volts
Excitation Current:	1.06Amps	3.19Amps	Amps

GENERATOR DATA

Selected Model

Engine	C9	**Generator Frame:**	M2774L4	**Genset Rating(kW):**	300.0	**Line Voltage:**	480
Fuel	Diesel	**Generator Arrangement:**	5652322	**Genset Rating(kVA):**	375.0	**Phase Voltage:**	277.0
Frequency	60	**Excitation Type:**	Self Excited	**Pwr.Factor:**	0.8	**Rated Current:**	451.1
Duty	STANDBY	**Connection:**	SERIES STAR	**Application:**	EPG	**Status:**	Current
						Version:	42423 /44642 /43655 /8538

Generator Mechanical Information

Center Of Gravity

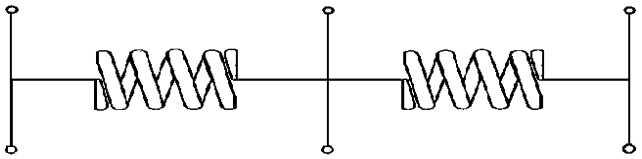
Dimension X	-493.0mm	-19.4IN.
Dimension Y	0.0mm	0.0IN.
Dimension Z	0.0mm	0.0IN.

* 'X' is measured from driven end of generator and parallel to rotor.Towards engine fan is positive.See General Information for details
* 'Y' is measured vertically from rotor center line.Up is positive
* 'Z' is measured to left and right of rotor center line.To the right is positive.

Generator WT =	888Kg 1,958LB	* Rotor WT =	355Kg 783LB	* Stator WT=	533Kg 1,175LB

Rotor Balance =	0.0mm deflection PTP
Overspeed Capacity =	125%of synchronous speed

Generator Torsional Data



J1= Coupling and Fan | **J2= Rotor TOTAL J = J1+J2+J3** | **J3= Exciter End**

K1=Shaft Stiffness between J1+J2(Diameter1) | **K2=Shaft Stiffness between J2+J3(Diameter2)**

J1	K1	Min Shaft Dia 1	J2	K2	Min Shaft Dia 2	J3
5.5LB IN.s²	44.0MLB IN./rad	4.3IN.	30.0LB IN.s²	47.1MLB IN./rad	4.5IN.	1.5IN.s²
0.618N m s²	4.96876MN m/rad	110.0mm	3.385N m s²	5.32m/rad	115.0mm	0.168N m s²
			Total J			
			36.9LB IN.s²			
			4.171N m s²			

GENERATOR DATA

Selected Model

Engine	C9	**Generator Frame:**	M2774L4	**Genset Rating(kW):**	300.0	**Line Voltage:**	480
Fuel	Diesel	**Generator Arrangement:**	5652322	**Genset Rating(kVA):**	375.0	**Phase Voltage:**	277.0
Frequency	60	**Excitation Type:**	Self Excited	**Pwr.Factor:**	0.8	**Rated Current:**	451.1
Duty	STANDBY	**Connection:**	SERIES STAR	**Application:**	EPG	**Status:**	Current
						Version:	42423 /44642 /43655 /8538

Generator Cooling Requirements - Temperature -Insulation Data

Cooling Requirements:		**Temperature Data:**	(Ambient 40.0°C)
Heat Dissipated:	19.1kW	**Stator Rise:**	105.0°C
Air Flow:	30.0m³/min	**Rotor Rise:**	105.0°C

Insulation Class:H

Insulation Reg. as shipped:100.0 M Ω minimum at 40 °C

Thermal Limits of Generator

Frequency:	60.0Hz
Line to Line Voltage:	480.0Volts
B BR 80/40	350.4kVA
F BR -105/40	398.6kVA
H BR - 125/40	438.0kVA
F PR - 130/40	438.0kVA
H PR - 150/40	464.3kVA
H PR27 - 163/27	481.8kVA

GENERATOR DATA

Selected Model

Engine	C9	**Generator Frame:**	M2774L4	**Genset Rating(kW):**	300.0	**Line Voltage:**	480
Fuel	Diesel	**Generator Arrangement:**	5652322	**Genset Rating(kVA):**	375.0	**Phase Voltage:**	277.0
Frequency	60	**Excitation Type:**	Self Excited	**Pwr.Factor:**	0.8	**Rated Current:**	451.1
Duty	STANDBY	**Connection:**	SERIES STAR	**Application:**	EPG	**Status:**	Current
						Version:	42423 /44642 /43655 /8538

Starting Capability and Current Decrement

Motor Starting Capability (0.6 pf)

SKVA	Percent Volt Dip
53	2.5
109	5.0
168	7.5
230	10.0
295	12.5
365	15.0
438	17.5
517	20.0
600	22.5
689	25.0
784	27.5
886	30.0
995	32.5
1,113	35.0
1,240	37.5
1,378	40.0

Current Decrement Data

E Time Cycle	AMP
0.0	4,520
1.0	3,273
2.0	2,673
3.0	2,249
4.0	1,901
5.0	1,606
7.5	1,043
10.0	665
12.5	413
15.0	268
20.0	144
25.0	102
30.0	85
35.0	79
40.0	76
45.0	75

GENERATOR DATA

Instantaneous 3 Phase Fault Current: 4520.0Amps
Instantaneous Line- Line Fault Current: 3706.0Amps
Instantaneous Line- Neutral Fault Current: 6266.0Amps

GENERATOR DATA

Selected Model

Engine	C9	**Generator Frame:**	M2774L4	**Genset Rating(kW):**	300.0	**Line Voltage:**	480
Fuel	Diesel	**Generator Arrangement:**	5652322	**Genset Rating(kVA):**	375.0	**Phase Voltage:**	277.0
Frequency	60	**Excitation Type:**	Self Excited	**Pwr.Factor:**	0.8	**Rated Current:**	451.1
Duty	STANDBY	**Connection:**	SERIES STAR	**Application:**	EPG	**Status:**	Current
						Version:	42423 /44642 /43655 /8538

Generator Output Characteristic Curves

Open Circuit Curve

Field Current	Line - Line Volt
0.0	0
11.2	288
13.4	336
16.0	384
19.6	432
25.2	480
35.4	528
56.0	576
99.3	624
193.4	672

Short Circuit Curve

Field Current	Armature Current
0.0	0
28.5	271
33.3	316
38.0	361
42.8	406
47.5	451
52.3	496
57.0	541
61.8	586
66.5	631

GENERATOR DATA

Selected Model

Engine	C9	**Generator Frame:**	M2774L4	**Genset Rating(kW):**	300.0	**Line Voltage:**	480
Fuel	Diesel	**Generator Arrangement:**	5652322	**Genset Rating(kVA):**	375.0	**Phase Voltage:**	277.0
Frequency	60	**Excitation Type:**	Self Excited	**Pwr.Factor:**	0.8	**Rated Current:**	451.1
Duty	STANDBY	**Connection:**	SERIES STAR	**Application:**	EPG	**Status:**	Current
						Version:	42423 /44642 /43655 /8538

Generator Output Characteristic Curves

Zero Power Factor Curve

Field Current	Line - Line Volt
47.5	0
57.1	240
59.2	288
61.4	336
64.1	384
67.9	432
74.2	480
85.9	528
109.6	576
160.0	624

Air Gap Curve

Field Current	Line - Line Volt
0.0	0
11.0	288
12.8	336
14.6	384
16.4	432
18.3	480
20.1	528
21.9	576
23.8	624
25.6	672

GENERATOR DATA

Selected Model

Engine	C9	**Generator Frame:**	M2774L4	**Genset Rating(kW):**	300.0	**Line Voltage:**	480
Fuel	Diesel	**Generator Arrangement:**	5652322	**Genset Rating(kVA):**	375.0	**Phase Voltage:**	277.0
Frequency	60	**Excitation Type:**	Self Excited	**Pwr.Factor:**	0.8	**Rated Current:**	451.1
Duty	STANDBY	**Connection:**	SERIES STAR	**Application:**	EPG	**Status:**	Current
						Version:	42423 /44642 /43655 /8538

Reactive Capability Curve

GENERATOR DATA

Selected Model

Engine	C9	**Generator Frame:**	M2774L4	**Genset Rating(kW):**	300.0	**Line Voltage:**	480
Fuel	Diesel	**Generator Arrangement:**	5652322	**Genset Rating(kVA):**	375.0	**Phase Voltage:**	277.0
Frequency	60	**Excitation Type:**	Self Excited	**Pwr.Factor:**	0.8	**Rated Current:**	451.1
Duty	STANDBY	**Connection:**	SERIES STAR	**Application:**	EPG	**Status:**	Current
						Version:	42423 /44642 /43655 /8538

General Information

GENERATOR INFORMATION (DM7900)

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1. Motor Starting
Motor starting curves are obtained in accordance with IEC60034, and are displayed at 0.6 power factor.

2. Voltage Dip
Prediction of the generator synchronous voltage dip can be made by consulting the plot for the voltage dip value that corresponds to the desired motor starting kVA value.

3. Definitions
A) Generator Keys
Frame: abbreviation of generator frame size
Freq: frequency in hertz.
PP/SB: prime/standby duty respectively
Volts: line - line terminal voltage
kW: rating in electrical kilo watts
Model: engine sales model

B) Generator Temperature Rise
The indicated temperature rises are the IEC/NEMA limits for standby or prime power applications. The quoted rise figures are maximum limits only and are not necessarily indicative of the actual temperature rise of a given machine winding.

C) Centre of Gravity
The specified centre of gravity is for the generator only. For single bearing, and two bearing close coupled generators, the center of gravity is measured from the generator/engine flywheel-housing interface and from the centreline of the rotor Shaft.

For two bearing, standalone generators, the center of gravity is measured from the end of the rotor shaft and from the centerline of the rotor shaft.

D) Generator Current Decrement Curves
The generator current decrement curve indicates the generator armature current arising from a symmetrical three-phase fault at the generator terminals. Generators equipped with AREP or PMG excitation systems will sustain 300% of rated armature current for 10 seconds.

E) Generator Efficiency Curves
The efficiency curve is displayed for the generator only under the given conditions of rating, voltage, frequency and power factor. This is not the overall generating set efficiency curve.

PERFORMANCE DATA[DM8168]

August 16, 2023

Performance Number: DM8168 **Change Level: 05**

SALES MODEL:	C9	**COMBUSTION:**	DIRECT INJECTION
BRAND:	CAT	**ENGINE SPEED (RPM):**	1,800
MACHINE SALES MODEL:		**HERTZ:**	60
ENGINE POWER (BHP):	480	**FAN POWER (HP):**	24.1
GEN POWER W/O FAN (EKW):	319.0	**ADDITIONAL PARASITICS (HP):**	12.3
GEN POWER WITH FAN (EKW):	300.0	**ASPIRATION:**	TA
COMPRESSION RATIO:	16.1	**AFTERCOOLER TYPE:**	ATAAC
RATING LEVEL:	STANDBY	**AFTERCOOLER CIRCUIT TYPE:**	JW+OC, ATAAC
PUMP QUANTITY:	1	**INLET MANIFOLD AIR TEMP (F):**	120
FUEL TYPE:	DIESEL	**JACKET WATER TEMP (F):**	192.2
MANIFOLD TYPE:	DRY	**TURBO CONFIGURATION:**	SINGLE
GOVERNOR TYPE:	ELEC	**TURBO QUANTITY:**	1
CAMSHAFT TYPE:	STANDARD	**TURBOCHARGER MODEL:**	S310-1.25
IGNITION TYPE:	CI	**CERTIFICATION YEAR:**	2005
INJECTOR TYPE:	EUI	**PISTON SPD @ RATED ENG SPD (FT/MIN):**	1,759.8
REF EXH STACK DIAMETER (IN):	4		
MAX OPERATING ALTITUDE (FT):	3,281		

INDUSTRY	SUBINDUSTRY	APPLICATION
ELECTRIC POWER	STANDARD	PACKAGED GENSET

General Performance Data

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	BRAKE MEAN EFF PRES (BMEP)	BRAKE SPEC FUEL CONSUMPTN (BSFC)	ISO BRAKE SPEC FUEL CONSUMPTN (BSFC)	VOL FUEL CONSUMPTN (VFC)	ISO VOL FUEL CONSUMPTN (VFC)	ELEC SPEC FUEL CONSUMPTN (ESFC)	ISO ELEC SPEC FUEL CONSUMPTN (ESFC)
EKW	%	BHP	PSI	LB/BHP-HR	LB/BHP-HR	GAL/HR	GAL/HR	LB/EKW-HR	LB/EKW-HR
300.0	100	480	393	0.332	0.328	22.4	22.2	0.530	0.520
270.0	90	430	352	0.334	0.330	20.2	20.0	0.532	0.522
240.0	80	383	314	0.339	0.335	18.3	18.1	0.541	0.531
225.0	75	361	295	0.342	0.339	17.4	17.2	0.549	0.539
210.0	70	339	277	0.347	0.344	16.6	16.4	0.560	0.550
180.0	60	296	242	0.360	0.357	15.0	14.9	0.592	0.580
150.0	50	253	207	0.376	0.372	13.4	13.3	0.635	0.623
120.0	40	212	173	0.390	0.386	11.6	11.5	0.688	0.675
90.0	30	170	139	0.403	0.400	9.7	9.6	0.762	0.748
75.0	25	149	122	0.411	0.407	8.6	8.5	0.815	0.800
60.0	20	127	104	0.419	0.415	7.5	7.4	0.889	0.872
30.0	10	82.9	68	0.441	0.437	5.2	5.1	1.218	1.195

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	INLET MFLD PRES	INLET MFLD TEMP	EXH MFLD TEMP	EXH MFLD PRES	ENGINE OUTLET TEMP	COMPRESSOR OUTLET PRES	COMPRESSOR OUTLET TEMP
EKW	%	BHP	IN-HG	DEG F	DEG F	IN-HG	DEG F	IN-HG	DEG F
300.0	100	480	82.5	122.6	1,247.3	60.6	927.2	83	450.8
270.0	90	430	78.7	121.1	1,179.5	55.9	877.6	80	428.0
240.0	80	383	74.9	121.5	1,120.8	51.5	840.4	76	406.4
225.0	75	361	73.0	121.6	1,094.5	49.4	826.3	74	396.1
210.0	70	339	71.0	121.7	1,071.1	47.3	817.6	72	386.3
180.0	60	296	66.4	121.7	1,028.3	43.1	800.8	67	367.7
150.0	50	253	61.1	121.7	988.0	38.7	784.5	62	350.2
120.0	40	212	52.8	121.7	944.9	32.8	768.7	54	321.8
90.0	30	170	42.5	121.6	899.1	25.9	752.9	43	282.8
75.0	25	149	36.9	121.6	875.4	22.3	745.0	38	260.3
60.0	20	127	30.8	121.6	850.8	18.7	737.0	31	235.4
30.0	10	82.9	17.9	121.5	723.0	11.7	650.3	18	178.8

General Performance Data (Continued)

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	WET INLET AIR VOL FLOW RATE	ENGINE OUTLET WET EXH GAS VOL FLOW RATE	WET INLET AIR MASS FLOW RATE	WET EXH GAS MASS FLOW RATE	WET EXH VOL FLOW RATE (32 DEG F AND 29.98 IN HG)	DRY EXH VOL FLOW RATE (32 DEG F AND 29.98 IN HG)
EKW	%	BHP	CFM	CFM	LB/HR	LB/HR	FT3/MIN	FT3/MIN

300.0	100	480	916.6	2,460.9	3,985.8	4,144.9	872.5	798.0
270.0	90	430	893.4	2,306.9	3,884.5	4,028.0	848.2	780.6
240.0	80	383	870.9	2,173.0	3,772.3	3,902.1	821.8	760.2
225.0	75	361	859.8	2,109.4	3,711.7	3,835.1	806.5	747.8
210.0	70	339	846.8	2,047.1	3,649.5	3,766.9	788.0	732.2
180.0	60	296	814.1	1,926.8	3,499.4	3,605.2	751.6	701.1
150.0	50	253	772.8	1,810.5	3,315.8	3,410.8	715.5	669.7
120.0	40	212	707.1	1,643.7	3,018.0	3,100.6	657.9	617.9
90.0	30	170	623.3	1,424.8	2,642.8	2,711.5	577.7	544.3
75.0	25	149	576.0	1,299.8	2,434.3	2,495.5	530.5	500.6
60.0	20	127	524.5	1,162.9	2,209.5	2,262.9	477.8	451.6
30.0	10	82.9	412.8	851.2	1,728.1	1,764.7	377.1	358.8

Heat Rejection Data

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	REJECTION TO JACKET WATER	REJECTION TO ATMOSPHERE	REJECTION TO EXH	EXHAUST RECOVERY TO 350F	FROM OIL COOLER	FROM AFTERCOOLER	WORK ENERGY	LOW HEAT VALUE ENERGY	HIGH HEAT VALUE ENERGY
EKW	%	BHP	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN
300.0	100	480	6,838	1,312	18,223	10,196	2,598	5,239	20,357	48,785	51,968
270.0	90	430	6,227	1,100	16,530	8,999	2,344	4,774	18,249	44,009	46,881
240.0	80	383	5,718	954	15,163	8,062	2,120	4,304	16,263	39,804	42,402
225.0	75	361	5,492	885	14,576	7,680	2,017	4,080	15,306	37,868	40,339
210.0	70	339	5,288	827	14,082	7,393	1,922	3,868	14,366	36,078	38,432
180.0	60	296	4,912	823	13,054	6,800	1,739	3,448	12,536	32,644	34,774
150.0	50	253	4,565	786	11,966	6,184	1,555	3,034	10,749	29,195	31,100
120.0	40	212	4,219	770	10,567	5,402	1,348	2,419	8,983	25,307	26,959
90.0	30	170	3,811	699	8,973	4,534	1,120	1,706	7,210	21,028	22,400
75.0	25	149	3,554	623	8,129	4,085	999	1,352	6,312	18,747	19,970
60.0	20	127	3,271	492	7,247	3,625	871	1,008	5,399	16,350	17,417
30.0	10	82.9	2,624	519	4,878	2,172	597	397	3,514	11,200	11,931

Emissions Data

DIESEL

RATED SPEED NOMINAL DATA: 1800 RPM

GENSET POWER WITH FAN		EKW	300.0	225.0	150.0	75.0	30.0
PERCENT LOAD		%	100	75	50	25	10
ENGINE POWER		BHP	480	361	253	149	82.9
TOTAL NOX (AS NO2)		G/HR	1,881	970	499	267	201
TOTAL CO		G/HR	115	89	129	109	102
TOTAL HC		G/HR	26	29	43	40	35
TOTAL CO2		KG/HR	225	175	135	86	51
PART MATTER		G/HR	15.5	15.2	34.2	22.5	14.6
TOTAL NOX (AS NO2)	(CORR 5% O2)	MG/NM3	2,196.0	1,456.1	978.0	821.3	1,152.5
TOTAL CO	(CORR 5% O2)	MG/NM3	115.5	117.0	221.7	309.8	521.3
TOTAL HC	(CORR 5% O2)	MG/NM3	23.1	33.0	63.3	96.7	146.2
PART MATTER	(CORR 5% O2)	MG/NM3	12.7	17.6	52.2	50.4	64.7
TOTAL NOX (AS NO2)	(CORR 15% O2)	MG/NM3	814.9	540.3	362.9	304.8	427.7
TOTAL CO	(CORR 15% O2)	MG/NM3	42.9	43.4	82.3	115.0	193.5
TOTAL HC	(CORR 15% O2)	MG/NM3	8.6	12.2	23.5	35.9	54.2
PART MATTER	(CORR 15% O2)	MG/NM3	4.7	6.5	19.4	18.7	24.0
TOTAL NOX (AS NO2)	(CORR 5% O2)	PPM	1,070	709	476	400	561
TOTAL CO	(CORR 5% O2)	PPM	92	94	177	248	417
TOTAL HC	(CORR 5% O2)	PPM	43	62	118	180	273
TOTAL NOX (AS NO2)	(CORR 15% O2)	PPM	397	263	177	148	208
TOTAL CO	(CORR 15% O2)	PPM	34	35	66	92	155
TOTAL HC	(CORR 15% O2)	PPM	16	23	44	67	101
TOTAL NOX (AS NO2)		G/HP-HR	3.95	2.70	1.98	1.79	2.42
TOTAL CO		G/HP-HR	0.24	0.25	0.51	0.73	1.23
TOTAL HC		G/HP-HR	0.06	0.08	0.17	0.27	0.42

PERFORMANCE DATA[DM8168]

August 16, 2023

PART MATTER	G/HP-HR	0.03	0.04	0.14	0.15	0.18
TOTAL NOX (AS NO2)	G/KW-HR	5.37	3.67	2.69	2.44	3.29
TOTAL CO	G/KW-HR	0.33	0.34	0.70	0.99	1.67
TOTAL HC	G/KW-HR	0.08	0.11	0.23	0.37	0.57
PART MATTER	G/KW-HR	0.04	0.06	0.18	0.21	0.24
TOTAL NOX (AS NO2)	LB/HR	4.15	2.14	1.10	0.59	0.44
TOTAL CO	LB/HR	0.25	0.20	0.29	0.24	0.22
TOTAL HC	LB/HR	0.06	0.06	0.09	0.09	0.08
TOTAL CO2	LB/HR	496	387	297	189	112
PART MATTER	LB/HR	0.03	0.03	0.08	0.05	0.03
OXYGEN IN EXH	%	9.2	11.2	12.6	13.6	15.0
DRY SMOKE OPACITY	%	0.1	0.3	1.0	0.9	0.8
BOSCH SMOKE NUMBER		0.62	0.67	0.96	0.90	0.87

RATED SPEED POTENTIAL SITE VARIATION: 1800 RPM

GENSET POWER WITH FAN		**EKW**	**300.0**	**225.0**	**150.0**	**75.0**	**30.0**
PERCENT LOAD		**%**	**100**	**75**	**50**	**25**	**10**
ENGINE POWER		**BHP**	**480**	**361**	**253**	**149**	**82.9**
TOTAL NOX (AS NO2)		G/HR	2,032	1,047	539	288	217
TOTAL CO		G/HR	214	166	242	203	191
TOTAL HC		G/HR	50	54	81	76	65
PART MATTER		G/HR	30.2	29.7	66.7	43.9	28.4
TOTAL NOX (AS NO2)	(CORR 5% O2)	MG/NM3	2,371.7	1,572.5	1,056.2	887.0	1,244.7
TOTAL CO	(CORR 5% O2)	MG/NM3	216.0	218.7	414.7	579.4	974.9
TOTAL HC	(CORR 5% O2)	MG/NM3	43.7	62.4	119.7	182.7	276.3
PART MATTER	(CORR 5% O2)	MG/NM3	24.8	34.3	101.8	98.2	126.1
TOTAL NOX (AS NO2)	(CORR 15% O2)	MG/NM3	880.1	583.5	391.9	329.2	461.9
TOTAL CO	(CORR 15% O2)	MG/NM3	80.2	81.2	153.9	215.0	361.8
TOTAL HC	(CORR 15% O2)	MG/NM3	16.2	23.2	44.4	67.8	102.5
PART MATTER	(CORR 15% O2)	MG/NM3	9.2	12.7	37.8	36.5	46.8
TOTAL NOX (AS NO2)	(CORR 5% O2)	PPM	1,155	766	514	432	606
TOTAL CO	(CORR 5% O2)	PPM	173	175	332	464	780
TOTAL HC	(CORR 5% O2)	PPM	82	116	223	341	516
TOTAL NOX (AS NO2)	(CORR 15% O2)	PPM	429	284	191	160	225
TOTAL CO	(CORR 15% O2)	PPM	64	65	123	172	289
TOTAL HC	(CORR 15% O2)	PPM	30	43	83	127	191
TOTAL NOX (AS NO2)		G/HP-HR	4.27	2.92	2.13	1.94	2.61
TOTAL CO		G/HP-HR	0.45	0.46	0.96	1.36	2.30
TOTAL HC		G/HP-HR	0.11	0.15	0.32	0.51	0.79
PART MATTER		G/HP-HR	0.06	0.08	0.26	0.29	0.34
TOTAL NOX (AS NO2)		G/KW-HR	5.80	3.96	2.90	2.63	3.55
TOTAL CO		G/KW-HR	0.61	0.63	1.30	1.85	3.12
TOTAL HC		G/KW-HR	0.14	0.21	0.43	0.69	1.07
PART MATTER		G/KW-HR	0.09	0.11	0.36	0.40	0.47
TOTAL NOX (AS NO2)		LB/HR	4.48	2.31	1.19	0.64	0.48
TOTAL CO		LB/HR	0.47	0.37	0.53	0.45	0.42
TOTAL HC		LB/HR	0.11	0.12	0.18	0.17	0.14
PART MATTER		LB/HR	0.07	0.07	0.15	0.10	0.06

Regulatory Information

EPA TIER 3		**2005 - 2010**		
GASEOUS EMISSIONS DATA MEASUREMENTS PROVIDED TO THE EPA ARE CONSISTENT WITH THOSE DESCRIBED IN EPA 40 CFR PART 89 SUBPART D AND ISO 8178 FOR MEASURING HC, CO, PM, AND NOX. THE "MAX LIMITS" SHOWN BELOW ARE WEIGHTED CYCLE AVERAGES AND ARE IN COMPLIANCE WITH THE NON-ROAD REGULATIONS.				
Locality	**Agency**	**Regulation**	**Tier/Stage**	**Max Limits - G/BKW - HR**
U.S. (INCL CALIF)	EPA	NON-ROAD	TIER 3	CO: 3.5 NOx + HC: 4.0 PM: 0.20

EPA EMERGENCY STATIONARY		**2011 - ----**		
GASEOUS EMISSIONS DATA MEASUREMENTS PROVIDED TO THE EPA ARE CONSISTENT WITH THOSE DESCRIBED IN EPA 40 CFR PART 60 SUBPART IIII AND ISO 8178 FOR MEASURING HC, CO, PM, AND NOX. THE "MAX LIMITS" SHOWN BELOW ARE WEIGHTED CYCLE AVERAGES AND ARE IN COMPLIANCE WITH THE EMERGENCY STATIONARY REGULATIONS.				
Locality	**Agency**	**Regulation**	**Tier/Stage**	**Max Limits - G/BKW - HR**
U.S. (INCL CALIF)	EPA	STATIONARY	EMERGENCY STATIONARY	CO: 3.5 NOx + HC: 4.0 PM: 0.20

PERFORMANCE DATA[DM8168]

Altitude Derate Data

STANDARD

ALTITUDE CORRECTED POWER CAPABILITY (BHP)

AMBIENT OPERATING TEMP (F)	30	40	50	60	70	80	90	100	110	120	130	140	NORMAL
ALTITUDE (FT)													
0	480	480	480	480	480	477	474	465	452	433	412	395	478
1,000	480	480	480	480	477	475	470	457	441	422	402	386	476
2,000	480	480	479	477	474	470	463	446	427	410	392	376	473
3,000	480	478	475	470	463	457	449	434	418	403	386	370	464
4,000	475	469	463	456	450	444	436	422	407	391	374	358	453
5,000	462	456	449	442	436	430	422	408	393	377	360	343	442
6,000	449	442	435	428	422	416	408	394	379	362	346	329	430
7,000	434	428	421	414	408	402	394	379	364	348	332	315	418
8,000	420	413	406	400	394	387	380	365	350	334	318	302	406
9,000	405	398	392	385	379	373	365	350	335	320	305	289	394
10,000	390	384	377	371	365	359	352	337	322	307	293	278	382
11,000	376	369	363	357	351	345	339	334	320	305	291	277	370
12,000	361	355	348	342	337	331	326	320	315	303	288	270	357
13,000	347	340	334	329	323	318	312	307	302	290	274	257	345
14,000	332	326	321	315	310	304	299	294	289	276	261	246	333
15,000	319	313	307	302	297	291	286	282	276	263	249	235	322

Cross Reference

Test Spec	Setting	Engine Arrangement	Engineering Model	Engineering Model Version	Start Effective Serial Number	End Effective Serial Number
0K6616	NAP	2531644	GS279	-	S9L00001	
4150068	PP5547	3950369	GS279	-	S9P00001	
4150068	PP5547	4529865	GS857	LS	S9P00001	
4150068	PP5547	5664658	PG350	G	RG300001	
4150068	PP5547	5664658	PG375	G	RE300001	

Performance Parameter Reference

Parameters Reference:DM9600-14

PERFORMANCE DEFINITIONS

PERFORMANCE DEFINITIONS DM9600
APPLICATION:
Engine performance tolerance values below are representative of a typical production engine tested in a calibrated dynamometer test cell at SAE J1995 standard reference conditions. Caterpillar maintains ISO9001:2000 certified quality management systems for engine test Facilities to assure accurate calibration of test equipment. Engine test data is corrected in accordance with SAE J1995. Additional reference material SAE J1228, J1349, ISO 8665, 3046-1:2002E, 3046-3:1989, 1585, 2534, 2288, and 9249 may apply in part or are similar to SAE J1995. Special engine rating request (SERR) test data shall be noted.
PERFORMANCE PARAMETER TOLERANCE FACTORS:
Power +/- 3%
Torque +/- 3%
Exhaust stack temperature +/- 8%
Inlet airflow +/- 5%
Intake manifold pressure-gage +/- 10%
Exhaust flow +/- 6%
Specific fuel consumption +/- 3%
Fuel rate +/- 5%
Specific DEF consumption +/- 3%
DEF rate +/- 5%
Heat rejection +/- 5%
Heat rejection exhaust only +/- 10%
Heat rejection CEM only +/- 10%
Heat Rejection values based on using treated water.

PERFORMANCE DATA[DM8168]

Torque is included for truck and industrial applications, do not use for Gen Set or steady state applications.
On C7 - C18 engines, at speeds of 1100 RPM and under these values are provided for reference only, and may not meet the tolerance listed.
On 3500 and C175 engines, at speeds below Peak Torque these values are provided for reference only, and may not meet the tolerance listed.
These values do not apply to C280/3600. For these models, see the tolerances listed below.
C280/3600 HEAT REJECTION TOLERANCE FACTORS:
Heat rejection +/- 10%
Heat rejection to Atmosphere +/- 50%
Heat rejection to Lube Oil +/- 20%
Heat rejection to Aftercooler +/- 5%
TEST CELL TRANSDUCER TOLERANCE FACTORS:
Torque +/- 0.5%
Speed +/- 0.2%
Fuel flow +/- 1.0%
Temperature +/- 2.0 C degrees
Intake manifold pressure +/- 0.1 kPa
OBSERVED ENGINE PERFORMANCE IS CORRECTED TO SAE J1995 REFERENCE AIR AND FUEL CONDITIONS.
REFERENCE ATMOSPHERIC INLET AIR
FOR 3500 ENGINES AND SMALLER
SAE J1228 AUG2002 for marine engines, and J1995 JAN2014 for other engines, reference atmospheric pressure is 100 KPA (29.61 in hg), and standard temperature is 25deg C (77 deg F) at 30% relative humidity at the stated aftercooler water temp, or inlet manifold temp.
FOR 3600 ENGINES
Engine rating obtained and presented in accordance with ISO 3046/1 and SAE J1995 JANJAN2014 reference atmospheric pressure is 100 KPA (29.61 in hg), and standard temperature is 25deg C (77 deg F) at 30% relative humidity and 150M altitude at the stated aftercooler water temperature.
MEASUREMENT LOCATION FOR INLET AIR TEMPERATURE
Location for air temperature measurement air cleaner inlet at stabilized operating conditions.
REFERENCE EXHAUST STACK DIAMETER
The Reference Exhaust Stack Diameter published with this dataset is only used for the calculation of Smoke Opacity values displayed in this dataset. This value does not necessarily represent the actual stack diameter of the engine due to the variety of exhaust stack adapter options available. Consult the price list, engine order or general dimension drawings for the actual stack diameter size ordered or options available.
REFERENCE FUEL
DIESEL
Reference fuel is #2 distillate diesel with a 35API gravity;
A lower heating value is 42,780 KJ/KG (18,390 BTU/LB) when used at 15 deg C (59 deg F), where the density is 850 G/Liter (7.0936 Lbs/Gal).
GAS
Reference natural gas fuel has a lower heating value of 33.74 KJ/L (905 BTU/CU Ft). Low BTU ratings are based on 18.64 KJ/L (500 BTU/CU FT) lower heating value gas. Propane ratings are based on 87.56 KJ/L (2350 BTU/CU Ft) lower heating value gas.
ENGINE POWER (NET) IS THE CORRECTED FLYWHEEL POWER (GROSS) LESS EXTERNAL AUXILIARY LOAD
Engine corrected gross output includes the power required to drive standard equipment; lube oil, scavenge lube oil, fuel transfer, common rail fuel, separate circuit aftercooler and jacket water pumps. Engine net power available for the external (flywheel) load is calculated by subtracting the sum of auxiliary load from the corrected gross flywheel out put power. Typical auxiliary loads are radiator cooling fans, hydraulic pumps, air compressors and battery charging alternators. For Tier 4 ratings additional Parasitic losses would also include Intake, and Exhaust Restrictions.
ALTITUDE CAPABILITY
Altitude capability is the maximum altitude above sea level at standard temperature and standard pressure at which the engine could develop full rated output power on the current performance data set.
Standard temperature values versus altitude could be seen on TM2001.
When viewing the altitude capability chart the ambient temperature is the inlet air temp at the compressor inlet.
Engines with ADEM MEUI and HEUI fuel systems operating at conditions above the defined altitude capability derate for atmospheric pressure and temperature conditions outside the values defined, see TM2001.
Mechanical governor controlled unit injector engines require a setting change for operation at conditions above the altitude defined on the engine performance sheet. See your Caterpillar technical representative for non standard ratings.
REGULATIONS AND PRODUCT COMPLIANCE

PERFORMANCE DATA[DM8168]

TMI Emissions information is presented at 'nominal' and 'Potential Site Variation' values for standard ratings. No tolerances are applied to the emissions data. These values are subject to change at any time. The controlling federal and local emission requirements need to be verified by your Caterpillar technical representative.
Customer's may have special emission site requirements that need to be verified by the Caterpillar Product Group engineer.
EMISSION CYCLE LIMITS:
Cycle emissions Max Limits apply to cycle-weighted averages only. Emissions at individual load points may exceed the cycle-weighted limit.
WET & DRY EXHAUST/EMISSIONS DESCRIPTION:
Wet - Total exhaust flow or concentration of total exhaust flow
Dry - Total exhaust flow minus water vapor or concentration of exhaust flow with water vapor excluded
EMISSIONS DEFINITIONS:
Emissions : DM1176
EMISSION CYCLE DEFINITIONS
1. For constant-speed marine engines for ship main propulsion, including,diesel-electric drive, test cycle E2 shall be applied, for controllable-pitch propeller sets
test cycle E2 shall be applied.
2. For propeller-law-operated main and propeller-law-operated auxiliary engines the test cycle E3 shall be applied.
3. For constant-speed auxiliary engines test cycle D2 shall be applied.
4. For variable-speed, variable-load auxiliary engines, not included above, test cycle C1 shall be applied.
HEAT REJECTION DEFINITIONS:
Diesel Circuit Type and HHV Balance : DM9500
HIGH DISPLACEMENT (HD) DEFINITIONS:
3500: EM1500
RATING DEFINITIONS:
Agriculture : TM6008
Fire Pump : TM6009
Generator Set : TM6035
Generator (Gas) : TM6041
Industrial Diesel : TM6010
Industrial (Gas) : TM6040
Irrigation : TM5749
Locomotive : TM6037
Marine Auxiliary : TM6036
Marine Prop (Except 3600) : TM5747
Marine Prop (3600 only) : TM5748
MSHA : TM6042
Oil Field (Petroleum) : TM6011
Off-Highway Truck : TM6039
On-Highway Truck : TM6038
SOUND DEFINITIONS:
Sound Power : DM8702
Sound Pressure : TM7080
Date Released : 10/27/21

Appendix E Romtec Preliminary Design

ROMTEC UTILITIES

Preliminary Scope of Products and Services – Booster Station

Project: Oak Lodge Booster Station
Customer: WSC
Location: Milwaukie, Oregon
Date: April 3rd, 2023

Part 1: Overview

1.1 About Romtec Utilities

Romtec Utilities is a design, engineering, and manufacturing firm specializing in site-specific pumping systems. For more than 20 years, Romtec Utilities has been delivering the most effective pump systems to public and private owners across the United States. Romtec Utilities provides a dedicated project management team to coordinate with you through the planning, design/engineering, production, installation, and commissioning of your pump system. Romtec Utilities provides unmatched pre-fabrication, project management services, and engineering support.

1.2 Project Overview

Romtec Utilities will design and supply a complete packaged potable water booster station with control building for the Oak Lodge Booster Station project. This preliminary scope of work is based on design criteria and information provided by Water Systems Consulting, Inc. and Tetra Tech as of 3/1/2023.

1.3 Operational Overview

The preliminary design is based on a standard alternating quadraplex configuration for the high demand pumps. In this configuration, the pumps will alternate operation after every pumping cycle to allow for approximately equal wear on the pumps.

For high flows, the high flow pump can provide 2,639 GPM at approximately 163 psi discharge pressure at the booster station (20 psi incoming plus 143 psi boosted pressure). This duty point will be provided with all pumps running.

The discharge pressures noted above are at the booster station. The actual discharge pressure at any particular downstream fixture is dependent on several factors, including but not limited to the inlet pressure at the booster station, the number of fixtures operating, the length of the piping between the booster station and the fixture, and the elevation change between the booster station and the fixture.

All pumps are designed to operate based on flow rate and discharge pressure at the booster station.

1.4 Key Notes

The preliminary design is intended match as closely as possible the given design criteria and standards. However, please note the following important clarifications regarding the proposed design.

- **Supply Power** – The preliminary design is based on 240V/single-phase supply power. The supply power must be confirmed before moving beyond the preliminary design.
- **Combustion Motors** – Equipment such as backup power generators or external emergency pumps that include internal combustion motors may be subject to strict local requirements for emissions standards and noise level restrictions.
    - **Emissions Requirements** –Some local air quality authorities update emissions requirements regularly, and often the air quality permit application process (if required) can be lengthy. Romtec Utilities recommends that the generator air quality requirements be determined and finalized as soon as possible. Specific requirements of local air quality authorities can have a significant effect on the required generator configuration and pricing.
    - **Noise Restrictions** – Local authorities sometimes require that noise levels be limited to a specific decibel amount at a specific distance from the project site (such as the nearest property line). While equipment manufacturers generally offer sound attenuation, Romtec Utilities cannot guarantee compliance with all local restrictions. Romtec Utilities is not responsible for measuring or calculating noise levels at the project site, and in some locations a separate structure to house the equipment may be required to comply with local noise restrictions.
- **Design Criteria** – Romtec Utilities has based this preliminary scope on several assumptions, including but not limited to the inlet and discharge pipe material and sizing (12" ductile iron CL52), and estimated elevations. Any future changes to the design criteria can have a significant effect on the system design.
- **Booster Station Building** – Details about the booster station control building are in Part 4: Control Building of this document.
- **Generator Location** – The generator location will be outside of the booster station control building as it is too large to be accommodated within the structure.
- **Communications** – Communications/SCADA for the project has not been defined. The preliminary system design does not include any communications/SCADA devices.

- **PRV Vault** – The preliminary system design includes a pressure reducing vault (PRV) vault for flow back to the upstream water source. More information regarding the design of the PRV vault will be provided as the project moves forward.

Note: *This Preliminary Scope Letter will be superseded by the Scope of Supply and Design Submittal when Romtec Utilities is directed to proceed with its complete submittal package (upon receipt of a signed Purchase Order).*

Part 2: Services

2.1 Engineering Plans and Submittals

A. **Plans and Submittal**
Structural, mechanical, and electrical pump system plans designed as a complete packaged system. Includes complete Structural, Mechanical, Electrical/Control, and supporting installation instructions. Romtec Utilities will provide a "to-scale" equipment layout on the Owner's/Project Engineer's site plan. Submittals will be provided in Romtec Utilities' standard electronic format, and Romtec Utilities has included up to four (4) design revisions. Submittals include plans, component data sheets, and supplemental information.

B. Please click the following link for more information about Design and Engineering services: https://romtecutilities.com/designengineering/

C. **O&M Manual**
Romtec Utilities will provide the Operation & Maintenance manual and for-construction drawings after the final design is approved. O&M manual will include all submittal documentation along with parts lists, maintenance manuals, and electrical schematics.

2.2 Project Management and Support

A. Romtec Utilities will assign a dedicated project management team to work with the customer and all related parties through the planning, design, delivery, installation, and commissioning/startup of the pump station.

2.3 Prefabrication and Delivery

A. Romtec Utilities will fully prefabricate/preassemble the pump station to the extent possible for shipping.

B. For more info about prefabrication, please click http://romtecutilities.com/preparing-structural-components-prior-to-delivery for structures and http://romtecutilities.com/engineering-prefabricated-vault-assemblies for valve assemblies.

C. The pump station will be delivered on standard flat-bed trucks to be offloaded by the customer or contractor.

D. For more info about delivery please click: http://romtecutilities.com/the-advantages-of-coordinated-delivery.

2.4 Installation and Commissioning

A. Install Advisor

1. An onsite Installation Advisor is provided for one (1) day at the time of booster skid structural & mechanical installation to oversee the delivery of components and provide advisory services for installation of primary skid structure.
2. Romtec Utilities provides Engineering support for the installing electrician via phone prior to and during installation.
3. The Installation Advisor will complete an Install Report to confirm basic install info.
4. For more info about the install advisor, please click: https://romtecutilities.com/field-services#Install-Advising.

B. Start-up/Testing and Owner Training

1. System start-up is performed by the installing contractor under the supervision of the Romtec Utilities Start-up Technician. The Start-up Technician will provide five (5) contiguous days of on-site field service.
2. During start-up, Romtec Utilities will prove the performance of the system based on the final approved Submittal(s) and will provide training to the owner's designated personnel.
3. The Start-up Technician will complete a field startup report with a copy for the customer and/or owner.
4. For more info about start-up services please click: http://romtecutilities.com/services#Start-Up-Testing.

2.5 Control Configuration and Programming

A. This system includes a Romtec Utilities Tier 4 system control, which includes an Allen Bradley Compact Logix PLC controller as the primary pump control unit with color HMI. This control design requires extensive custom programming of the controller by Romtec Utilities and requires a high level of coordination between the end user(s), owner's SCADA integrator, and Romtec Utilities system engineers during the design and development of the control processes.

B. See Part 3 below for more control system product details.

2.6 Warranty

A. Please click the link below to review the standard Romtec Utilities 1-year warranty terms online.

http://romtecutilities.com/wp-content/uploads/2022/05/RU-Warranty-5-4-22.pdf

Part 3: Booster System Equipment Supply

3.2 Prefabricated Skid and Mechanical

A. The steel skid assemblies will include: Pumps (see below); manifold piping, pipe supports, and stands; all required valves (butterfly valves, check valves, pressure relief valves, drain valves, etc.); couplings, elbows, and tees; pressure gauges and pressure transmitters; pressure tank.

B. The pump station manifold piping will be 12"ductile iron pipe (CL50).

3.3 Pump Package

A. For intertie flows, Romtec Utilities will supply four (4) Grundfos NBS 030-095-2P, end suction centrifugal 125HP pumps with associated mounting hardware and mechanical connections. The pumps will be automatically controlled based on the flow rate and pressure leaving the pump station.

1. The intertie flow pumps are designed to perform at the pumping rates of 880 GPM at 163 psi station discharge pressure (20 psi inlet pressure plus 143 psi provided by the pump). Three pumps running would meet the peak intertie flow requirement of 2,639 GPM.

B. Unless otherwise noted, the proposed pumps include the manufacturer's standard pump materials of construction and coatings (typically factory epoxy coated ductile iron or cast iron). More information about the pump materials can be provided upon request.

3.4 Control Panel and Variable Frequency Drives

A. UL listed for the USA

B. NEMA 4 painted steel enclosure with an interior "dead" front panel with Hand-off-auto (H.O.A.) switches, color HMI, alarm beacon and audible alarm.

C. Primary pump control: Compact Logix PLC controller configured for quadraplex operation.

D. Romtec Utilities will provide separate enclosures to house the VFD's for each pump (one enclosure for each pump drive).

E. The control panel and pump station are configured for 240V/single-phase supply power.

3.5 SCADA/Communications

A. The control panel will not include any remote communication devices.

B. The control panel will include an alarm beacon and audible alarm for local notification.

3.6 Generator and ATS

A. 450kW diesel generator will be required for pump station back-up power.

B. 24-hour fuel tank and level 2 sound attenuation enclosure

C. 600A automatic transfer switch

D. Remote emergency stop

E. Stand-alone load bank

Part 3: Control Building Equipment Supply

4.1 Control Building Structure

Once produced, the building package will arrive on organized pallets that are separated into stages for ease of installation. Because of this packaging style, there are no shipping limitations for the building package. It is Romtec's goal to provide the installing contractor with the most complete building kit possible to reduce time spent on installation, therefore reducing the overall cost of the project.

A. Structure

The Romtec building package has been quoted with the specific product colors noted below. Changes to these color selections may result in a price increase. Customer to select colors from each manufacturer's specified color chart for block, roofing, steel finishes, etc.

The following items relative to the building structure will be supplied by Romtec.

1. Concrete Masonry Units - CMU
   a. Exterior walls will be constructed of split-face, mortar joint, concrete masonry units (concrete blocks).
   b. Block color will be **grey**.
2. Interior wall finish
   a. Insulation with FRP
   b. Sealed concrete
3. Doors, frames and hardware
   a. Stainless steel, ball bearing hinges.
   b. Heavy duty door closures.
   c. Pull handle with deadbolt locks.
   d. Doors to have stainless steel kickplates
   e. Roll-up doors.
4. Roofing materials
   a. Truss mud sill plate
   b. Roofing will be Fabral, 29 gauge, Grand-Rib 3 roof panels with exposed fasteners

Note: Roofing color shall be selected by the **owner** from the manufactures standard color chart.

4.2 Building Electrical Fixtures

A. Wall mount, LED wall pack light fixtures for exterior lighting. Exterior lights controlled by photocell.

B. 48" ceiling mount LED light fixtures for interior lighting.

Part 5: Installer's Scope & Exceptions/Exclusions

5.1 Control Building

A. Overview

The following section includes an overview of items to be provided by others that are required to complete the installation of the Romtec building package.

B. Installer Scope

The installer's scope will generally consist of site preparation and grading, excavation for structures, backfill and/or structural backfill, any site work or utility work, foundation/pad construction and building package assembly/construction.

1. Structural

   The following structural components will be provided by the ***installer***:

   a. All materials, equipment and labor for exterior slabs and sidewalks.
   b. If required, design and supply of gutters and downspouts is by the installer or by others. Romtec Utilities can show basic gutters and downspouts on the plans upon request.
   c. All materials, equipment and labor for footings and interior slabs.
   d. Latex epoxy paint wall finish (if applicable).
   e. Caulking.
   f. Concrete sealant for floor and CMU block exterior.
   g. Masonry (concrete) grout and rebar.
   h. The ***installer*** may be required to notch CMU block for bond beams, cut full blocks to create half blocks and grind blocks for fixture mounting purposes.

   Note: Romtec is not responsible for any cost or installation delays associated with this CMU block modification work.

   i. The ***installer*** may be required to cut stone veneer to achieve the required shapes necessary for installation.

   Note: Romtec is not responsible for any additional stone veneer work required of the installer.

   j. Sealant for all exposed wood.

k. Typical fasteners such as nails, staples, and screws, and any other fasteners not included in product packaging.

2. Plumbing – Note that this section refers to standard building plumbing only (such as when the building includes a restroom). This section does not refer to the piping and equipment for the booster system. The following plumbing components will be provided by the ***installer.***
   a. Incoming plumbing utilities will be by the ***installer***.
   b. All water and sewer piping, drains, and valves are provided by the ***installer***.
   c. Plumbing rough-in, installation and trim will be by the ***installer***.

3. Electrical
   The following electrical components will be provided by the ***installer.***
   a. Incoming electrical utilities, including but not limited to any required meter and meter base.
   b. Electrical rough-in, installation and trim will be by the installer.
   c. All switches and outlets that are not included with electrical products are provided by the ***installer***.

4. Other materials, equipment, and services
   The following materials, equipment, and services are provided by the installer.
   a. Building package installation
   b. Site grading and/or asphalt paving (if applicable)
   c. Masonry pavers (if applicable)
   d. Branch circuit breakers
   e. Fire alarm & fire suppression equipment
   f. Gutters and downspouts
   g. Lighting equipment not attached to the building
   h. Backflow check valves & drain valves
   i. Freeze protection
   j. Landscaping
   k. Special inspection services
   l. Permits and fees
   m. Site plans
   n. Geotechnical reports
   o. All other items within the building footprint indicated on final plans or required by building codes to complete installation of the building package which are not specifically stated as supplied by Romtec Utilities or by others.

C. Delivery, Storage, and Handling

1. The ***installer*** will be responsible for all equipment and labor required for off-loading of the delivered building package onsite.
2. The ***installer*** will assume responsibility for adequate protection of delivered materials from weather, damage, and pilferage or all warranties, expressed or implied may be voided.
3. Do not throw away the Operations & Maintenance manuals that are provided by some manufacturers in their building product packaging. It is the responsibility of the ***installer*** to collect and maintain these manuals until delivered to the owner.

D. Romtec Utilities General Control Building Exclusions

The following are items that Romtec Utilities does not provide as part of its standard products and services.

1. Site visits by Romtec Utilities staff are not included in the proposal.
   Note: If site visits are required, Romtec will issue a change order.
2. Unless otherwise stated, Romtec is not proposing to meet any Buy America standard for materials.
3. Romtec's proposed building design is based on the following standard design loads. These standard design loads are typical for many locations. Local design loads specific to this project may require changes to the building design, which may result in a price increase due to increased material costs.
   a. Roof Snow Load: 25 psf
   b. IBC Seismic Design Category: C
   c. Design Wind Speed: 110 mph
   d. Allowable Soil Bearing: 1500 psf
   e. Occupancy Type: U
   f. Type: VB
4. Any site utility sizing shown on the Romtec plans is either based on design criteria provided by others or based on Romtec Utilities' assumption of the appropriate sizing. Site utility sizing must be confirmed by the customer. Romtec Utilities is not responsible for determining or confirming site utility sizing.
5. Romtec Utilities does not provide LEED/Green submittals as a standard service. Romtec Utilities can assist in providing documentation for products that may meet LEED/Green standards, but Romtec Utilities does not provide or fill out LEED credit forms. Unless specifically included in the Romtec Utilities proposal and quote, Romtec Utilities does not supply materials with the intent of meeting LEED standards. Any changes due to LEED or Green building requirements will result in a change order and increased lead times."

4.3 Booster System General Exception/Exclusions

Any items not explicitly included above should be considered excluded unless and until clarification is provided.

Services Exceptions/Exclusions

A. Unless otherwise explicitly included above, any requirement for stamped/sealed plans may result in a price increase, and stamped/sealed plans will be provided only after the full design submittal receives preliminary approval.
B. Romtec Utilities is not responsible for determining the methods and equipment used in site preparation or installation.
C. Final field trimming of piping, guide rails, and similar items is by the installer.
D. If applicable, final placement of supplied floor drains, piping, and drainback valves is by the installer.
E. Romtec Utilities is not the site engineer and does not provide any site design, pressure main, site electrical, or other site utility design services unless specifically included above.
F. Coring for conduits, and final mounting of electrical items are by the installer.
G. Romtec Utilities is not responsible for any required permits, local code compliance, or any related documentation or requirements unless otherwise noted in the preliminary scope letter or the Romtec Utilities Scope of Supply and Design Submittal.
H. Romtec Utilities does not guarantee the performance of any aspect of the overall system that is not supplied by Romtec Utilities.
I. Romtec Utilities makes no representation as to how long it will take to prepare the site, install the system, connect the system to other equipment not supplied by Romtec Utilities, or to start-up and complete the system.
J. If a geotechnical report is not provided for the pump station location, then Romtec Utilities makes no guarantees of the pump station structural design.
K. Romtec Utilities is not a subcontractor and does not perform any installation or construction tasks at the project site. Any Romtec Utilities staff at the project site are there strictly to observe and advise.
L. Unless notified by the customer, Romtec Utilities sources materials made around the world. “Buy America” requirements must be communicated to Romtec Utilities prior to signing a purchase order or a change order will be issued.
M. Romtec Utilities is not responsible for onsite structural or leak testing.
N. Romtec Utilities is not responsible for providing site drainage plans (above or below grade). Adequate drainage is required for performance and stability of underground structures, especially in areas of high ground water. Inadequate site drainage may result in issues not covered by the Romtec Utilities warranty.
O. Romtec Utilities is not responsible for ensuring communication signal/service at the project site. Any required comms/signal site surveys, supplemental antennas, antenna cables, and/or antenna mounting are by others.
P. Romtec Utilities is not responsible for integrating any SCADA equipment with the owner’s existing system.
Q. O&M manuals are final and not subject to revision except at Romtec Utilities discretion.
R. All steel fabrication work is performed by qualified fabricators in conformance with engineered drawings. Romtec Utilities does not offer third party certification or inspection of steel fabrication work.
S. To ensure timely delivery of the pump system amid ongoing and industry-wide disruptions to shipping, parts/materials availability, and lead times, Romtec Utilities reserves the right make equivalent or better substitutions at any time for any components that are not specifically required to match an exact brand/model.

> *Note: Romtec Utilities keeps only limited quantities of parts on hand and does not keep all recommended spare part in stock. Because of the ongoing industry-wide disruptions to shipping and extended lead times, Romtec Utilities encourages owners to stock all recommended spare parts.*

Equipment Exceptions/Exclusions

A. Conduits and site wiring (including site convenience outlets and extension plugs) are by the installer.
B. If required, supply and installation of thrust blocks around supplied retainer glands is by the installer.
C. If required, all cast-in-place concrete is by the installer (e.g., control panel mounting slab, etc.).
D. If required, generator metal heat exhaust shroud, exhaust piping, and any required supplemental tank vent piping is by the installer.
E. Romtec Utilities is not responsible for any of the following:
    1. Installation of supplied goods.
    2. Unloading delivery vehicles and securing/protecting delivered goods.
    3. Any fasteners not included with the pre-assembled systems.
    4. Generator fuel of any kind.
    5. Traffic control, site safety, dunnage, fencing, signage, bollards, excavation, shoring, dewatering, sub-base rock, backfill material, crushed rock, asphalt paving
    6. Piping to and from pump station.
    7. Site electrical service/meter equipment.

Part 5: Budgetary Pricing

5.2 Pricing

The complete design and supply of a package pump station and associated appurtenances as defined in the above Preliminary Scope of Products and Services Document:

Booster Station Design and Supply = $685,000 - $800,000

Control Building Design and Supply = $125,000 - $175,000

Permanent Emergency Generator Design and Supply = $190,000 - $225,000

Note: The above pricing includes freight to the jobsite but does not include any sales taxes or installation cost.

PROJECT INFO

Job Name:	**Oak Lodge Booster**
Company:	
Contact:	
Job Type:	**New Station**
Water Type:	**Potable Water**
Import/Domestic:	**Import Acceptable**
Bid Job:	**No**

ROMTEC UTILITIES

PACKAGE/STARTUP

Offering:	**Complete System**
Mechanical:	**All by Romtec Utilities**
Pumps:	**By Romtec Utilities**
Control Panel:	**By Romtec Utilities**
Generator:	**By Romtec Utilities**
Startup:	**Mechanical & Electrical**
Turnkey:	**No**

DESIGN CRITERIA

ELEVATIONS

Finish Grade:		Feet
Piping CL Elevation:	**89.00**	Feet
Press. Main High Point:	**359.00**	Feet
Elevation Change:	**270.00**	Feet

FLOW RATE (DAILY)

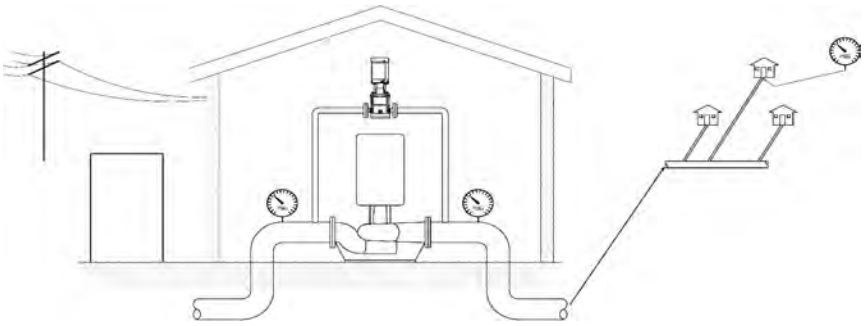
Avg. Daily Demand:		GPM
Peak Daily Demand:		GPM
Min. Service Pressure:	**20.0**	PSIG
Static Pressure:	**106.1**	PSIG
Duty Point:		
TDH Calcs:	**RU Calcs**	

FLOW RATE (HIGH)

Peak High Demand:	**2639.0**	GPM
Min. Service Pressure:	**20.0**	PSIG
Static Pressure:	**106.1**	PSIG
Duty Point:	**880 GPM at 330 TDH**	
TDH Calcs:	**RU Calcs**	

ON-SITE POWER

Power:	**240V / 1-Phase**



INLET MAIN

Pipe Size:	**12"**	
Material:	**Ductile Iron**	
Water Source:	**Pressure Main**	
Min. Inlet Pressure:	**31.0**	PSIG

PRESSURE MAIN

Pipe Size:	**12"**	
Material:	**Ductile Iron**	
Length:		Feet
Min. Disch. Pressure:		PSIG

GENERATOR

Indoor/Outdoor:	**Outdoor**
Enclosure:	**TBD**

CONTROL BUILDING

Type:	**CMU (Romtec)**
Size:	**28' x 22'**

BOOSTER STATION INFORMATION

PUMPS (DAILY)

Configuration:	
Type:	
Manufacturer:	
Model:	
Impeller Dia/Model:	
Motor HP:	
Voltage/Phase:	

PUMPS (HIGH)

Configuration:	**Quadplex**
Type:	**End Suction Centrifugal**
Manufacturer:	**Grundfos**
Model:	**NBS 030-095-2P**
Impeller Dia/Model:	
Motor HP:	**125 HP**
Voltage/Phase:	**230/460V, 3-Phase**

CONTROL PANEL

Controller:	**Compact Logixs**
Suction Sensor:	**Pressure Transducer**
Discharge Sensor:	**Dual Pressure Transducers**
Enclosure:	**NEMA 4**
Comms:	**Undefined**
Options:	**Variable Frequency AC Drives**
Options:	**N/A**

MANIFOLD PIPING

Size:	**12"**	
Material:	**Steel SCH40**	
Options:	**3.5" Gauges**	
Options:	**Drain Valve**	
Options:		
Flowmeter:		
Pressure Relief:	**2"**	
Air Release:	**1"**	
Tank Volume:		Gallons
Qty of Tanks	**1**	

GENERATOR

Model:	**450DFEJ Diesel**
Enclosure:	**TBD**
Transfer Switch:	**600A**
Options:	**24Hr. Fuel Tank**
Options:	**Auxiliary Alarm Contacts**
Options:	**Remote E-Stop**
Address:	**4267 SE Bowman St, Milwaukie, OR 97222**

CONTROL BUILDING

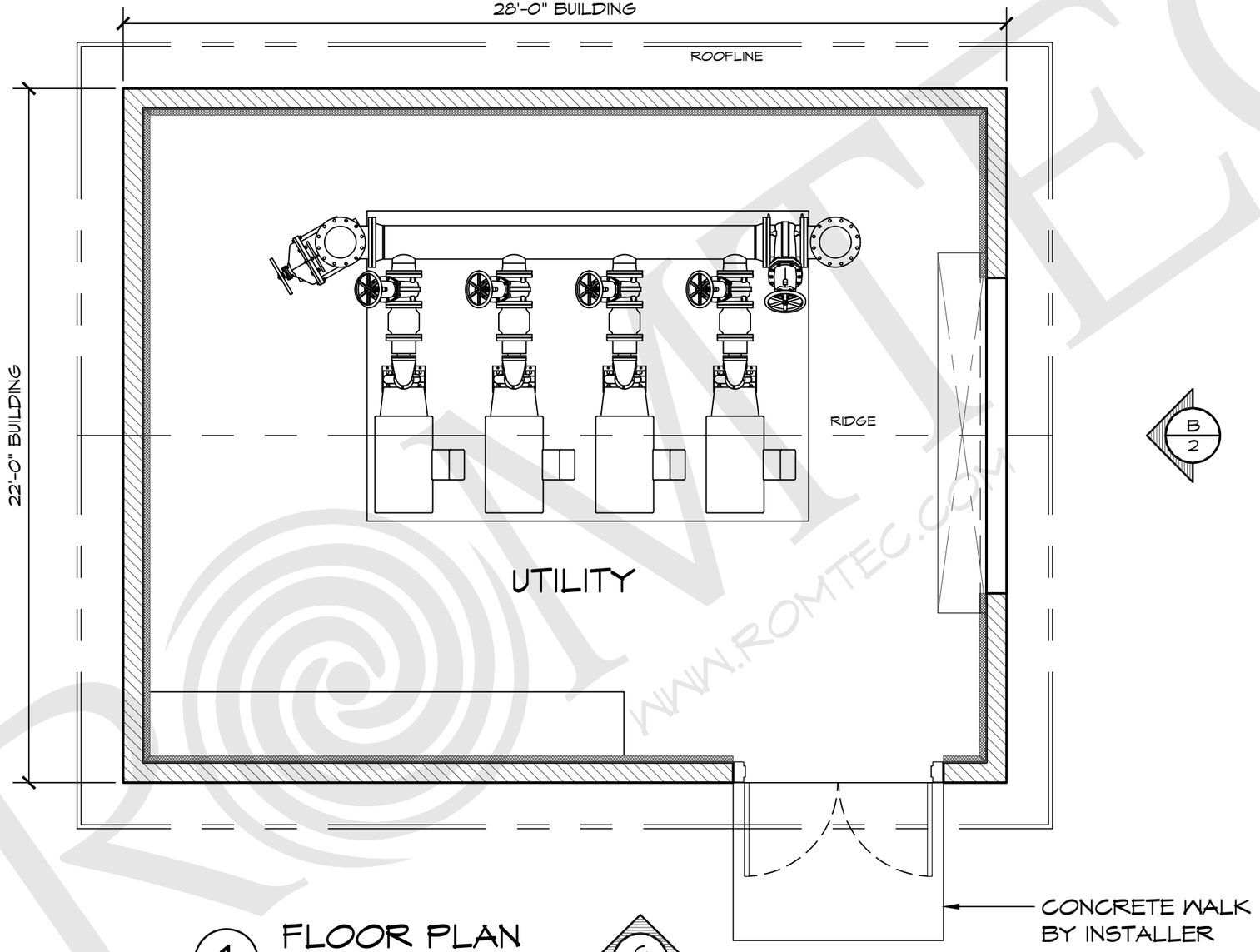
Size:	**28' x 22'**
Options:	**Flood Sensor**
Options:	
Options:	
Options:	
Options:	
Options:	

LEGEND		
SYMBOL	DESCRIPTION	AREA/ QUANTITY
	EXTERIOR WALL LIGHTS	4
	INTERIOR CEILING LIGHTS	4

THESE PLAN VIEW AND ELEVATION DRAWINGS ARE A PRELIMINARY ARCHITECTURAL REPRESENTATION OF THE BUILDING. ALL DIMENSIONS, FEATURES AND COMPONENTS SHOWN ON THESE PRELIMINARY DRAWINGS MAY OR MAY NOT BE PART OF THE QUOTE. PLEASE REFER TO THE "SCOPE OF SUPPLY AND SERVICES" LETTER PROVIDED WITH YOUR QUOTE FOR ROMTEC'S PROPOSED SCOPE OF SUPPLY.

WALL TYPE SCHEDULE

8" REINFORCED CONCRETE MASONRY BLOCK WALL WITH MORTAR JOINTS, GROUTED SOLID ALL CELLS RUNNING BOND PATTERN.



1 FLOOR PLAN

SCALE: 1/4" = 1'-0"

ROMTEC
18240 NORTH BANK ROAD - ROSEBURG, OR 97470
(541) 496-3541 FAX (541) 496-0803

PRELIMINARY

PROJECT: ROMTEC UTILITIES
OAK LODGE BOOSTER STATION BLDG
MILWAUKIE, OREGON

SHEET TITLE: FLOOR PLAN

PROJECT#: 2016

DATE: 3/15/2023

REVISIONS

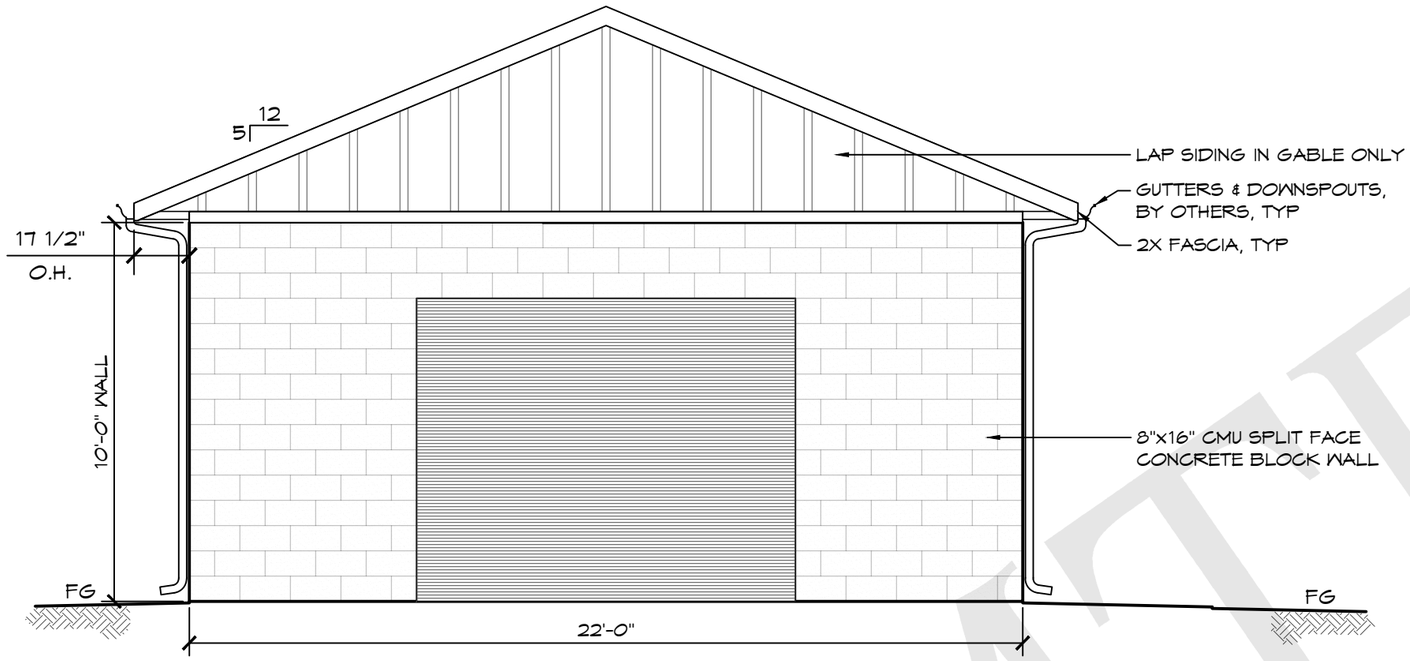
REV.	DATE:	BY:

DRAWN BY: JRM

SHEET NO. 01

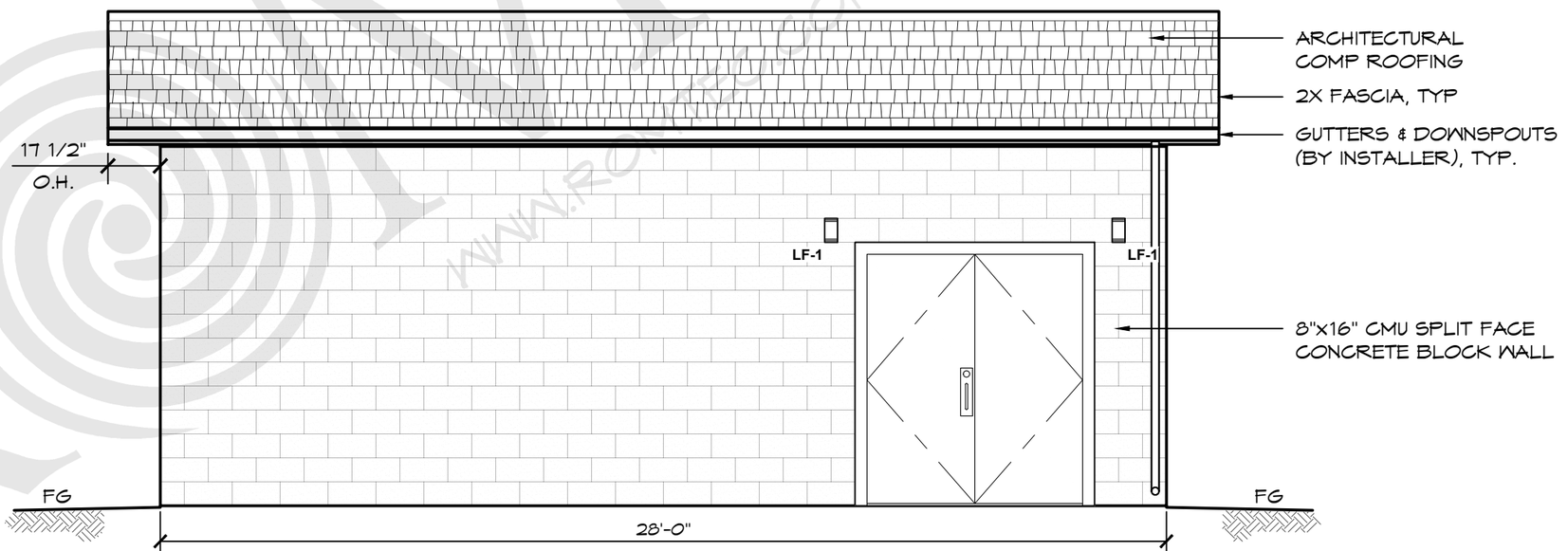
A D B C

THESE PLAN VIEW AND ELEVATION DRAWINGS ARE A PRELIMINARY ARCHITECTURAL REPRESENTATION OF THE BUILDING. ALL DIMENSIONS, FEATURES AND COMPONENTS SHOWN ON THESE PRELIMINARY DRAWINGS MAY OR MAY NOT BE PART OF THE QUOTE. PLEASE REFER TO THE "SCOPE OF SUPPLY AND SERVICES" LETTER PROVIDED WITH YOUR QUOTE FOR ROMTEC'S PROPOSED SCOPE OF SUPPLY.



B ELEVATION VIEW

SCALE: 1/4" = 1'-0"



C ELEVATION VIEW

SCALE: 1/4" = 1'-0"

ROMTEC
18240 NORTH BANK ROAD - ROSEBURG, OR 97470
(541) 496-3541 FAX (541) 496-0803

PRELIMINARY

PROJECT:
ROMTEC UTILITIES
OAK LODGE BOOSTER STATION BLDG
MILWAUKIE, OREGON

SHEET TITLE: ELEVATION VIEW

PROJECT#: 2016

DATE: 3/15/2023

REVISIONS

REV.	DATE:	BY

DRAWN BY: JRM

SHEET NO. 02

Appendix F Existing BPS Site Visit Photos

Figure F.1 - Northwest Corner of Pump Station

Figure F.2 - Southeast Corner of Pump Station

Figure F.3 – Pump Station Interior

Appendix G "Appendix C: Emergency Supply Study TM" from Oak Lodge 2020 Water Master Plan

Appendix C. Emergency Supply Study TM

Date: 6/8/2020

To: Jason Rice
District Engineer
14611 SE River Road
Oak Grove, Oregon 97267

Phone: (503) 353-4202

Prepared by: Scott Duren

Reviewed by: Kirsten Plonka

Project: Oak Lodge Water Services District Water System Master Plan Update

SUBJECT: **EMERGENCY SUPPLY STUDY TECHNICAL MEMORANDUM**

Oak Lodge Water Services District (District) has appointed Water Systems Consulting, Inc. (WSC) with the task of updating their Water System Master Plan (WSMP). During the process of evaluating the District's water supply sources, WSC identified a major vulnerability for the District's emergency supplies. As part of the WSMP effort, the District would like to include a Capital Improvement Plan (CIP) project and budget for a project to improve the District's emergency supply options. WSC completed an emergency supply study to evaluate alternatives for emergency supplies for the District.

This technical memorandum (TM) describes the District's criteria for evaluating emergency supply alternatives, the initial screening of eight supply alternatives, and the final alternative evaluation and recommendation. This TM will be included as an appendix to the final WSMP update. WSC requests that the District review the draft provided in this TM and provide comments within 2 weeks. The District's review comments will be incorporated into revised final draft TM.

For reference, a list of terms is provided below:

ADD	Average Day Demand	NCCWC	North Clackamas County Water Commission
ASR	Aquifer storage and recovery	NRW	Non-Revenue Water
AWWA	American Water Works Association	O&M	Operations and maintenance
CRW	Clackamas River Water	OLWSD	Oak Lodge Water Services District
GIS	Geographical Information Systems	PHD	Peak Hour Demand
gpm	Gallons per Minute	PRV	Pressure Reducing Valve
HDPE	High Density Polyethylene	PVC	Polyvinyl Chloride
IGA	Intergovernmental agreement	PWB	Portland Water Bureau
LOTWP	Lake Oswego-Tigard Water Partnership	SCADA	Supervisory Control and Data Acquisition
MDD	Maximum Day Demand	SFWB	South Fork Water Board
MG	Million Gallons	TAZ	Transportation Analysis Zone
MGD	Million Gallons per Day	TVWD	Tualatin Valley Water district

1 WATER SUPPLY VULNERABILITIES

In 2018, the Oregon Water Resources Department issued new requirements for Water System Master Plans to identify improvements necessary for a seismically resilient water system within 50 years. A review of the District's water system found that water supply is entirely dependent upon a single 24-inch water supply pipeline and a single water source, the Clackamas River.

The single 24-inch diameter supply main that feeds the Valley View Reservoirs supplies treated water from the North Clackamas County Water Commission (NCCWC) water treatment plant which has a raw water intake on the Clackamas River. While the District has several interties with the adjacent City of Gladstone and Clackamas River Water (CRW) service areas, these existing interties only allow the District to export water delivery. The District's service pressure is significantly higher than the adjacent Gladstone and CRW service pressures, and there are no permanent pumps at the interties that could overcome the difference in hydraulic grade to supply water to the District. The NCCWC can obtain emergency water from other sources such as CRW and the South Fork Water Supply Board (SFWB), but conveyance of any emergency supply to the District requires the 24-inch diameter pipeline. The District has determined that a secondary means of supplying water is necessary to prevent supply outages if the 24-inch diameter pipeline is out of service.

The District also depends solely on the Clackamas River as a water source. Although the NCCWC maintains interties with CRW and SFWB, both water systems also use the Clackamas River as their source of supply. If any event caused the Clackamas River to be temporarily limited or unavailable as a supply source, the District does not have direct access to an alternative supply. The District has determined that gaining access to alternative water supply sources is key to improving resilience and reliability of water deliveries in the future.

Three potential scenarios were identified that could impact the ability of the District to supply water to customers:

- Supply Pipeline Outage. Damage to the pipeline could occur from a seismic event or adjacent underground construction, and the 50-year old District-owned pipe may require an outage for future maintenance or replacement.
- Clackamas River Contamination. Spills of hazardous materials into the river from tanker trucks, accidents on adjacent roads, or cyanotoxins from algal blooms could limit the water availability due to treatment limitations.
- Clackamas River Curtailment. During the late summer and early fall, withdrawals from the river could be curtailed provide minimum flows for fishery health and limit water availability.

New interties, or combinations of intertie options, are desired to provide the District with the ability to continue water delivery to customers under any of the above scenarios. The District has investigated several possible interties with neighboring water agencies that could reduce the risk associated with any of these events.

2 PREVIOUS EMERGENCY INTERTIES AND SUPPLY STUDIES

The need to access alternative water supply sources to the Clackamas River is not new for the District. Several past studies have evaluated different concepts, both regionally with other Clackamas River Providers, and for the District alone. Returning previously existing interties to service and modifying current interties are also options that were identified. A brief description of each concept is provided below:

- **City of Milwaukie Intertie**. Although the District has never had an intertie with the City of Milwaukie, an abandoned intertie with the Portland Water Bureau (PWB) included an alignment through the City and connected with the District at SE Aldercrest Road. An emergency pump station located within the Milwaukie service area was available to pump water from PWB into the District's system. The pump station is no longer operable but the building still exists and the intertie piping is believed to be intact. In discussions with District staff, temporary piping and pumping could allow some water to be transferred from the City of Milwaukie directly into the District's system but no formal agreement or infrastructure exists for emergency supply.
- **Clackamas River Water.** As mentioned above, the District currently maintains three interties with CRW distribution system, however due to pressure differential between the service zones, these can only be used to supply CRW with water from the District. A fourth interconnection is the District owned pump station at the CRW water treatment plant that is currently used by Sunrise, which can transfer water through the 24-inch supply pipeline to Valley View. In discussions with District staff, temporary piping and pumping could allow some water to be transferred directly between CRW and the District's distribution system but no formal agreement exists.
- **City of Portland Water Bureau Intertie**. The intertie with the City of Milwaukie, mentioned above, included a steel transmission pipeline along Linwood Road that connected to the PWB distribution system near the intersection of SE Flavel and SE Harney Drives. The majority of the pipeline was abandoned in place, but a portion was removed during construction of Highway 224.
- **City of Portland Water Bureau Regional Intertie**. Additional studies for a regional interconnection between PWB and Sunrise Water Authority were conducted by the Clackamas River Water Providers. The study investigated several options for construction of a transmission pipeline to convey water from PWB Bull Run Conduits to storage tanks at either the SE 92nd Ave and Otty Road or the SE 97th and Mather Road facilities owned and operated by Sunrise Water Authority. From these locations water could be conveyed to the District through the existing 24-inch diameter supply pipeline.
- **City of Gladstone**. Similar to CRW, the District currently maintains three interties with Gladstone, but due to pressure differential they can only be used to supply water to Gladstone from the District. In discussions with District staff, temporary piping and pumping could allow some water to be transferred into the District's system but no formal agreement exists.
- **Oak Lodge Groundwater Well**. In 2010 the District commissioned a Groundwater Feasibility Report to investigate the potential for a groundwater supply well. The study concluded that a capacity of up to 1 million gallons per day could be possible from a single well, and a minimum of two wells would be necessary at an estimated cost of $1.92M per well (in 2010 dollars) to meet District demands. The study did not include any test drilling or pumping and recommended further exploratory drilling to confirm assumptions related to yield and interference from other wells. The District does not currently maintain any groundwater rights, but the study indicated there were no obvious impediments to obtaining a groundwater right.
- **Sunrise Water Authority Aquifer Storage and Recover Wells.** The Sunrise Water Authority plans to further develop the capacity of an aquifer storage and recovery (ASR) system that could be used to store surplus water during wet years and augment water supply during periods of drought. Water from the ASR system cannot be feasibly routed to the District during normal operating conditions but could be used to offset Sunrise's water supply from the NCCWC to deliver a higher percentage of the NCCWC WTP's capacity to the District and Gladstone. This solution would require the use of the 24-inch diameter District supply pipeline.

- **Willamette River Intake**. A study commissioned by the Clackamas River Water Providers included an option to construct a new surface water intake on the Willamette River south of the confluence with the Clackamas River. The intake would include a 500-600 hp raw water pump station, a 12,500 foot long 30- to 36-inch diameter pipeline and would terminate at the South Fork WTP intake. Water could then be conveyed to the District through existing intertie pipelines between the SFWB and the NCCWC and then via the 24-inch water supply line.
- **Lake Oswego-Tigard Water Partnership**. A study commissioned by the North Clackamas County Water Commission (NCCWC) investigated the feasibility of repurposing the abandoned raw water supply pipeline to the Lake Oswego-Tigard Water Partnership (LOTWP) for supply of emergency potable water to Gladstone. Additional piping would be required to connect the existing pipeline to an abandoned 24-inch Gladstone Ranney Collector supply line and to Gladstone's Webster Tanks. An intertie pump station would be required to supply water to the District directly or emergency water could be routed through the NCCWC system and the 24-inch water supply pipeline to Valley View.

3 INITIAL SCREENING CRITERIA

To screen the list of potential emergency intertie options, the District established level of service requirements for an emergency intertie and criteria for use in ranking options.

3.1 Level of Service

During an emergency event that would require the use of an intertie, the District anticipates the ability to reduce demands through public outreach and water use restrictions such as discouraging outdoor irrigation. A minimum level of service during an emergency would provide sufficient supply to meet the average winter demands across the system. To account for projected future demands over the 20-year planning horizon, a minimum supply of 2.7 MGD would allow customers to receive continuous water service with some conservation requirements. The emergency supply must also meet the District's level of service for pressure above 40 psi at all service connections and provide fire flow with a residual pressure of 20 psi.

3.2 Initial Screening Criteria

The District developed criteria to screen potential emergency supply options as described below.

Table 3-1**Error! Reference source not found.** describes each screening category and the factors used to designate a ranking score. Each criterion results in a ranking score on a scale of 1 (lowest score) to 3 (highest score) that are summed for the purpose of ranking the alternatives. The alternatives with the highest sum of criteria scoring are preferable and will be further analyzed. A brief description of each criterion is provided below:

- **Water Sources** – The alternative's ability to provide a source of water that is not a Clackamas River source is an important ranking criterion. Alternatives that can provide access to a non-Clackamas River source, either by wheeling water from a third-party intertie or via direct connection, were given higher scores to account for the additional resilience in diversifying the District's access to water supply sources.
- **Partner Agencies** – The number of partner agencies that are required to supply the District with a non-Clackamas River water source will add complexity to an emergency situation and may impact the District's ability to access water. For example, an intertie with CRW would provide access to water from the Bull Run watershed through an interconnection with PWB, but this requires CRW to introduce non-Clackamas River water into their distribution system which may cause water quality concerns for their customers. Higher scores were awarded for alternatives that require less partner agencies.
- **Cost Estimates** – The anticipated cost of an intertie is an important factor for ranking alternatives. Preliminary cost estimates for initial capital costs were developed for each alternative or estimates from previous studies were used when available. Cost estimates prepared for this analysis conform to Class 5 Planning Level Classification of Opinions of Probable Construction Costs as developed by the Association for the Advancement of Cost Engineering. A Class 5 Estimate is typically used for concept screening purposes and has an expected accuracy ranging from -50% to +100%. Higher scores were awarded for alternatives with relatively lower estimated capital costs.
- **Operations and Maintenance (O&M)** – The anticipated O&M required is important to consider, as complex infrastructure will incur annual costs for maintaining equipment, functionality testing, and training of operations staff. For example, an intertie requiring a permanent pumping station and a long emergency pipeline will add to the annual O&M requirements for District staff compared to an intertie that only requires a few valves and a flow meter. Interties that will require reconfiguring existing District flow patterns, reservoir settings, and pump station operations are also considered to have a higher O&M burden than an intertie that mimics the existing supply and does not require specialized emergency controls or valve closures. It should be noted that additional ongoing charges that might be required by partner agencies for connecting to their system have not been determined and are not included in this study. Higher scores were given to alternatives that require less O&M.
- **Uncertainty/Risks** – Some intertie alternatives are less defined than others, and the rankings need to account for uncertainty and the risk of potential feasibility issues and hidden risk costs. For example, an alternative that depends on the unknown condition of currently abandoned pipelines or which requires the District to obtain new water rights would be ranked lower than those projects that are better defined. Alternatives that require a long pipeline alignment will have additional uncertainty related to potential water way or environmental wetland crossings, freeway crossings, or construction limitations due to land use or zoning that could increase construction costs.

Each of the criteria is presented in Table 3-1 below along with the specific parameters used to assign the individual ranking scores associated with the criteria.

Table 3-1. Initial Screening Criteria Descriptions and Scoring

Screening Criteria	Description	1	2	3
Water Sources	Ability to provide a non-Clackamas River water source	No access to non-Clackamas River Sources	Connection to a Clackamas user that can wheel non-Clackamas River water	Direct Connection to Non-Clackamas River Source
Partner Agencies	Number of partner agencies required to supply non-Clackamas River water	3+	2	0-1
Cost Estimates	Preliminary capital cost estimates	>$10M	$5M-$10M	<$5M
O&M	Modifications to current operations and increased asset maintenance	Major operational modifications And/or 2+ mechanical facilities	Minor operational modifications And/or 1 pump and over 1 mile of pipeline	No operational modifications And/or 1 pump and less than 1 mile of pipeline
Uncertainty /Risks	Potential to impact costs or project feasibility	Alignment poorly defined and >0.5 miles, water rights required, use of abandoned pipe in uncertain condition, capacity uncertainty	Alignments well defined but >0.5 miles, no new water right, all new infrastructure, minor capacity uncertainty	Alignments well defined and <0.5 miles, no new water rights, all new infrastructure, capacity can be defined

4 INITIAL ALTERNATIVE SCREENING

An overview of the alternatives that were investigated, a description of the criteria scoring for each alternative, and a summary and recommendation for more detailed analysis are provided in this section. Alternative screening was conducted in an interactive workshop with District staff to gain consensus on the recommendations for further evaluation.

4.1 Overview

To conduct an initial screening of each of the alternative emergency intertie options described in Section 2 of this TM, a conceptual description of each alternative was developed. In cases where previous studies had developed detailed descriptions of the potential emergency intertie, only the cost estimates were modified to reflect escalation and inflation to current pricing using the Engineering News Report's Construction Cost Index. Other alternatives unique to the District were developed to a conceptual level for the purpose of comparison. All the concepts were reviewed with District staff during an interactive workshop to confirm the feasibility and potential benefits or concerns with each alternative.

4.2 Alternative Screening

The following sections provide a brief description of each alternative emergency intertie and the justification behind the scoring provided for each of the screening criteria described in Section 3. As described in Section 3, the higher the score, the more preferred each alternative is for providing emergency supply to the District.

4.2.1 City of Milwaukie

The City of Milwaukie's distribution system borders the north end of the District's service area. Milwaukie receives its water supply from groundwater wells and has emergency intertie connections with CRW and PWB. A pump and upsized pipelines will be required to distribute the supply to the District's customers. Five distinct connection locations were identified and considered. Scoring for each criterion is provided below along with a brief description to explain each score.

- ***Water Sources: 3.*** The City's primary water source is groundwater which provides direct access to a non-Clackamas River source. The City also can access water from PWB (an additional non-Clackamas River source) and CRW through emergency interties.
- ***Partner Agencies: 3.*** Coordination with a single partner agency, Milwaukie, is required to obtain non-Clackamas River supply from the City's groundwater wells.
- ***Cost: 3.*** Estimated costs were developed between $1.6M and $2.5M depending on the location of the intertie. Costs include a pumping station to boost pressure from the City's operating pressure to match the District's lower pressure zone and to fill the Valley View reservoirs. Each location also requires upsizing of existing District pipelines to convey flow to Valley View.
- ***O&M: 2.*** Infrastructure maintenance includes a pump station and upsizing existing pipelines but does not add new pipelines. Upsizing existing pipelines is not considered to increase the amount of maintenance for any intertie alternative. An intertie with Milwaukie requires reversing flow through the system to pump into the north end and reach the Valley View tanks. This operational modification may increase pressures in the north end of the system and impact water quality in the distribution system.
- ***Uncertainty/Risks: 3.*** The project appears to be feasible, does not rely on abandoned infrastructure, and does not require any new water rights. The City has indicated a mutual desire for an emergency intertie.
- **Total Score: 14**

4.2.2 Clackamas River Water

The District's service area is bordered by the CRW service area to the east. To supply water from CRW to the District along the eastern service boundary, a pump station will be required to overcome the difference in service pressures. Four distinct connection locations were identified and considered. Scoring for each criterion is provided below along with a brief description to explain each score.

- ***Water Sources: 2.*** The primary water source is from the Clackamas River. Access to Bull Run watershed source water and groundwater is possible through CRW's existing 18-inch diameter intertie connection to PWB at SE 99th Avenue and Foster Road. PWB water cannot be directly accessed and must be wheeled through the CRW distribution system.
- ***Partner Agencies: 2.*** Two partner agencies, CRW and PWB, are required for the District to obtain access to a non-Clackamas River supply.
- ***Cost: 3.*** An estimated cost of $1.3M was developed for a connection between an existing 12-inch CRW water main and the District's 24-inch diameter supply line at the intersection of Strawberry Lane and Webster Road (location CRW D). The infrastructure includes a pump station and valve insertion on the District's 24-inch supply line.
- ***O&M: 3.*** Although maintenance will be required for the pump station, no modifications are needed within the District system as emergency supply would be provided to Valley View similar to normal conditions.
- ***Uncertainty/Risks: 3.*** The project appears to be feasible, does not rely on abandoned infrastructure, and does not require any new water rights. CRW has indicated an emergency intertie appears to be feasible

for supplying water from the CRW water treatment plant, but the capacity to wheel PWB water through the CRW system is unknown at this time.

- **Total Score: 13**

4.2.3 Portland Water Bureau

The PWB receives surface water supply from the Bull Run watershed and groundwater from the Columbia Shore Wellfield. A direct connection to PWB would provide the District with access to two non-Clackamas River water sources. District staff indicated that a 16-inch diameter steel pipeline along Linnwood Ave provided a connection to a PWB transmission main located along Harney and Clatsop Roads. The 16-inch diameter intertie pipe was abandoned, and sections were removed to provide for construction of Highway 224. Due to the unknown condition of the existing pipeline, a new direct connection is assumed to require 3.4 miles of pipeline to deliver water to the District at Aldercrest Road, where a pump station and pipe alignment underneath Kellogg Creek previously existed. Upsizing of existing District 8-inch diameter pipe on Aldercrest to 12-inch diameter pipe would be required.

- ***Water Sources: 3.*** PWB's primary water source is from the Bull Run watershed. Their secondary water source is groundwater from the Columbia Shore Wellfield.
- ***Partner Agencies: 3.*** With a direct connection to PWB, only one partner agency is anticipated.
- ***Cost: 2.*** An estimated cost of $8.4M would be required to construct a new pump station, 3.4 miles of new pipeline, and 1 mile of upsized pipeline within the District's system.
- ***O&M: 2.*** The pipeline will require periodic maintenance and flushing. The connection location will require reversing flow within the District from the north end of the system to fill the Valley View tanks, which has the potential to impact customer pressures in the north end of the District and could impact water quality due to reversing flow from the current operating conditions.
- ***Uncertainty/Risks: 2.*** The pipeline alignment may change based on easement acquisition, creek crossings, and highway crossings and presents the potential for unforeseen cost increases.
- **Total Score: 12**

4.2.4 City of Gladstone

The City of Gladstone borders the south end of the District's service area. The District has three existing interconnections that supply water from the District to Gladstone. A pump station would be required to supply water to the District from Gladstone's system.

- ***Water Sources: 1.*** The primary water source for Gladstone is the NCCWC which is the same source water and treatment plant that provides District water. Secondary sources for Gladstone are from the SFWB or CRW through the NCCWC. This alternative does not provide access to a non-Clackamas River water source.
- ***Partner Agencies: 1.*** Non-Clackamas River water could be obtained from PWB through interconnections with CRW and the NCCWC and then Gladstone but would require three partner agencies.
- ***Cost: 3.*** An estimated project cost of $0.5M would be required for adding a pump station at the largest diameter intertie located at Valley View.
- ***O&M: 3.*** No operational modifications are expected because the intertie location is close to the Valley View Tanks so regular operations can occur. Maintenance would be required for the pump station.
- ***Uncertainty/Risks: 3.*** The project appears to be feasible, does not rely on abandoned infrastructure, and does not require any new water rights. The emergency intertie with Gladstone already exists.
- **Total Score: 11**

4.2.5 Oak Lodge Groundwater

In 2010, the District evaluated the feasibility of drilling groundwater wells within the District service boundary to provide emergency supply. The Groundwater Feasibility Report was used to provide background information about groundwater within the District's service boundary. The report provided two locations for wells, one at the Valley View facility and one near Candy Lane Elementary School. The report was based on limited well information in the vicinity and there is uncertainty regarding the actual production of the wells. The District does not currently have groundwater rights and would need to apply for them.

- ***Water Sources: 3.*** The well would supply groundwater directly to the District.
- ***Partner Agencies: 3.*** No partners required.
- ***Cost: 2.*** Based on cost estimates provided for a single well in the previous report, an estimate of $5M was developed for two well sites. The cost estimate included exploratory well drilling, well equipping, standby power generator, chlorination system, and a treatment system should treatment be necessary.
- ***O&M: 1.*** The groundwater wells will require two additional mechanical facilities along with chlorination and controls, and possibly treatment equipment.
- ***Uncertainty/Risks: 1.*** Construction of new wells has a relatively higher uncertainty compared to other alternatives. The actual well yield and water quality is uncertain. Additional exploratory drilling and geochemical analysis is necessary to confirm the stratigraphy and thickness of the aquifer. Additional field studies and modeling to determine drawdown impacts on or by other users will also be required. A new well will also require the District to obtain a groundwater right, which presents uncertainty in permitting, zoning, and land use requirements.
- **Total Score: 10**

4.2.6 Sunrise Water Authority ASR Wells

Sunrise Water Authority owns a permit to maintain and operate up to five aquifer storage and recovery (ASR) wells. Currently, one of the five wells is installed and operational. Expanding the ASR system could reduce demand on the Clackamas River during low flow events. This alternative would offset the demand on NCCWC water by Sunrise Water Authority to allow the District to receive a greater percentage allocation.

- ***Water Sources: 1.*** The ASR wells would not provide groundwater directly to the District and would be used to offset Sunrise Water Authority's allocation of NCCWC supply. This alternative does not provide access to a non-Clackamas River water source.
- ***Partner Agencies: 1.*** Non-Clackamas River water could be obtained from PWB through interconnections with CRW and the NCCWC and would require three partner agencies.
- ***Cost: 2.*** Sunrise Water Authority has indicated a cost of $3.4M is required to fully develop the ASR water right.
- ***O&M: 3.*** No new pump stations or pipelines would be required for District maintenance and flow would enter the system through the existing 24-inch diameter supply pipeline as in normal conditions.
- ***Uncertainty/Risks: 1.*** There is a great degree of uncertainty as the capacity of individual ASR wells depends on the underlying geology which can be unpredictable. The individual yield and storage capacity of individual wells can vary, and capacity cannot be established until a bore hole is completed and pump testing can be conducted.
- **Total Score: 8**

4.2.7 Willamette River Intake

The Clackamas River Water Providers evaluated developing a new raw water intake on the Willamette River as an additional water source for the region's water suppliers. The intake and pump station would be constructed upstream of the confluence with the Clackamas River, over 2 miles of 30-inch diameter pipeline would be required to connect to the existing SFWB intake, and a new surface water right would be required.

- ***Water Sources: 3.*** The alternative would provide access to Willamette River water.
- ***Partner Agencies: 2.*** At least two partner agencies would be required, SFWB and the NCCWC.
- ***Cost: 1.*** An estimated cost of $32M-$39M was developed by escalating the estimate provided in the 2015 Alternate Water Supply Study prepared by Clackamas River Water Providers.
- ***O&M: 1.*** The intake, pump station, and pipeline will require substantial maintenance.
- ***Uncertainty/Risks: 1.*** The ability to obtain water rights is unclear and hidden costs may be present in alignment selection, intake siting, and permitting.
- **Total Score: 8**

4.2.8 Lake Oswego-Tigard Water Partnership

The Lake Oswego-Tigard Water Partnership (LOTWP) owns an abandoned raw water 27-inch main that crosses under the Willamette River. The LOTWP supplies water from the Clackamas River but is also connected to City of Portland and with the Joint Water Commission through the City of Beaverton. The NCCWC provided funding to install the necessary fittings for a future connection to the treated water from the LOTWP. With some improvements the abandoned pipeline under the Willamette River could deliver treated water to the City of Gladstone or wheel water from City of Portland from an existing intertie with the city of Tigard (Providers, 2015). Water could be delivered to Gladstone's Webster Road Reservoir by connecting to an abandoned 24-inch Ranney collector supply line within the City of Gladstone and modifying piping at existing pressure reducing valves (PRVs) and at the reservoir site. A pump station at the Webster Reservoir or at the interconnection with the District system would be required to convey flow from the lower pressure Gladstone system into the Valley View tanks. The abandoned pipelines have not been used for potable water and would likely need to be flushed before water could be conveyed to the District and it is unclear if the lines could be adequately disinfected or if the water quality would require issuance of boil water notifications within the District. The condition of the existing abandoned pipeline is not known however a study indicated the pipe should be sufficiently rated to convey flow based on initial thickness, past operating conditions, and estimated condition.

- ***Water Sources: 1.*** LOTWP primarily receives water from the Clackamas River, but does have the ability to provide Bull Run watershed source water through an intertie with PWB. The PWB connection is in the northwest end of the Tigard water system however, and the ability to wheel PWB water to the District is likely to be limited.
- ***Partner Agencies: 1.*** Access to non-Clackamas River source water would require at least three partner agencies.
- ***Cost: 2.*** A project cost estimate of $1.1M was developed assuming investigations into the existing pipe condition, new piping connections, modifications to the Gladstone Hereford PRVs and reservoir piping, and booster pump station.
- ***O&M: 2.*** The abandoned pipelines will require periodic flushing and the pump station will require maintenance. The pipeline will also require periodic inspection to verify condition and is over one mile in length.

- ***Uncertainty/Risks: 1.*** The pipeline is approximately 50 years old and current condition is unknown. The pipeline is not likely to be seismically retrofitted and may fail in a seismic event. Hidden costs may arise to provide OHA required pipeline separation and cross-connection prevention and to provide modifications to the Webster Storage Tank and Hereford PRV piping.
- **Total Score: 7**

4.3 Screening Evaluation Summary

Based on the results of the initial screening, the top three alternatives appear to be construction of new interties with Milwaukie, CRW, or PWB. A summary of the scoring for all of the alternatives including the anticipated benefits and limitations of each are provided in Table 4-1 below.

Table 4-1. Initial Screening Criteria Descriptions and Scoring

Alternatives	Rating	Water Source(s)	Partner Agencies	Estimated Capital Costs	Operational Modifications	Uncertainty/ Risks	Summary
Milwaukie	**14**	3	3	3	2	3	Provides direct access to groundwater source with minimal infrastructure improvements.
CRW	**13**	2	2	3	3	3	Minimal operational changes and infrastructure improvements.
PWB	**12**	3	3	2	2	2	Provides direct access to non-Clackamas River water supply but high costs.
Gladstone	**11**	1	1	3	3	3	Minimal infrastructure improvements but provides no new source
OLWSD Wells	**10**	3	3	2	1	1	Direct access to groundwater supply but high level of uncertainty
Sunrise	**8**	1	1	2	3	1	Minimal infrastructure improvements but provides no new source
Willamette River intake	**8**	3	2	1	1	1	Provides access to non-Clackamas River water supply but high costs.
LOTWP	**7**	1	1	2	2	1	Provides access to non-NCCWC water supply but high uncertainty.

5 ALTERNATIVES ANALYSIS

This section provides a more detailed analysis and cost estimates for each of the top three alternatives identified during the screening evaluation.

5.1 Overview of Top 3 Alternatives

The initial screening identified CRW, Milwaukie and PWB as the top three potential intertie partners. Each of these alternatives have multiple connection options. Figure 5-1 shows each of the intertie locations that were considered during the initial screening and subsequent alternatives analysis.

The top three alternatives were discussed with each of the partner agencies to confirm supply availability and impacts on their distribution systems. WSC evaluated multiple locations for the interties by modeling the additional supply in the District's distribution system. Four intertie locations for a connection with Milwaukie, four locations for CRW, and one location for PWB were evaluated based on cost, proximity to larger diameter pipelines in the respective partner agency system, and design feasibility considerations, including land availability, constructability, creek and highway crossings, and security measures.

5.2 CRW Alternative

Four intertie locations (CRW A, B, C, and D) were identified for the CRW alternative. The District and CRW have three existing intertie locations that are used to serve small areas of customers (CRW A, B, and C). The existing interties are connected to 8-inch diameter mains that would require upsizing to convey the desired emergency flow. A fourth location (CRW D) was considered due to the proximity of the District's 24-inch diameter supply pipeline and a 12-inch diameter CRW main. CRW D would require a new intertie along the District's 24-inch main that uses a 35 horsepower pump station to fill the Valley View Tanks from the CRW transmission main. An intertie at this location would allow CRW to supply the District without any major modifications to the two systems. There does not appear to be any vacant lots along the alignment, however the pump station could be located within Heddie Notz Park. North Clackamas Parks and Recreation District owns the park and further discussion would be required to determine if an intergovernmental agreement or easement could be obtained to allow placing a pump station within the park. Other locations may be available through purchase of an easement or a portion of existing private property, or through construction of a below-grade prefabricated booster pump station within the right-of-way. A proposed layout is provided in Figure 5-2.

To allow the pump station to convey water from CRW into the Valley View tanks, an isolation valve will be required on the 24-inch diameter water supply pipeline that could be closed when the emergency supply is required. Because this alternative requires conveyance through a portion of the existing supply pipeline, a seismic study is recommended and included within the costs for the project. The study could potentially be paired with a larger study of the entire 24-inch diameter supply pipeline recommended as a result of the seismic risk analysis in the WSMP. The pipeline alignment is located in close proximity to mapped areas of landslide risk located south of the Valley View facility A study to confirm the anticipated ground deformations directly under and over the pipe can confirm that the existing pipe material and joints are anticipated to remain operational following a major earthquake. An itemized cost estimate for the intertie, including land acquisition, studies, and engineering fees is provided in Table 5-1.

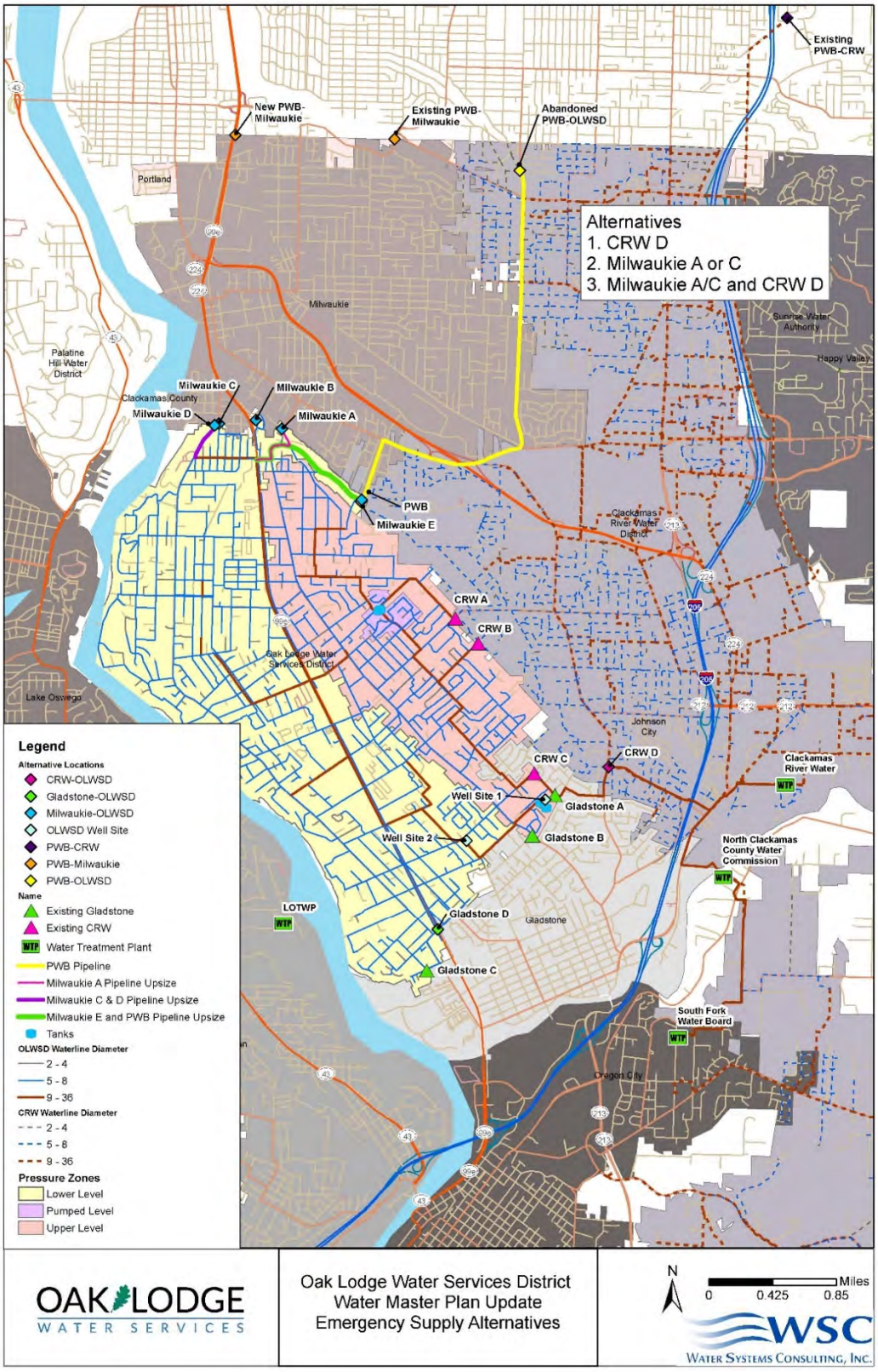


Figure 5-1. Potential Emergency Intertie Locations and Pipelines

The District engaged CRW and provided the concept for the intertie to initiate discussions of a potential emergency connection. CRW indicated that both pumping and treatment capacity are sufficient under current maximum day demand to provide the desired 2.7 MGD to the District, but by 2038 there will not be sufficient pumping and treatment capacity to deliver this much flow based on assumed growth within CRW's service area. The available pumping capacity in 2038 appears to be closer to 2.4 MGD. CRW expressed interest in further discussions to confirm capacity commitments, metering requirements, and other provisions that could be included into an intergovernmental agreement (IGA) for emergency water supply between the two providers. WSC recommends that CRW and the District discuss establishing an IGA.

Table 5-1. Itemized Cost Estimate for Emergency Intertie with CRW

Item	Unit Cost	Unit	Qty	Cost
Prefabricated Pump Station - 35 hp	$ 500,000	EA	1	$ 500,000
Isolation Valve - 24"	$ 100,000	EA	1	$ 100,000
Construction Subtotal				**$ 600,000**
Construction Contingency	20%			$ 120,000
Unaccounted for Items	10%			$ 60,000
Mobilization	3%			$ 18,000
Insurance and Bonds	1%			$ 6,000
SWPPP	1%			$ 6,000
Subtotal				**$ 810,000**
Land Acquisition	$ 25	/sqft	2000	$ 50,000
Seismic Study	$ 100,000		1	$ 100,000
Subtotal				$ **960,000**
Design/CM/Administration	30%			$ 288,000
Total				**$ 1,248,000**

Figure 5-2. Proposed Concept for Emergency Intertie with CRW

5.3 Milwaukie Alternative

Five locations (Milwaukie A, B, C, D, and E) were identified for a potential intertie connection with the City of Milwaukie. Each location was evaluated in terms of estimated cost, feasibility, land availability, and design considerations. Locations A and C were found to have the lowest capital and life-cycle costs; however, location A has limited land availability and is located along a tight curve on Oatfield Road that presents a significant safety risk. Thus, location C was chosen as the preferred Milwaukie intertie due to its proximity to a larger 10-inch diameter main on the City side and the potential for viable options for siting a relatively small booster pump station within the right-of-way or through acquisition of an easement through partial purchase of vacant private property. Location C will require the District to upsize their existing 8-inch diameter piping along River Road to 12-inch diameter to convey emergency water into the larger diameter transmission system to fill the Valley View reservoirs. A proposed conceptual location for the intertie, including the extents of upsizing required within the District system, is provided in Figure 5-3. An itemized cost estimate is provided in Table 5-2.

The District engaged the City of Milwaukie in November 2019 to discuss the potential intertie location and to gauge the interest in forming an IGA for emergency supply. The City is also interested in an intertie that could supply NCCWC water in an emergency and is willing in concept to share some of the construction costs. The City of Milwaukie agrees that the proposed location is preferable, however recent efforts are underway to update the City's water hydraulic model as part of a Water System Master Plan update. Initial review of the City's 2010 Water System Master Plan appears to indicate there is adequate supply to provide the desired 2.7 MGD based on combined well capacity and City-wide storage. The City would like to confirm that the location is preferred and that the desired emergency demand capacity can be provided once an updated and calibrated hydraulic model is available. Milwaukie indicated that with their current biennial budget cycle already finalized, they would like to continue to explore an intertie within the next 2 to 5 years.

Table 5-2. Itemized Cost Estimate for Emergency Intertie with Milwaukie

Item	Unit Cost	Unit	Qty	Cost
Prefabricated Pump Station - 35 hp	$ 500,000	EA	1	$ 500,000
OLWSD Pipe Upsize (non-CIP) - 12" pipe	$ 240	/LF	2,010	$ 482,400
Construction Subtotal				**$ 982,400**
Construction Contingency	20%			$ 196,480
Unaccounted for Items	10%			$ 98,240
Mobilization	3%			$ 29,472
Insurance and Bonds	1%			$ 9,824
SWPPP	1%			$ 9,824
Subtotal				$ **1,326,240**
Land Acquisition	$ 25	/sqft	2,000	$ 50,000
Subtotal				$ **1,376,240**
Engineering, Design, CM Services	30%			$ 412,872
TOTAL				**$ 1,789,112**

Figure 5-3. Proposed Concept for Emergency Intertie with the City of Milwaukie

5.4 Portland Water Bureau

The analysis of an emergency intertie with PWB was limited to a single alternative that matches the general description of a previously existing connection that was abandoned. Although the previous 16-inch diameter steel pipe is still in existence, the condition and ability to reuse the pipeline is unknown. A portion of the old pipeline was removed during the construction of Highway 224. The proposed emergency intertie would include a 12-inch diameter pipeline along Linnwood Road to connect to an existing PWB transmission main in Harvey and Clatsop Roads. The interconnecting pipeline would cross under Kellogg Creek near an abandoned pump station within the City of Milwaukie at the intersection of Where Else Lane and Bowman Street. The connection to the District's system would be located along Aldercrest Road. A new 35 horsepower pump station will be needed to boost the pressure before entering the District's Lower Zone. Trenchless pipeline construction is anticipated to be required for the crossing of Highway 224 and for Kellogg Creek. Upsizing of the existing 6-inch and 8-inch diameter water main on Aldercrest to a 12-inch diameter pipeline will be required to convey water to Valley View. A conceptual description of the intertie locations, including the required piping alignment, is provided in Figure 5-4. An itemized cost estimate is provided in Table 5-3.

PWB indicated that there is sufficient capacity within their system to provide the desired 2.7 MGD during maximum day demand conditions. Due to the significantly higher capital cost for the PWB intertie alternative as compared to Milwaukie and CRW, further discussions with the PWB were not pursued by the District.

Table 5-3. Itemized Cost Estimate for Emergency Intertie with the Portland Water Bureau

Item	Unit Cost	Unit	Qty	Cost
Prefabricated Pump Station - 35 hp	$ 500,000	EA	1	$ 500,000
New Pipe - 10" pipe	$ 200	/LF	18000	$ 3,600,000
OLWSD Pipe Upsize (non-CIP) - 12" pipe	$ 240	/LF	2200	$ 528,000
OLWSD Pipe Upsize (CIP) - 8" pipe to 12" pipe	$ 40	/LF	3290	$ 131,600
Construction Subtotal				**$ 4,759,600**
Construction Contingency	20%			$ 951,920
Unaccounted for Items	10%			$ 475,960
Mobilization	3%			$ 142,788
Insurance and Bonds	1%			$ 47,596
SWPPP	1%			$ 47,596
Subtotal				**$ 6,425,460**
Land Acquisition	$ 25	/sq ft	0	$ -
Subtotal				**$ 6,425,460**
Engineering Services	30%			$ 1,927,638
TOTAL				**$ 8,353,098**

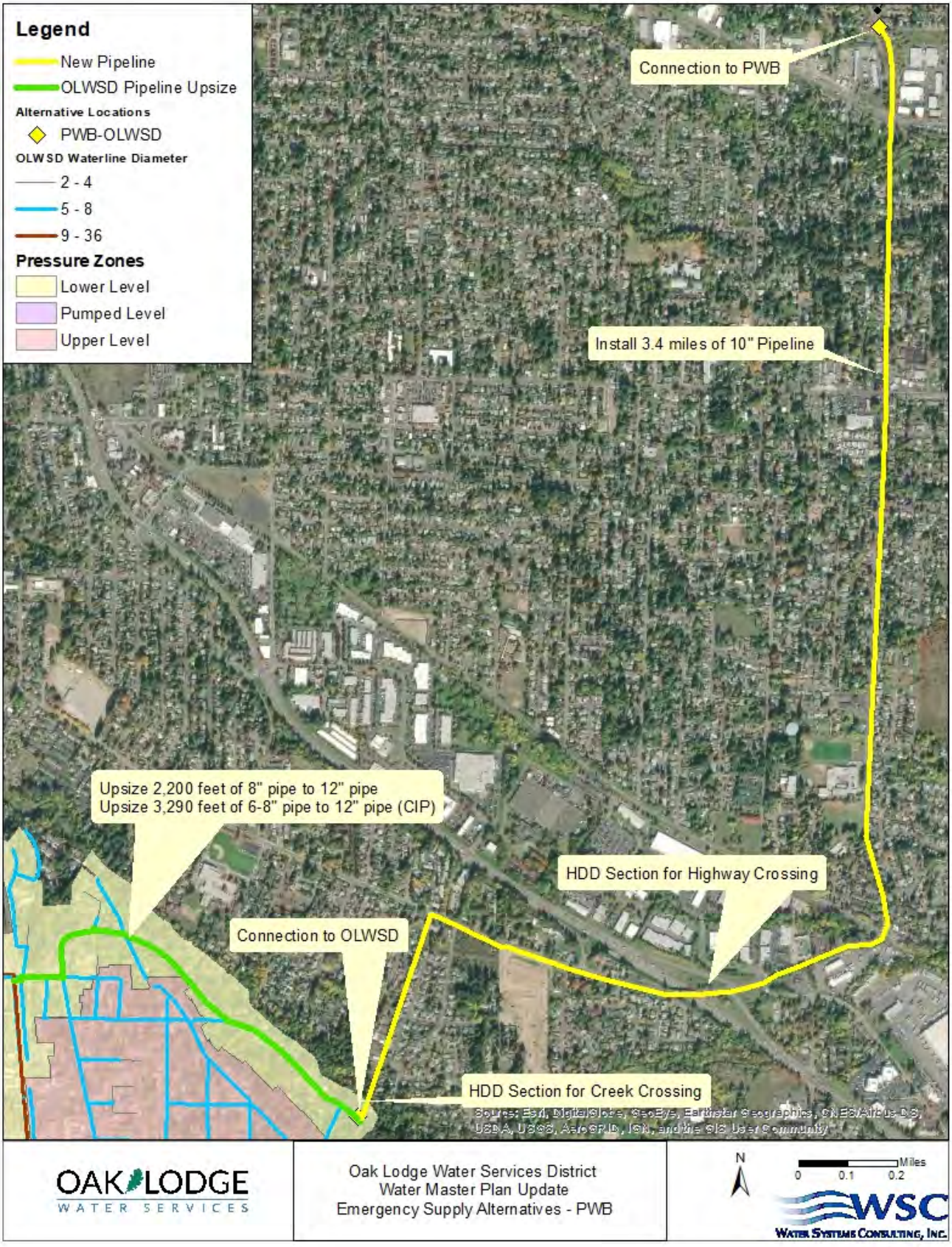


Figure 5-4. Proposed Concept for Emergency Intertie with the Portland Water Bureau

5.5 Portable Pump Station Hybrid Option

The top two alternatives, CRW and Milwaukie, may be combined into a hybrid alternative using a portable pump station. The CRW and Milwaukie alternatives require nearly identical pump sizes which lends the possibility of a single trailer mounted pumping station that could be mobilized to either of the locations in an emergency. Although a portable pump station is anticipated to be slightly more expensive than a prepackaged booster pump station due the customized design and fabrication required, there are the following significant savings:

- No building is required at either site
- Only one set of pumps is required for purchase and to maintain
- Diesel driven pumps can be used to eliminate permanent power supply or standby generator
- Property acquisition can be minimized if not eliminated

To allow rapid mobilization during an emergency, site improvements would include hard piping for pump suction and discharge, valve modifications to existing buried pipelines, and sufficient space and surfacing to allow the trailer mounted station to be placed into position. A single pump and connective piping can likely be transported on a large trailer with dimensions of approximately 8 feet in width and 25 to 30 feet in length. The exact spatial requirements will be influenced by the piping configurations at each of the potential sites and could require 40 to 50 feet in length and 20 to 30 feet in width at a minimum. Additional space may be required to account for maneuvering trailers into position, piping assembly, and flow metering. Installation could likely be completed in 1 day, excluding any extensive cleaning, disinfection, or testing requirements.

The District would need to consider where a unit could be stored securely and protected from excessive exposure, and annual training and trial installations are recommended to keep operations staff familiar with the installation and to test equipment functionality. Additional capital improvements could be performed at the Valley View facility to create a permanent testing and training installation site with similar configuration to field locations. It may also be possible to configure the testing location so that the portable pump station could also serve as a backup to the Valley View Booster Pump Station.

An example of a portable pump station designed for emergency deployment by the Tualatin Valley Water District (TVWD) is provided in Figure 5-4. The TVWD portable station includes two 5 MGD capacity pumps, each mounted on a separate 8-foot wide by 30-foot long trailer. Each trailer is also equipped to store and convey the connection fittings required for a hard-piped suction and discharge manifold to connect to the distribution system. The photo provided below is taken at a testing facility constructed by the District at a reservoir site that allows the installation to be setup and tested once a year for several days to check functionality and to train operators in installation procedures.

Figure 5-5. Example of Portable Trailer-Mounted Pump Station from TVWD

A hybrid estimate was developed to compare the cost of constructing two permanent emergency intertie pump stations as compared to a single trailer-mounted portable pump station that could be deployed at either location. Given the level of accuracy expected for a conceptual level design, the estimated costs for a portable pump station is effectively equal to the construction of a permanent station for each of the Milwaukie and CRW interties. An itemized estimate of the cost of the hybrid alternative is provided in Table 5-4.

Table 5-4. Itemized Cost Estimate for Portable Emergency Intertie Pump Station at CRW and Milwaukie

Item	Unit Cost	Unit	Qty	Cost
Trailer Mounted Pump Station - 35 hp	$ 600,000	EA	1	$ 600,000
Plumb Sites for Trailer Mounted Station	$ 150,000	EA	2	$ 300,000
Plumb Test Site at Valley View	$ 100,000	EA	1	$ 100,000
OLWSD Pipe Upsize (non-CIP) - 12" pipe	$ 240	/LF	2010	$ 482,400
Isolation Valve – 24-inch Supply Pipe	$ 100,000	EA	1	$ 100,000
Construction Subtotal				**$ 1,582,400**
Construction Contingency	20%			$ 316,480
Unaccounted for Items	10%			$ 158,240
Mobilization	3%			$ 47,472
Insurance and Bonds	1%			$ 15,824
SWPPP	1%			$ 15,824
Subtotal				**$ 2,136,240**
Land Acquisition	$ 25	/sq ft	2000	$ 50,000
Seismic Study	$ 100,000	EA	1	$ 100,000
Subtotal				**$ 2,286,240**
Engineering Services	30%			$ 685,872
TOTAL				**$ 2,972,112**

6 RECOMMENDATIONS AND NEXT STEPS

Based on the screening evaluation and analysis of alternatives for emergency interties that could provide water service to the District, connections with both Milwaukie and CRW appear to be preferred and would give the District multiple options in an emergency. The cost of constructing both interties would be approximately $3.0M. A portable trailer-mounted pump station that could provide emergency supply from either CRW or the City of Milwaukie also appears to be a viable alternative and would cost approximately $3.0M. The true costs of each alternative could vary based on siting, permitting, and other factors that are not known at this time.

WSC recommends proceeding with a preliminary design for both permanent intertie pump stations at each location and a portable pump station that could be deployed to either intertie location to determine more accurate cost estimates for each alternative. The preliminary design would include the following activities:

- Confirmation of available capacity from Milwaukie, CRW, and PWB wheeled through the CRW system
- Development of term sheets with each agency partner to determine costs for water supply during emergencies, standby charges (if any), and any cost sharing for operations and maintenance or capital costs for construction and installation
- Identification of feasible sites and the necessary property acquisition required for pump stations and connection points
- Identification of any permitting requirements
- Seismic design criteria and plans for mitigating risks in existing infrastructure required to convey emergency water to the District

WSC recommends that work commence as soon as possible to commence preliminary design of the alternatives so that a preferred project can be recommended. Upon approval of the preferred project, detailed design should commence so that construction bid documents can be developed for the construction of the much needed emergency interties.

Another step that should be considered is to evaluate and apply for grant funding that could be used to finance the project. Programs such as the Federal Emergency Management Agency Pre-Disaster Mitigation Fund provide funding for projects that improve the resilience of water systems and communities in the aftermath of a seismic event.

OAK LODGE WATER SERVICES

CONSENT AGENDA

To	Board of Directors
From	Sarah Jo Chaplen, General Manager
Title	Consent Agenda
Item No.	4
Date	November 21, 2023

Summary

The Board of Directors has a standing item on the regular monthly meeting agenda called "Consent Agenda." This subset of the regular agenda provides for the Board to relegate routine business functions not requiring discussion to a consent agenda where all included items can be acted upon by a single act.

The Consent Agenda includes:

a. **September 2023 Financial Report**
b. **Approval of October 17, 2023 Board Meeting Minutes**

Options for Consideration

1. Approve the Consent Agenda as listed on the meeting agenda.

2. Request one or more items listed on the Consent Agenda be pulled from the Consent Agenda for discussion.

Recommendation

Staff requests that the Board approve the items listed under the Consent Agenda.

Suggested Board Motion

"I move to approve the Consent Agenda."

Approved By _____ Date _____

MONTHLY FINANCIAL REPORT

To	Board of Directors
From	Gail Stevens, Finance Director
Title	September 2023 Financial Reports
Item No.	4a
Date	November 21, 2023

Reports

- September 2023 Monthly Overview
- September 2023 Budget to Actual Report [Not ready at time of publication]
- September 2023 Budget Account Roll Up Report [Not ready at time of publication]

Oak Lodge Water Services
Monthly Overview
FY 2023-24 September 2023

This report summarizes the revenues and expenditures for September 2023. Also incorporated in this report are account balances, including all cash and investment activity as well as checks and withdrawals.

Cash and Investments

Account Balances As of:		
September 30, 2023	**Interest Rate**	**Balance**
Account		
Wells Fargo Bank Checking-3552		$ 513,663
Wells Fargo Bank Checking-9966		1,614,259
LGIP	4.63%	11,012,166
Total		**$ 13,140,088**

The OLWS' checks, electronic withdrawals, and bank drafts total $1.08 million for September 2023. There were 36 voided checks totaling $242,192.76. The high number of voided checks is due to the wrong check stock used, requiring the voids and printing on the correct stock.

Services Revenue

Below is a table identifying OLWS' three principal sources of service charges in each fund with a comparison between annual budget estimates and year-to-date service charge fees.

GL Account	Service Charge	Budget Estimate	Period Amount	Year-to-Date Amount	Percentage of Budget
10-00-4211	Water sales	$ 5,469,000	$ 530,481	$ 1,619,848	29.6%
20-00-4212	Wastewater charges	11,913,000	880,727	2,775,250	23.3%
30-00-4213	Watershed protection	1,751,000	141,637	427,659	24.4%
	Subtotal	$ 19,133,000	$ 1,552,845	$ 4,822,757	25.2%

With respect to revenues, water sales are above budget, with wastewater and watershed protection services' revenues are below budget. Total variance through September is a positive $39,507. This is typical for the first months of the fiscal year because the first month's billing includes one month at prior year rates and water sales are highest in the first quarter of the fiscal year.

Expenses by Budget Category

The table below matches the Budget for the number of months reported to the same number of months of actual expenses. The **Budget YTD** column provides the portion of the Budget for comparison, whereas the financial reports compare actuals to the full annual budget. This view

allows for a review at the category level to ensure expenditures remain within the budget within each category.

Expense Category	FY 2024 Adopted Budget	BUDGET Year-to-Date September 2023	ACTUALS Year-to-Date September 2023	% Spent
Personnel Services	$ 5,760,000	$ 1,440,000	$ 1,358,087	94%
Materials & Services	5,850,600	1,462,650	1,187,951	81%
Capital Outlay	9,085,000	2,271,250	1,106,682	49%
		$ 5,173,900	$ 3,652,720	71%

With respect to expenditures, at the end of September expenditures are overall 19.3% of budget, excluding Contingencies, with 25.0% of the fiscal year completed.

Review of expenditure lines that are above 30% of budget:

1. **5130 – Overtime** is 31.6% of budget. Three divisions are currently running over budget: Administrative & Finance, Wastewater Plant and Wastewater Collections. There are multiple events that are driving overtime, including yet not limited to loss of staff, personal leave, new equipment integration and weather.
2. **5240 - Unemployment** is 73.6% of budget. OLWS' budget is equivalent to one claim for two quarters. Therefore, if there is one claim for the fiscal year, this budget appears to be sufficient as this time.
3. **6710 – Purchased Water** is 34.5% of budget. This is typical for the summer months and the first half of the fiscal year.
4. **6760 - Equipment Rental** is 71.7% of budget. This is due to continued rental for the Aerzen blower beyond initial estimates.

Financial Assistance Utility Rate Relief Program Overview

The Low Income Rate Relief Program has been changed to the Financial Assistance Utility Rate Relief Program (FAURRP), as requested by the Board of Directors.

The Authority allows eligible customers to obtain a discounted rate on a portion of their bill. The Authority budgets resources to fund the revenue losses due to the program at the rate of 0.5% of budgeted service charge revenue. The budgeted amount serves as a cap to the program's cost which can only be exceeded with approval from the OLWS' Board of Directors. The program cap for FY 2023-24 is **$95,665**. As of September 2023, the program at 100.5% of budget.

Outreach has been successful in providing this program to more OLWS' customers and continues as customers reach out. At this point, to continue to provide this program, a funding increase to raise the cap above the current 0.5% is necessary. This request is presented separately to the Board of Directors as part of the November 21, 2023 meeting.

The program cap for FY 2022-23 was **$75,710**.

The FAUPPR Program provides the following discounts:

- Drinking water customers receive a 50% discount on their water base rate. Consumption is billed at full Authority tiered rates.
- Wastewater customers receive a 50% discount on both their base rate and consumption.
- Watershed Protection customers receive a 50% discount on their base rate.

The number of customers for each utility receiving financial assistance for the September 30, 2023 billing has reach the current funding level. The total number of customers enrolled in FAURRP is split between the two billing cycles and can vary in total by utility.

	Budget	Budget Year-to-Date September 2023	Actual Year-to-Date September 2023	% Spent
FAURR Program Cap	$ 95,665	23,916	24,029	100.5%

	# of Customers Current Month	Discount Provided	Fiscal Year to Date
Drinking Water	93	2,184	5,639
Wastewater	83	6,076	16,002
Watershed Protection	82	871	2,388
		9,131	**24,029**

OAK LODGE WATER SERVICES

AGENDA ITEM

To	Board of Directors
From	Laural Casey, District Recorder
Title	Approval of Meeting Minutes
Item No.	4b
Date	November 21, 2023

Summary of Minutes for Approval

The Board of Directors reviews and approves the minutes of the Body's prior public meetings.

Attachments

1. October 17, 2023 Meeting Minutes

OAK LODGE WATER SERVICES
BOARD OF DIRECTORS
REGULAR MEETING MINUTES
OCTOBER 17, 2023

Board of Directors

Susan Keil	Chair
Kevin Williams	Vice Chair
Paul Gornick	Treasurer
Ginny Van Loo	Director
Heidi Bullock	Director

Oak Lodge Water Services Staff

Sarah Jo Chaplen	General Manager
Brad Albert	Public Works Director/District Engineer (PWD)
Gail Stevens	Finance Director
David Hawkins	Plant Superintendent
Laural Casey	District Recorder
Alexa Morris	Outreach and Communications Specialist

Consultants & Organizational Representatives

Tommy Brooks	Cable Huston
Dan Bates	Thorn Run
Katie Buxman	Maloney, Lauersdorf, Reiner
Laura Maffei	Cable Huston

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1. Call to Order & Hybrid Meeting Facilitation Protocols

Chair Keil called the meeting to order at 6:00 p.m. and facilitated the flag salute.

General Manager Chaplen overviewed the general protocols of a hybrid meeting.

2. Call for Public Comment

There were no verbal comments.

3. Presentation of State and Federal Government Relations Update

Consultant Dan Bates introduced Thorn Run Partners and overviewed the state and federal funding opportunities available to OLWS.

The Board asked questions regarding:

- bond financing,
- grant eligibility,
- demonstrating a need,
- packaging our projects with similar projects from other special districts, and
- how to raise the profile of our projects.

4. Public Hearing and Consideration of Special Procurement for Human Resources Services

General Manager Chaplen overviewed the HR Manager recruitment process and special procurement of interim services.

Chair Keil stated the purpose and opened the public hearing at 6:48 p.m.

There was no public comment.

Chair Keil closed the public hearing at 6:50 p.m.

The Board asked clarifying questions regarding:

- anticipated cost,
- outsourcing other human resources services,
- continued implementation of policies and collective bargaining agreements,
- cost partnership with NCCWC and CRWP,
- support from SDAO for risk management services, and
- recruitment of a permanent candidate.

There was discussion on the Management Team's capacity and the legal requirements of the HR Manager position. The payment and the independent contractor clauses were questioned, as well as considering a maximum amount for the contract.

Director Bullock moved to adopt the findings presented in the Staff Report tonight and approve a special procurement to contract for Human Resources Services by direct appointment. Treasurer Gornick seconded. District Recorder Casey conducted a roll call vote. Voting Aye: Directors Keil, Williams, Gornick, Van Loo, and Bullock.

MOTION CARRIED

Treasurer Gornick moved to authorize the General Manager to negotiate and execute a contract for Human Resources Services with Workplace Results, LLC. with a maximum amount of $91,000, correcting the contract to name Clackamas River Water Providers, and to establish key personnel as Mary Rowe. Director Bullock seconded. District Recorder Casey conducted a roll call vote. Voting Aye: Directors Keil, Williams, Gornick, Van Loo, and Bullock.

MOTION CARRIED

Staff were directed to come back if more funds were needed. The Board requested to see the job description for the permanent HR position before recruiting.

5. Consent Agenda

Items on the Consent Agenda included:

- The August 2023 Financial Report, and
- September 19, 2023 Board Meeting Minutes

Treasurer Gornick moved to approve the Consent Agenda. Director Van Loo seconded.

The Board asked questions regarding the Financial Report.

District Recorder Casey conducted a roll call vote. Voting Aye: Directors Keil, Williams, Gornick, Van Loo, and Bullock.

MOTION CARRIED

6. Business from the Board

Vice Chair Williams and Chair Keil reported on their written reports. Director Van Loo provided a verbal report on monthly liaison activities.

7. Department Reports

The Management Team provided highlights from their written reports.

The Board asked clarifying questions regarding catch basin cleaning, non-revenue water analysis, Wastewater Treatment Plant systems.

8. Recess to Executive Session

Chair Keil recessed to executive session at 8:00 p.m. under ORS 192.660(2)(f) to consider information or records that are exempt by law from public inspection, and ORS 192.660(2)(h) to consult with counsel concerning the legal rights and duties of a public body with regard to current litigation or litigation likely to be filed.

9. Adjourn Executive Session

Chair Keil adjourned the executive session at 9:23 p.m.

No decisions were made as a result of the executive session.

10. Adjourn Meeting

Chair Keil adjourned the meeting at 7:38 p.m.

Respectfully submitted,

Susan Keil
Chair, Board of Directors

Date: _____

Kevin Williams
Vice Chair, Board of Directors

Date: _____

OAK LODGE WATER SERVICES

STAFF REPORT

To	Board of Directors
From	Gail Stevens, Finance Director
Title	Consideration of Funding Increase for Financial Assistance Utility Rate Relief Program
Item No.	5
Date	November 21, 2023

Summary

The Financial Assistance Utility Rate Relief Program (FAURRP), formerly known as the Low Income Rate Relief Program (LIRRP), is funded at a rate of 0.5 percent of budgeted OLWS rate revenue. This amount serves as a cap to the program's cost which requires Board of Director's approval to exceed.

Background

The FAURRP allows eligible Oak Lodge Water Services' (OLWS) customers to obtain a discounted rate for service charge portions of their utility bill. This program applies to residential customers of OLWS seeking rate relief based on income level. Approved FAURRP customers receive a 50% reduction on their water base rate, wastewater charge, and watershed protection charge. Water consumption charges are not eligible for discount.

Budget

During the FY 2023-2024 Budget season, the possibility of needing additional funding for rate relief for customers due to rate increases was identified. In addition, the Board requested a program name change to hopefully encourage OLWS' customers who needed assistance to apply. The existing LIRRP was renamed FAURRP. OLWS' staff have encouraged OLWS customers to apply, especially customers on a fixed income.

As a result, the program utilization has increased, and the program cap has been reached by the end of September 2023. In order to continue to provide this rate relief to all customers beyond those currently approved, a higher funding rate is being requested. The current level of funding at 0.5 percent can serve 73 customers (bi-monthly billing) with all three utility services, at a cost of $7,972 per month, $95,665 annually. This is based on budgeted revenues of $19.1 million for the fiscal year 2023-2024.

Funding level options compared to the current funding level are listed below, for the Board of Directors to select from:

Percent of Revenue	Annual Cost	Average # of Customers	Additional Cost	Additional # of Customers
0.50%	**95,665**	**73**		
0.55%	105,232	80	9,567	7
0.60%	114,798	87	19,133	14
0.65%	124,365	94	28,700	21
0.70%	133,931	102	38,266	29
0.75%	143,498	109	47,833	36

Recommendation

Based on the September utility billing, the monthly costs are trending to 0.56 percent of budgeted revenues. Staff recommends a minimum funding level of 0.60 percent. However, I encourage the Board of Directors to discuss and establish the FAURRP funding level of their choosing.

Alternatives to Recommendation

The Board of Directors can retain the current funding level of 0.5 percent as the cap. This results in no additional rate relief to be provided for the remainder of fiscal year 2023-24.

Suggested Board Motion

"I move to establish the revised funding rate for the Financial Assistance Utility Rate Relief Program at 0.## percent of budgeted revenues for fiscal year 2023-24."

Attachments

1. Financial Assistance Utility Rate Relief Program Policy

OAK LODGE
WATER SERVICES

FINANCIAL ASSISTANCE UTILITY RATE RELIEF PROGRAM POLICY

Policy Number: FN-0006

Adopted October 25, 2018

This document supersedes any and all previous FAURRP policies.

FINANCIAL ASSISTANCE UTILITY RATE RELIEF PROGRAM POLICY

Purpose

The purpose of this policy is to allow eligible Oak Lodge Water Services' (OLWS) customers to obtain a discounted rate for the service charge portion of their bill.

Scope

This policy applies to residential customers of OLWS seeking rate relief on the basis of low income resulting in economic hardship. Approved Financial Assistance Utility Rate Relief Program (FAURRP) applicants will receive a 50% reduction on the eligible portions of their bill. Eligible portions include water base rate, wastewater charge, and watershed protection fee. Water consumption charges are not eligible for discount.

Policy Statement

This policy defines the process and procedures to be used in processing applications for the FAURRP, determining eligibility, and delineating rules governing administration of the program.

Procedure

Financing the Program

Water, wastewater, and watershed protection service charges shall be established at a level sufficient to cover revenue losses resulting from OLWS customers qualifying for a reduced rate as authorized by OLWS Ordinance. OLWS shall budget resources sufficient to fund the revenue losses due to the program at a rate of 0.5 percent of budgeted OLWS rate revenue. This budgeted amount shall serve as a cap to the program's cost which will require Board of Director's approval to exceed.

Eligibility

To be eligible for the FAURRP, applicants must meet all of the following minimum qualifications:

- The applicant must be a residential customer of the OLWS; and
- The property served must be occupied and used by the applicant as their principal residence during the period for which rate relief is applied; and
- The applicant must be current on all accounts with OLWS; and
- The applicant's family, of which the applicant is a member shall not exceed the gross annual household income levels as defined by the United States Housing and Urban Development (HUD) Department as "very low income" for the Portland-Vancouver area, most recent version; and
- The applicant must make written application on a form provided by OLWS; and
- The applicant must provide proof of income status in a form determined by OLWS; and
- The applicant may not own property other than that associated with their principal residence

for which the application is submitted; and

- Family means one person, or two or more persons related by blood, marriage, legal adoption, or guardianship; or a group of not more than five persons, all or part of whom are not related by blood, marriage, legal adoption, or guardianship living together as a simple housekeeping and economic unit in the dwelling occupying the property for which the reduced rate is applied; and
- Rate reductions, if granted, are based on complete calendar months and commence on the first day of the month following the date the application is approved by the General Manager; and
- Billings will not be prorated for partial month eligibility; and
- Once approved the rate relief will last for 12 months. It is the applicant's duty to reapply for the program annually. If OLWS has not received the renewal application 30 days prior to the expiration of the 12-month period, the rate will revert to the standard service charge; and
- OLWS will not retroactively adjust charges.

Contract

The application required under this policy shall be in a form provided by OLWS and shall contain a signed statement of agreement to abide by all terms of this policy and subsequent rules and regulations as may be adopted by the Board. Enrollment in the rate reduction program ends if the applicant can no longer meet one or more of the program requirements or is disqualified for a violation of the policy.

- Proof of Eligibility
    - Applicants must file with OLWS proof of eligibility in the form of a federal or state tax filing from the previous year, or other acceptable official document as OLWS may require.
- Termination of Rate Reduction
    - Reduced rates for customers shall be terminated in the event of the occurrence of any of the following circumstances;
        - Minimum income levels are exceeded.
        - Applicant defaults in the performance of the terms and provisions of his contract with OLWS (including delinquency on sewer or water assessments).
        - Applicant moves from the dwelling.
        - Applicant (if an owner) sells, trades, or otherwise relinquishes ownership of the dwelling.
        - Applicant fails to comply with any rule or regulation adopted; refuses to provide information to or hinders any investigation by OLWS into the continued eligibility of the applicant for reduced rates; willfully makes any false or misleading statement to obtain or retain a rate reduction; or receives benefits under this policy with knowledge that he or she does not qualify for such benefits.

Confidentiality

To the maximum extent possible under the law, the applications, records, and other information relating to rate reduction requests shall be kept confidential by OLWS.

Violations, Penalties, and Enforcement

A violation of this policy shall be punishable by a penalty equal to twenty percent of the monies owed and shall disqualify the applicant from further participation in the program.

Each violation of a separate provision of this policy shall constitute a separate offence and each day that a violation of this Policy is committed or permitted to continue shall constitute a separate offence.

The disqualification of any person for violation of this policy shall not act to relieve such person from the requirement to pay the full regular water, wastewater, and watershed Protection rates for the entire period he or she was unqualified for reduced rates. The penalties imposed by this section are in addition to and not in lieu of any remedies available to OLWS.

The disqualification of any person for violation of this policy shall disqualify such person from eligibility for a period of not less than two years, nor more than three years.

Multiple disqualifications of any person for violation of this policy shall disqualify such person for eligibility in perpetuity.

Review and Update

The Billing Team shall review this policy annually to ensure accuracy of policy and practice.

Last Updated: August 2023

OAK LODGE WATER SERVICES

STAFF REPORT

To	Board of Directors
From	Brad Albert, Public Works Director/District Engineer Gail Stevens, Finance Director
Title	Presentation of Quarterly Capital Project Status Report
Item No.	6
Date	November 21, 2023

Summary

The Board has requested quarterly updates on the status of the Capital Improvement Plan (CIP). This report provides high level status of the projects and the budget spent to date. This is to inform the Board whether the projects are progressing on time and budget, or if adjustments have been made to accommodate unforeseen issues.

Capital Improvement Projects Status

Oak Lodge Water Services
Capital Outlay Reporting
FY 2024 - July 2023 through September 2023

	Budget	Actuals	Projections	Projected Spend FY 2023	% of Budget	Variance
Drinking Water Capital	3,200,000	53,434	397,042	450,477	14%	2,749,523
Wastewater Capital						
Wastewater Treatment Plant	1,773,411	248,848	1,270,758	1,519,606	86%	253,805
Wastewater Collections System	3,999,067	808,782	1,584,556	2,393,338	60%	1,605,729
Watershed Protection Capital	300,000	-	-	-	0%	300,000
Totals	**9,272,478**	**1,111,065**	**3,252,356**	**4,363,421**	47%	**4,909,057**
Combined Contingency	714,356					
Appropriation	**9,986,834**					

Drinking Water

28th Avenue Water Main

- Bidding for the project took place in August.
- OLWS received favorable bids and awarded the contract for construction.
- A preconstruction meeting was held and construction should commence in December.
- As a result of the favorable bidding, staff is recommending to start design of the Oatfield Road water main replacement.

Milwaukie-OLWS Intertie Pump Station

- Received the final preliminary report.
- Discussed site options with Milwaukie and both parties agree on the location of the intertie.
- Present the preliminary report to the Board in November.
- Next steps are to negotiate a intergovernmental agreement with Milwaukie and jointly seek grant funding for the project.

Valley View Leak Repair

- Received quotes for the leak repair to the drinking water main.
- The north tank is taken offline for two weeks to complete the repair.
- The repair is scheduled for November and should be complete by the end of the month.

Valley View Reservoir Fall Protection

- Received quotes for the safety railing to be constructed on the top of the reservoirs.
- Contract award in August.
- Railing is currently being manufactured.
- Project set to start in late Winter 2024 and finish in Spring 2024.

Wastewater Projects

Tertiary Filtration Project

- 30% design was presented to the Board in July.
- Final design contract awarded in July to develop bid ready construction plans.
- Additional soil boring were taken onsite.
- 60% design was just completed and review workshop held.
- Final design should be complete in April 2024.

Infiltration and Inflow Reduction Lift Station 5 Basin

- Final design contract awarded to develop bid ready construction plans.
- Surveying is taking place.
- Bidding should take place in the Spring of 2024.
- Construction to take place in FY24 & 25

Lift Station 2 Rebuild

- Construction commenced in May 2023.
- Project was paused to secure building permits from Clackamas County
- Bypass pumping is being set up to start demolition of existing infrastructure.
- Forecast to be completed in April 2024.

Aeration Blower Replacement

- Order placed for the new blower and should arrive in early 2024.
- Acquiring quotes for installation.
- Installation should happen in Spring 2024 and be completed this FY.

Hillside Sewer Line Replacement

- Construction started July 2023.
- Construction was complete on September 30, 2024.
- Minor punch list items were corrected in October.
- The project is complete.

Attachments

1. Capital Outlay Tracker

Drinking Water Capital Fund
Fund 71
FY 2024 - July 2023 through September 2023

Drinking Water		Current Phase	CIP Budget	Re-assign	Adjusted Budget	Projected FY 2024	Variance	Estimated Phase Completion
71-20-7200	**Infrastructure**		**500,000**	**71,746**	**571,746**	**365,324**	**206,422**	
71-20-7300	**Buildings and Improvements**		**25,000**	**-**	**25,000**	**-**	**25,000**	
71-20-7400	**Improvement other than Bldgs**		**-**	**9,000**	**9,000**	**9,000**	**-**	
71-20-7520	**Equipment**		**200,000**	**(4,334)**	**195,666**	**15,666**	**180,000**	
71-20-7530	**Information Technology**		**75,000**	**-**	**75,000**	**6,788**	**68,212**	
71-20-7600	**Capital Improvement Projects**		**2,400,000**	**(76,412)**	**2,323,588**	**53,698**	**2,269,890**	
2020-W06	28th Ave Loop Water Main	Pre-Construction	2,000,000	(90,566)	1,909,435	9,322	1,900,112	Start 12/23
2020-W05	Aldercrest Watermain	Complete	-	778	778	778	-	Complete
2024-DW01	Water Main McLoughlin @ Jennings	Design	250,000	-	250,000	-	250,000	TBD
2020-W02	Milwaukie-OLWS Intertie Pump Station	Design	150,000	-	150,000	30,222	119,778	On-going
2021-W01	OLWS Water Pump Station @ CRW Generator	Design	-	13,376	13,376	13,376	(0)	On Hold
	Total Drinking Water		**3,200,000**	**-**	**3,200,000**	**450,477**	**2,749,523**	
	Contingency		**370,000**	**-**	**370,000**		370,000	
	Total Appropriation		**3,570,000**	**-**	**3,570,000**	**450,477**	**3,119,523**	

Wastewater Capital Fund
Fund 72
FY 2024 - July 2023 through September 2023

Wastewater Treatment		Current Phase	CIP Budget	Re-assign	Adjusted Budget	Projected FY 2024	Variance	Estimated Phase Completion
72-21-7300	**Buildings and Improvements**		**25,000**	**58,997**	**83,997**	**23,997**	**-**	
72-21-7520	**Equipment**		**690,000**	**(35,000)**	**655,000**	**478,181**	**176,819**	
72-21-7530	**Information Technology**		**115,000**	**-**	**115,000**	**98,014**	**16,986**	
72-21-7600	**Capital Improvement Projects**		**900,000**	**19,414**	**919,414**	**919,414**	**(0)**	
2020-SS06	Wastewater Master Plan 2022 (50%)	SDC Analysis	-	45,353	45,353	45,353	(0)	On-Hold
2021-SS03	Secondary Clarifiers 1&2 Rehabiliation	Final Design	150,000	45,435	195,435	195,435	-	May 2024
2023-WW06	Tertiary Filtration Facility	Final Design	750,000	(71,374)	678,626	678,626	(0)	FY 2026
	Total Treatment		**1,730,000**	**43,411**	**1,773,411**	**1,519,607**	**253,804**	
Wastewater Collections								
72-22-7200	**Infrastructure**		**225,000**	**-**	**225,000**	**27,900**	**197,100**	
72-22-7520	**Equipment**		**30,000**	**-**	**30,000**	**-**	**30,000**	
72-22-7530	**Information Technology**		**-**	**6,788**	**6,788**	**6,788**	**(0)**	
72-22-7600	**Capital Improvement Projects**		**3,600,000**	**137,279**	**3,737,279**	**2,332,129**	**1,397,177**	
2020-SS06	Wastewater Master Plan 2022 (50%)	In Progress	50,000	(4,647)	45,353	45,353	(0)	On-hold
2024-WW01	Lift Station #3 Rebuild	60% Design	50,000	-	50,000	10,000	40,000	FY 2027
2022-SS01	Lift Station #2 Rebuild	Construction	1,100,000	186,194	1,286,194	1,286,194	0	Apr 2024
2023-WW03	Infiltration and Inflow Reduction Lift Station 5 Basin	Final Design	1,500,000	-	1,500,000	322,885	1,177,115	FY 2025
2024-WW04	Infiltration and Inflow Reduction Lift Station 2 Basin	Smoke Testing	200,000	-	200,000	19,939	180,061	Complete
2020-SS05	Hillside Sewer Line Replacement	Construction	700,000	(52,241)	647,759	647,759	0	Complete
	Boardman Sewer Line Replacement	Design-Prelim	-	7,973	7,973	-	(0)	TBD
	Total Collections		**3,855,000**	**144,067**	**3,999,067**	2,366,817	**1,654,276**	
	Total Capital Outlay		**5,585,000**	**187,478**	**5,772,478**	3,886,424	**1,908,081**	
	Contingency		**481,834**	**(187,478)**	**294,356**		**294,356**	
	Total Appropriation		**6,066,834**		**6,066,834**	3,886,424	**2,202,437**	

Watershed Protection Capital Fund
Fund 73
FY 2024 - July 2023 through September 2023

Drinking Water		Current Phase	Staff	CIP Budget	Re-assign	Adjusted Budget	FY 2024	Variance	Estimated Phase Completion
73-23-7520	**Equipment**			**-**	-	**-**	**-**	**-**	
73-23-7600	**Capital Improvement Projects**			**300,000**	-	**300,000**	**-**	**300,000**	
	Boardman & Arista Flooding	Design-Prelim	Brad A	300,000	-	300,000	-	300,000	Complete
	Total Drinking Water			**300,000**	**-**	**300,000**	**-**	**300,000**	
	Contingency			**50,000**	-	**50,000**		**50,000**	
	Total Appropriation			**350,000**	**-**	**350,000**	**-**	**350,000**	

OAK LODGE
WATER SERVICES

STAFF REPORT

To	Board of Directors
From	Sarah Jo Chaplen, General Manager
Title	Consideration of Resolution No. 2023-0022 Approving Amended and Restated Intergovernmental Agreement of Regional Water Providers Consortium
Item No.	7
Date	November 21, 2023

Summary

Oak Lodge Water Services ("OLWS") is a signatory to the 2005 Intergovernmental Agreement of Regional Water Providers Consortium (the "2005 IGA"), which is an amended version of an agreement that has existed since 1996. The 2005 IGA and its predecessor agreement created the Regional Water Providers Consortium ("Consortium"), of which OLWS is deemed a member.

At its meeting on October 4, 2023, the Consortium Board unanimously approved an updated version of the 2005 IGA and recommended that each Consortium member's individual board, council, or commission approve the Amended and Restated Intergovernmental Agreement of the Regional Water Providers Consortium (2023) (the "2023 IGA").

This item comes before the OLWS Board of Directors ("Board") to consider adoption of the 2023 IGA by resolution. A proposed resolution and the 2023 IGA are included with this Staff Report.

Background/Discussion

The stated purpose of the Consortium is, among other things, to provide a collaborative clearinghouse function for water supply planning and development that fosters regional coordination. OLWS has participated in the Consortium and benefited from being a member in multiple ways. Being able to work together as a region on Emergency Preparedness plans, exercises, and tools for customer information such as the "Who is my Water Provider Tool?" is essential. Coming together to develop approaches for water conservation also adds to the region's flexibility during emergencies. We are able to communicate on a different level, across a wide range of water issues, as a result of being a Consortium member and pooling our resources.

The last time Consortium members considered updates to the Consortium was in 2005. Since that time, the organization has grown and its needs have evolved, which in turn have resulted

in a need to update the 2005 IGA. The proposed changes to the 2005 IGA include the following:

1. New provisions reflect two types of members: “Associate Member” and “Full Member”. Full Members pay full dues and appoint a representative to the Consortium’s Board of Directors. Associate Members’ dues are established when they join, and they do not appoint a representative to the Board of Directors.

2. Changes were made to various definitions to create more clarity (e.g. defining “Region”), and outdated references were removed

3. The stated purposes of the Consortium were revised to align with the current mission statement and Strategic Plan

4. The process for a member seeking withdrawal from the Consortium was updated to encourage timely notification

5. New language creates an obligation and Board authority to maintain a Strategic Plan to guide its work; references to update Regional Water Supply Plan were removed

6. New language clarifies the roles and responsibilities of the Executive Committee

7. General revisions were made throughout the document to reflect current best practices for agreements and meetings of public bodies.

Each signatory to the agreement must approve the 2023 IGA for it to take effect. OLWS is one of the first entities to officially take up this matter, and Consortium staff anticipate receiving all approvals by June 30, 2024.

The OLWS legal counsel did not represent OLWS directly during this process, but did review and provide comment on the 2023 IGA on behalf of all Consortium members. This was OLWS’ contribution to moving this significant IGA revisions process on behalf of all Consortium members.

Recommendations

It is recommended that the Board approve Resolution No. 2023-0022 Approving Amended and Restated Intergovernmental Agreement of Regional Water Providers Consortium, which authorizes the Board Chair to execute the 2023 IGA as presented in the Resolution included with this Staff Report.

Suggested Board Motions

“I move to adopt Resolution No. 2023-0022 Approving Amended and Restated Intergovernmental Agreement of Regional Water Providers Consortium.”

Attachments

1. Resolution No. 2023-0022
2. Exhibit A – 2023 Amended and Restated IGA

OAK LODGE WATER SERVICES

RESOLUTION NO. 2023-0022

A RESOLUTION APPROVING AMENDED AND RESTATED INTERGOVERNMENTAL AGREEMENT OF REGIONAL WATER PROVIDERS CONSORTIUM.

WHEREAS, Oak Lodge Water District ("District"), a predecessor of Oak Lodge Water Services Authority ("OLWS") adopted Resolution No. 1996-3 to participate in the Regional Water Supply Consortium on November 11, 1996; and

WHEREAS, the District's Board of Directors adopted the Regional Water Supply Plan in 1996; and

WHEREAS, the District adopted Resolution No. 2004-15 approving the Amended and Restated Regional Water Providers Consortium Intergovernmental Agreement (2005) ("2005 IGA") on December 21, 2004; and

WHEREAS, the District assigned to OLWS, and OLWS accepted from the District, all rights and obligations of the District, including the 2005 IGA; and

WHEREAS, OLWS has been an active participant in the activities of the Regional Water Providers Consortium, benefits greatly from the water conservation promotion activities of the Consortium, and desires to continue to participate in the activities of the Regional Water Providers Consortium through an update of the 2005 IGA;

NOW, THEREFORE, BE IT RESOLVED that the Oak Lodge Water Services Board of Directors hereby approves the Amended and Restated Intergovernmental Agreement of Regional Water Providers Consortium attached as Exhibit A hereto and authorizes the Board Chair to sign the agreement on behalf of Oak Lodge Water Services.

INTRODUCED AND ADOPTED THIS 21 DAY OF NOVEMBER 2023.

OAK LODGE WATER SERVICES

By _____ By _____

Susan Keil, Chair Kevin Williams, Vice Chair

AMENDED AND RESTATED INTERGOVERNMENTAL AGREEMENT OF REGIONAL WATER PROVIDERS CONSORTIUM (2023)

TABLE OF CONTENTS

REGIONAL WATER PROVIDERS CONSORTIUM

This Amended and Restated Intergovernmental Agreement of the Regional Water Providers Consortium (2023) is entered into by and among the undersigned municipalities and districts, hereinafter called "Participants," to participate in the Regional Water Providers Consortium for the Portland Metropolitan Region ("the Consortium").

RECITALS

WHEREAS, in 1989 water providers of the Portland metropolitan area began meeting in an informal group called the "Regional Providers Advisory Group" to coordinate water supply planning efforts; and

WHEREAS, in 1996 a Regional Water Supply Plan was completed; and

WHEREAS, the Regional Water Supply Plan, which contains specific recommendations for cooperation and coordination between the water providers in this region through the formation of the Regional Water Providers Consortium, was adopted by signatory water providers in their *Inter-Governmental Agreement of Regional Water Providers Consortium*; and

WHEREAS, as the regional land use agency under state law and regional charter, the Metropolitan Service District ("Metro") adopted the Regional Water Supply Plan as part of the Metro Regional Framework Plan; and

WHEREAS, in 1997 the Consortium was formed when 15 Participants entered into an intergovernmental agreement to endorse the Regional Water Supply Plan and coordinate and cooperate in its implementation, and amended that intergovernmental agreement in 2004-05 (*2004-05 IGA*); and

WHEREAS, the Participants desire to amend and restate the 2004-05 IGA to make certain updates to the Participants and their obligations, and to streamline certain procedures, while continuing to endorse the Regional Water Supply Plan; and

WHEREAS, ORS Chapter 190 authorizes units of local government to enter into written agreements with any other unit or units of local government for the performance of any or all functions and activities that any of them has authority to provide; and

WHEREAS, all the Participants of this Agreement are thus authorized to enter into an intergovernmental agreement;

NOW, THEREFORE, the Participants agree as follows:

Section 1. **Definitions**

For purposes of this Agreement, the following terms shall be defined as follows:

"Agreement" – Shall mean this document and any authorized amendments thereto.

"Associate Member" – Shall mean a Participant that does not have an appointed representative to the Board and that pays reduced dues as determined by the Board.

"Board" – Shall mean the Board of Directors established by Section 9 of this Agreement, consisting of one member from the governing body of each Full Member Participant.

"Bylaws" – Shall mean the regulations of the Consortium adopted by the Board pursuant to Section 9.B. of this Agreement.

"Consortium" – Shall collectively mean all Participants to this Agreement acting pursuant to and under the terms of the Agreement.

"Consortium Funds" – Shall mean Consortium funds consisting of all dues, voluntary contributions, grant monies, and funding from any other source provided to the Consortium to conduct the activities and business of the Consortium.

"Executive Committee" – Shall mean the committee established by Section 10 of this Agreement.

"Full Member" – Shall mean a Participant that has an appointed representative to the Board and Technical Committee and that pays full dues as outlined in Section 7.

"Participant" – Shall mean any signatory to the Agreement.

"Plan" – Shall mean the 1996 “Regional Water Supply Plan” for the Portland Metropolitan Area, and all subsequent amendments thereto.

"Region" – Shall mean the area within which Participants provide services to Retail Customer Accounts.

"Retail Customer Accounts" – Shall mean all retail accounts that are billed by a Participant (including residential single family, residential multifamily, commercial, industrial, and wholesale accounts).

"Technical Committee" – Shall mean the committee established by Section 11 of this Agreement.

"Total average daily water use" – Shall mean all billed water usage for Retail Customer Accounts.

Section 2. **Purposes**

The general purposes of the Consortium are as follows:

A. To provide leadership in the planning, management, stewardship, and resiliency of drinking water in the Region;

B. To foster coordination in the Region by sharing knowledge, technical expertise, and resources between Participants;

C. To serve as the central custodian for Consortium documents, data, and studies;

D. To review and recommend revisions to the Plan, as appropriate;

E. To provide a forum for the study and discussion of water supply issues of mutual interest to Participants;

F. To promote fiscal responsibility by pooling resources to achieve economies of scale;

G. To allow for public participation in Consortium activities;

H. To promote stewardship, emergency preparedness, and water conservation in the Region through outreach and education;

I. To strengthen emergency preparedness and resiliency among water providers in the Region;

J. To ensure safe and reliable drinking water is accessible to all.

Section 3. **Strategic Plan**

A. The Consortium will maintain a strategic plan to guide its work, establish priorities, and set goals for the strategic planning timeline.

B. The strategic plan will be updated at an interval set by the Board.

Section 4. **Cooperation and Participants' Retained Powers**

The Participants intend that the Consortium shall act through the processes laid out herein in the spirit of cooperation. Unless specifically provided for herein, by entering into this Agreement, no Participant has assigned or granted to any other or to the Consortium its water rights or the power to plan, construct, and operate its water system or perform any other obligation or duty assigned to it under law.

Section 5. **Consortium Authority**

In accomplishing its purposes, and utilizing the organizational structure and decision-making processes contained herein, the Consortium is authorized to:

A. Adopt or revise Bylaws and other operating procedures consistent with the terms of this Agreement to govern Consortium operation and administration, including such things as meeting arrangements, voting procedures, election of officers of Consortium boards and committees, notice procedures, procedures for execution of binding legal documents, budgeting, and financial operations.

B. Adopt or revise, and implement an annual work plan and budget and issue annual reports and such supplementary reports as the Consortium may determine appropriate;

C. Update and adopt its strategic plan as set forth in Section 3.

D. Collect regular dues from Participants to support the routine business of the Consortium in amounts established as established in Section 7;

E. Accept voluntary contributions from Participants in amounts higher than the regular dues for the purpose of conducting studies or engaging in other activities consistent with Consortium purposes;

F. Apply for and receive grants and accept other funds from any person or entity to carry on Consortium activities;

G. Expend Consortium funds, however obtained, and establish accounts and accounting processes to manage Consortium funds, which may include utilizing the accounts and processes of Participants for such purposes under appropriate agreements;

H. Execute public procurement contracts and enter into arrangements whereby Participants may enter into a public procurement contract on behalf of the Consortium;

I. Execute intergovernmental agreements;

J. Establish procedures or recommendations for the hiring, dismissal, and review of Managing Director, and to delegate such activities to a Participant;

K. Accept assignment of staff from individual Participants to conduct Consortium work and to reimburse the Participants for the salary and other costs associated with the assigned staff;

L. Establish procedures and criteria whereby other governmental entities may become a Participant in this Agreement;

M. Establish a process to coordinate Participant response to water policy issues of mutual interest or concern;

N. Establish procedures to solicit the views of the public on water supply and water resource issues within the purview of the Consortium;

O. Establish a process whereby water policy and water supply disputes or disagreements among Participants may be resolved;

P. Protect Consortium rights and enforce obligations owed to the Consortium by third parties to the extent permitted by law;

Q. Take other action within the powers specifically granted to the Consortium herein by the Participants to exercise the authority granted in this Section 5 and to carry out the purposes stated in Section 2.

Section 6. Participants

A. Participant Memberships: A Participant may join as a Full Members or Associate Member in accordance with the definitions set forth in Section 1 and as further provided in the Bylaws.

B. Any Participant which, having once joined, withdraws or is expelled from the Consortium for non-payment of dues, may only re-join as provided in Section 7.F.

C. Additional Participants: The Board may accept additional governmental entities as Participants into the Consortium under terms and financial arrangements that the Board determines just and appropriate. The Board may establish standards for membership in the Bylaws or may allow Participants to join on a case-by-case basis. Provided, however, that in all cases, no new Participant may join the Consortium without the affirmative vote of a majority of the Board.

D. Withdrawal: Any Participant may withdraw from the Consortium at any time by giving written notice to the Chair of the Consortium Board. Consortium dues already paid shall not be refunded to the withdrawing Participant. Unless otherwise approved by the Board, a withdrawing Participant shall have no ownership or interest in a Consortium asset after the date of withdrawal. Any Participant intending to withdraw from the Consortium shall make its best efforts to advise the Board Chair of that fact prior to February 1 and the approval of the Consortium budget for next fiscal year. Participants acknowledge that failure to notify the Consortium in accordance with these procedures may cause financial harm to the Consortium.

Section 7. **Dues**

A. Each Participant shall pay annual dues no later than September 1 of each year sufficient to fund the approved annual budget of the Consortium, as established by the Board, provided, however, that the Board may establish a different payment amount and/or schedule for a Participant upon request from that Participant or upon the Board's own motion.

B. The dues of each Participant shall be determined annually as follows:

1. Total annual dues for all Participants shall be set to equal the annual budget for the Consortium, not counting budget items to be funded by fewer than all the Participants as provided in Section 8.C.

2. Any grants or non-dues monies obtained by the Consortium may be applied towards the annual budget, thereby reducing the annual dues assessments commensurately.

3. The Board shall establish the dues obligation of Associate Members at the time it approves an entity's membership and which amount is subject to any changes set forth in the Bylaws.

4. The total annual dues of an Associate Member shall be subtracted from the total annual dues-based budget, described in subsection 7.B.1. leaving a budget number to be funded by Full Member dues. Dues shall be set so that the dues of each Full Member reflect its proportional share of that sum based on the following formula:

(a) 50% of the dues shall be allocated proportionally based on the Participant's proportional share of the total number of all Participants' Retail Customer Accounts for the prior year;

(b) 50% of the dues shall be allocated proportionally based on the Participant's proportional share of total average daily retail water use (in million gallons per day) in the prior year of all Participants.

C. Minimum dues may be set by the Board to cover costs of adding a new Participant as outlined in the Bylaws.

D. In-kind contributions may be made in lieu of dues if approved by the Board. In-kind contributions must be tracked and quantified.

E. A Participant that fails to pay its assigned dues by September 1, or a time otherwise established by the Board pursuant to Section 7.A., may be removed by the Board as a Participant after two reminders are sent.

F. Upon a majority vote of the Board, a removed Participant (or a Participant that has previously withdrawn from membership) may be reinstated in the Consortium upon its agreement to pay its full dues for the year during which it wishes to rejoin (calculated as if the entity had been a Participant at the time the budget was approved). Upon receipt of such dues by a rejoining Participant, the Board shall add the dues payment to the existing budget for expenditure or carry over to the following year's budget.

G. If a new Participant joins the Consortium during an annual dues cycle, its dues and those of the existing Participants shall be calculated as follows:

1. If a new Participant is a Full Member, its dues requirement will be calculated pursuant to Section 7.B.4.

2. If a new Participant is an Associate Member, its dues will be determined as provided in Section 7.B.3.

3. The initial year dues for a new Participant joining partway through a fiscal year will be pro-rated to reflect partial year membership if more than halfway through the fiscal year.

4. New Participants joining at any time after September 1 shall pay their initial year's dues within 90 days of signing this Agreement.

Section 8. Work Plan and Budgeting

A. Each year, at the first Board meeting of the calendar year, the Board shall adopt an annual work plan of Consortium activities for the upcoming fiscal year beginning on July 1.

B. At the same time, the Board shall adopt a budget sufficient to conduct the Consortium's annual work plan. The budget shall also include a calculation of the dues owed by each Participant to fund the budget as provided in Section 7 and a table apportioning the dues to each Participant.

C. The budget may include special projects that will be funded by fewer than all of the Participants on a voluntary basis as outlined in Section 5.E.

D. The Board may amend the budget and the work plan at any time as it deems appropriate except that dues may only be increased annually as provided for in Section 7. Additional expenditures may be permitted so long as there are identified sources of revenue, other than increased dues, for such expenditures.

E. Participants shall provide to Consortium staff the data necessary to calculate the annual dues for budgeting and planning in a timely manner.

Section 9. **Consortium Board**

A. The Board shall be made up of one member from the governing body of each Full Member. Each Participant shall also name an alternate Board representative from its governing body to serve in case the primary representative cannot. Provided, however, that if the Board Chair does not attend a meeting, the Vice Chair shall assume the Chair's duties rather than the Chair's alternate.

B. Annually, the Board shall elect a Board Chair and a Vice Chair and appoint the Executive Committee members in accordance with the provisions in the Consortium Bylaws.

C. The Board is authorized to: (1) approve the Consortium's annual work plan and budget; (2) approve the Consortium's strategic plan; (3) set Consortium policy; (4) approve new Participants; (5) initiate updates to the Plan as needed; (6) approve minor amendments to the Plan; (7) recommend to Participants' governing bodies major amendments to the Plan; (8) recommend to Participants' governing bodies amendments to this Agreement; (9) adopt and update the Bylaws; (10) exercise any other powers and authority granted to the Consortium by this Agreement necessary to accomplish the Consortium's purposes.

D. The Board shall have the authority to designate which amendments to the Plan are major and which are minor for purposes of determining the process for amendment consideration. Generally, major amendment to the Plan should include revisions to the Plan's policy objectives, resource strategies, or implementation actions which significantly alter Plan direction or would significantly change the implementation strategies. Minor amendments are all other changes to the Plan.

E. The Board may assign such duties or delegate such Board authority as the Board deems advisable to any Participant, Board committee, the Executive Committee, or to the Technical Committee, except that the Board may not delegate the authority (1) to execute intergovernmental agreements, (2) to designate Plan amendments as minor or major, (3) to recommend major Plan Amendments or amendments to this Agreement, (4) to approve the annual work plan and the budget, (5) to approve minor Plan amendments, (6) to approve the admission of Participants to the Consortium, or (7) to dissolve the Consortium.

F. To be effective, Board actions must be approved by a vote of a majority of the Board at a meeting at which a simple majority of the Board is present.

Section 10. **Executive Committee**

A. The Consortium shall have an Executive Committee, which shall be appointed by the Board and consist of seven Board members, one of which shall be the Board Chair. The Board shall endeavor to appoint Executive Committee members in a manner that achieves geographic representation and representation from municipalities, special districts, and other types of entities that form the Consortium.

B. The Board Chair shall be the Chair of the Executive Committee.

C. The Executive Committee shall serve to assist the Board in more timely and meaningful policy action as outlined in the Bylaws.

D. The Executive Committee shall at no time act on behalf of the Board unless specifically authorized by the Board to do so as provided in Section 9.E.

E. Except for the Board Chair, the term for each Executive Committee member shall be two years, and individuals may serve consecutive terms if re-appointed.

F. To be effective, Executive Committee actions must be approved by a vote of a majority of the Executive Committee at a meeting at which a simple majority of the Executive Committee is present.

Section 11. Technical Committee

A. The Consortium shall have a Technical Committee, which shall be made up of one staff representative appointed by each Full Member. Each Full Member shall also appoint an alternate Technical Committee representative to serve when the primary representative cannot. Provided, however, that if the Technical Committee Chair does not attend a meeting, the Vice Chair shall assume the Chair's duties rather than the Chair's alternate.

B. On an annual basis, the Technical Committee shall elect a Chair and Vice Chair.

C. The Technical Committee shall advise and provide assistance to the Board on any matters falling within the Consortium's purview under this Agreement, and may act upon Board delegation of authority as provided in Section 9.E.

D. The Technical Committee under the provisions of any agreement or contract to provide staff shall advise Consortium staff and assume the responsibility to draft proposed work plans, budgets, annual and other reports, plan amendments, and implementation proposals for submission to the Board or Executive Committee as appropriate.

E. To be effective, Technical Committee actions must be approved by a vote of a majority of the Technical Committee at a meeting at which a simple majority of the Technical Committee is present.

Section 12. Dispute Resolution

It is the intention of the Participants to limit the issues available for dispute resolution. The issues raised must be related to interpretation of the express terms of this Agreement. No issues related to water supply development or program development by individual Participants may be raised.

Any such dispute shall, if possible, be resolved through the use of a mandatory, but non-binding dispute resolution mechanism established by the Board through the Bylaws.

Section 13. Duration and Dissolution

This Agreement shall remain in effect, subject to the following: (1) any Participant may withdraw at any time as provided in Section 6.D. of this Agreement; (2) should all but one Participant withdraw, the Agreement shall end and the Consortium shall be dissolved; (3) the Agreement may be ended and the Consortium dissolved by a vote of the Board; (4) remaining funds shall be distributed in accordance with the Bylaws.

Section 14. Legal Liability

Participants agree to share any costs or damages, including reasonable attorney's fees, from third party actions against the Consortium. The obligation shall apply to any entity that was a Participant in the Consortium at the time the liability arose or the cause of action accrued. Payment obligations shall be proportional to the dues of each entity. Participants agree to assist and cooperate in the defense of such an action. Settlement of any action that would impose an obligation to pay upon the Participants under this provision must be approved by a majority of the Board. The obligations of a Participant under this Section 13 shall survive that Participant's withdrawal from the Consortium, termination of this Agreement, or dissolution of the Consortium.

Section 15. Oregon Law and Forum

A. This Agreement shall be construed according to the law of the State of Oregon.

B. Any litigation between the Participants under this Agreement or arising out of work performed under this Agreement shall occur, if in the state courts, in the Multnomah County Court having jurisdiction thereof, and if in the federal courts, in the United States District Court for the District of Oregon.

Section 16. Public Notification

The Board, the Executive Committee, and the Technical Committee shall be deemed public bodies for purposes of Oregon's public meeting laws as provided by ORS Chapter 192. Other committees or sub-committees are subject to ORS Chapter 192 only as applicable.

Section 17. Agreement Amendment

Amendments to this Agreement shall be recommended by the Board and shall be effective when authorized by the governing body of every Participant.

Section 18. **Indemnification**

Subject to the conditions and limitations of the Oregon Constitution, Article XI, Section 7, and Oregon Tort Claims Act, ORS 30.260 through 30.300, each Participant shall indemnify, defend, and hold harmless the Consortium and other Participants from and against all liability, loss, and costs arising out of or resulting from the negligent or intentionally wrongful acts of the indemnifying Participant, their governing bodies, officers, employees, and agents in the performance of this Agreement.

Section 19. **Severability**

If any term or provision of this Agreement is declared by a court of competent jurisdiction to be illegal or in conflict with any law, the validity of the remaining terms and provisions shall not be affected, and the rights and obligations of the parties shall be construed and enforced as if the Agreement did not contain the particular term or provision held to be invalid.

Section 20. **No Third-party Beneficiaries**

The Participants are the only parties to this Agreement and as such are the only parties entitled to enforce its terms. Nothing contained in this Agreement gives or shall be construed to give or provide any benefit, direct, indirect, or otherwise to third parties unless third persons are expressly described as intended to be beneficiaries of its terms.

Section 21. **Merger Clause**

This Agreement constitutes the entire agreement between the Participants. No waiver, consent, modification or change of terms of this Agreement shall bind a Participant unless in writing and signed by the affected Participants. Such waiver, consent modification or change, if made, shall be effective only in the specific instance and for the specific purpose given. There are no understandings, agreements, or representations, oral or written, not specified herein regarding this Agreement.

Section 22. **Counterparts**

This Agreement may be signed in counterparts, each of which shall be deemed an original, and which, when taken together, shall constitute one and the same Agreement.

The Participants agree that any Participant may execute this Agreement, including any Agreement amendments, by electronic means, including the use of electronic signatures.

AMENDED AND RESTATED REGIONAL WATER PROVIDERS CONSORTIUM INTERGOVERNMENTAL AGREEMENT

IN WITNESS WHEREOF, the signatory hereby causes this agreement to be executed.

Oak Lodge Water Services

By: _____

Title: Board Chair

Print Name: Susan Keil

Contact Person: Sarah Jo A. Chaplen, General Manager

Dated: _____

Address: 14496 SE River Rd. Oak Grove, OR 97267

Send signed agreement to Patty Burk patty.burk@portlandoregon.gov or mail to:
Portland Water Bureau
Attn: Patty Burk
1120 SW 5th Ave. Suite 405
Portland, OR 97204

OAK LODGE WATER SERVICES

STAFF REPORT

To	Board of Directors
From	Gail Stevens, Finance Director
Title	Consideration of Resolution No. 2023-0023 Approving a FY 2023-2024 Budget Transfer
Item No.	8
Date	November 21, 2023

Summary

A budget transfer is necessary to transfer appropriations within the fiscal year 2023-2024 adopted budget and provide for compliance with Oregon Local Budget Law. The budget amendment resolution is proposed to address budget line items variances. Appropriations will only be transferred from continency, where noted below, within the respective funds to offset identified additional costs.

Fiscal year to date expenditures have been reviewed to determine accounts that are projected higher that the current budget. For accounts projected higher, either:

1. Funds will be redistributed between budget lines within the Fund and Division, with no impact to Contingency.
2. Funds will be transferred from Contingency within the same Fund. This is only for under-budgeted accounts, unanticipated cost increases or unplanned costs.

The following amended line items included in this request are:

Fund	Account	Account Name	Description	Requested Budget	Current Budget	Transfer Amount	Source
			Administrative Services Fund				
05.01.	5130	Overtime	Finance / Accounting staff OT overage	7,500	5,000	2,500	Contingency
			Wastewater Reclamation Fund				
20.21.	5130	Overtime	WTP staff actual OT overage	50,000	43,000	7,000	Contingency
20.21.	6760	Equipment Rental	Aerzen blower & Forklift rental extended	25,000	10,000	15,000	Contingency
20.22.	5130	Overtime	Collections staff actual OT overage	28,500	22,000	6,500	Contingency
			Waterwater Capital Fund - Treatment Plant				
72.21.	7520	Equipment	Laundry Facilities - Electrical	60,000	25,000	35,000	Transfer
72.21.	7300	Buildings & Improvements	Postpone VFD	655,000	690,000	(35,000)	Transfer

Background

Total appropriations within the OLWS' adopted budget will remain the same; however, to comply with Oregon Local Budget Law, a resolution is needed to transfer between categories (ORS294.463(1)). The attached resolution will transfer appropriations between contingency, personnel services, materials and services and capital outlay within the identified funds.

Recommendation

It is recommended the Board approve Resolution No. 2023-0023 Amending Fiscal Year 2023-2024 Adopted Budget.

Suggested Board Motion

"I move to adopt Resolution No. 2023-0023 amending the Fiscal Year 2023-2024 Adopted Budget as presented."

Attachments

1. Resolution No. 2023-0023

OAK LODGE WATER SERVICES

RESOLUTION NO. 2023-0023

A RESOLUTION AUTHORIZING A BUDGET TRANSFER IN THE FISCAL YEAR 2023-2024 ADOPTED BUDGET.

WHEREAS, the Oak Lodge Water Services Authority (the "Authority") Board of Directors (the "Board") serves as the governing body of the Authority;

WHEREAS, the Authority Board of Directors adopted and made appropriations for the Fiscal Year 2023-2024 Budget; and

WHEREAS, subsequent to budget adoption, either costs exceeded budget, or the account was missing necessary and appropriate budget on the lines within the fund; and

WHEREAS, budgeted contingency in OLWS' Administrative Services, Drinking Water, Wastewater Reclamation, Watershed Protection, Wastewater Capital, and Watershed Protection Capital funds exists in amounts sufficient to cover the additional costs; and

WHEREAS, ORS 294.463 allows the Board of Directors to authorize a transfer of appropriations within funds by resolution, so long as the contingency appropriation transfers in aggregate are less than 15% of the total appropriations of the fund containing the original adopted budget.

NOW, THEREFORE, BE IT RESOLVED BY THE OAK LODGE WATER SERVICES BOARD OF DIRECTORS:

Section 1. The Board of Directors of the Oak Lodge Water Services Authority authorizes the following budget transfers and revisions to the Fiscal Year 2023-2024 Adopted Budget as follows:

FUND		Adopted Budget	Change	Amended Budget 09/2023
05	**Administrative Services Fund**			
	Personnel Services	2,602,000	2,500	2,604,500
	Materials & Services	2,436,200		2,436,200
	Contingency	677,092	(2,500)	674,592
	Total Appropriation	**5,715,292**	**-**	**5,715,292**

20	**Wastewater Reclamation Fund**			
	Personnel Services- Treatment	1,876,000	13,500	1,889,500
	Materials & Services-Collections	1,313,600	15,000	1,328,600
	Transfers	8,712,000		8,712,000
	Contingency	693,588	(28,500)	665,088
	Total Appropriation	**12,595,188**	**-**	**12,595,188**
72	**Wastewater Reclamation Capital Fund**			
	Capital Outlay	5,585,000	-	5,585,000
	Contingency	653,800		653,800
	Total Appropriation	**6,238,800**	**-**	**6,238,800**
	Change in contingency		**(31,000)**	

INTRODUCED AND ADOPTED THIS 21st DAY OF NOVEMBER 2023.

OAK LODGE WATER SERVICES

By _____ By _____

Susan Keil, Chair Kevin Williams, Vice-Chair

OAK LODGE WATER SERVICES

STAFF REPORT

To	Board of Directors
From	Brad Albert, Public Works Director/District Engineer
Title	Consideration of Purchase of Five Yard Dump Truck
Item No.	9
Date	November 21, 2023

Summary

Staff is seeking to authorize the General Manager to purchase one 5-yard dump truck for use in the Water Distribution Division, replacing an ageing (26-year-old) 5-yard dump truck which is not emissions compliant.

Background

HB 2007 (2019) established deadlines, after which certain older model diesel engine vehicles cannot be titled or registered in Clackamas, Multnomah and Washington Counties. The first phase is effective Jan. 1, 2023, and includes vehicles equipped with a 1996 or older diesel engine.

The Water Distribution division currently owns and operates a 1997 GMC 5-yard dump truck. The engine model year of the dump truck is a 1996 which falls into the first phase of the State of Oregon's diesel phase out or retrofit program. The cost to retrofit is prohibitive give the dump truck is a 27-year-old asset and has been used extensively. Also, if retrofitted DEQ needs to approve of the retrofit strategy and provide annual visual and smoke inspection results performed by an approved retrofit installer.

The purchase of this 5-yard dump truck utilized the State or Oregon buyers guide for fleet vehicles. This is a State of Oregon Department of Administrative Services procurement that has price agreements for goods that local agencies can 'piggyback' purchases. OLWS reviewed the buyer's guide pricing in conjunction with Sourcewell pricing and found the State of Oregon price agreement was more favorable on this purchase.

Past Board Actions

June 2023 The Board of Directors adopted the FY 2023-24 Budget, which appropriated funds in Fund 71 Drinking Water Capital Fund. Included within the fund is the 5-yard dump truck in the amount of $150,000.

Budget

Funding for the 5-yard dump truck is included in FY 2023-24 Adopted Budget within the Drinking Water Capital Fund 71.

Recommendation

Staff recommends approval of the purchase of one 5-yard dump truck from Peterson Trucks based on the quote provided.

Suggested Board Motion

"I move to authorize the General Manager to accept the Peterson Trucks quote and approve the purchase of one 5-yard dump truck from Peterson Trucks in the amount of $145,658.55."

Attachments

1. Peterson Trucks' Quote

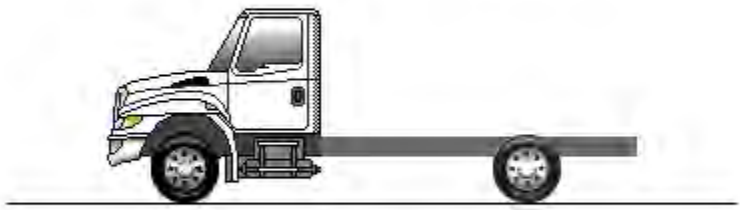
Prepared For:
OAK LODGE WATER DISTRICT
RYAN HUNTER
14496 S.E. RIVER RD.
MILWAUKIE, OR 97267-
(503)654 - 7765
Reference ID: 5-YrdDmp-L9

Presented By:
PETERSON TRUCKS, INC
Barney Newman
61 NE COLUMBIA BLVD.
PORTLAND OR 97211 - 1413
(503)285-9300

Thank you for the opportunity to provide you with the following quotation on a new International truck. I am sure the following detailed specification will meet your operational requirements, and I look forward to serving your business needs.

Note: Due to unprecedented pandemic related component shortages commodity prices are constantly fluctuating and our quotation includes any surcharges we have on record currently but we reserve the right to adjust pricing to include future potential surcharges -if implemented- by manufacturer .

PURCHASING USING OUR STATE OF OREGON PURCHASE AGREEMENT #1641



Model Profile
2025 MV607 SBA (MV607)

AXLE CONFIG:	4X2
APPLICATION:	Construction Dump
MISSION:	Requested GVWR: 33000. Calc. GVWR: 33000. Calc. GCWR: 60000 Calc. Start / Grade Ability: 44.55% / 3.29% @ 55 MPH
DIMENSION:	Wheelbase: 169.00, CA: 101.90, Axle to Frame: 55.00
ENGINE, DIESEL:	{Cummins L9 300} EPA 2024, 300HP @ 2200 RPM, 860 lb-ft Torque @ 1200 RPM, 2200 RPM Governed Speed, 300 Peak HP (Max)
TRANSMISSION, AUTOMATIC:	{Allison 3500 RDS} 6th Generation Controls, Wide Ratio, 6-Speed with Double Overdrive, with PTO Provision, Less Retarder, Includes Oil Level Sensor, with 80,000-lb GVW and GCW Max, On/Off Highway
CLUTCH:	Omit Item (Clutch & Control)
AXLE, FRONT NON-DRIVING:	{Meritor MFS-12-122A} I-Beam Type, 12,000-lb Capacity
AXLE, REAR, SINGLE:	{Dana Spicer 21060D} Single Reduction, 21,000-lb Capacity, Driver Control Locking Differential, R Wheel Ends Gear Ratio: 6.17
CAB:	Conventional, Day Cab
TIRE, FRONT:	(2) 11R22.5 Load Range G HSR 3 (CONTINENTAL), 494 rev/mile, 75 MPH, All-Position
TIRE, REAR:	(4) 11R22.5 Load Range G HDR2+ (CONTINENTAL), 491 rev/mile, 75 MPH, Drive
SUSPENSION, REAR, SINGLE:	23,500-lb Capacity, Vari-Rate Springs, with 4500-lb Capacity Auxiliary Rubber Springs
PAINT:	Cab schematic 100WP Location 1: 9219, Winter White (Std)

Chassis schematic N/A

Code	Description
MV60700	Base Chassis, Model MV607 SBA with 169.00 Wheelbase, 101.90 CA, and 55.00 Axle to Frame.
1570	TOW HOOK, FRONT (2) Frame Mounted
1ANA	AXLE CONFIGURATION {Navistar} 4x2
	Notes : Pricing may change if axle configuration is changed.
1CAE	FRAME RAILS Heat Treated Alloy Steel (120,000 PSI Yield); 10.125" x 3.580" x 0.312" (257.2mm x 90.9mm x 8.0mm); 460.0" (11684mm) Maximum OAL
1LEG	LICENSE PLATE HOLDER Includes Upper & Lower Mounting Plate Hardware, Mounted in Existing Holes in Front Bumper
1LNG	BUMPER, FRONT Contoured, Steel, Painted Gloss Black
1WEH	WHEELBASE RANGE 134" (340cm) Through and Including 197" (500cm)
2ASC	AXLE, FRONT NON-DRIVING {Meritor MFS-12-122A} I-Beam Type, 12,000-lb Capacity
3ADC	SUSPENSION, FRONT, SPRING Parabolic Taper Leaf, Shackle Type, 12,000-lb Capacity, with Shock Absorbers
	Includes : SPRING PINS Rubber Bushings, Maintenance-Free
4091	BRAKE SYSTEM, AIR Dual System for Straight Truck Applications
	Includes : BRAKE LINES Color and Size Coded Nylon : DRAIN VALVE Twist-Type : GAUGE, AIR PRESSURE (2) Air 1 and Air 2 Gauges; Located in Instrument Cluster : PARKING BRAKE CONTROL Yellow Knob, Located on Instrument Panel : PARKING BRAKE VALVE For Truck : QUICK RELEASE VALVE On Rear Axle for Spring Brake Release: 1 for 4x2, 2 for 6x4 : SPRING BRAKE MODULATOR VALVE R-7 for 4x2, SR-7 with relay valve for 6x4/8x6
4619	TRAILER CONNECTIONS Four-Wheel, with Hand Control Valve and Tractor Protection Valve, for Straight Truck
	Notes : When electronic stability control is ordered with trailer connections on a 4x2 truck, please check the operator manual for trailer weight restrictions.
4AZA	AIR BRAKE ABS {Bendix AntiLock Brake System} 4-Channel (4 Sensor/4 Modulator) Full Vehicle Wheel Control System
4EDN	AIR DRYER {Bendix AD-9SI} with Heater, Includes Safety Valve
4EXU	BRAKE CHAMBERS, REAR AXLE {Bendix EverSure} 30/30 SqIn Spring Brake
4EXV	BRAKE CHAMBERS, FRONT AXLE {Bendix} 24 SqIn
4GBM	BRAKE, PARKING Manual Push-Pull Pneumatic Parking Brake
4LAG	SLACK ADJUSTERS, FRONT {Gunite} Automatic
4LGG	SLACK ADJUSTERS, REAR {Gunite} Automatic
4SPA	AIR COMPRESSOR {Cummins} 18.7 CFM
4VKJ	AIR TANK LOCATION (2) Mounted Under Battery Box, Outside Left Rail, Back of Cab, Perpendicular to Rail
4VLE	AIR DRYER LOCATION Mounted Inside Engine Compartment, Right Side
4WDM	DUST SHIELDS, REAR BRAKE for Air Cam Brakes

Code	Description
4WWZ	DRAIN VALVE (3) with Pull Chains for Air Tanks
4XDP	BRAKES, FRONT {Meritor 16.5X5 Q-PLUS CAST} Air S-Cam Type, Cast Spider, Fabricated Shoe, Double Anchor Pin, Size 16.5" X 5", 14,700-lb Capacity
4XDR	BRAKES, REAR {Meritor 16.5X7 Q-PLUS CAST} Air S-Cam Type, Cast Spider, Fabricated Shoe, Double Anchor Pin, Size 16.5" X 7", 23,000-lb Capacity per Axle
5710	STEERING COLUMN Tilting and Telescoping
5CAW	STEERING WHEEL 4-Spoke; 18" Dia., Black
5PSA	STEERING GEAR {Sheppard M100} Power
6DGB	DRIVELINE SYSTEM {Dana Spicer} SPL140, for 4x2/6x2
7BEV	AFTERTREATMENT COVER Steel, Black
7BLW	EXHAUST SYSTEM Horizontal Aftertreatment System, Frame Mounted Right Side Under Cab, for Single Vertical Tail Pipe, Frame Mounted Right Side Back of Cab
7SDP	ENGINE COMPRESSION BRAKE {Jacobs} for Cummins ISL/L9 Engines; with Selector Switch and On/Off Switch
7WBA	TAIL PIPE (1) Turnback Type, Bright
7WCM	EXHAUST HEIGHT 8' 10"
7WDN	MUFFLER/TAIL PIPE GUARD (1) Aluminum
8000	ELECTRICAL SYSTEM 12-Volt, Standard Equipment Includes : DATA LINK CONNECTOR For Vehicle Programming and Diagnostics In Cab : HAZARD SWITCH Push On/Push Off, Located on Instrument Panel to Right of Steering Wheel : HEADLIGHT DIMMER SWITCH Integral with Turn Signal Lever : PARKING LIGHT Integral with Front Turn Signal and Rear Tail Light : STARTER SWITCH Electric, Key Operated : STOP, TURN, TAIL & B/U LIGHTS Dual, Rear, Combination with Reflector : TURN SIGNAL SWITCH Self-Cancelling for Trucks, Manual Cancelling for Tractors, with Lane Change Feature : TURN SIGNALS, FRONT Includes Reflectors and Auxiliary Side Turn Signals, Solid State Flashers; Flush Mounted : WINDSHIELD WIPER SWITCH 2-Speed with Wash and Intermittent Feature (5 Pre-Set Delays), Integral with Turn Signal Lever : WINDSHIELD WIPERS Single Motor, Electric, Cowl Mounted : WIRING, CHASSIS Color Coded and Continuously Numbered
8518	CIGAR LIGHTER Includes Ash Cup
8540	HORN, ELECTRIC (2) Trumpet Style
8GHU	ALTERNATOR {Delco Remy 28SI} Brush Type, 12 Volt, 200 Amp Capacity, Pad Mount, with Remote Sense
8HAB	BODY BUILDER WIRING Back of Day Cab at Left Frame or Under Sleeper, Extended or Crew Cab at Left Frame; Includes Sealed Connectors for Tail/Amber Turn/Marker/ Backup/Accessory Power/Ground and Sealed Connector for Stop/Turn
8HAH	ELECTRIC TRAILER BRAKE/LIGHTS Accommodation Package to Rear of Frame; for Combined Trailer Stop, Tail, Turn, Marker Light Circuits; Includes Electric Trailer Brake Accommodation Package with Cab Connections for Mounting Customer Installed Electric Brake Unit, Less Trailer Socket
8MSG	BATTERY SYSTEM {Fleetrite} Maintenance-Free, (3) 12-Volt 1980CCA Total, Top Threaded Stud

Code	Description
8RMH	BATTERY DISCONNECT SWITCH {Cole-Hersee 75920-06} 300 Amp, Disconnects Charging Circuits, Locks with Padlock, Battery Box Mounted
8RMZ	SPEAKERS (2) 6.5" Dual Cone Mounted in Both Doors, (2) 5.25" Dual Cone Mounted in Both B-Pillars
8RPB	RADIO, AUXILIARY CONTROLS Mounted in Steering Wheel, Radio Function Control Switch, Includes Volume Up/Down, Mute, Forward/Back and Bluetooth Answer/Disconnect
8RPP	ANTENNA Shark Fin, Roof Mounted
8RPS	RADIO AM/FM/WB/Clock/Bluetooth/USB Input/Auxiliary Input
8THB	BACK-UP ALARM Electric, 102 dBA
8TKK	TRAILER AUXILIARY FEED CIRCUIT for Electric Trailer Brake Accommodation/Air Trailer ABS; with 30 Amp Fuse and Relay, Controlled by Ignition Switch
8VUL	BATTERY BOX Steel, with Plastic Cover, 18" Wide, 2-4 Battery Capacity, Mounted Left Side Back of Cab
8WPH	CLEARANCE/MARKER LIGHTS (5) {Truck Lite} Amber LED Lights, Flush Mounted on Cab or Sunshade
8WPZ	TEST EXTERIOR LIGHTS Pre-Trip Inspection will Cycle all Exterior Lamps Except Back-up Lights
8WRB	HEADLIGHTS ON W/WIPERS Headlights Will Automatically Turn on if Windshield Wipers are turned on
8WTK	STARTING MOTOR {Delco Remy 38MT Type 300} 12 Volt, Less Thermal Over-Crank Protection
8WWJ	INDICATOR, LOW COOLANT LEVEL with Audible Alarm
8XAH	CIRCUIT BREAKERS Manual-Reset (Main Panel) SAE Type III with Trip Indicators, Replaces All Fuses
8XHN	HORN, AIR Single Trumpet, Black, with Lanyard Pull Cord
8XNZ	HEADLIGHTS Halogen, with Daytime Running Lights
8XPN	USB PORT One USB-A Port and One USB-C Port, Located in Instrument Panel
9AAB	LOGOS EXTERIOR Model Badges
9AAE	LOGOS EXTERIOR, ENGINE Badges
9HAN	INSULATION, UNDER HOOD for Sound Abatement
9HBN	INSULATION, SPLASH PANELS for Sound Abatement
9HCW	GRILLE Molded in Black
9WBN	FENDER EXTENSIONS Painted
9WBW	FRONT END Tilting, Fiberglass, with Three Piece Construction, Dual Air Intakes
9WBZ	BUG SCREEN Mounted Behind Grille and Bumper Grille
10060	PAINT SCHEMATIC, PT-1 Single Color, Design 100
	Includes : PAINT SCHEMATIC ID LETTERS "WP"
10761	PAINT TYPE Base Coat/Clear Coat, 1-2 Tone
10AGB	COMMUNICATIONS MODULE Telematics Device with Over the Air Programming; Includes Five Year Data Plan and International 360
10SLV	PROMOTIONAL PACKAGE Government Silver Package
10UAG	VEHICLE REGISTRATION IDENTITY ID for Other State
	Notes

Code	Description
	: CANNOT BE REGISTERED IN CALIFORNIA. For vehicles that will be registered in States other than California.
10WBS	KEYS - ALL ALIKE, ADDITIONAL 2 Keys
10WCY	SAFETY TRIANGLES
10XAP	FIRE EXTINGUISHER BRACKET Mounted Left Side Driver Seat
11001	CLUTCH Omit Item (Clutch & Control)
12703	ANTI-FREEZE Red, Extended Life Coolant; To -40 Degrees F/ -40 Degrees C, Freeze Protection
12849	BLOCK HEATER, ENGINE 120V/1000W, for Cummins ISB/B6.7/ISL/L9 Engines
	Includes : BLOCK HEATER SOCKET Receptacle Type; Mounted below Drivers Door
12EYW	ENGINE, DIESEL {Cummins L9 300} EPA 2024, 300HP @ 2200 RPM, 860 lb-ft Torque @ 1200 RPM, 2200 RPM Governed Speed, 300 Peak HP (Max)
12THT	FAN DRIVE {Horton Drivemaster} Two-Speed Type, Direct Drive, with Residual Torque Device for Disengaged Fan Speed
	Includes : FAN Nylon
12VCE	AIR CLEANER Single Element, Fire Retardant Media
12VJS	EMISSION, CALENDAR YEAR {Cummins L9} EPA, OBD and GHG Certified for Calendar Year 2024
12VXT	THROTTLE, HAND CONTROL Engine Speed Control; Electronic, Stationary, Variable Speed; Mounted on Steering Wheel
12WVG	EPA IDLE COMPLIANCE Low NOx Idle Engine, Complies with EPA Clean Air Regulations; Includes "Certified Clean Idle" Decal on Hood
12WZJ	CARB IDLE COMPLIANCE Low NOx Idle Engine, Complies with California Clean Air Regulations; Includes "Certified Clean Idle" Decal located on Driver Door
12WZY	CARB EMISSION WARR COMPLIANCE for Cummins L9 Engines
12XBM	ENGINE CONTROL, REMOTE MOUNTED Provision for; Includes Wiring for Body Builder Installation of PTO Controls and Starter Lockout, with Ignition Switch Control, for Cummins B6.7 and L9 Engines
12XCA	RADIATOR Aluminum, 3-Row, Down Flow, Front to Back System, 837 SqIn Louvered, with 477 SqIn Charge Air Cooler, Includes In-Tank Oil Cooler
13BDR	TRANSMISSION, AUTOMATIC {Allison 3500 RDS} 6th Generation Controls, Wide Ratio, 6-Speed with Double Overdrive, with PTO Provision, Less Retarder, Includes Oil Level Sensor, with 80,000-lb GVW and GCW Max, On/Off Highway
13WET	TRANSMISSION SHIFT CONTROL Column Mounted Stalk Shifter, Not for Use with Allison 1000 & 2000 Series Transmission
13WLP	TRANSMISSION OIL Synthetic; 29 thru 42 Pints
13WUC	ALLISON SPARE INPUT/OUTPUT for Rugged Duty Series (RDS) and Regional Haul Series (RHS), General Purpose Trucks, Construction, Package Number 223
13WVV	NEUTRAL AT STOP Allison Transmission Shifts to Neutral When Service Brake is Depressed and Vehicle is at Stop; Remains in Neutral Until Service Brake is Released
13WYU	SHIFT CONTROL PARAMETERS {Allison} 3000 or 4000 Series Transmissions, Performance Programming
13XAL	PTO LOCATION Customer Intends to Install PTO at Left Side of Transmission

Code	Description
14AKW	AXLE, REAR, SINGLE {Dana Spicer 21060D} Single Reduction, 21,000-lb Capacity, Driver Control Locking Differential, R Wheel Ends . Gear Ratio: 6.17
14VAH	SUSPENSION, REAR, SINGLE 23,500-lb Capacity, Vari-Rate Springs, with 4500-lb Capacity Auxiliary Rubber Springs
14WMN	AXLE, REAR, LUBE {EmGard FE-75W-90} Synthetic Oil; 1 thru 29.99 Pints
15LMN	FUEL/WATER SEPARATOR {Racor 400 Series,} 12 VDC Electric Heater, Includes Pre-Heater, with Primer Pump, Includes Water-in-Fuel Sensor
15LRE	LOCATION FUEL/WATER SEPARATOR Mounted Under Hood, Left Side, Above Front Axle
15SRE	FUEL TANK Top Draw, Non-Polished Aluminum, D-Style, 19" Tank Depth, 50 US Gal (189L), Mounted Left Side, Under Cab
15WDG	DEF TANK 7 US Gal (26L) Capacity, Frame Mounted Outside Left Rail, Under Cab
16030	CAB Conventional, Day Cab
	Includes : CLEARANCE/MARKER LIGHTS (5) Flush Mounted
16BAM	AIR CONDITIONER with Integral Heater and Defroster
16GEG	GAUGE CLUSTER Premium Level; English with English Electronic Speedometer
	Includes : GAUGE CLUSTER DISPLAY: Base Level (3" Monochromatic Display), Premium Level (5" LCD Color Display); Odometer, Voltmeter, Diagnostic Messages, Gear Indicator, Trip Odometer, Total Engine Hours, Trip Hours, MPG, Distance to Empty/Refill for : GAUGE CLUSTER Speedometer, Tachometer, Engine Coolant Temp, Fuel Gauge, DEF Gauge, Oil Pressure Gauge, Primary and Secondary Air Pressure or Auxiliary Air Pressure (if Air Equipped) : WARNING SYSTEM Low Fuel, Low DEF, Low Oil Pressure, High Engine Coolant Temp, Low Battery Voltage (Visual and Audible), Low Air Pressure, Primary and Secondary (if Air Equipped)
16HGH	GAUGE, OIL TEMP, AUTO TRANS for Allison Transmission
16HGL	GAUGE, OIL TEMP, REAR AXLE
16HGN	GAUGE, AIR APPLICATION
16HKT	IP CLUSTER DISPLAY On Board Diagnostics Display of Fault Codes in Gauge Cluster
16JNT	SEAT, DRIVER {National 2000} Air Suspension, High Back with Integral Headrest, Vinyl, Isolator, 1 Chamber Lumbar, with 2 Position Front Cushion Adjust, -3 to +14 Degree Angle Back Adjust
16SGH	GRAB HANDLE, EXTERIOR (2) Chrome, for Cab Entry, (1) Towel Bar Type, with Anti-Slip Rubber Inserts Mounted Left Side at B-Pillar, (1) Towel Bar Type Mounted Right Side on Vertical Exhaust
16SMN	SEAT, PASSENGER {National} Non Suspension, High Back, Fixed Back, Integral Headrest, Vinyl
16SNT	MIRRORS (2) Aero Pedestal, Power Adjust, Heated, Turn Signals, Black Heads and Arms, 6.5" x 14" Flat Glass, Includes 6.5" x 6" Convex Mirrors, for 102" Load Width
	Notes : Mirror Dimensions are Rounded to the Nearest 0.5"
16SNW	MIRROR, CONVEX, LOOK DOWN Right Side, Black, 6" x 10.5"
16VKK	CAB INTERIOR TRIM Diamond, for Day Cab
	Includes : CONSOLE, OVERHEAD Molded Plastic with Dual Storage Pockets, Retainer Nets and CB Radio Pocket; Located Above Driver and Passenger

Code	Description
	: DOME LIGHT, CAB Door Activated and Push On-Off at Light Lens, Timed Theater Dimming, Reading Lights; Integral to Overhead Console, Center Mounted : SUN VISOR (3) Padded Vinyl; 2 Moveable (Front-to-Side) Primary Visors, Driver Side with Vanity Mirror and Toll Ticket Strap, plus 1 Auxiliary Visor (Front Only), Driver Side
16VLK	CAB REAR SUSPENSION Air Suspension, for Mid Cab Height
16WBY	ARM REST, RIGHT, DRIVER SEAT
16WHJ	HOSE CLAMPS, HEATER HOSE {Breeze} Belleville Washer Type
16WJU	WINDOW, POWER (2) and Power Door Locks, Left and Right Doors, Includes Express Down Feature
16WLM	HOURMETER, PTO for Customer Provided PTO; with Indicator Light and Hourmeter in Gauge Cluster Includes Return Wire for PTO Feedback Switch
16WLS	FRESH AIR FILTER Attached to Air Intake Cover on Cowl Tray in Front of Windshield Under Hood
16XJP	INSTRUMENT PANEL Wing Panel
16ZBT	ACCESS, CAB Steel, Driver & Passenger Sides, Two Steps per Door, for use with Day Cab and Extended Cab
27DUK	WHEELS, FRONT {Accuride 29169} DISC; 22.5x8.25 Rims, Powder Coat Steel, 5-Hand Hole, 10-Stud, 285.75mm BC, Hub-Piloted, Flanged Nut, with .472" Thick Increased Capacity Disc and Steel Hubs
28DUK	WHEELS, REAR {Accuride 29169} DUAL DISC; 22.5x8.25 Rims, Powder Coat Steel, 5-Hand Hole, 10-Stud, 285.75mm BC, Hub-Piloted, Flanged Nut, with .472" Thick Increased Capacity Disc and Steel Hubs
29WLK	WHEEL BEARING, FRONT, LUBE {EmGard FE-75W-90} Synthetic Oil
60AAG	BDY INTG, REMOTE POWER MODULE Mounted Inside Cab Behind Driver Seat, Up to 6 Outputs & 6 Inputs, Max 20 amp per Channel, Max 80 amp Total; Includes 1 Switch Pack with Latched Switches
60AKG	BDY INTG, PTO ACCOMMODATION for (3) Latched Rocker Switches, (1) PTO Switch, (2) Generic Switches to Control (3) 30 amp relays, with Programmable Interlocks, for Body Builder Hook up in the Engine Compartment Left Side, Recommended for Automatic Transmissions
7372135439	(2) TIRE, FRONT 11R22.5 Load Range G HSR 3 (CONTINENTAL), 494 rev/mile, 75 MPH, All-Position
7372135444	(4) TIRE, REAR 11R22.5 Load Range G HDR2+ (CONTINENTAL), 491 rev/mile, 75 MPH, Drive
	Cab schematic 100WP
	Location 1: 9219, Winter White (Std)
	Chassis schematic N/A
	Services Section:
40129	WARRANTY Standard for MV Series, Effective with Vehicles Built July 1, 2017 or Later, CTS-2020A
40NSG	CARB COMPANION PLAN {Navistar} for CARB B6.7 and L9 Engines
	ENOVEN FURNISHED 5/7 YARD DUMP BODY PER QUOTE # 63150 DATED 10-10-2023 WITH ADDITION OF VIBRATOR ON BODY. PRICING OF ENOVEN QUOTE "INCLUDED" IN THIS PROPOSAL. ENOVEN QUOTE SENT FOR INFORMATION PURPOSES ONLY.

(US DOLLAR)

Description		Price
Net Sales Price:		$145,658.55
Memo Item(s):		
Total Federal Excise Tax	$0.00	
Note: Memo item(s) shown here are included in the above Net Sales Price.		

Please feel free to contact me regarding these specifications should your interests or needs change. I am confident you will be pleased with the quality and service of an International vehicle.

Approved by Seller:

Official Title and Date

Authorized Signature

Accepted by Purchaser:

Firm or Business Name

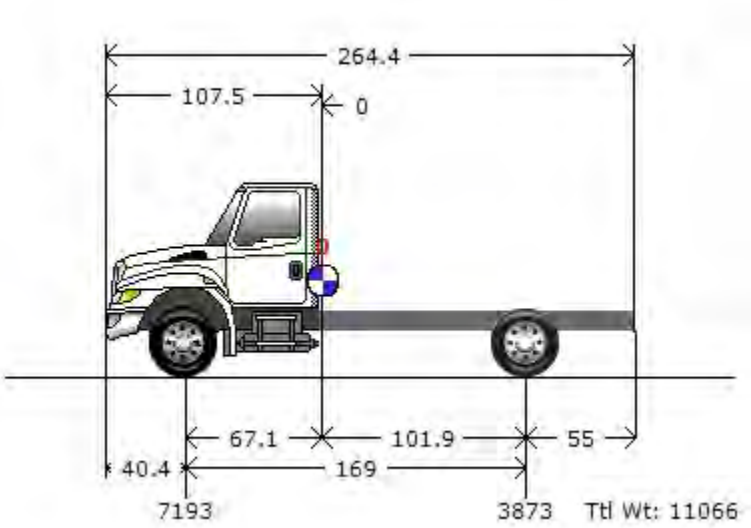
Authorized Signature and Date

This proposal is not binding upon the seller without Seller's Authorized Signature

Official Title and Date

The TOPS FET calculation is an estimate for reference purposes only. The seller or retailer is responsible for calculating and reporting/paying appropriate FET to the IRS.

The limited warranties applicable to the vehicles described herein are Navistar, Inc.'s standard printed warranties which are incorporated herein by reference and to which you have been provided a copy and hereby agree to their terms and conditions.



Graphics are provided as visual aids only and are not intended to represent the actual scale, shape, or color of the truck or its components. All weights are represented in lbs.

Truck		
Bumper to Axle	(BA)	40.4
Wheelbase	(WB)	169.00
Axle to Frame	(AF)	55.00
Axle to Back Cab	(ABC)	67.1
Cab to Axle	(CA)	101.9
Usable CA		101.9
CA Reduction Adjustment		0.00
Fuel-Diesel(Gals)		0
DEF(Gals)		0

Body/Trailer		
Body Length	(BL)	N/A

Chassis/Empty Weights	
Tractor Front Axle:	7,193
Tractor Rear Axle:	3,873

Payloads

Before the Cab			Cab			Chassis			Body			After the Body		
#	Weight	CG	#	Weight	CG	#	Weight	CG	#	Weight	CG	#	Weight	CG
						1	0	1						

Loads	
Payload Weight:	0
Driver:	0
Fuel-Diesel(Lbs):	0
DEF(Lbs):	0

Weight Distribution	
Total Front Axle:	7,193
Total Rear Axle:	3,873
Total Weight:	11,066

Weights and clearances in this proposal are estimates only. Navistar, Inc. is not liable for any consequences resulting from any differences between the estimated weights and clearances and the actual manufactured weights and clearances.

Weight Distribution

All weights are represented in lbs.

	Truck		
	Front	Rear	**Total**
Chassis Weight			
Chassis Weight:	7,193	3,873	**11,066**
Fuel:	0	0	**0**
DEF:	0	0	**0**
(Curb Weight):	**7,193**	**3,873**	**11,066**
Loads			
Payloads:	0	0	**0**
Driver:	0	0	**0**
Axle Totals (Gross Weight):	**7,193**	**3,873**	**11,066**

Weight Ratings

	Truck	
	Front	Rear
Axle(axle capacity)	12,000	21,000
Tire(tire capacity)	12,350	24,700
Suspension(suspension capacity)	12,000	23,500
Spring:	0	
Fed Bridge Law (axle spread):	20,000	20,000

Wheel Combination	**Load**	**Limit**
1 - 2	11,066	44,000

Federal Total Vehicle Weight Limit: 80,000

Maximum Gross Vehicle Weight Rating (GVWR) 33,000 - Gross Vehicle Weight(GVW) 11,066 = 21,934 Reserves

Weight Summary

* Distributed weights are within capacity limits

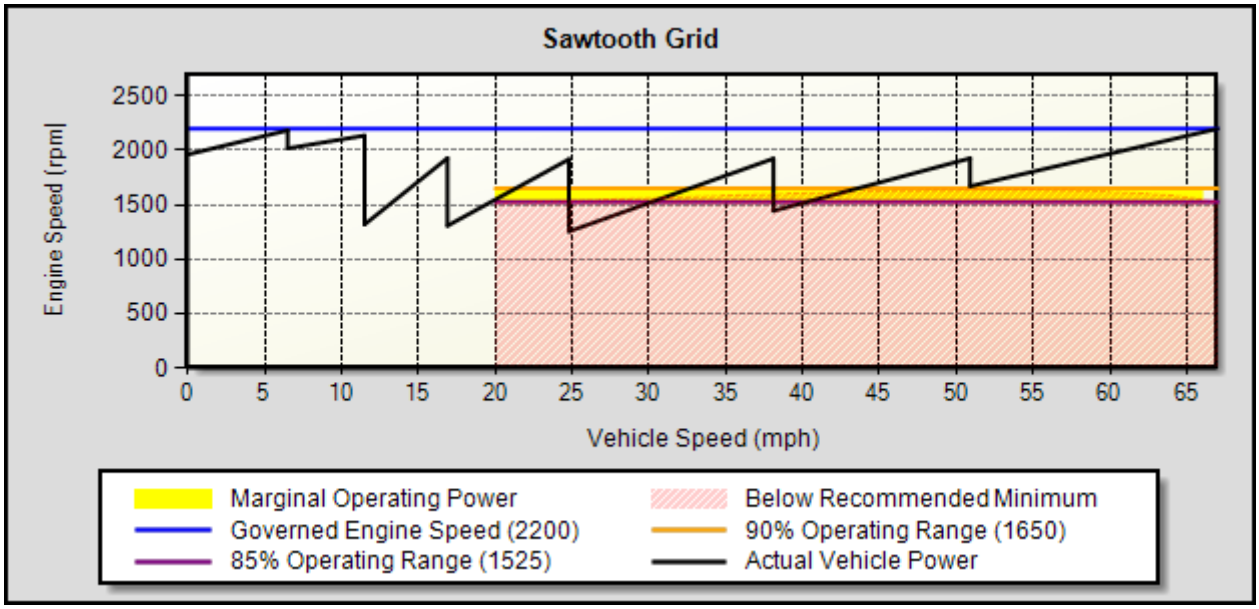
(0012EYW)
ATTACHMENTS: 0012VXT 0012THT 0007SDP

Parameter	Value	UOM
Max Accelerator Vehicle Speed	67	MPH
Road Speed Governor Upper Droop	3	MPH
Road Speed Governor Lower Droop	0.0	MPH
Max Engine Speed No Veh Speed Sensr	2184	RPM
Idle Speed Adjustment Enable	Y, ENABLE FEATURE OR FUNCTION	N/A
Low Idle Speed	750	RPM
Idle Shutdown Enable	N, DISABLE FEATURE OR FUNCTION	N/A
ISD Time Before Shutdown	15.0	MIN
ISD Percent Engine Loading	100	%
ISD In PTO	N, DISABLE FEATURE OR FUNCTION	N/A
ISD Manual Override	N, DISABLE FEATURE OR FUNCTION	N/A
ISD With Parking Brake Set	N, DISABLE FEATURE OR FUNCTION	N/A
ISD Ambient Temperature Override	N, DISABLE FEATURE OR FUNCTION	N/A
ISD Cold Ambient Air Temperature	30	F
ISD Intermediate Ambient Air Temp	40	F
ISD Hot Ambient Air Temperature	81	F
ISD Manual Override Inhibit Zone En	N, DISABLE FEATURE OR FUNCTION	N/A
ISD Hot Ambient Automatic Override	Y	N/A
ISD Engine Coolant Temp Threshold	53	F
Cruise Control Enable	Y, ENABLE FEATURE OR FUNCTION	N/A
CC Maximum Vehicle Speed	67	MPH
CC Save Set Speed	N, DISABLE FEATURE OR FUNCTION	N/A
CC Upper Droop	3.0	MPH
CC Lower Droop	0.0	MPH
CC Auto Resume	N, DISABLE FEATURE OR FUNCTION	N/A
Remote Accelerator Enable	N, DISABLE FEATURE OR FUNCTION	N/A
Remote Accelerator Mode	1, REMOTE ACCELERATOR PEDAL OR LEVER WITH TRANS VERIFICATION	N/A
PTO Enable	Y, ENABLE FEATURE OR FUNCTION	N/A
PTO In Cab Mode	Y, ENABLE FEATURE OR FUNCTION	N/A
Remote PTO Enable	N, DISABLE FEATURE OR FUNCTION	N/A
Remote Station PTO Enable	N, DISABLE FEATURE OR FUNCTION	N/A
PTO Max Engine Speed	1700	RPM
PTO Min Engine Speed	750	RPM
PTO Maximum Engine Load	800	LB-FT
PTO Max Vehicle Speed	5	MPH
PTO Accelerator Override	N, DISABLE FEATURE OR FUNCTION	N/A
PTO Accel Override Max Engine Speed	2400	RPM
PTO Clutch Override	N, DISABLE FEATURE OR FUNCTION	N/A
PTO Service Brake Override	Y, ENABLE FEATURE OR FUNCTION	N/A
PTO Parking Brake Interlock Mode	1, PTO PRK BRK INT TYPE SET TO CAB ONLY	N/A
PTO Transmission Neutral Interlock	Y, ENABLE FEATURE OR FUNCTION	N/A
PTO Eng Spd Limit w/VSS Limit	N, DISABLE FEATURE OR FUNCTION	N/A
PTO Ignore Vehicle Speed Sensor	N, DISABLE FEATURE OR FUNCTION	N/A
PTO Resume Switch Speed	925	RPM
PTO Set Switch Speed	850	RPM
PTO Additional Switch Speed	950	RPM
PTO Ramp Rate	250	RPM/SEC
Remote PTO Number of Speed Settings	1	N/A
Remote PTO Speed Setting 1	1000	RPM
Remote PTO Speed Setting 2	1200	RPM
Remote PTO Speed Setting 3	1400	RPM
Remote PTO Speed Setting 4	1400	RPM
Remote PTO Speed Setting 5	1500	RPM
Remote Station PTO Resume Sw Spd	1000	RPM

Remote Station PTO Set Switch Speed	1500	RPM
Remote Station PTO Addition Sw Spd	1500	RPM
Transmission Driven PTO	N, DISABLE FEATURE OR FUNCTION	N/A
Transmission Driven PTO Type	0, ENGINE DRIVEN STEADY LOAD	N/A
DPF Active Regen in PTO Mode	Y	N/A
Powertrain Protection Enable	N, DISABLE FEATURE OR FUNCTION	N/A
Max Torque Allow By Axle/Driveshaft	23602	LB-FT
Max Torque in Top Gear Range	2995	LB-FT
Max Torque in Int. Gear Range	2995	LB-FT
Max Torque in Low Gear Range	2995	LB-FT
Max Torque w/o Vehicle Speed	1475	LB-FT
Lowest Gear of Top Gear Range	2.00	N/A
Lowest Gear of Int. Gear Range	3.00	N/A
Lowest Gear of Low Gear Range	6.00	N/A
Engine Protection Shutdown	Y, ENABLE FEATURE OR FUNCTION	N/A
Engine Protection Restart Inhibit	Y, ENABLE FEATURE OR FUNCTION	N/A
Engine Prot Coolant Level Shutdown	N, DISABLE FEATURE OR FUNCTION	N/A
Trip Information Vehicle Ovrspeed1	74	MPH
Trip Information Vehicle Ovrspeed2	76	MPH
Maintenance Monitor Enable	N, DISABLE FEATURE OR FUNCTION	N/A
Maintenance Monitor Operating Mode	0, MAINTENANCE MONITOR AUTOMATIC MODE OF OPERATION	N/A
Maintenance Monitor Alert Percent	90	%
Maintenance Monitor Distance	15000	MILES
Maintenance Monitor Fuel	2000	GALLONS
Maintenance Monitor Time	500	HOURS
Maintenance Monitor Interval Factor	1.00	N/A
Master Password	000000	N/A
Adjustment Password	000000	N/A
Reset Password	000000	N/A

These Electronic Parameters have been successfully finalized

ENGINE/TRANSMISSION MATCHING



Sawtooth Details

Gear	Trans Ratio	Upshift Power Avail		Govern Power Avail		Peak Power Comparison			Warn Msg
		Veh Spd (MPH)	Eng Spd (RPM)	Veh Spd (MPH)	Eng Spd (RPM)	Gear Step (%)	85% Range (%)	90% Range (%)	
1C	4.59	0.0	1963	6.5	2185	N/A	44	33	
2C	2.26	6.5	2019	11.5	2137	N/A	44	33	
2L	2.26	11.5	1318	16.9	1930	N/A	44	33	
3L	1.53	16.9	1307	24.8	1919	N/A	44	33	
4L	1.00	24.8	1254	38.1	1925	N/A	44	33	
5L	0.75	38.1	1444	50.9	1928	N/A	44	33	
6L	0.65	50.9	1671	67.0	2200	N/A	44	33	

@ - WHEELSLIP CAN OCCUR AT THE GRADE SHOWN. THE VEHICLE IS CAPABLE OF INCREASED GRADEABILITY IF MORE WEIGHT IS PLACED ON THE DRIVE AXLES.

STEADY STATE PERFORMANCE

Performance Results	Gear	Veh Spd (mph)	Eng Spd (rpm)	Fuel Econ (mpg)	Grade (%)	Notes
LEVEL ROAD MAXIMUM SPEED	6L	69.0	2266	*****	0.00	
HI GEAR SPEED @ RATED RPM	6L	67.0	2200	*****	1.63	
55.0 MPH STEADY-STATE	6L	55.0	1805	*****	3.29	
TYPICAL OPERATING SPEED	6L	62.0	2035	*****	2.33	- Calculated Grade Ability/Fuel Economy

VEHICLE ORDER CODING ERRORS MAY RESULT IF THE "LEVEL ROAD MAX SPEED" VALUE EXCEEDS THE "HI GEAR SPEED @ RATED RPM" AND IS USED AS THE ENGINE PROGRAMMABLE VEHICLE SPEED LIMIT.

IF THE RESULTS CONTAIN " -----" , VEHICLE CANNOT ATTAIN THAT SPEED.

IF THE RESULTS CONTAIN "*****", THE ENGINE USED DOES NOT HAVE A FUEL MAP. FUEL ECONOMY CANNOT BE PREDICTED.

Recommendations / General Information

IDLE FUEL RATE : ***** GALS/HR @ 700.0 RPM
TORQUE CONVERTER : TC-418 STALL RATIO: 1.98

Fuel Economy Route: Normal Route - City, Suburban, and Highway

Key Fuel Economy Information	City	Suburban	Highway	Notes
MILES PER GALLON	*****	*****	*****	
AVERAGE MPH	19.1	39.9	54.6	
MISSION MINUTES	29.64	51.83	173.31	

IF THE RESULTS CONTAIN "*****", THE ENGINE USED DOES NOT HAVE A FUEL MAP. FUEL ECONOMY CANNOT BE PREDICTED.

GRADEABILITY PERFORMANCE

Enroute - Full Throttle Upshift Performance

Gear	Trans Ratio	Veh Spd (mph)	Eng Spd (rpm)	Whl Pwr (hp)	Grade (%)	Warn Msg	Notes
1C	4.59	0.0	1963	0.00	44.55	@	STALL
		3.8	2043	139.72	44.55	@	70% EFF
		5.0	2101	181.98	44.55	@	80% EFF
		6.5	2185	229.96	43.21		
2C	2.26	6.5	2019	167.78	30.03		
		11.5	2137	224.38	21.87		
2L	2.26	11.5	1318	193.31	18.62		
		16.9	1930	267.52	17.45		
3L	1.53	16.9	1307	191.84	12.19		
		24.8	1919	267.65	11.39		
4L	1.00	24.8	1254	183.69	7.50		
		38.1	1925	266.10	6.66		
5L	0.75	38.1	1444	208.03	4.92		
		50.9	1928	261.33	4.06		
6L	0.65	50.9	1671	235.69	3.49		
		67.0	2200	249.34	1.63		RATED RPM
		67.8	2226	216.95	1.00		
		68.4	2246	191.27	0.50		
		69.0	2266	165.09	0.00		LEVEL ROAD

STARTING / TOP GEAR PERFORMANCE

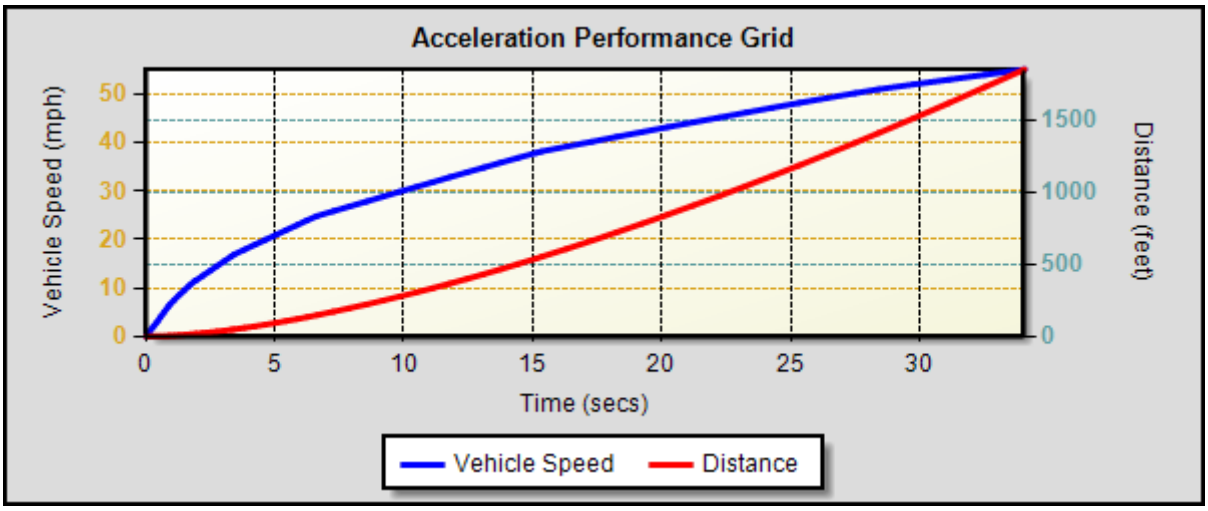
Gear	Trans Ratio	Veh Spd (mph)	Eng Spd (rpm)	Whl Pwr (hp)	Grade (%)	Warn Msg	Notes
1C	4.59	0.0		0.00	44.55	@	STALL
		5.0		181.98	44.55	@	80% EFF - Calculated Start Ability

@ - WHEELSLIP CAN OCCUR AT THE GRADE SHOWN. THE VEHICLE IS CAPABLE OF INCREASED GRADEABILITY IF MORE WEIGHT IS PLACED ON THE DRIVE AXLES.

THE TRANSMISSION WAS SIMULATED IN PERFORMANCE OPERATING MODE.

ACCELERATION PERFORMANCE RESULTS

Acceleration Performance Grid



Acceleration Performance: TIME TO ACCELERATE ON A GRADE TO 55.0 (MPH) IS 34.08 (SECS)

Acceleration Performance Details

Gear	Time (secs)	Distance (feet)	Speed (mph)	Notes
1C	0.14	0.1	1.0	
	0.29	0.4	2.0	
	0.44	1.0	3.0	
	0.57	1.6	4.0	
	0.71	2.6	5.0	
	0.85	3.7	6.0	
2C	0.92	4.4	6.5	
	1.10	6.2	7.5	
	1.29	8.4	8.5	
	1.49	11.0	9.5	
	1.69	14.0	10.5	
	1.92	17.6	11.5	
2L	1.93	17.9	11.5	
	2.21	22.7	12.5	
	2.49	28.0	13.5	
	2.76	33.8	14.5	
	3.04	39.9	15.5	
	3.32	46.5	16.5	
3L	3.43	49.2	16.9	
	3.83	59.4	17.9	
	4.23	70.3	18.9	
	4.64	81.7	19.9	
	5.04	93.8	20.9	
	5.44	106.5	21.9	
	5.85	119.8	22.9	
	6.25	133.8	23.9	
4L	6.64	147.6	24.8	
	7.28	171.2	25.8	
	7.91	195.9	26.8	
	8.56	221.5	27.8	
	9.20	248.2	28.8	
	9.84	276.0	29.8	

Gear	Time (secs)	Distance (feet)	Speed (mph)	Notes
	10.49	304.8	30.8	
	11.14	334.7	31.8	
	11.79	365.7	32.8	
	12.45	397.8	33.8	
	13.11	431.0	34.8	
	13.77	465.3	35.8	
	14.44	501.1	36.8	
	15.14	539.0	37.8	
5L	15.34	550.5	38.1	
	16.31	605.1	39.1	
	17.28	661.4	40.1	
	18.25	719.7	41.1	
	19.24	779.9	42.1	
	20.23	842.0	43.1	
	21.23	906.1	44.1	
	22.25	972.3	45.1	
	23.27	1040.6	46.1	
	24.30	1111.0	47.1	
	25.34	1183.6	48.1	
	26.40	1259.4	49.1	
	27.50	1339.5	50.1	
6L	28.41	1406.8	50.9	
	29.77	1509.3	51.9	
	31.15	1615.3	52.9	
	32.54	1724.9	53.9	
	33.96	1838.2	54.9	
	34.08	1847.5	55.0	

REQUIRED TCAPE INFORMATION

TCAPE Factors For Vehicle

Selected Rear Axle Gear Ratio(s):	6.17
Engine Fan Type:	VISCOUS
Parked PTO:	NO
Enroute PTO:	NO
ID Wheel Slip Conditions:	Yes
Road Governor/Cruise Ctrl:	No
Road Surface Type:	TYPICAL
Fuel Economy Route:	Normal Route - City, Suburban, and Highway
Vehicle Vocation:	GENERAL ON HIGHWAY
Acceleration Grade (%):	0.0
Frontal Area (FT2):	96
Speed Limit on Route (MPH):	61.0
Relative Drag Coefficient:	85
Alternator (A):	40
Steering Gear (HP):	2.60
Air Conditioner (HP):	2.20
Vehicle Width (IN):	96
Vehicle Height (IN):	144
Weight on Drive Axle (LBF):	21000
Acceleration Vehicle Spd (MPH):	55.0
Ambient Temperature (F):	70.0
Air Compressor (HP):	2.20
TIRE, FRONT	2 - RADIAL NORMAL
TIRE, REAR	4 - RADIAL NORMAL

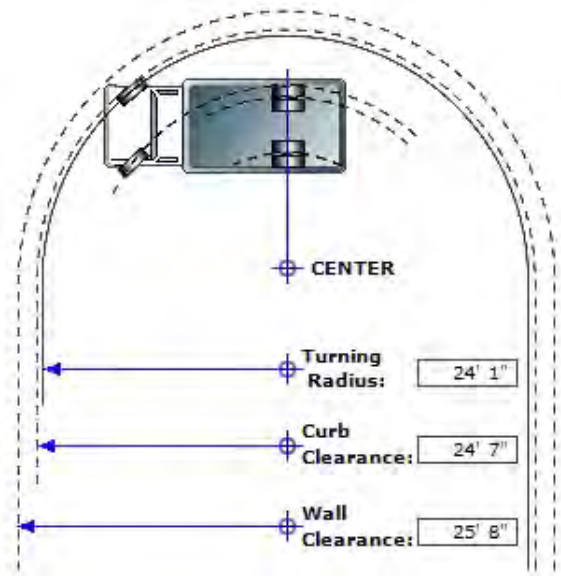
Components

0001ANA	AXLE CONFIGURATION {Navistar} 4x2
0002ASC	AXLE, FRONT NON-DRIVING {Meritor MFS-12-122A} I-Beam Type, 12,000-lb Capacity
0004SPA	AIR COMPRESSOR {Cummins} 18.7 CFM
0005PSA	STEERING GEAR {Sheppard M100} Power
0008GHU	ALTERNATOR {Delco Remy 28SI} Brush Type, 12 Volt, 200 Amp Capacity, Pad Mount, with Remote Sense
0012EYW	ENGINE, DIESEL {Cummins L9 300} EPA 2024, 300HP @ 2200 RPM, 860 lb-ft Torque @ 1200 RPM, 2200 RPM Governed Speed, 300 Peak HP (Max)
0012THT	FAN DRIVE {Horton Drivemaster} Two-Speed Type, Direct Drive, with Residual Torque Device for Disengaged Fan Speed
0013BDR	TRANSMISSION, AUTOMATIC {Allison 3500 RDS} 6th Generation Controls, Wide Ratio, 6-Speed with Double Overdrive, with PTO Provision, Less Retarder, Includes Oil Level Sensor, with 80,000-lb GVW and GCW Max, On/Off Highway
0014AKW	AXLE, REAR, SINGLE {Dana Spicer 21060D} Single Reduction, 21,000-lb Capacity, Driver Control Locking Differential, R Wheel Ends
0016030	CAB Conventional, Day Cab
0016BAM	AIR CONDITIONER with Integral Heater and Defroster
07372135439	TIRE, FRONT 11R22.5 Load Range G HSR 3 (CONTINENTAL), 494 rev/mile, 75 MPH, All-Position 11R22.5 Load Range G HSR 3 (CONTINENTAL), 494 rev/mile, 75 MPH, All-Position
07372135444	TIRE, REAR 11R22.5 Load Range G HDR2+ (CONTINENTAL), 491 rev/mile, 75 MPH, Drive 11R22.5 Load Range G HDR2+ (CONTINENTAL), 491 rev/mile, 75 MPH, Drive

TCAPE HAS BEEN DESIGNED TO GIVE ECONOMY AND PERFORMANCE PREDICTIONS WHICH HAVE BEEN SHOWN TO BE TYPICAL FOR MOST OPERATIONS. HOWEVER, DUE TO OPERATING CONDITIONS, DRIVER INFLUENCES, AND OTHER FACTORS, YOUR RESULTS MAY VARY FROM THOSE PREDICTED. ALSO, BECAUSE OF FUEL MAPPING PROCEDURES USED BY VARIOUS ENGINE MANUFACTURERS, COMPARISONS OF FUEL ECONOMY RESULTS FOR DIFFERENT BRANDS OF ENGINES MAY VARY FROM THOSE SHOWN.

NAVISTAR, INC. SHALL NOT BE LIABLE FOR ANY LOSS OF PROFITS, LOSS OF USE, INTERRUPTION OF BUSINESS OR INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND THAT ARE INCURRED BY DEALER OR BY

DEALER'S CUSTOMERS AS A RESULT OF RELIANCE ON TCAPE, WHETHER THE CLAIM IS IN CONTRACT,TORT (INCLUDING NEGLIGENCE), STRICT LIABILITY OR OTHERWISE.



Series:	MV
Model:	MV607
Description:	MV607 SBA
Model Year:	2025

Calculation Factors

Wheelbase:	169
Front Axle:	0002ASC
Description:	AXLE, FRONT NON-DRIVING, {Meritor MFS-12-122A} I-Beam Type, 12,000-lb Capacity
Front Wheel:	0027DUK
Description:	WHEELS, FRONT, {Accuride 29169} DISC; 22.5x8.25 Rims, Powder Coat Steel, 5-Hand Hole, 10-Stud, 285.75mm BC, Hub-Piloted, Flanged Nut, with .472" Thick Increased Capacity Disc and Steel Hubs
Front Tire:	07372135439
Description:	TIRES, 11R22.5 Load Range G HSR 3 (CONTINENTAL), 494 rev/mile, 75 MPH, All-Position
Steering Gear:	0005PSA
Description:	STEERING GEAR, {Sheppard M100} Power

Turning Radius Statistics

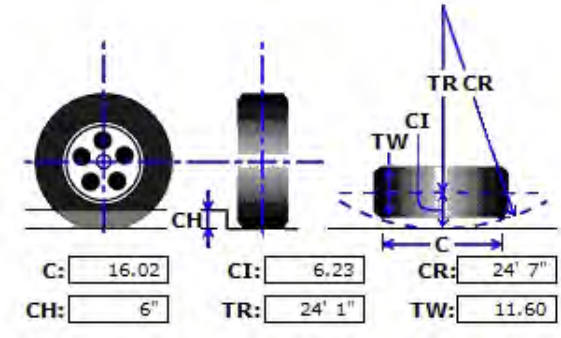
General Information

Inside Turn Angle:	50 Degrees
Radial Overhang:	19

Axle Information

KingPin Inclination:	6.25 Degrees
KingPin Center:	69

Turning Radius - Curb View



C	- Curb Contact Length:	16.02
CI	- Curb Clearance Increment:	6.23
CR	- Curb Clearance Radius:	24'7"
CH	- Curb Height:	6"
TR	- Turning Radius:	24'1"
TW	- Tire Width:	11.60

* All Measurements are in inches, unless otherwise specified.

This information is based on engineering information available at this time. Actual figures may vary. Navistar, Inc. cannot accept liability for consequences due to this variance.

OAK LODGE
WATER SERVICES

STAFF REPORT

To	Board of Directors
From	Aaron Janicke, Assistant District Engineer
Title	Consideration of Engineering Contract with AKS Engineering for the Oatfield Road Water Main Replacement Project Design
Item No.	10
Date	November 21, 2023

Summary

Staff seek approval of a Task Order with AKS Engineering and Forestry in the amount of $588,240.00 for the design of the Oatfield Road Water Main Replacement project. This project would be fully designed during the current fiscal year and constructed over the course of three fiscal years.

Background

In the 2020 Water Master Plan, Oak Lodge staff identified and prioritized the replacement of the Oatfield Road water main based on age and condition. Staff identified this water main as one of the highest contributors to main breaks. This project was originally slated for design in the fiscal year 2026. Oak Lodge saw significant savings with the recent bid for the 28th Loop Water Main Project and intends to utilize the saving to advance future Drinking Water projects.

Past Board Actions

June 2023	Adoption of the FY24-29 Capital Improvement Plan, which includes $400,000 in FY26 for the design of the Oatfield Road Water Main Replacement.
September 2023	Board awards the contract with Trench Line Excavation for the 28th Loop Water Main replacement in the amount of $952,382.88. The awarded bid is $1M below the budgeted amount due to reductions in project scope.

Budget

Cost savings on the 28th Loop Water Main project will provide the necessary funding to complete the design work for Oatfield Road in the current fiscal year.

Recommendation

Staff recommends the Board approve the General Manager to sign a Task Order under the active On-Call Services Contract with AKS Engineering and Forestry for the design of the Oatfield Road Water Main Replacement Project in the amount of $588,240.00.

Alternatives to Recommendation

An alternative to the recommendation would be to divide the design work over several fiscal years. This would likely lead to an increase in design costs.

An alternative to the recommendation would be to not design the Oatfield Road Water Main Replacement project this fiscal year.

Suggested Board Motion

"I move to approve the General Manager to sign a Task Order under the active On-Call Services Contract with AKS Engineering and Forestry for the design of the Oatfield Road Water Main Replacement Project in the amount of $588,240.00."

Attachments

1. AKS Scope of Work, Fee Estimate, & Project Map

Oatfield Water Main Replacement

OAK GROVE, OREGON

Exhibit A — Scope of Work

Oak Lodge Water Services (District) plans to replace the existing water main within SE Oatfield Road from SE Aldercrest to SE Hull. The project is approximately 18,000 lineal feet in total length. The District intends to construct the water line improvements over three fiscal years, 24/25/26.

The following services will be performed by AKS Engineering & Forestry, LLC (Consultant) and/or our subconsultants. All services will be performed by or under the observation of a Professional Land Surveyor and/or Professional Engineer registered in the State of Oregon.

I. Project Management

Consultant will:

- Provide a cohesive consulting team to execute the scope of work listed herein
- Coordinate and participate in project meetings
- Develop a schedule identifying critical tasks
- Perform project management duties including monthly invoicing, preparing monthly project status reports and managing schedule, budget and scope to meet the project requirements.

II. Review of Records

Consultant will review the following records provided by District:

- As-built records

III. Geotechnical Investigation

Consultant will complete two days of pavement core samples to support the pavement restoration design. Pavement core data will be logged and compiled into a field data report.

IV. Topographic Survey

Consultant will complete a photogrammetric aerial survey for the area shown in the attached Exhibit C. Additional topographic survey will be completed as needed for design to record invert elevations of any sanitary sewer and stormwater structures.

Data collected in the topographic and lidar survey will be drafted in a digital format (CAD) for use in design.

V. Construction Documents

Consultant will prepare the following:

- Construction Drawings including the following sheets: Cover Sheet, General Notes Sheet, Existing Conditions Plan, Erosion Control Plan, Utility Improvements Plans and Profiles, Surface Restoration Plan, Construction Details, and Traffic Control Plan
- Special Provisions for any work item not defined in the District standard specifications
- Bid Sheet
- Engineer's Estimate

Construction drawings will be issued to District for review at 50%, 90% and 100% design stage. All other construction documents will be issued to District for 90% and 100% review. Consultant will participate in two (2) design review meetings with District.

VI. Permitting Coordination

Clackamas County:
Consultant will submit construction drawings to Clackamas County to coordinate with the County ahead of permit issuance, which will be issued once a contractor is selected. Consultant will respond to County review comments and revise plans as required to support the right-of-way permit.

VII. Construction Phase Services

Consultant will perform the following construction phase services:

- Respond to contractor RFIs
- Participate in a final walkthrough with District, the contractor, and Clackamas County.
- Prepare as-builts based on contractor redlines

VIII. Reimbursable Expenses

Reimbursable expenses include mileage, deliveries, and commercial copies.

Fee Estimate
(See attached detailed estimate – Exhibit B)

Oatfield Phase 1 (FY 2024)	$242,071
Oatfield Phase 2 (FY 2025)	$180,149
Oatfield Phase 3 (FY 2026)	$207,730
TOTAL	**$627,950**

Assumptions

- Deliverables listed above will be issued for each of the three phases of work.
- District will provide as-builts of existing waterline
- Topographic surveying services do not include determination of the right-of-way boundaries. Work limits will be to existing water meters which as assumed to be within public right-of-way.
- District is responsible for preparing project specifications and assembling the contract documents for bidding.
- District is responsible for all permit fees
- The erosion control permit for the project will be reviewed and issued by District.
- Easement negotiation in excluded from this scope of work.
- District is responsible for all construction inspection
- District is responsible for public involvement and any required coordination with effected private properties.

Exclusions

Services that do not fall within the scope of work are excluded from this estimate.

Exhibit 'B'

Fee Estimate

Oak Lodge Water Services District
Oatfield Road Water Main Replacement

Fee Estimate	Principal	Project Engineer	Eng. Designer	Eng CAD Tech	Sr. Project Surveyor	Project Surveyor	Surveyor	Survey CAD Tech	Survey Crew	Drone Crew	Tech Editor	Clerical	Direct Cost	ESTIMATED TOTAL COST
	$245	$185	$165	$145	$220	$185	$165	$145	$275	$220	$130	$100	1	
Project Tasks & Estimated Personnel Hours														
I. Project Management	60	40										80		$30,100
II. Review of Records			12	40			12	40				4		$15,960
III. Geotechnical	1	6	12									4	$28,000	$31,735
IV. Topographic Survey	5	24	12		24	70	130	300	350	8		20	$1,500	$192,335
V. Construction Documents	100	240	880	610							12	80		$312,110
VI. Permitting Coordination	6	20										20		$7,170
VII. Construction Phase Services	12	60	100									20		$32,540
VIII. Reimbursable Expenses													$6,000	$6,000
ESTIMATED TASK HOURS SUBTOTAL	184	390	1016	650	24	70	142	340	350	8	12	228	-	-
ESTIMATED COST SUBTOTAL	$45,080	$72,150	$167,640	$94,250	$5,280	$12,950	$23,430	$49,300	$96,250	$1,760	$1,560	$22,800	$35,500	$627,950
TOTAL COST ESTIMATE														$627,950

Exhibit 'C' (Project Map)

OAK LODGE WATER SERVICES

AGENDA ITEM

Title	Business from the Board
Item No.	11
Date	November 21, 2023

Summary

The Board of Directors appoints representatives to serve as OLWS liaisons or representatives to committees or community groups.

Directors assigned specific roles as OLWS representatives are placed on the agenda to report to the Board on the activities, issues, and policy matters related to their assignment.

Business from the Board may include:

a. Individual Director Reports

b. Tabled Agenda Items

OAK LODGE WATER SERVICES
2023 BOARD LIAISON ASSIGNMENTS

Board/Committee	Primary Liaison	Alternate Liaison	Meeting Cadence
American Water Works Association (AWWA)	All Directors	N/A	Varies
Chamber of Commerce	Ginny Van Loo	Susan Keil	Monthly, Third Wednesday 11:45 a.m. – 1:15 p.m.
Clackamas River Water	Kevin Williams	Paul Gornick	Monthly, Second Thursday 6 p.m.
Clackamas County Coordinating Committee (C-4)	Paul Gornick	Susan Keil	Monthly, First Thursday 6:45 p.m.
Healthy Watersheds	Kevin Williams	OPEN	
Jennings Lodge CPO	Kevin Williams	Paul Gornick	Quarterly, Fourth Tuesday 6 p.m.
North Clackamas County Water Commission (NCCWC)	1: Paul Gornick 2: Kevin Williams	Susan Keil	Quarterly, Fourth Thursday (Jan, Mar, June, Sept) 5:30 p.m.
Oak Grove Community Council	Heidi Bullock	Susan Keil	Monthly, Fourth Wednesday 7 p.m.
Regional Water Providers Consortium (RWPC)	Kevin Williams	Paul Gornick	3x Annually, First Wednesday 6:30 p.m.
Special Districts Association of Oregon (SDAO)	All Directors	N/A	Varies
Sunrise Water Authority (SWA)	Paul Gornick	Kevin Williams	Monthly, Fourth Wednesday 6 p.m.

November 7, 2023

Rotary Satellite Club of Oregon City Meeting

A group of folks who are players in water issues and water resources such as Oak Lodge Water Services met on Tuesday to discuss the beginnings of the Oregon City Rotary pulling together a Clean Water Satellite Club.

I attended as did many others including Clackamas County WES, Clackamas River Basin Councils and other basin councils, Clackamas River Water, Sunrise Water and many more along with City agency folks and a variety of others interested in what is about to come together. The idea here is to find folks interested in becoming Rotarians and working with them in our local areas.

Marcia Wimmer of Oregon City Rotary along with Greg Geist led the group. It was an hour-long initial meeting where many were on zoom and about 8 of us in the room at the County building.

In 3-4 weeks, there will be another meeting to begin the process. It is $325 to join Rotary and there is a Sponsor situation whereby a company like OLWS could sponsor some employees or directors to be part of the group.

Maybe Sarah Jo has some comments as she was there too.

Ginny Van Loo

Director

Business from the Board
Paul Gornick's Liaison Report – November 2023

October 25, 2023 – Sunrise Water Authority Board Meeting (held in new administration building)

- Public comment period included concerns/complaints about communication and progress of construction making a loop connection of water lines on High Ridge Ct and Dogwood Lane via private property. Contractor has left vehicles on public streets during breaks in activity. Some property owners were forced to park on one street and cross private property on foot to access their homes, which generated liability concerns for the affected property owners.
- General Manager Wade Hathhorn offered information on development of a Social Equity Action Plan. This was developed with Anis Zaman, a graduate student from PSU.
- Board met as the Local Contract Review Board to discuss proposed changes to the contract related to completion of final paving of the public street, where the contractor has installed curbs, sidewalks, and the base lifts of asphalt. NW Natural wants to delay the final lift of asphalt until they install a new high pressure gas main in Spring/Summer of 2024. Board was not keen on the risks of damage to the improvements, and inability to expect the contractor to delay completion and start of warranty period until that is completed. Board chose to let contractor proceed with final lift, and let NW Natural bear costs of repaving and dealing with Happy Valley's moratorium on pavement cuts in a newly completed road.

November 2, 2023 – C4 Meeting

- Vahid Brown (ClackCo Supportive Housing Services) did a PowerPoint Presentation of the Housing Services Program (see pages 5-16 of meeting packet).
- Adam Brown (also from ClackCo Supportive Housing Services) provided information on prior SHS funding background and request of County Board for allocation of carryover funds (see pages 17-28 of meeting packet).
- Karen Buehrig (ClackCo Long Range Planning Manager) provided an update to the 2023 Regional Transportation Plan (see pages 29-36 of meeting packet). This includes an 8/3/2023 letter from C4 to Metro with feedback from C4 on perceived gaps in the RTP policy emphasis.
- Trent Wilson (ClackCo Government Affairs) provided information on the Legislature's Special Subcommittee on Transportation Planning, which will be holding meetings in local areas to seek public input. The first meeting in Salem was in late September, and additional community meetings are scheduled starting in November. See this link to view tentative dates and locations for local meetings (meeting in Oregon City/West Linn/Gladstone is slated for Saturday, December 2nd:
  Transportation Planning Joint 2023-2024 Interim - Oregon Legislative Information System (oregonlegislature.gov)
- The C4 meeting packet can be found here: d6c52691-8b67-4eca-ab29-4e9b6561a738 (clackamas.us)
- A video of the meeting is not yet posted but will be available here: C4 Meetings | Clackamas County

Oak Grove Community Council

General Meeting Minutes
September 27, 2023

Attendance:

Board: Valerie Chapman, Mark Elliot, Jane Civiletti, Joseph Edge, Rich Nepon,

Voting Members: Anatta Blackmarr, Bob Bohannon, Cynthia Brown, Ben Chaney, Jean Coberly, Sue Conachan, Gene and Melody Fifield, Marylin Gottschall, Tom and Jolene Hammond, Thomas Hogan, Pam Horan, Ed Riddle, Thelma Haggenmiller, Gwion Miller, Wayne Potter, Paul Savas, Baldwin Van der Bijil, Craig von Valkenberg,

Other Attendees: Chris Dreger, Will Farley, Joyce Johnson. Roy Kruger, Katherine Maack, Donald McHarness, Ed Riddle, Ryan Stee, Scott Hoelscher; presenter,

7:00 PM Welcome/ Introductions

7:05 PM Officer Reports: Treasurer; Secretary; Board/Chair.

Treasurer: Income: $1,800.00 Expense: $ 1,619.99 Checkbook Balance: $1,549.95, A/R: $500 from Friends of the Oak Lodge Public Library

Rich: Meeting Minutes approved as presented.

Mark: Oak Grove Library Groundbreaking attendees at approximately 225 to 250 people. Ice cream was enjoyed by all. The weather was hot!

7:10 PM Board Member nomination, vote. Wayne Potter. Nominated by Mark Elliott, seconded by Jane Civiletti, vote outcome: 16 yeah votes, no, No votes, Wayne is elected! (Members Voting: Blackmarr, Bohannon, Brown, Civiletti, Conachan, Edge, Elliot, Gottschall, T. Hammond, Hogan, Horan, Miller, Nepon, Potter, Savas, Van Valkenberg)

7:15 PM Commissioner Savas on Short Term Rentals

Discussion: Started about 6 years ago prompted by tourism and loss of revenue from short term rental operators not paying their taxes. The County processes the fees and sends them to the State. This is a two-year pilot project.

Housing supply shortage was another issue in favor of putting these laws into place. The county received complaints from residents of disturbances from renters. There was a strong lobby by good operators asking for more reasonable regulations.

New regulations take effect in about two months and up and running in about 1 year. Person attests to meeting all of the requirements. No cost to register. AirBnB folks wanted these regulations.

Question: Will there be land use permit process for creating a short-term rental. Short answer no. Owners will be asked to attest to meeting all the requirements.

Question: What is the line between short-term and regular rentals: 30 days is the cut off.

Question: If there is a problem with a short-term rental what do residents do: Residents will have an emergency contact number to call. Two legitimate complaints will terminate the operator's license. Residents can also call law enforcement.

Question: How will the taxes be collected? Taxes will be collected in the same way that the other taxes are collected now.

7:30 PM Scott Hoelscher, Senior Transportation Planner, Clackamas County; Walk Bike Clackamas Plan

Update to the pedestrian and bicycle mast plans for the county, current plan is about 20 years old. Future project and programs are to meet future needs. Plan covers unincorporated areas only, not incorporated cities.

Existing and new conditions:
On-street facilities in unincorporated areas: existing 101.7 miles, planned 800.7 miles
93% of county roads do not have sidewalks.
Shared street concept to reduce vehicular speed from 25 to 20 mph.

8:15 PM Luart: Report by Joseph Edge

Three applications in recently:

Oak Lodge Library Design Review Appeal hearing is tomorrow, Thursday at 1:00 p.m. Involves connectivity between the site and SE Oatfield for pedestrian/bike street infrastructure.

Middle housing land division application.

Park Ave garage application

8:35 PM Roethe Road Residents on road improvements

Joyce Johnson: Roethe area residents concerned about lack of improvements on Roethe to address Rex Putnam school zone awareness and safety. Concerns addressed to the Board of County Commissioners at a business meeting.

Some issues are being addressed. Challenges, the school is not visible from the road. Updated signage is needed at Gordon. Entrances and exits are not visible. There is no clear drop off and pick up area.

Roethe is a commuter connector between SE Oatfield and McLoughlin. Presents challenges to school safety.

8:40 PM Comments/ Public Input

NCPRD District Advisory Committee Report by Ryan Stee:
DAC Goals approved in September 2023

Oak Lodge Water Services had an informational meeting with OLCERT at Awakening Coffee
Next board meeting is on October 2nd at 7:15 p.m. Next general meeting on October 25th

8:47 Meeting Adjourned

STAFF REPORT

To	Board of Directors
From	Sarah Jo Chaplen, General Manager
Title	Administration Monthly Report
Item No.	12a
Date	November 21, 2023

Summary

The Board has requested updates at regular meetings on the status of OLWS operations.

Highlights

- Planning for State Legislative Short Session is in Process.
- Analysis of borrowing options continues.
- OLWS participated in Trunk-or-Treat event held by Historic Downtown Oak Grove (HDOG) on October 28.
- Two milestones in electronic records management and a Records Disaster Management Plan.

General Manager

Thorn Run Partners is working to set up appointments with State Legislators and their staff prior to the Legislative Short Session to discuss potential funding of OLWS Wastewater capital projects. Conversations have also continued with Federal Representatives and their staff.

OLWS is working with PFM Financial Advisors, LLC as our official financial advisor required as part of the borrowing process. Brad Albert, Gail Stevens and Sarah Jo have been working closely with PFM Financial Advisors, LLC to analyze the different borrowing options to review with the Board later in December.

Communications and Outreach

OLWS has sandbags available for customers. The sandbags are for residential water flow protection. Call ahead to ensure sandbag availability: (503) 353-4207. Additional sandbag stations in Clackamas County can be found here: https://clackamas.us/dm/sandbags.html

A big thanks to the Oak Grove United Methodist Church and the Historic Downtown Oak Grove (HDOG) for hosting Trunk-or-Treat on Saturday, October 28. OLWS passed out about 1,000

pieces of candy. This was the second time OLWS participated in this event, and we plan to return in 2024.

Figure 1. Staff members Elaine and Antonio at Trunk-or-Treat

Operation Santa Claus has been a Clackamas Fire tradition within the community since 1974. The goal is to collect non-perishable food and new, unwrapped toys for families in need within the communities we serve. OLWS will host a bin this year. More information to come when it is available.

The 2024 Water Conservation Calendars are available for customers at the OLWS Admin Office from the Clackamas River Water Providers. You may also request a calendar by mail from Christine at christine@clackamasproviders.org. For the first time OLWS has a calendar available that is easy to stick on the fridge or cabinet with contact information. Please visit the OLWS Admin Office to pick one up.

As you prepare for your Thanksgiving meal, beware of fats, oils, and grease! We offer a friendly reminder to avoid pouring fats, oils and grease down your kitchen sink because it can lead to backups, overflows and expensive pipe damage.

Records Management

The State Archivist has accepted the OLWS petition to retain all official records in an electronic records management system (ERMS). This is a huge achievement for the Records Management Program and offers OLWS numerous advantages in terms of efficiency, accessibility, security, and functionality.

CDI software engineers have achieved a significant milestone by completing the initial filing and retention workflows in Laserfiche, the chosen Electronic Records Management System (ERMS) for OLWS. Records are now being successfully archived in the system. The next step involves configuring an import agent to automate the process of filing records from local servers. This automation streamlines data integration, reduces manual efforts, and ensures historical data is seamlessly incorporated into the ERMS. This move aligns with best practices in records

management, enhancing efficiency and compliance.

District Recorder Casey has completed a draft Records Disaster Management Plan, which is being reviewed by the Records Management Team before submitting to the Management Team. A Records Disaster Management Plan is an essential component of an organization's overall disaster preparedness and business continuity strategy. It aims to safeguard critical records, mitigate risks, and ensure the organization can continue its operations, meet legal obligations, and minimize the impact of disasters on its records and data.

Attachments

1. Records Petition

August 28, 2023

Stephanie Clark
State Archivist
Oregon State Archives
800 Summer St. NE
Salem, OR 97301

RE: OLWS Request for Exception

Dear State Archivist,

Oak Lodge Water Services Authority (OLWS), an Oregon Special District, requests an exception to 166-017-0045(2) for public records meeting the specific preservation requirements as outlined in 166-017-0045(3). OLWS acknowledges that electronic records (including digital images) may serve as the official copy of a public record only in the specifications outlined in this request.

Specifications

- OLWS will store electronic records in Laserfiche Version 10 – Records Management Edition.
- OLWS will store the official copy of electronic records in the following formats:
  - TIFF 6.0
  - PDF
  - MPEG 4 (audio recordings)

Official copies of public records requested to store electronically include the following:

Record Series Title	Retention Schedule Number	Length of Retention
Administrative	166-150-0005 (4), (9b), (12a), (17a), (19a), (20a), (26c), (33a), (36), (41), (42), (43), (44a)	Permanent
Building	166-150-0020 (1a), (2a), (4a)	Permanent, Life of Structure
Counsel	166-150-0030 (5a)	Permanent
County Clerk – Elections	166-150-0035 (2), (9d)	Permanent
County Clerk – General	166-150-0040 (21)	Permanent
Emergency Management	166-150-0100 (5a), (11a)	Permanent

Equipment and Property	166-150-0105 (1), (3a), (3b), (5a), (5b), (9), (11)	Permanent, Life of Structure, No Longer Owned
Financial	166-150-0110 (3), (6), (13a), (16a)	Permanent
Information and Records Management	166-150-0125 (10a)	Permanent
Personnel	166-150-0160 (1a), (4a)	Permanent
Planning	166-150-0165 (1), (3a)	Permanent
Public Works – Engineering	166-150-0170 (1), (2), (5a), (6), (8)	Permanent
Public Works – Operations and Maintenance	166-150-0175 (2a), (6a), (8a), (12a), (13a)	Permanent, Life of Structure, Removed from Service
Public Works – Wastewater Treatment	166-150-0190 (1a), (3a), (5a), (7a), (8), (9), (11a), (12a)	Permanent
Public Works – Water Treatment	166-150-0195 (3a), (8a), (10a)	Permanent
Surveyor	166-150-0205 (5)	Permanent

Thank you,

Sarah Jo A. Chaplen

Sarah Jo A. Chaplen
General Manager

Approved

Stephanie Clark

Digitally signed by: Stephanie Clark
DN: CN = Stephanie Clark email = stephanie.clark@oregon.gov C = US O = SOS OU = Archives
Date: 2023.11.01 14:13:09 -08'00'

_____ _____

State Archivist Date

Please return this form letter to:

Laural Casey, CMC
District Recorder
Oak Lodge Water Services
14496 SE River Rd.
Oak Grove, OR 97267

OAK LODGE
WATER SERVICES

STAFF REPORT

To	Board of Directors
From	Gail Stevens, Finance Director
Title	Finance Department Monthly Report
Item No.	12b
Date	November 21, 2023

Summary

The Board has requested updates at regular meetings on the status of the OLWS operations.

Highlights of the Month

- The Low-Income Household Water Assistance (LIWHA) program began July 2022, and we have received 89 approvals from Clackamas County as of November 9th, 2023. LIWHA is currently transitioning Federal Fiscal Years and not expected to resume until December 2023.
- The Accounts Receivable balance increased by 4.7%, the average delinquent balance increased by $15.30, and the number of delinquent accounts decreased by 22.
- Utility bill payments in October were more than the September 30th billed amounts.
- The Finance Team will be working on running testing in the Springbrook test environment on converting to monthly billing.

Low Income Household Water Assistance (LIHWA)

In 2022, Clackamas County Board of Commissioners partnered with Oak Lodge Water Services to provide water utility customers assistance through the Low-Income Household Water Assistance (LIHWA) program. As of October 05, 2023, eighty-nine customers have been approved for assistance totaling $44,807.00. Clackamas County received an extension for the LIWHA program. While Clackamas County processes extension paperwork and contracts, customers are unable to apply. Customers will be able to apply or reapply for funds in the near future. The extension will be until March 2024 or funds are exhausted.

Accounts Receivable Review

The Accounts Receivable (A/R) balances as of October 31, 2023, compared to September 30, 2023, decreased by (0.32%). These are the findings:

1. A/R Balance owed to OLWS has decreased by ($5,903), after accounting for the delta between billing cycles.

A/R Balance	8/31/2023	9/30/2023	10/31/2023
Bi-Monthly Residential	$ 1,367,803	$ 1,153,180	$ 1,331,926
Large Meters	693,702	692,662	666,983
Total	**2,061,505**	**1,845,842**	**1,998,909**
Variance	**366,488**	**(215,663)**	**153,067**
Billing Cycle Variance	**(345,562)**	**249,262**	**(158,970)**
	20,925	**33,598**	**(5,903)**
	1.23%	**1.63%**	**-0.32%**

2. The total number of delinquent accounts decreased by 22 accounts as of October 31, 2023, compared to September 30, 2023. The average balance per account increased by 4.7% or $15.30.

Delinquent Accounts	8/31/2023	9/30/2023	10/31/2023
Over 60 Days	$ 164,498	$ 186,402	$ 187,746
Number of Accounts	494	576	554
Average Balance per Acct.	$ 333	$ 324	$ 339
	6.6%	-2.8%	4.7%

3. The percentage of accounts that are current, accounts paid in full within 30 days, has increased by 0.28% compared to the prior month. The shift is from current to the delinquent category.

Account %	8/31/2023	9/30/2023	10/31/2023
Current	84.32%	85.71%	85.99%
30-60 Day Grace	7.34%	5.05%	5.06%
Delinquent	5.45%	6.35%	6.13%
Credit Balance	2.88%	2.89%	2.82%

Each month, OLWS hangs red tags for accounts in delinquent status, over 60 days past due, and with a balance over $350. The red tag process allows 7 days for the customer to provide payment. If payment/a payment plan is not received/created, water is then shut off.

	July 2023	Aug 2023	Sep 2023	Oct 2023
Cycle	Cycle 1	Cycle 2	Cycle 1	Cycle 2
# Red Tags	84	41	62	82
Minimum Delinquent Balance	$ 250	$ 350	$ 350	$ 350
# Shut off Service Requests	4	3	3	4

Billing Payment Rate

In October 2023, OLWS received $2,820.41 less in payments than was billed on September 3, 2023.

	July 2023	Aug 2023	Sep 2023	Oct 2023
Utility Billing Sales	$ 1,344,228	$ 1,459,591	$ 1,805,153	$ 1,555,891
Cash Receipts	1,330,131	1,453,683	1,769,704	1,558,712
% Collected	99.00%	99.60%	98.00%	100.20%

Attachments

1. Checks by Date Report for October 2023

Bank Reconciliation
Checks by Date
User: antonio@olwsd.org
Printed: 11/09/2023 - 5:08PM
Cleared and Not Cleared Checks
Print Void Checks

ACH Disbursement Activity

Check No.	Check Date	Name	Comment	Module	Void	Clear Date	Amount
0	10/6/2023	Internal Revenue Service		AP			35,200.39
0	10/6/2023	Oregon Department Of Revenue		AP			11,326.49
0	10/6/2023	State of Oregon Savings Growth Plan		AP			3,519.34
0	10/6/2023	VALIC c/o JP Morgan Chase		AP			1,574.38
0	10/6/2023	Payroll Direct Deposit	DD 00001.10.2023	PR			84,792.07
0	10/11/2023	TSYS		AP			14,763.64
0	10/11/2023	Wells Fargo Bank		AP			0.00
0	10/12/2023	Internal Revenue Service		AP			5,953.52
0	10/12/2023	Oregon Department Of Revenue		AP			1,713.91
0	10/12/2023	State of Oregon Savings Growth Plan		AP			250.00
0	10/18/2023	Portland General Electric		AP			29,925.34
0	10/20/2023	Internal Revenue Service		AP			35,289.69
0	10/20/2023	Oregon Department Of Revenue		AP			11,468.71
0	10/20/2023	Oregon DEQ		AP	Void		22,264.00
0	10/20/2023	ORR Inc		AP			110,580.00
0	10/20/2023	State of Oregon Savings Growth Plan		AP			3,519.34
0	10/20/2023	VALIC c/o JP Morgan Chase		AP			1,552.41
0	10/20/2023	Payroll Direct Deposit	DD 00002.10.2023	PR			86,733.83
0	10/21/2023	Pitney Bowes Global Financial Services LLC		AP			91.29
0	10/23/2023	Wells Fargo Remittance Center		AP			11,133.18
ACH Disbursement Activity Subtotal							**471,651.53**
Voided ACH Activity							**22,264.00**
Adjusted ACH Disbursement Activity Subtotal							**449,387.53**

Paper Check Disbursement Activity

Check No.	Check Date	Name	Comment	Module	Void	Clear Date	Amount
51003	10/6/2023	Aerzen Rental USA LLC		AP			3,340.00
51004	10/6/2023	AFLAC		AP			971.73
51005	10/6/2023	Aks Engineering & Forestry		AP			9,647.32
51006	10/6/2023	Apex Labs		AP			4,320.00
51007	10/6/2023	BMS Technologies		AP			3,907.47
51008	10/6/2023	Cascade Rigging, Inc		AP			636.00
51009	10/6/2023	Cintas Corporation		AP			99.00
51010	10/6/2023	Cintas Corporation - 463		AP			71.27
51011	10/6/2023	City Of Gladstone		AP			250.95
51012	10/6/2023	City Of Milwaukie		AP			1,870.57
51013	10/6/2023	Contractor Supply, Inc.		AP			10.97
51014	10/6/2023	Convergence Networks		AP			10,239.38
51015	10/6/2023	Gills Point S Tire		AP			1,928.63
51016	10/6/2023	Customer Refund		AP			87.56
51017	10/6/2023	Horner Enterprises, Inc.		AP			3,219.42
51018	10/6/2023	J. Thayer Company		AP			472.35
51019	10/6/2023	Measure-Tech		AP			564.04
51020	10/6/2023	Merina & Company, LLP		AP			4,680.00
51021	10/6/2023	Net Assets Corporation		AP			409.00
51022	10/6/2023	Northwest Natural		AP			346.79
51023	10/6/2023	OCD Automation, Inc.		AP			7,925.00
51024	10/6/2023	One Call Concepts, Inc.		AP			754.84
51025	10/6/2023	O'Reilly Auto Parts		AP			28.47
51026	10/6/2023	Owen Equipment		AP			6,942.29
51027	10/6/2023	Portland Engineering Inc		AP			300.00
51028	10/6/2023	Unifirst Corporation		AP			590.33
51029	10/6/2023	Verizon Wireless		AP			2,630.78
51030	10/6/2023	Water Systems Consulting, Inc.		AP			14,708.75
51031	10/6/2023	Wesco Marketing		AP			1,765.40
51032	10/6/2023	Employee Paycheck		PR			9,459.51
51033	10/11/2023	Aks Engineering & Forestry		AP			0.00
51034	10/13/2023	AFSCME Council 75		AP			818.66
51035	10/13/2023	Alamo Chapter of the Texas Municipal Clerks Assoc		AP			50.00
51036	10/13/2023	Customer Refund		AP			707.09
51037	10/13/2023	Buels Impressions Printing		AP			1,667.90
51038	10/13/2023	Customer Refund		AP			10.95
51039	10/13/2023	Cascadia Backflow		AP			4,214.00

51040	10/13/2023	CDR Labor Law, LLC	AP		832.50
51041	10/13/2023	City Wide Tree Service Inc	AP		2,715.00
51042	10/13/2023	Customer Refund	AP		10.45
51043	10/13/2023	Coastal Farm & Home Supply	AP		159.96
51044	10/13/2023	Contractor Supply, Inc.	AP		244.25
51045	10/13/2023	Customer Refund	AP		178.39
51046	10/13/2023	D&H Flagging, Inc.	AP		275.00
51047	10/13/2023	Equipment Depot Northwest, Inc	AP		1,529.00
51048	10/13/2023	Ferguson Enterprises, Inc.	AP		0.02
51049	10/13/2023	Customer Refund	AP		1.56
51050	10/13/2023	Customer Refund	AP		0.78
51051	10/13/2023	Grainger, Inc.	AP		486.65
51052	10/13/2023	H.D. Fowler Company	AP		480.79
51053	10/13/2023	Customer Refund	AP		13.70
51054	10/13/2023	HealthEquity	AP		44.30
51055	10/13/2023	Customer Refund	AP		3.12
51056	10/13/2023	Customer Refund	AP		19.93
51057	10/13/2023	Customer Refund	AP		10.16
51058	10/13/2023	Customer Refund	AP		31.98
51059	10/13/2023	McFarlane's Bark, Inc.	AP		13.00
51060	10/13/2023	Customer Refund	AP		3.50
51061	10/13/2023	Customer Refund	AP		262.22
51062	10/13/2023	North Clackamas Parks & Recreation District	AP		4,643.73
51063	10/13/2023	Northstar Chemical, Inc.	AP		1,106.60
51064	10/13/2023	OREGON STATE TREASURY	AP	Void	136.09
51065	10/13/2023	OREGON STATE TREASURY	AP	Void	105.62
51066	10/13/2023	R.L. Reimers Company	AP		4,382.51
51067	10/13/2023	Customer Refund	AP		3.77
51068	10/13/2023	Customer Refund	AP		2.46
51069	10/13/2023	Relay Resources	AP		8,578.63
51070	10/13/2023	Robert Lloyd Sheet Metal	AP		1,659.41
51071	10/13/2023	Seattle Ace Hardware	AP		559.57
51072	10/13/2023	Customer Refund	AP		235.41
51073	10/13/2023	Staples Contract & Commercial LLC	AP		89.64
51074	10/13/2023	Stein Oil Co Inc	AP		541.89
51075	10/13/2023	Thorn Run Partners, LLC	AP		20,000.00
51076	10/13/2023	Customer Refund	AP		117.96
51077	10/13/2023	Customer Refund	AP		10.49
51078	10/13/2023	Traffic Safety Supply Co Inc	AP		1,951.31
51079	10/13/2023	Unifirst Corporation	AP		882.47
51080	10/13/2023	Wallis Engineering PLLC	AP		666.22
51081	10/13/2023	Western Exterminator Company	AP		377.45
51082	10/20/2023	Airgas, Inc	AP		9.33
51083	10/20/2023	Backflow Management Inc.	AP		100.00
51084	10/20/2023	BendTel, Inc	AP		277.25
51085	10/20/2023	Buffalo Welding, Inc	AP		300.00
51086	10/20/2023	CDW LLC	AP		8,549.70
51087	10/20/2023	Cintas Corporation	AP		411.11
51088	10/20/2023	Cintas Corporation - 463	AP		71.27
51089	10/20/2023	City Of Milwaukie	AP		333.60
51090	10/20/2023	Comcast	AP		557.18
51091	10/20/2023	Contractor Supply, Inc.	AP		156.44
51092	10/20/2023	Convergence Networks	AP		1,021.80
51093	10/20/2023	Eurofins Environment Testing Northwest, LLC	AP		8,711.00
51094	10/20/2023	Grainger, Inc.	AP		6,873.89
51095	10/20/2023	Graphic Products Inc	AP		3,311.05
51096	10/20/2023	H.D. Fowler Company	AP		6,458.38
51097	10/20/2023	Historic Downtown Oak Grove	AP		250.00
51098	10/20/2023	Employee Reimbursement	AP		248.80
51099	10/20/2023	Les Schwab	AP		65.94
51100	10/20/2023	Employee Reimbursement	AP		215.16
51101	10/20/2023	McGuire Bearing Company	AP		1,220.13
51102	10/20/2023	Merina & Company, LLP	AP		1,450.00
51103	10/20/2023	Modern Machinery Inc.	AP		666.50
51104	10/20/2023	Employee Reimbursement	AP		557.94
51105	10/20/2023	O'Reilly Auto Parts	AP		9.99
51106	10/20/2023	Owens Pump & Equipment	AP		4,510.61

51107	10/20/2023	S-2 Contractors, Inc.	AP		34,900.00
51108	10/20/2023	Seattle Ace Hardware	AP		188.25
51109	10/20/2023	Springbrook Holding Company LLC	AP		1,690.00
51110	10/20/2023	Unifirst Corporation	AP		590.33
51111	10/20/2023	Verizon Wireless	AP		81.64
51112	10/20/2023	Waste Management Of Oregon	AP		221.62
51113	10/20/2023	Customer Refund	AP		42.71
51114	10/27/2023	Aerzen Rental USA LLC	AP		7,100.00
51115	10/27/2023	AFSCME Council 75	AP		818.66
51116	10/27/2023	Customer Refund	AP		237.37
51117	10/27/2023	AnswerNet	AP		758.42
51118	10/27/2023	Bureau Of Labor And Industries	AP		952.38
51119	10/27/2023	Canby Excavating Inc	AP		331,677.78
51120	10/27/2023	CenturyLink	AP		736.27
51121	10/27/2023	Columbia Land Trust	AP		2,636.02
51122	10/27/2023	Consolidated Supply Co.	AP		3,258.31
51123	10/27/2023	CTX-Xerox	AP		9,800.00
51124	10/27/2023	D&H Flagging, Inc.	AP		3,917.98
51125	10/27/2023	Department of Environmental Quality	AP		22,264.00
51126	10/27/2023	Grainger, Inc.	AP		98.24
51127	10/27/2023	Customer Refund	AP		24.60
51128	10/27/2023	Customer Refund	AP		590.64
51129	10/27/2023	Customer Refund	AP		10.94
51130	10/27/2023	OCD Automation, Inc.	AP		4,000.00
51131	10/27/2023	Oregon State Treasury	AP	Void	1,740.41
51132	10/27/2023	O'Reilly Auto Parts	AP		17.99
51133	10/27/2023	Customer Refund	AP		240.62
51134	10/27/2023	Portland Engineering Inc	AP		90.00
51135	10/27/2023	Red Wing Shoe Store	AP		300.00
51136	10/27/2023	Customer Refund	AP		81.63
51137	10/27/2023	Customer Refund	AP		68.44
51138	10/27/2023	Seattle Ace Hardware	AP		98.98
51139	10/27/2023	Staples Contract & Commercial LLC	AP		136.23
51140	10/27/2023	Stein Oil Co Inc	AP		505.45
51141	10/27/2023	Customer Refund	AP		75.52
51142	10/27/2023	Traffic Safety Supply Co Inc	AP		1,170.50
51143	10/27/2023	Unifirst Corporation	AP		803.51
51144	10/27/2023	Verizon Wireless	AP		2,489.41
51145	10/27/2023	Waste Management Of Oregon	AP		159.12
51146	10/27/2023	Xerox Corporation	AP		65.65
51147	10/31/2023	Oregon State Treasury	AP		1,981.52

Paper Check Disbursement Activity Subtotal	**635,972.12**
Voided Paper Check Disbursement Activity	**1,982.12**
Adjusted Paper Check Disbursement Activity Subtotal	**633,990.00**

Total Void Check Count:	4
Total Void Check Amount:	24,246.12
Total Valid Check Count:	161
Total Valid Check Amount:	1,083,377.53
Total Check Count:	165
Total Check Amount:	1,107,623.65

OAK LODGE
WATER SERVICES

STAFF REPORT

To	Board of Directors
From	Brad Albert, Public Works Director/District Engineer Chad Martinez, Wastewater Collections Supervisor Ryan Hunter, Water Distribution Supervisor
Title	Public Works Monthly Report
Item No.	12c
Date	November 21, 2023

Summary

The Board has requested updates at regular meetings on the status of the OLWS operations.

Highlights

- Hillside Wastewater Main Replacement Project is complete and so are all punch list items.
- Tertiary Filtration final design is 60% complete, now moving towards 90%.
- Surveying is taking place for the LS5 basin I&I project, moving towards 30% design.
- 28th Ave Waterline Replacement Project is scheduled to start construction in December.

Watershed Protection

Leaf fall has begun, and with this comes the end of catch basin inspections for the Municipal Separate Storm Sewer System (MS4) Permit's Zone maintenance program and the beginning of hot spot cleaning. Work orders for areas most prone to flooding due to leaf fall are programmed into Lucity so that the field operations staff can time manage effectively. In addition, the recent rainy days allowed for the first of three Stormwater monitoring samples collected on Naef Rd.

This month the watershed protection report refocuses from partner highlights to review beaver dam monitoring and removal. As stated by the responsibilities in MS4 Permit, Oak Lodge is obligated to monitor and support water quality in our area. Beaver dams typically provide water quality support, but also can cause the potential for flooding.

Oak Lodge has a responsibility to apply funds that we collect for their designated purpose. At this time, the removal of beaver dams on private property is not part of the watershed protection service fee structure. Watershed protection funds collected by Oak Lodge support

the best management practices required by the MS4 Permit, and OLWS has a responsibility to apply the funds received for their designated purpose.

As part of the Oregon Drainage Law, private property owners have the right and the responsibility to keep water flowing on or across their land. Owners may remove up to 50 cubic yards of debris and sediment without a permit from the Department of State Lands. When owners contact Oak Lodge for support, it tends to be because they are not able to do the work themselves and need additional support. In the past, there are occurrences where OLWS crews helps a property owner to open stream flow for a variety of reasons. However, this action sets a precedent for service for which Oak Lodge does not collect funds.

Each year, field operations staff spend about 15-20 hours monitoring and removing beaver dams on public property (such as Stringfield Park). In general, private property dam removal is not something that field operations staff FTE is designed to include.

Photos of selected beaver dams and areas affected by beaver activity.

Finally, to fulfill the requirements of the 2021 NPDES MS4 Permit #101348, Oak Lodge requires clarification of how it will prioritize Low Impact Development (LID) and Green Infrastructure (GI) Strategy under the permit Schedule A.3.e.ii. to the maximum extent feasible by December 1, 2023. Attached to this report you will find the Memo which presents Oak Lodge's LID/GI strategy. In addition, OLWS is in the process of updating its Watershed Protection Design and Construction Standards, of which the LID/GI is a part.

Wastewater Collection Work

During the month of October, Collections crew kept up with regular cleaning and videoing of basin 2A. New Tier 3 hydrojetter nozzles (Tier 3 = Above 80% efficiency rating) were purchased to replace outdated and worn nozzles, these nozzles have proven to be highly-efficient in cleaning and clearing blockages making way for less complications while conducting video assessment of the lines.

Multiple root intrusions have been located in the connections of our sewer lines and residential

lateral taps causing residential backups, collections has been assisting with mini camming and locating these lines to better assist contractors in excavation and repair.

Collections is working together on a five-class training on Collections System Operations and Maintenance provided by The Office of Water Programs under California State University of Sacramento. We are working together one day a week to complete the training as a group. This training will help the new hires better understand the operations and maintenance of a collections system while earning continuing education units to maintain and advance in their DEQ certifications.

New Tier 3 Nozzles

Old Tier 1 & Tier 2 Nozzles

Water Distribution System Work

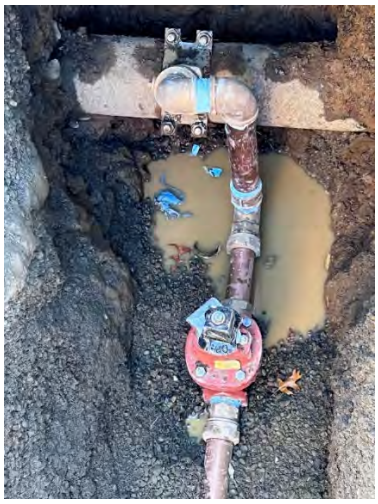
In October, the Water Team responded to a 2-inch service break that serves Heritage Apartments on SE Roethe Rd. Due to the severe corrosion, the 2-inch galvanized service line was unable to be repaired and had to be replaced. Galvanized service lines are made of steel with a zinc coating to prevent corrosion. Over time, the zinc coating wears off and the steel pipe starts to deteriorate. (3 Photos below)

Below are some of the highlights:

- Ongoing replacement of water meters
- Ongoing maintenance, repair, and replacement of fire hydrants
- Staff attended 8-hour Confined Space Training

- Ongoing leak detection efforts.





Non-Revenue Water

The total water purchased in October was 71.784 million gallons. Non-revenue water totaled -22.223 million gallons with 1.852 million gallons in apparent losses, -24.448 million gallons in real losses, and 374,000 gallons for unbilled authorized consumption. The negative values for real losses this month result from a continuing transition into the lower seasonal demand period and the timing difference in the meter reading cycles. In July and August, we saw spikes in real losses, in September, we saw the inverse. The trailing twelve month (TTM) non-revenue water trend indicates the average non-revenue water over the past 12 months is 10.844 million gallons.

Permit Activity

October 2023 Development Activity

FY2023-2024	*This Month*	*Last Month*	*Fiscal Year-to-Date*	*This Month Last Year**	*Last Year-to-Date*
Pre-applications Conferences	2	0	4	1	10
New Erosion Control Permits	2	1	6	3	12
New Development Permits	0	2	5	3	5
New Utility Permits	8	4	21	5	23
Wastewater Connections		1	10	0	3
Sanitary SDC Fees Received	$5,165	$5,165	$56,815.00	$0	$15,495
Water SDC Fees Received	$6,248	$35,155	$230,087.00	$0	$101,967
Plan Review Fees Received	$1,300	$5,418	$11,493.41	$1,816	$9,051
Inspection Fees Received	$0	$0	$1,640.00	$1,120	$6,318

Attachments

1. DEQ Memo
2. Development Tracker

OAK LODGE
WATER SERVICES

Memo

To:	Oregon Department of Environmental Quality
From:	Brad Albert, Public Works Director / District Engineer
Re:	LID/GI Strategy: MS4 Permit #101348; Oak Lodge Water Services
Date:	November 2023

Summary: The purpose of this memo is to address the requirement to submit a Low Impact Development (LID) and Green Infrastructure (GI) Strategy for Oak Lodge Water Services (OLWS) per the Clackamas County group's Phase I National Pollutant Discharge Elimination System (NPDES) municipal separate storm sewer systems (MS4) #101348 (Clackamas NPDES MS4 permit October 1, 2021), Schedule A.3.e.ii. This permit deliverable requests clarification of the jurisdiction's strategy prioritizing Low Impact Development (LID) and Green Infrastructure (GI) to the maximum extent feasible by December 1, 2023.

Background: In the OLWS NPDES MS4 Permit, prioritization of Low Impact Development & Green Infrastructure is required:

> *"The co-permittees must, by December 1, 2023, review and update or develop and begin implementation of a strategy to require to the maximum extent feasible, the use of Low Impact Development and Green Infrastructure (LID/GI) design, planning, and engineering strategies intended to minimize effective impervious area or surfaces, and reduce the volume of stormwater discharge and the discharge of pollutants in stormwater runoff from development and redevelopment projects."*

Current Standards: Prioritized LID/GI: OLWS' current Design and Construction Standards (Standards) encourages and requires LID/GI components. These Standards are used to authorize and size many GI and vegetated surface water management facilities (SMFs). Specifically, Section 2.1005.04 Water Quality Standards prioritizes open, vegetated treatment facilities with other, alternative systems only approved with an exception by OLWS. The Standards reference the City of Portland's Stormwater Management Manual (SWMM) for selection and sizing of vegetated SMFs. Facilities typically approved include water quality swales, detention ponds/infiltration trenches, bioswales, downspout disconnections, subsurface infiltration, and tree box filters.

Based on precedence and practice, Oak Lodge typically only approves GI for sites that have sufficient infiltration rates.

The existing standards require infiltration analyses, and based on that analysis, allow for use of GI including raingardens, infiltration planters, bioretention, etc.. In all cases, Oak Lodge requires equivalent water quality treatment performance whether using GI or other vegetated SMFs.

The current Standards encourage, but do not require LID approaches such as impervious area reduction techniques (i.e., pervious pavement, green roofs, downspout disconnections) to the maximum extent feasible as required in the recent NPDES MS4 Phase I Permit. OLWS' Rules and Regulations do contain riparian buffer requirements and riparian tree retention as well as mitigation requirements, which further support LID principles but those are not detailed in conjunction with the District's Standards. As such, additional refinement of the District's Standards by the December 1, 2024 deadline are anticipated.

Future Standards: OLWS anticipates adopting applicable elements of Water Environment Services (WES') recently adopted (June 2023) Stormwater Standards. WES is also a co-permittee on the Clackamas Phase I NPDES MS4 Permit. Given the unique ownership situation of stormwater assets in OLWS, as well as a desire to maintain regional consistency, WES' updated stormwater standards were selected for tailoring and adoption. OLWS has observed hydromodification issues, and adoption of the WES standards, which have a defined focus on flow control, is seen as a distinct benefit.

Implementation of the current set of OLWS Standards has resulted in the installation of numerous GI-type facilities and they will continue to be implemented until the update in 2024. Tailoring WES' Stormwater Standards to OLWS's particular needs will bring in the benefits of the new MS4 Permit requirements. Thus, LID/ GI will continue to be prioritized until OLWS' Standards are updated and adopted Adopting provisions of WES' 2023 Stormwater Standards will enhance the OLWS water quality treatment standards and further comply with the requirement of MS4 permit section 3.e.ii, Prioritization of Low Impact Development & Green Infrastructure.

Project Status	*Address*	*Type of Development*	*Notes*	*Last Updated*
Under Construction	4410 SE Pinehurst Ave.	Residential: 17-lot Subdivision	Final Inspections Pending. Next step: asbuilt review and bond release.	Nov. 1, 2023
Under Construction	16305 SE Oatfield Rd.	Residential: 12-lot Subdivision	OLWS Inspections Occuring	Nov. 1, 2023
Under Construction	15603 SE Ruby Dr.	Residential: 3-lot Partition	OLWS Inspections Occuring	Nov. 1, 2023
Under Construction	6364 SE McNary Rd.	Residential: 15-lot Partition	Final Inspections Pending. Next step: asbuilt review and bond release.	Nov. 1, 2023
Under Construction	2316 SE Courtney Ave.	Residential: 14 rowhomes and 6 single family dwellings	OLWS Inspections Occuring. (May 2023, Land Use Comments Sent for Middle Housing Proposal.)	Nov. 1, 2023
Under Construction	4322 SE Pinehurst Ave.	Residential: 7-lot subdivision	OLWS Inspections Occuring	Nov. 1, 2023
Under Construction	15717 SE McLoughlin	Bank and Restaurant	OLWS Inspections Occuring	Nov. 1, 2023
Under Construction	3421 SE Vineyard Rd.	Residential: Two tri-plexes and one duplex	OLWS Inspections Occuring	Nov. 1, 2023
Under Construction	21E11AB00100 (SE River Rd. @ SE Maple St)	Residential Tri-plex	Current OLWS Review	Nov. 1, 2023
Under Construction	21E11AB01100 (SE River Rd. @ SE Maple St)	Residential: 7-lot subdivision	OLWS Inspections Occuring	Nov. 1, 2023
Plan Review	3870 SE Hillside Dr.	Residential: Modification of previously approved 13-lot subdivision	Current OLWS Review	Nov. 1, 2023
Plan Review	3811 SE Concord Rd.	Concord School Library	Current OLWS Review	Nov. 1, 2023
Plan Review	16103 SE Southview Ave	Residential: 7-lot subdivision	Current OLWS Review	Nov. 1, 2023
Plan Review	15510 SE Wallace Rd.	Residential: 15-lot Partition	Land Use conditions sent to CC DTD. County land use expiration timeline.	Nov. 1, 2023
Plan Review	17025 SE Oatfield Rd	Residential: 2-lot subdivision	Current OLWS Review	Nov. 1, 2023
Plan Review	14928 SE Oatfield Rd	Residential 4-lot Partition	Current OLWS Review	Nov. 1, 2023
Plan Review	13822 SE Oatfield Rd	Residential: 26-unit Cottages	Current OLWS Review	Nov. 1, 2023
Pre-Application	6300 SE Roethe Rd.	Residential: 2-lot Partition	Pre-app Comments sent to CCDTD. County land use expiration timeline.	Nov. 1, 2023
Pre-Application	4833 SE Glen Echo Ave.	Residential: 2-lot partition	Pre-app Comments sent to CCDTD. County land use expiration timeline.	Nov. 1, 2023
Pre-Application	3214 SE Westview Ave.	Residential: 2-lot Partition	Pre-app Comments sent to CCDTD. County land use expiration timeline.	Nov. 1, 2023
Pre-Application	2750 SE Park Ave	Institutional: Add Two Floors To Existing Parking Garage	Pre-app Comments sent to CCDTD. County land use expiration timeline.	Nov. 1, 2023
Pre-Application	17605 SE Roethe Pl. and 21E13DB02000	Residential: 2-lot Partition	Pre-app Comments sent to CCDTD. County land use expiration timeline.	Nov. 1, 2023
Pre-Application	6418 SE Jennings Ave.	Residential: 8-lot Partition	Pre-app Comments sent to CCDTD. County land use expiration timeline.	Nov. 1, 2023
Pre-Application	13843 SE McLoughlin Blvd	Commercial: Drive Though Restaurant	Pre-app Comments sent to CCDTD. County land use expiration timeline.	Nov. 1, 2023
Pre-Application	14120 SE River Rd.	Residential: 5-Cottage Clusters	Pre-app Comments sent to CCDTD. County land use expiration timeline.	Nov. 1, 2023
Pre-Application	18521 SE River Rd	Recreational: Park Improvements	Pre-app Comments sent to CCDTD. County land use expiration timeline.	Nov. 1, 2023
Pre-Application	2600 SE Courtney Ave	Residential: Existing Multi-Family Façade Upgrades	Pre-app Comments sent to CCDTD. County land use expiration timeline.	Nov. 1, 2023

OAK LODGE
WATER SERVICES

STAFF REPORT

To	Board of Directors
From	David Hawkins, Plant Superintendent
Title	Plant Operations Monthly Report
Item No.	12d
Date	November 21, 2023

Summary

The Board has requested updates at regular meetings on the status of the OLWS operations.

Highlights of the Month

- Plant Process Update
- E. Coli Excursion
- Winterization of WWTP
- Geotechnical Updates for Tertiary Filters

Wastewater Treatment Plant

Treatment at the Wastewater Treatment Plant (WWTP) continued to be good in the month of October. Fall can be a challenging time for wastewater treatment, as the biological process undergoes the seasonal change. As the incoming water gets cooler the bacteria become more sluggish. To add to that, we start the slow transition out of nitrification/denitrification. This means that those warm weather nitrifier and denitrifier bacteria start to lose their foothold and the more resilient bacteria take over.

In wastewater parlance, we call this changing of the guard, “shoulder months” and if not monitored closely can lead to a degradation of effluent quality. Operations is happy to report as of the time of this writing, all permit requirements were met for the month. October also signals the end of the summer permit when our discharge levels are more stringent. During summer permit 2022, the WWTP experienced 4 months of noncompliance out of six whereas this year during summer permit, we only experienced 2 months of noncompliance. While this is good news, staff are still heavily focused on reaching the goal of total compliance year-round and eventually getting back on the NACWA Peak Performance Award cycle with gold (1-year of total permit compliance) and eventually platinum (5-years of total permit compliance).

Of the seventeen permitted levels that Oak Lodge Water Services (OLWS) reports every month, the most misunderstood and frustrating tests is the one for E. Coli using the Quanti-tray

System. Twice a week, staff must go out and collect a sample of treated and disinfected effluent. The analyst must then measure out 100 milliliters (mL) of sample and add a pillow of chemicals. That pillow acts not only as a food for the bacteria, but also adds a fluorescence to make the bacteria more identifiable (See pictures). Staff then pour the aliquot into a pouch with several bubbles that are filled with the liquid. The pouch is then sealed and placed into an incubator for 24 hours. After that, staff remove the pouch from the incubator and run a blacklight over it, counting the bubbles that glow under the light. The laboratory analyst then references a chart with the number of positive wells. This is referred to as the quantification of the Most Probable Number (MPN). If the MPN of a single sample is below 406, the test has passed. If the MPN is above 406, it means the test has failed.

A single E. Coli test above 406 MPN does not automatically mean a permit violation, however. If a single test is failed, it triggers an excursion which means that OLWS must retest five more times in the next 24 hours, meaning the laboratory must be staffed that night for testing, and then the next night when the tests are ready to be read. When all the test results are completed, the geometric mean of the five retests must be equal to or less than 126 MPN. If below 126 MPN, the excursion has been completed and no violation occurred. If the MPN is above 126, the retesting has failed and a violation is triggered.

In May of 2023, the WWTP experienced an excursion where the results of the retest were above 126 MPN, which triggered a violation which resulted in a warning letter. On October 25th, the treatment plant experienced another excursion, but the results of the retest were below 126 MPN, meaning that luckily a violation was averted.

As the hot weather and longer days give way to rain and longer nights, the staff at the WWTP are busy weatherizing the Plant. Operators start to back off excess spray hoses, isolate valves and water lines that are susceptible to freezing, and test redundant equipment that is not typically used in the low flows of summer. Operations is not the only group working on these preparations. Maintenance is also doing their part to protect against the upcoming winter weather as well. This fall, Maintenance mechanics Matt Kloer and Abe Merritt are building an enclosure for the grit system that sits atop the headworks. This equipment takes an especially bad battering in the freezing months. Not only is the equipment exposed, but it also sits high enough that the brutal east winds come through and can often get so cold that the rags and degritting systems will freeze any wet refuse on contact. Often times this will lead to massive icebergs of rags and grit that can fail the equipment out. The enclosure that Matt and Abe are working on will provide a wind block. When coupled with the heat from a simple flood light, this will help alleviate some of the freezing issues (see photo page).

Another telltale sign that things are progressing with the tertiary treatment project is the geotechnical survey of the land where the building and filters will be placed. In late October, Brown and Caldwell, the engineering consultants working for OLWS on the tertiary project, had another round of geotechnical surveying done. While the survey went off without a hitch, there was a sacrificial shrub that had to be removed for the drilling.

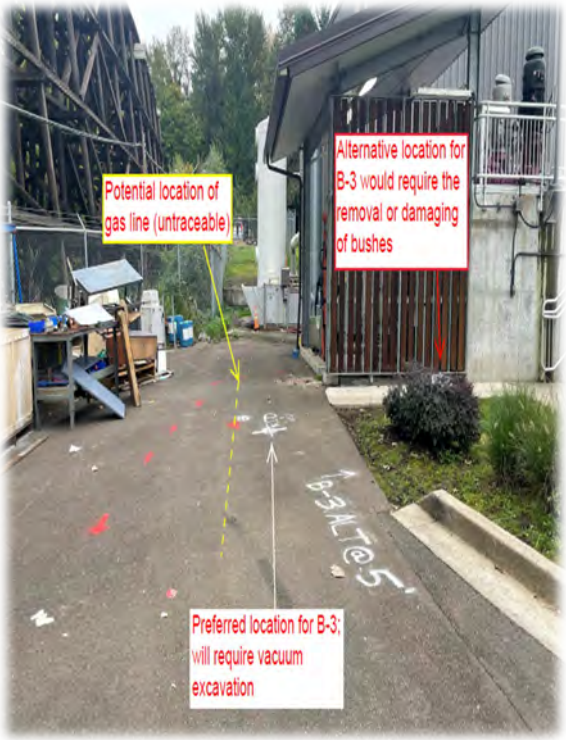
Attachments

1. Photo Pages of October 2023 Work
2. Rainfall vs. Flow Data Correlation for May-October 2023
3. Plant Performance BOD-TSS Graph for May-October 2023

Plant Operations Photo Page

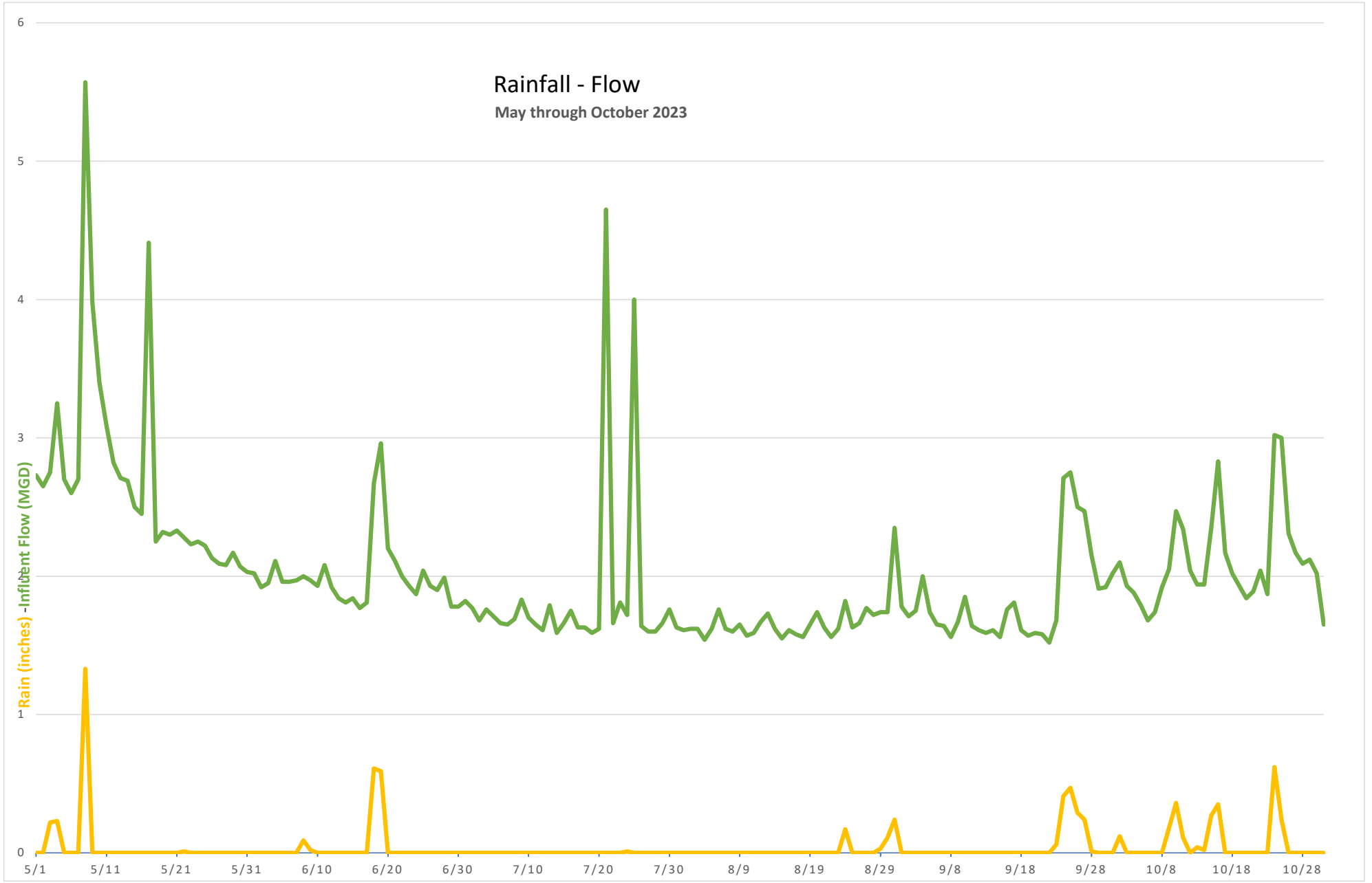
Failed E. Coli test (Left) and the retest (right)

Grit Snail Enclosure.



Overview of Geotechnical Location.

Sacrificial Bush


Rainfall - Flow
May through October 2023
Rain (inches) -Influent Flow (MGD)
6
5
4
3
2
1
0
5/1
5/11
5/21
5/31
6/10
6/20
6/30
7/10
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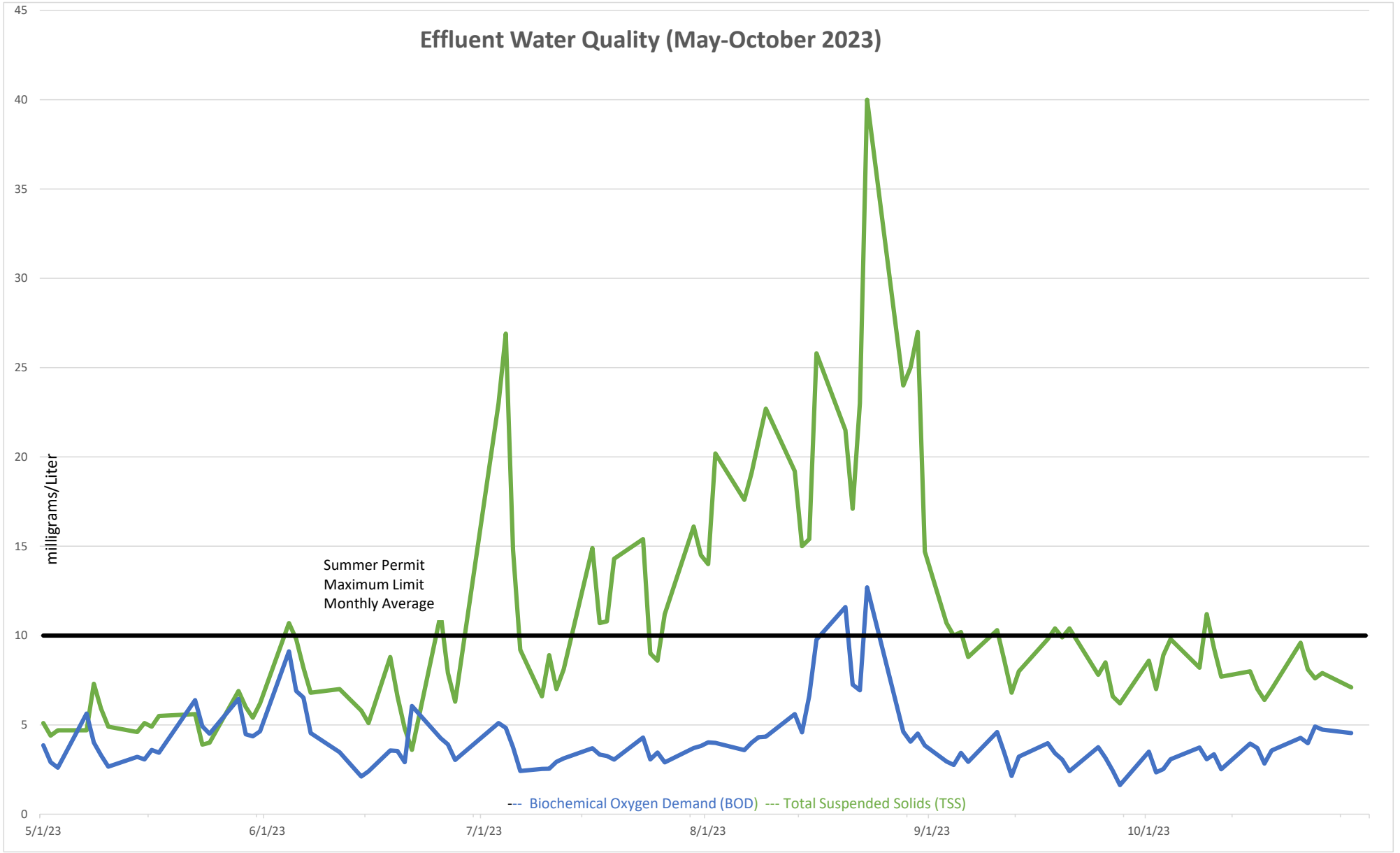
10/8
10/18
10/28


Effluent Water Quality (May-October 2023)
45
40
35
30
25
20
15
10
5
0
milligrams/Liter
Summer Permit
Maximum Limit
Monthly Average
--- Biochemical Oxygen Demand (BOD) --- Total Suspended Solids (TSS)
5/1/23
6/1/23
7/1/23
8/1/23
9/1/23
10/1/23

OAK LODGE
WATER SERVICES

AGENDA ITEM

Title Adjourn Meeting
Item No. 13

Summary

If there is no further business to be discussed, the Chair will note the time and adjourn the meeting.