System Capacity Analysis

Deception Park View Water System
PWS ID # 18305 H

Oak Harbor, WA 98277

January 2019

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CERTIFICATE OF ENGINEER
System Capacity Analysis for Deception Park View Water System

The technical material and data contained within this report has been prepared by or under the direction of the following registered professional engineer(s), licensed in accordance with the laws of the State of Washington to practice in the State of Washington.

QUICK REFERENCE PROJECT INFORMATION

General Project Information

Water System Name	Deception Park View Water System
Project Description	Capacity Analysis to Support Existing Water System
Well #1, Well #2, Reservoir, and Pumphouse Site	S6455-00-0000A-0 Oak Harbor, WA 98277 Owner: Deception Park View Community Association
System Contact	Terri Boonstra, Deception Park View Community Association
System Operator	King Water Company
System Engineer	Jeff Tasoff, P.E. Davido Consulting Group, Inc.

Project Summary

Service Connections	69 Approved Connections 65 Full-Time Single-Family Residences (Current)
Proposed Connections	100 ERUs
System Design Values	Average Day Demand = 200 gpd/ERU Maximum Day Demand = 450 gpd/ERU Peak Hour Demand = 104 gpm
Source Production	Source 01 (inactive) - Well #1 (AGA575) – 12 gpm Source 02 – Well #2 (AGA589) – 33 gpm
Water Rights	G1-00552C, Priority Date: May 3, 1968 Q_i = 45.0 gpm & Q_a = 40.0 Ac-Ft/year
Treatment	Chlorination dosing and residual
Storage	36,650 gallon Octagonal Concrete Reservoir (20.4’ diameter x 15’ tall) 33,500 gallon Cylindrical Concrete Reservoir (19.5’ diameter x 15’ tall)
Booster Pump	(2) 5 HP *Goulds 3656* (140 gpm @ 45 psi)
Cycle Stop Valves	(2) 2” Model B, 5 gpm bypass flow, Pressure Setting = 49 psi
Hydropneumatic Tanks	(2) 119-gallon *WellMate WM-35WB* Pressure Tanks
Pump Controls Proposed	Booster Pump #1 (lead pump): 43 – 55 psi Booster Pump #2 (lag pump): 39 – 53 psi
Pump Controls Current	Booster Pump #1 (lead pump): 46 - 58 psi Booster Pump #2 (lag pump): 42 - 56 psi

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1. PROJECT DESCRIPTION

This project details a capacity analysis performed on Deception Park View Water System to determine the system capacity based on current water usage. The factors involved in determining system capacity include source capacity, existing storage volume, water rights, booster pump and distribution system capacity. The Washington State Department of Health (DOH) design standards used to evaluate the system include:

- Provide peak demand flow rate while maintaining 30 psi at each service connection
- Adequate source capacity to meet maximum day demand if pumped less than 24 hours
- Adequate equalizing storage volume to meet the peak hour demand for 150 minutes
- Adequate stand-by storage volume for the temporary loss of the system's well
- Reliable operation (not subject to pressure loss or back flow
- Compliance with system's Water Right Permit(s) / Certificate(s)

2. EXISTING SYSTEM

The system is currently served by a single groundwater well (Well #2) with a submersible pump. The inactive source (Well #1) has been physically disconnected from the system and used only during emergencies. Well #2, installed in 1975, is 6-inch in diameter and 401 feet deep. The source is approved at a capacity of 33 gpm. Please see APPENDIX A for the WFI. Water right limitations set the maximum withdrawal rate from the well at 45 gpm. See APPENDIX C for copy of the system's Water Rights.

Source water from the system's well is chlorinated and discharged to two ground level octagonal and cylindrical concrete reservoirs with storage capacity of approximately 36,000 gal (20.4' diam. x 15' tall) and 33,000 gal (19.5' diam. x 15' tall), respectively. The reservoirs are located adjacent to the pumphouse/well at an elevation of approximately 101 feet. Float level switches control the operation of the well pump.

A booster pump station located within the pumphouse building provides pressurized water to the distribution system. The booster pump system is composed of two booster pumps with automated alternate operation. The booster pumps are Gould's model 3656, both with 5 horse power (HP) motors. The Gould's pumps are each capable of supplying 140 gpm at 45 psi. A cycle stop valve is installed on the discharge of each of the booster pumps. The cycle stop valves along with the two 119-gallon pressure tanks are provided to limit the number of pump starts. Refer to APPENDIX B for information on existing equipment. The emergency well (Well #1) is located adjacent to the pumphouse on the reservoir site.

The main distribution system is composed of 4" polyvinyl chloride pipes (PVC). The total installed pipe length is estimated at 4,500 linear feet. The served parcels are located at an elevation range of 25-110' above sea level. The system is served by a single pressurized distribution system. The booster pumps are currently located at 100 feet elevation with pump on pressure of 46 psi (105') and pump off pressure of

58 psi (135'), which equates to distribution pressure range of 43 to 91 psi. The well, pumphouse and existing reservoir locations are highlighted below in Figure 1. Refer to APPENDIX H for topographic map.

Figure 1 Service Area Map

There are currently 65 connections within the service area. The original system map indicates up to 100 buildable lots within the existing service area. The system is not planning on expanding the existing service area but would like to ensure that adequate service connections are available for infilling the existing lots within the service area.

3. WATER QUANTITY & WATER RIGHTS

3.1 Water Usage

Water usage from the last six years (2013 -2018) was analyzed to determine current design values for the system. The system is composed of mostly full-time residences, so the annual average is a good reflection of typical system usage. Refer to Table 1 below for summary of water usage data.

Table 1 Water Usage Summary

Year	ADD (gpd/ERU)	Summer ADD (gpd/ERU)	MMAD (gpd/ERU)	MDD (gpd/ERU)
2013	114	126	165	280
2014	123	147	168	285
2015	142	162	201	343
2016	150	172	247	419
2017	112	126	191	325
2018	136	148	172	293
Average	130	147	191	324
Minimum	112	126	165	280
Maximum	150	172	247	419
Recommended	200			450

The annual average day demand (ADD) for this period is 130 gpd/ERU. The highest summer (June-September) ADD value from the last 6 years is approximately 172 gpd/ERU. The maximum day demand (MDD) could not be determined from actual water usage data due to a lack of daily source meter readings. Therefore, a multiplier of 1.7 is used to estimate MDD from the maximum monthly average day demand (MADD). The design MADD is 247 gpd/ERU which equates to MDD value of 419 gpd/ERU. For a conservative analysis, the system ADD will use the summer ADD rounded up to 200 gpd/ERU. Likewise, the MDD will be rounded up to 450 gpd/ERU.

The monthly data was plotted to compare year-to-year trends (see Figure 2), and although the 2016 usage was higher than usual, the peak usage occurred in August which is typically a potentially high-water usage month. No other unusual spikes were detected that could suggest a major system leak. The 2016 water usage data appears valid and was included in this analysis.

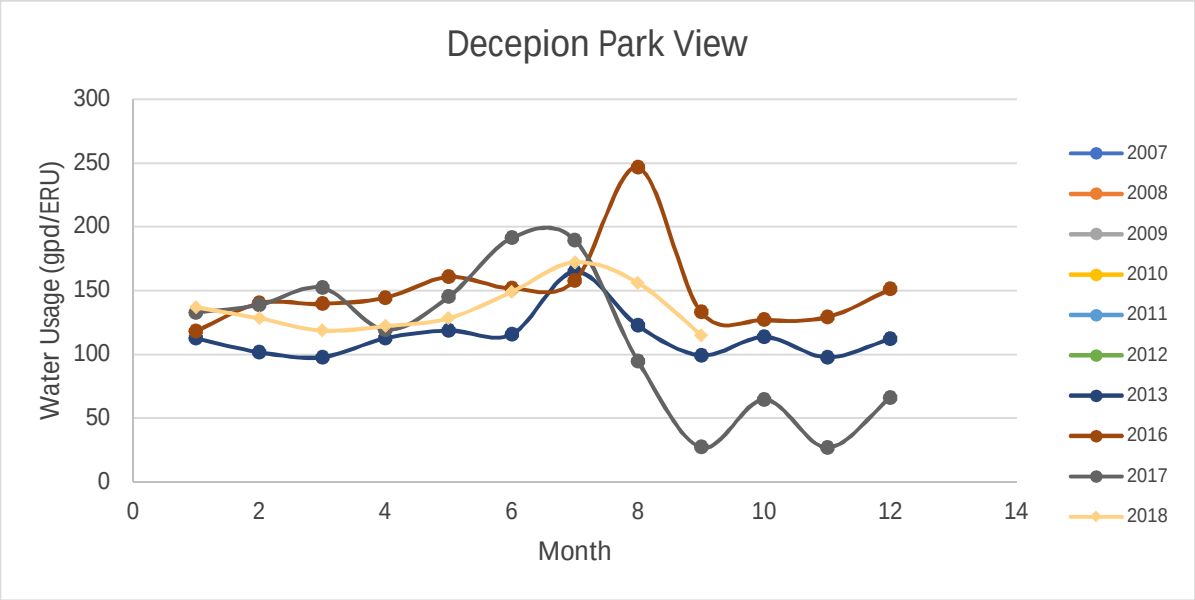

Figure 2 Monthly Water Usage by Year

3.2 Water Rights

Water Right number G1-00552C (Priority Date: May 3, 1968) has been granted for Well #1. The water right allows for total instantaneous withdrawal of 45.0 gpm and an annual withdrawal of 40.0 ac-ft/yr. This water right was amended on September 13, 1999 to include Well #2 as a source. The approved capacity of Well #2 at 33 gpm is less than that allowed by the existing water right instantaneous withdrawal limit of 45 gpm. See APPENDIX C for copy of the system's Water Rights and DOE letter for the amendment of the water right.

4. SYSTEM CAPACITY

4.1 Source Capacity Adequacy

The system source should have the capacity to supply the anticipated maximum day demand.

$$Source\ Capacity\ (gpm) = \frac{MDD\ \cdot ERUs}{minutes\ pumped}$$

$$ERU = \frac{pump\ rate\ \cdot minutes\ pumps}{MDD}$$

$$ERU = \frac{33\ gpm\ \cdot 1440\ minutes/day}{gpd/ERU}$$

$$= 105\ ERUs$$

The current source capacity is the limiting factor for the water system at 105 connections However the system only has 100 potential parcels within their existing service area, so a maximum of 100 connections will be adequate to allow the system to service its entire existing service area.

4.2 Treatment System Adequacy

The system currently only has a chlorination system to disinfect the source water. The existing chlorination system is designed to meet the system's well capacity of 33 gpm. The system has adequate standby storage to provide in excess of 33 minutes of contact time at the peak hour demand of 104 gpm. Therefore, the treatment system can meet the system's anticipated maximum day demand as shown in the calculations provided in APPENDIX E.

4.3 Water Rights

The water right for the well allows for total instantaneous withdrawal of 45.0 gpm and an annual withdrawal of 40.0 ac-ft/yr.

The annual water usage at full build-out is estimated by the following equation:

$$ADD \cdot \#ERUs \cdot 365\ days = Annual\ Withdrawal$$

Based upon the ADD value of 200 gpd/ERU and the maximum potential ERU of 100, the estimated annual withdrawal is:

$$\frac{200\,\frac{gpd}{ERU} \cdot 100\ ERUs \cdot 365\ days}{43{,}560\,\frac{\text{ft}^2}{\text{ac}} \cdot 7.48\,\frac{\text{gallons}}{\text{ft}^3}} = 22.4\ \text{ac} \cdot \frac{\text{ft}}{\text{year}}$$

The estimated annual withdrawal at maximum potential is less than the current water right limit of 40.0 ac-ft/year. The system's well current capacity of 35 gpm and the approved capacity of 33 gpm are below the water right instantaneous withdrawal rate of 45 gpm. Please see a copy of the water right self-assessment provided in Appendix C.

4.4 Peak Hour Demand

The "Water System Design Manual", Equation 5-3, was used to obtain the estimated Peak Hour Demand (PHD) based upon the MDD and the source limited capacity of 100 ERUs. The equation uses the MDD and the number of potential connections to determine the PHD flowrate.

The number of connections was set to 100 to reflect the needed system capacity.

$$PHD = \frac{MDD(C \cdot N + F)}{1440} + 18$$

N = number of potential connections, 100 connections
C = coefficient based on system size

F = coefficient based on system size
MDD = 450 gpd/ERU

The coefficients utilized in the above formula are dependent upon the number of connections served. The coefficients are listed in Table 2.

Table 2 Peak Hour Demand Calculation Coefficients

Range of ERUs	C	F
15-50	3.0	0
51-100	2.5	25
101-250	2.0	75
251-500	1.8	125
501-1,000,000	1.6	225

The system peak hour demand (PHD) is calculated to be 104 gpm for 100 ERUs, as shown in APPENDIX E.

4.5 System Design Values

Based upon the analysis and calculations performed in the previous two sections, the system design values are summarized in Table 3 below:

Table 3 System Design Values

Parameter	Value
Average Day Demand	200 gpd/ERU
Maximum Day Demand	450 gpd/ERU
Peak Hour Demand	104 gpm

4.6 Booster Pumps

The booster pump system has a redundant pumping system composed of two Goulds 3656 pumps with 5 HP motors. The pumps are each capable of providing 140 gpm at 45 psi during normal operation. A pump curve was located and is provided in APPENDIX B. Each of these pumps are adequate to meet the PHD of 104 gpm for the system. The system can therefore meet the PHD requirements with one of the booster pumps out of service. An electrical analysis of the system was not performed but it was noticed that an emergency generator has been installed on this system. It is assumed that the generator was installed to provide power to at least a single booster pump to keep the system pressurized in the event of a power outage.

4.7 Pressure Tank

Pressure tanks are already installed for pump protection. The pneumatic tank sizing equation for bladder tanks is provided as Equation 11-3:

Total Volume Required:

$$V_T = \frac{R \cdot Q_P}{N_C}$$

$$V_T = \frac{15\,(P_1 + 14.7)(P_2 + 14.7)}{(P_1 - P_2)\,(P_2 + 9.7)}$$

Where:

V_B = Total Volume Required (gallons)
P_1 = pump off pressure (55 psi)
P_2 = pump on pressure (43 psi)
Qp = pump capacity (125 gpm) at the midpoint (49 psi)
N_C = number of pump starts per hour. Since a duplex alternating pumping system is being specified, a total of 12 starts will be allowed per hour (6 starts for each pump).
R = 95.4

Based upon the above parameters, a total volume of 994 gallons of storage is needed for the existing booster pump system operation range using a standard pressure tank configuration.

The system does have two cycle stop valves (CSV) installed between each booster pump and pressure tank. These valves increase pump runtimes to decrease the number of pump starts, however the increased runtimes would appear to increase the overall energy consumption. Per the DOH Group A Water System Design Manual, the minimum withdrawal volume is 10 times the minimum by-pass flow for the CSV. It is anticipated that this would provide an estimated ten minutes of pump-off time when the demand is low before restarting, effectively limiting the number of pump starts to less than 6 per hour. The bypass flowrate for the cycle stop valves is listed at 5 gpm. This would equate to a drawdown volume of 50 gallons.

The system currently provides two 119 gallon pressure tanks or a total of 238 gallons of storage. At the above pressure setting, the drawdown factor is approximately 0.15 from look up tables (refer to APPENDIX B), which would equate to approximately 36 gallons of drawdown. This is below the minimum 50 gallons indicated. However, since there are two booster pumps and if these pumps are configured in a lead/lag/alternate configuration, an additional six starts per hour is provided by the second pump and the existing pressure tank volume would appear adequate.

4.8 Storage

The system is supplemented by two 15’ tall concrete reservoirs. One of the reservoirs is octagonal and other is cylindrical with an effective inside diameter of 20.4’ and 19.5’, respectively. The total capacity is 70,200 gallons or 4,680 gallon/foot of height. The reservoir provides the following storage components:

- Operational Storage (OS)
- Equalizing Storage (ES),
- Stand-by Storage (SBS) and
- Dead Storage (DS)

Operational storage is the height difference between where the well pumps are turned on and off. Equalizing storage is defined as the volume of storage needed to supplement the sources when the peak hourly demand exceeds the total source pumping capacity. Stand-by storage is defined as the volume of stored water available for use during a loss of well production, such as from a power interruption, well pump failure, or similar short-term emergency. Dead storage is the portion of the reservoir that is not usable for storage. Dead storage includes the volume at the top that is needed for installation of the overflow pipe and the offset at the bottom of the tank that is used for silt accumulation.

Operational Storage (OS) is the amount of volume that is needed to supply the system when the well pumps are off. This prevents the excess cycling of well pumps, in a similar manner that bladder tanks provide pump protection. It is assumed that one half of a foot (6") of elevation difference exists between the well pump on and off signals.

$$OS = 0.5\ foot \cdot 4{,}680 \frac{gallons}{foot} = 2{,}340\ gallons$$

$$\frac{2{,}340\ gallons}{33\ gpm\ (well\ production)} = 70\ minutes\ of\ runtime$$

The submersible well pump will run for at least one hour after each start. Therefore, the submersible well pumps will not have more than 1 start per hour. The OS is adequate to minimize the number of submersible pump starts per hour.

Equalizing Storage (ES) is the volume of water that is needed to meet the peak demand period for the water system. From Equation 9-1:

$$ES\ (gallons) = (PHD - Qs) \cdot 150\ minutes$$

Where:

PHD = peak hour demand, 100 gpm (Refer to Section 2.2 above);
Qs = well pump capacity, 33 gpm;

$$ES = (100 - 33)\ gpm \cdot 150\ minutes = 10{,}650\ gallons\ (or\ 2.3\ feet)$$

Dead Storage (DS) is the unusable volume at the top and bottom of the tank. Approximately six inches (6") is provided at the top for the overflow pipe (freeboard) and additional six inches (6") at the bottom of the tank. Therefore, a total of twelve inches (12") or one foot (1.0') of dead storage is provided.

$$DS = 1.0\ foot \cdot 4{,}680 \frac{gallons}{foot} = 4{,}680\ gallons$$

The amount of water available as standby storage can be assumed to be the amount of storage not already utilized.

$$SB\ Storage = Total\ Reservoir\ capacity - OS - ES - DS$$

$$SB\ Storage = 70{,}200 - 2{,}340\ gallons - 10{,}650 - 4{,}680 = 52{,}500\ gallons\ (11.2\ feet)$$

Standby storage (SB) is the volume of water that would be needed to supply the system in case of a problem with the source. The minimum recommended volume is 200 gallons per ERU. The available standby storage has a capacity to support up to 127 ERUs. The desired standby storage at the proposed 100 ERUs:

$$SB\ storage\ (desired) = (2)(ADD)(N)$$

$$SB\ storage\ (desired) = 2 \cdot \frac{200gpd}{ERU} \cdot 100\ ERUs = 40{,}000\ gallons\ (or\ 8.5\ feet)$$

The existing reservoir provides approximately 52,500 gallons of stand-by storage (or 525 gallons per ERU). This exceeds the minimum recommended stand-by storage volumeADD and is more than 3 times (or three plus days of storage) during the typical summer demand.

This is an existing non-expanding water system and is not required to provide fire flow. However, the reservoir was also analyzed to determine if fire flow storage volume was provided to determine the feasibility of adding fire flow capability in the future. Residential fire flow requirement is 500 gpm for 30 minutes or 15,000 gallons of storage. Since fire flow storage may be nested with standby storage and the standby storage is in excess of 15,000, the reservoir does provide adequate fire suppression storage as currently installed. The provided storage volumes are summarized in Table 4 below.

Table 4 Reservoir Sizing (Current Usage)

Storage Component	Vol (gal)	Res VF
Top Dead Storage	2,340	0.5
Operational Storage (OS)	2,340	0.5
Equalizing Storage (ES)	10,650	2.3
Standby Storage (SB)	52,500	11.2
Fire Suppression Storage (FSS)	*(15,000)*	*(3.2)*
Bottom Dead Storage (DS)	2,340	0.5
Totals:	70,200	15.0

4.9 Water Age

Water age may sometimes become a problem in storage reservoirs, especially when the system is not at its maximum design capacity. The average age of the water in the reservoir is calculated based upon the lowest recorded average day demand of 27 gpd/ERU recorded in 2017. Based upon the existing 65 ERUs, this equates to 1,800 gallons.

$$Water\ Age\ = \frac{Storage\ Volume}{ADD \cdot ERU}\ =\ 54{,}8900\frac{gallons}{1{,}800}gallons\ per\ day\ =\ 30\ days$$

It is recommended that complete turnover of water should occur at least every three to five days. The water in the reservoir does not have adequate turnover during winter months. If the system receives complaints, an aeration system or recirculation pump may be needed.

4.10 SWI Analysis

The SWI analysis provided in APPENDIX H indicates that there is low risk with sea water intrusion. Therefore, there are no existing concerns with increasing the annual withdrawal rate to support the proposed additional service connections.

4.11 Limiting Component

The summary of capacity analysis based on the system's components is provided using Table 5 below and calculations for this analysis are provided in APPENDIX E.

Table 5 System Capacity Components

Component	Maximum Value	Potential Connections
Instantaneous Water Right, Qi	45.0 gpm	144
Annual Water Right, Qa	40.0 ac-ft/year	178
Source Capacity	33 gpm	105
Booster Pumps Capacity	140 gpm @ 45 psi	158
Standby Storage Capacity	53,400	133

The source capacity was determined to be the limiting factor, with the existing capacity of 33 gpm a total of 105 ERUs can be supported. The original system map indicates up to 100 buildable lots within the existing service area. Therefore, the system is requesting a total of 100 ERUs to provide an adequate number of service connections to complete the infilling of the existing service area.

5. IMPROVEMENTS

5.1 Required Improvements

- The system's current pressure setting results in high pressure at the lowest service elevation areas of approximately 25 - 50 feet. The recommended distribution system maximum pressure is typically 80 to 90 psi to reduce the risk of leaks. The delivered pressure can be up to 91 psi at the lowest service elevations. The anticipated minimum pressure at the highest service elevation is 43 psi, which is slightly above the desired minimum recommended service pressure of 40 psi. The lead pump on and off pressure should be lowered 3 psi to 43 and 55 psi to decrease the maximum system pressure to approximately 88 psi, while keeping the minimum pressure at 40 psi. Alternatively, individual pressure reducing valves (PRV) could be installed to reduce system's pressure in the lower elevation areas. Individual PRV should be set between 40-50 psi.
- Confirm that the pressure setting of the cycle stop vales are in the midpoint of the lead pump pressure settings. The cycle stop valves are currently not operating properly and as a result, the pumps are running continually and not building pressure. It is recommended that the cycle stop valves are fixed or replaced. The system should review their past electrical charges to determine the impact that the cycle stop valves have on the overall system electrical usage.
- The booster pump should be configured in a lead/lag/alternate configuration. The electrical controls should be investigated to determine if this is the current system configuration. If not, an alternator module such be installed to provide the required configuration.

5.2 Recommended Improvements

- The system has experienced leaks and water main repairs in the past. Monies should be budgeted to replace the aging mains. A preliminary budget number for waterline replacement is $200 per linear foot.
- The system is reliant upon a single source. Development of a second source is recommended.
- The water in the reservoir does not have adequate turnover. If this becomes problematic for the customers, the probe setting in the reservoir may be modified to decrease the amount of stored water. These could be adjusted seasonally if needed to balance operational needs. Installation of aeration or recirculation system may also help with water quality if needed.
- An Operations and Maintenance Manual (O & M manual) should be created and maintained. This manual would list the current operational configuration of the system and provide information on the installed equipment and their settings and/or capacities.
- Fireflow could be added to the system with additional booster pumps and upsized watermains. The residential fireflow requirement in Island County is 500 gpm for 30 minutes. Adequate reservoir capacity is currently provided. If desired by the community, the system should plan future upgrades to support adding fireflow. The watermain piping will need to be increased to at least 6" diameter to support the additional flow rates.
- The chlorination tank is currently located close to the pump controls. In order to avoid rusting of the controls, it is advised that the chlorination pump is relocated away from the pump controls in the available space near the northeast corner of the pumphouse. Alternatively, the storage room

located west of the pumphouse can be used as a treatment building to house the chlorination tank and injection point.

- It is recommended that the well enclosure for Well #1 (SO1) is replaced to prevent rodent infestation and to provide good weather protection.

APPENDIX A Existing System Information

WATER FACILITIES INVENTORY (WFI) FORM

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

ONE FORM PER SYSTEM

Quarter: 2
Updated: 10/12/2018
Printed: 11/28/2018
WFI Printed For: On-Demand
Submission Reason: No Change

RETURN TO: Central Services - WFI, PO Box 47822, Olympia, WA, 98504-7822

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
18305 H	DECEPTION PARK VIEW	ISLAND	A	Comm

6. PRIMARY CONTACT NAME & MAILING ADDRESS	7. OWNER NAME & MAILING ADDRESS	8. OWNER NUMBER: 001440
SANDRA V. BODAMER [CONTACT] KING WATER CO PO BOX 2243 OAK HARBOR, WA 98277	DECEPTION PARK VIEW COMM ASSN TERRI BOONSTRA PO BOX 2446 OAK HARBOR, WA 98277	PRESIDENT
STREET ADDRESS IF DIFFERENT FROM ABOVE	**STREET ADDRESS IF DIFFERENT FROM ABOVE**	
ATTN KING WATER CO. ADDRESS 107 SOUTH MAIN ST. STE. A-203 CITY COUPEVILLE STATE WA ZIP 98239	ATTN ADDRESS CITY STATE ZIP	

9. 24 HOUR PRIMARY CONTACT INFORMATION		10. OWNER CONTACT INFORMATION	
Primary Contact Daytime Phone: (360) 678-5336		Owner Daytime Phone: (360) 675-6252	
Primary Contact Mobile/Cell Phone: (360) 969-1019		Owner Mobile/Cell Phone:	
Primary Contact Evening Phone: (xxx)-xxx-xxxx		Owner Evening Phone:	
Fax: (360) 678-8302	E-mail: xxxxxxxxxxxxxxxxxxx	Fax:	E-mail: xxxxxxxxxxxxxxxxxxx

11. SATELLITE MANAGEMENT AGENCY - SMA (check only one)

- ☐ Not applicable (Skip to #12)
- ☐ Owned and Managed
- ☒ Managed Only
- ☐ Owned Only

SMA NAME: KING WATER COMPANY SMA Number: 128

12. WATER SYSTEM CHARACTERISTICS (mark all that apply)

- ☐ Agricultural
- ☐ Commercial / Business
- ☐ Day Care
- ☐ Food Service/Food Permit
- ☐ 1,000 or more person event for 2 or more days per year
- ☐ Hospital/Clinic
- ☐ Industrial
- ☐ Licensed Residential Facility
- ☐ Lodging
- ☐ Recreational / RV Park
- ☒ Residential
- ☐ School
- ☐ Temporary Farm Worker
- ☐ Other (church, fire station, etc.):

13. WATER SYSTEM OWNERSHIP (mark only one)

- ☒ Association
- ☐ City / Town
- ☐ County
- ☐ Federal
- ☐ Investor
- ☐ Private
- ☐ Special District
- ☐ State

14. STORAGE CAPACITY (gallons)

70,000

15	16	17	18									19			20	21						22	23	24			
	SOURCE NAME	INTERTIE	SOURCE CATEGORY									USE			TREATMENT							DEPTH		SOURCE LOCATION			
Source Number	LIST UTILITY'S NAME FOR SOURCE AND WELL TAG ID NUMBER. Example: WELL #1 XYZ456 IF SOURCE IS PURCHASED OR INTERTIED, LIST SELLER'S NAME Example: SEATTLE	INTERTIE SYSTEM ID NUMBER	WELL	WELL FIELD	WELL IN A WELL FIELD	SPRING	SPRING FIELD	SPRING IN SPRINGFIELD	SEA WATER	SURFACE WATER	RANNEY / INF. GALLERY	OTHER	PERMANENT	SEASONAL	EMERGENCY	SOURCE METERED	NONE	CHLORINATION	FILTRATION	FLUORIDATION	IRRADIATION (UV)	OTHER	DEPTH TO FIRST OPEN TERVAL IN FEET	CAPACITY (GALLONS PER MINUTE)	1/4, 1/4 SECTION	SECTION NUMBER	TOWNSHIP	RANGE
S01	WELL #1 (AGA575)		X											X	Y	X						163	12	NE SW	35	34N	01E
S02	WELL #2 (AGA589)		X									X			Y		X					285	~~26~~	NE SW	35	34N	01E

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WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
18305 H	DECEPTION PARK VIEW	ISLAND	A	Comm

	ACTIVE SERVICE CONNECTIONS	DOH USE ONLY! CALCULATED ACTIVE CONNECTIONS	DOH USE ONLY! APPROVED CONNECTIONS
25. SINGLE FAMILY RESIDENCES (How many of the following do you have?)		67	69
A. Full Time Single Family Residences (Occupied 180 days or more per year)	67		
B. Part Time Single Family Residences (Occupied less than 180 days per year)	0		
26. MULTI-FAMILY RESIDENTIAL BUILDINGS (How many of the following do you have?)			
A. Apartment Buildings, condos, duplexes, barracks, dorms	0		
B. Full Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied more than 180 days/year	0		
C. Part Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied less than 180 days/year	0		
27. NON-RESIDENTIAL CONNECTIONS (How many of the following do you have?)			
A. Recreational Services and/or Transient Accommodations (Campsites, RV sites, hotel/motel/overnight units)	0	0	0
B. Institutional, Commercial/Business, School, Day Care, Industrial Services, etc.	0	0	0
28. TOTAL SERVICE CONNECTIONS		67	69

65

65

65

29. FULL-TIME RESIDENTIAL POPULATION

A. How many residents are served by this system 180 or more days per year? 180

30. PART-TIME RESIDENTIAL POPULATION	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
A. How many part-time residents are present each month?												
B. How many days per month are they present?												

31. TEMPORARY & TRANSIENT USERS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
A. How many total visitors, attendees, travelers, campers, patients or customers have access to the water system each month?												
B. How many days per month is water accessible to the public?												

32. REGULAR NON-RESIDENTIAL USERS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
A. If you have schools, daycares, or businesses connected to your water system, how many students daycare children and/or employees are present each month?												
B. How many days per month are they present?												

33. ROUTINE COLIFORM SCHEDULE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
* Requirement is exception from WAC 246-290	1	1	1	1	1	1	1	1	1	1	1	1

34. NITRATE SCHEDULE	QUARTERLY	ANNUALLY	ONCE EVERY 3 YEARS
(One Sample per source by time period)			

35. Reason for Submitting WFI:

☒ Update - Change ☐ Update - No Change ☐ Inactivate ☐ Re-Activate ☐ Name Change ☐ New System ☐ Other _____

36. I certify that the information stated on this WFI form is correct to the best of my knowledge.

SIGNATURE: Senait DATE: 1/31/2019

PRINT NAME: Senait Gebeeyesus TITLE: Engineer I

Well #2

Owner's Copy
Driller's Copy

STATE OF WASHINGTON

WELL #2

Permit No.

RECEPTION PARK WELL

OWNER: Name Community Action Council Address 4086 400 AVE W Oak Harbor WA 98277

LOCATION OF WELL: County ISLAND NE ¼ SW ¼ Sec 35 T 32 N. R 1 E WM.

Bearing and distance from section or subdivision corner.

(3) PROPOSED USE: Domestic ☐ Industrial ☐ Municipal ☑
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) 3
New well ☑ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☑ Driven ☐
Reconditioned ☐ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 401 ft. Depth of completed well 289 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6" Diam. from 0 ft. to 285 ft.
Threaded ☐ ____" Diam. from ____ ft. to ____ ft.
Welded ☑ ____" Diam. from ____ ft. to ____ ft.

Perforations: Yes ☐ No ☑
Type of perforator used
SIZE of perforations ____ in. by ____ in.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.

Screens: Yes ☑ No ☐
Manufacturer's Name Cook
Type RED BRASS Model No. [illegible]
Diam. 6 Slot size 30 from 285 ft. to 289 ft.
Diam. ____ Slot size ____ from ____ ft. to ____ ft.

Gravel packed: Yes ☐ No ☑ Size of gravel:
Gravel placed from ____ ft. to ____ ft.

Surface seal: Yes ☑ No ☐ To what depth? 18'+ ft.
Material used in seal
Did any strata contain unusable water? Yes ☐ No ☑
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level (+33) 90+ ft.
Static level 90 – ft. below top of well Date OCT 75
Artesian pressure ____ lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☑ No ☐ If yes, by whom? BOB'S PUMPS
Yield: 30 gal./min. with 41 ft. drawdown after 4 hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
5 min	84'6"				

Date of test 10-23-75
Bailer test 20 gal./min. with 105 ft. drawdown after 4 hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☑ No ☐

(10) WELL LOG:
Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
HARD PAN	0	18
SAND	18	31
SANDY CLAY	31	81
DRY SAND	81	124
CLAY	124	150
WATER SAND	150	156
GRAVELY CLAY	156	161
(GOOD) WATER SAND	161	193
CLAY	193	269
WATER SAND	269	277
HARD PAN	277	284
GOOD WATER GRAVEL	284	289
CLAY	289	401
STILL IN CLAY	401	

Work started July 19 75 Completed OCT 7 19 75

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME WHIDBEY WELL DRILLERS
(Person, firm, or corporation) (Type or print)

Address OAK HARBOR WN

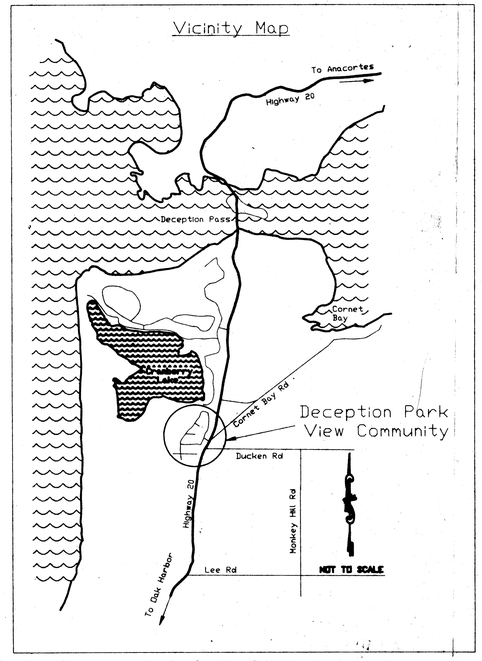
[Signed] [signature]
(Well Driller)

License No. 0129 Date OCT 19 75

(USE ADDITIONAL SHEETS IF NECESSARY)

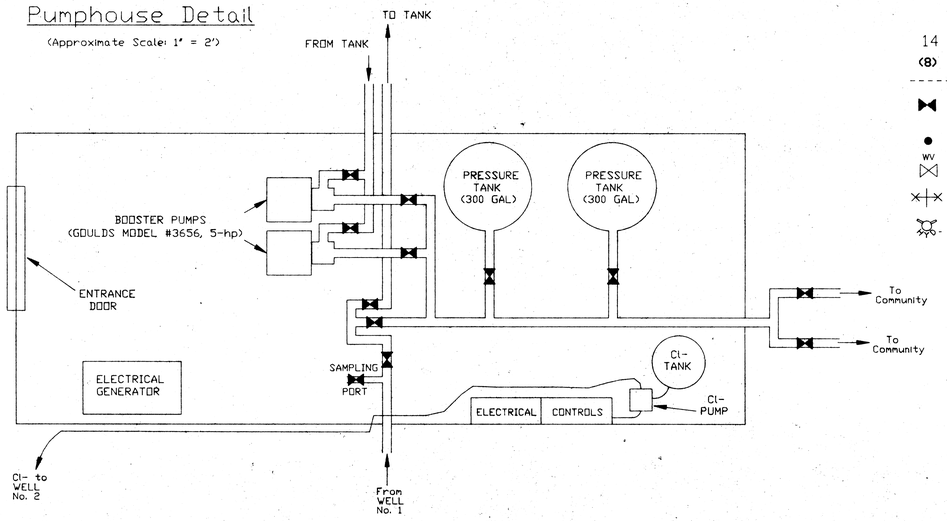
B. F. No. 7356—OS—(Rev. 4-71).

Vicinity Map



Pumphouse Detail

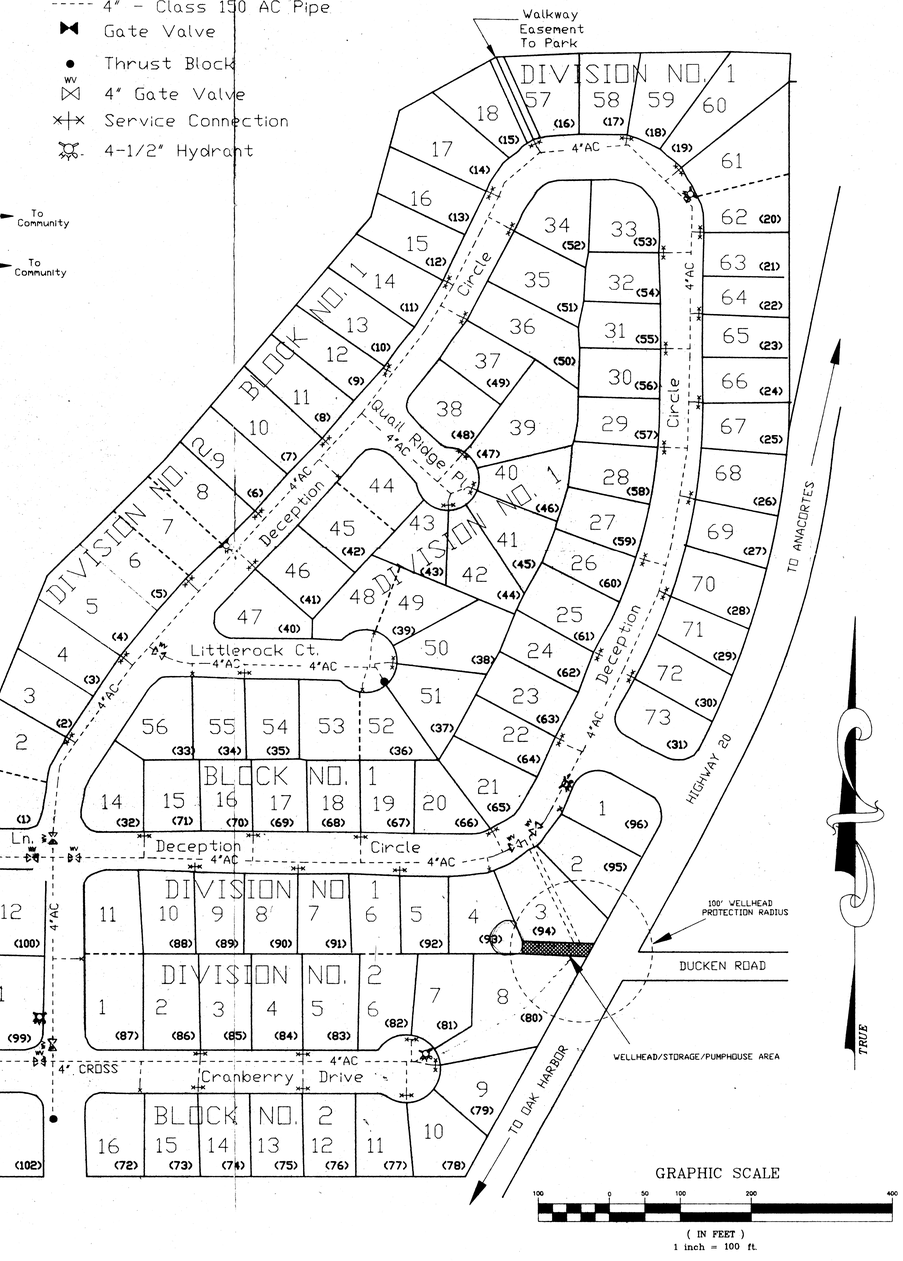
(Approximate Scale: 1" = 2')



Legend

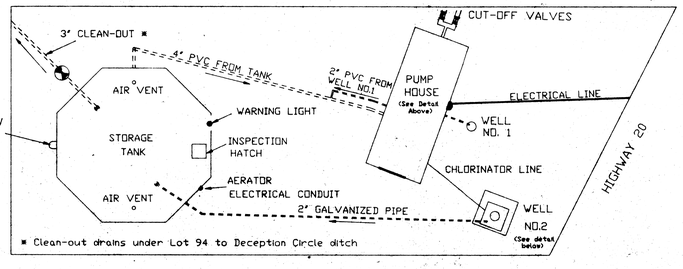
- 14 Legal Lot Number
- (8) Lot Count
- 4" - Class 150 AC Pipe
- Gate Valve
- Thrust Block
- 4" Gate Valve
- Service Connection
- 4-1/2" Hydrant

Water Distribution System



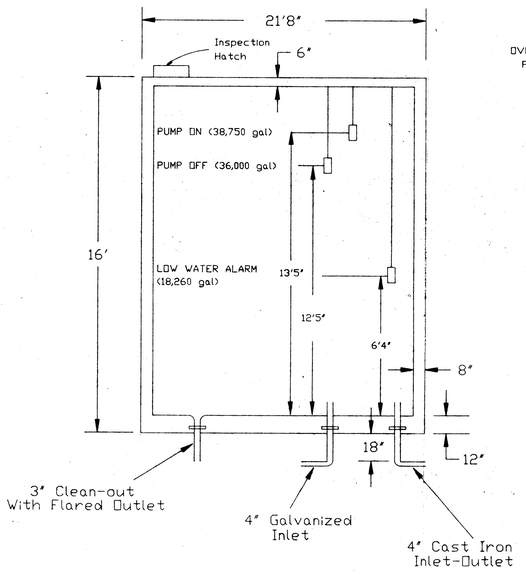
Pumphouse and Storage Tank Detail

(Approximate Scale: 1" = 10')



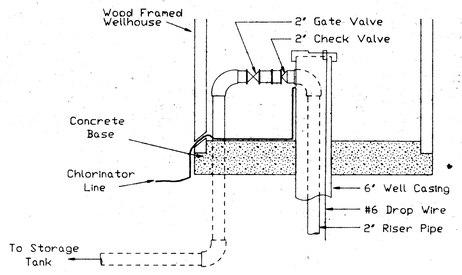
Storage Tank Detail

(Not to Scale)



Well 2 Detail

(Not to Scale)



NO.	REVISION	BY	DATE
1	DPVC PRELIMINARY AS-BUILT DRAWING	RPB/TEB	5/12/94
2	DPVC FINAL AS-BUILT DRAWING	RPB/TEB	10/26/94
3	AS-BUILT DRAWING UPDATE	TEB	11/22/96
4			
5			

THOMAS E. BENNETT — STATE OF WASHINGTON — 9985 — REGISTERED PROFESSIONAL ENGINEER — EXPIRES 11/07/97

W.D. PURNELL AND ASSOCIATES, INC.
CONSULTING ENGINEERS
Geology • Civil • Geotechnical • Environmental
2138 Humboldt Street
P.O. Box 5346
Bellingham, WA 98227
Ph: (206) 676-9589
Fax: (206) 676-4625

JOB NO.: 91080D.94
DWG. NAME: DPVC.DWG
DESIGNED BY: RPB
DRAWN BY: RPB
CHECKED BY: TEB

Deception Park View Comm.
P.O. Box 2446
Oak Harbor, WA 98277

AS-BUILT WATER SYSTEM PLAN
Deception Park View Community
Island County, Washington

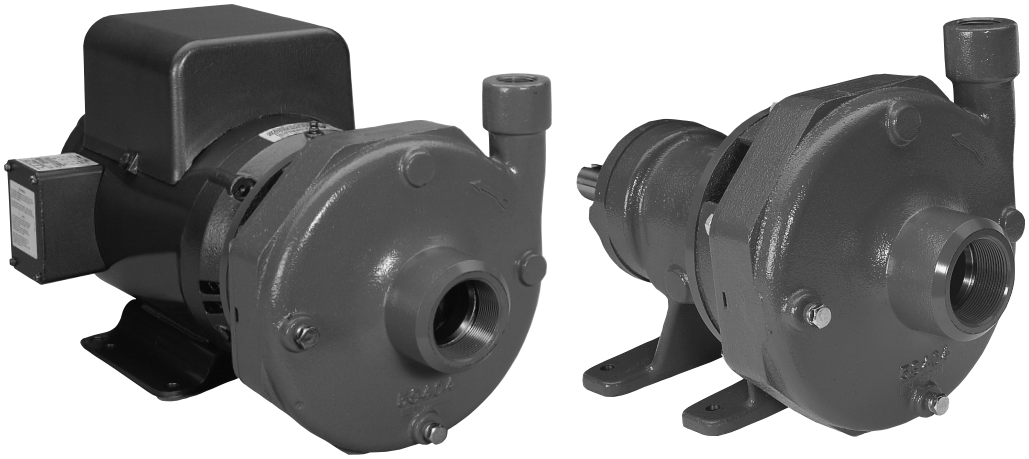
DATE: May 12, 1994
SCALE: H: 1"=100' V: NA

DRAWING: DPVC
SHEET: 1of1

APPENDIX B Equipment Information & Specifications

(2) Existing Booster Pumps

TECHNICAL BROCHURE
B363756S



3656/3756 S-Group

CAST IRON, BRONZE FITTED CENTRIFUGAL PUMPS

BOMBAS CENTRÍFUGAS EN HIERRO FUNDIDO CON ACCESORIOS DE BRONCE

GOULDS WATER TECHNOLOGY
a xylem brand

3656/3756 S-GROUP NUMBERING SYSTEM FOR ALL UNITS BUILT AFTER AUGUST 3, 1998

SISTEMA DE NUMERACIÓN DEL GRUPO S, MODELOS 3656/3756, PARA TODAS LAS UNIDADES FABRICADAS LUEGO DEL 3 DE AGOSTO DE 1998

The various versions of the 3656 and 3756 S-Group are identified by a product code number on the pump label. This number is also the catalog number for the pump. The meaning of each digit in the product code number is shown below.

Not all combinations of motor, impeller and seal options are available for every pump model. Please check with Goulds Water Technology on non-cataloged numbers.

Not recommended for operation beyond printed H-Q curve. For critical application conditions consult factory.

Las diferentes versiones de los modelos 3656 y 3756 del Grupo S se identifican con un número de código de producto en la etiqueta de la bomba. Este número es también el número de catálogo de la bomba. A continuación se ilustra el significado de cada dígito en el código del producto.

No todas las combinaciones de motor, impulsor y sellos están disponibles para cada modelo. Consulte a Goulds Water Technology sobre números que no aparecen en el catálogo.

No se recomienda la operación más allá de la curva impresa de H-Q (carga-capacidad). Para aplicaciones bajo condiciones críticas, consulte con la fábrica.

Example Product Code, *Ejemplo del código de producto*

9 BF 1 H 2 G 0 H

High Head Impeller (1½ x 2 – 6H Only), *Impulsor de carga alta (1½ x 2 – 6H únicamente)*

Mechanical Seal and O-ring, *Sello mecánico y anillo en O*

Type 21 Mechanical Seal, *Tipo 21 sello mecánico*

Seal Code, *Código del Sello*	Rotary, *Rotativo*	Stationary, *Estacionario*	Elastomers, *Elastómeros*	Metal Parts, *Partes Metálicas*	Part No., *Pieza Número*
0	Carbon, *Carbón*	Ceramic, *Cerámica*	BUNA-N	316 SS, *316 Acero inoxidable*	10K13
1		Sil-Carbide, *Carburo de silicona*	EPR		10K19
3			Viton		10K27
5	Sil-Carbide				10K64
9	Packed Box Design with BUNA O-Ring, *Diseño de prensaestopas empacado con anillo en O de BUNA*				15K16

Pump #1:
Goulds 3656, 11/2 x 2-6
3BF15012H

Pump #2:
Goulds 3656, 11/2 x 2-6
3BF15013

Note: 10K27 replaces obsolete 10K25, ***Nota:** La 10K27 reemplace la obsoleta 10K25.*

Impeller Option Code, *Código de opción de impulsor*

Impeller Code, *Código del impulsor*	22BF	9BF	3BF		5BF	4BF	6BF
	1 x 2 – 7	1 x 2 – 8	1½ x 2 – 6	1½ x 2 – 6H	1½ x 2 – 8	2½ x 3 – 7	3 x 4 – 7
	Dia.	Dia.	Dia.	Dia.	Dia.	Dia.	Dia.
A	6¾"	8 1/16"	5 15/16"	5 15/16"	8 1/16"	7 1/16"	7 1/16"
B	6 7/16	7 5/8	5 5/8	5 5/8	7 5/8	6 7/8	6 3/8
C	6	7 5/16	5 1/8		6¾	6 9/16	5½
D	5¾	7	4¾		5¾	6	4 11/16
E	5½	6½			7¾	5 11/16	5 1/8
F	5 1/16	6 3/16			7	5 7/16	6
G	4 13/16	5 3/8			6¼	5 3/16	
H	4 9/16	5 1/8			6 1/8	4¾	
J	4 3/8					4½	
K	4 1/16					4 1/16	
L	3 13/16						

Driver, *Elemento motor*

1 = 1 PH, *fase*, ODP
2 = 3 PH, *fases*, ODP
3 = 3 PH, *fases*, 575 V, ODP
4 = 1PH, *fase*, TEFC
5 = 3 PH, *fases*, TEFC
6 = 3 PH, *fases*, 575 V, TEFC
7 = 3 PH, *fases*, XP
8 = 3 PH, *fases*, 575 V, XP
9 = 3 PH, *fases*, TEFC, PREFF
0 = 1 PH, *fase*, XP

1 PH, fase = Monofásico; 3 PH, fases = Trifásico

For frame mounted version, substitute the letters "FRM" in these positions.

Para las versiones de montaje en bastidor, reemplazar las letras en esta ubicación con "FRM".

HP Rating, *Potencia nominal, HP*

C = ½ HP
D = ¾ HP
E = 1 HP
F = 1½ HP
G = 2 HP
H = 3 HP
J = 5 HP
K = 7½ HP
L = 10 HP
M = 15 HP
N = 20 HP

Driver: Hertz/Pole/RPM, *Elemento motor: Hertz/Polos/RPM*

1 = 60 Hz, 2 pole, 3500 RPM
2 = 60 Hz, 4 pole, 1750 RPM
3 = 60 Hz, 6 pole, 1150 RPM
4 = 50 Hz, 2 pole, 2900 RPM
5 = 50 Hz, 4 pole, 1450 RPM

Material, *Material*

BF = Bronze fitted, *Accesorios de bronce*
AI = All iron, *Todo hierro*
AB = All bronze, *Todo bronce*

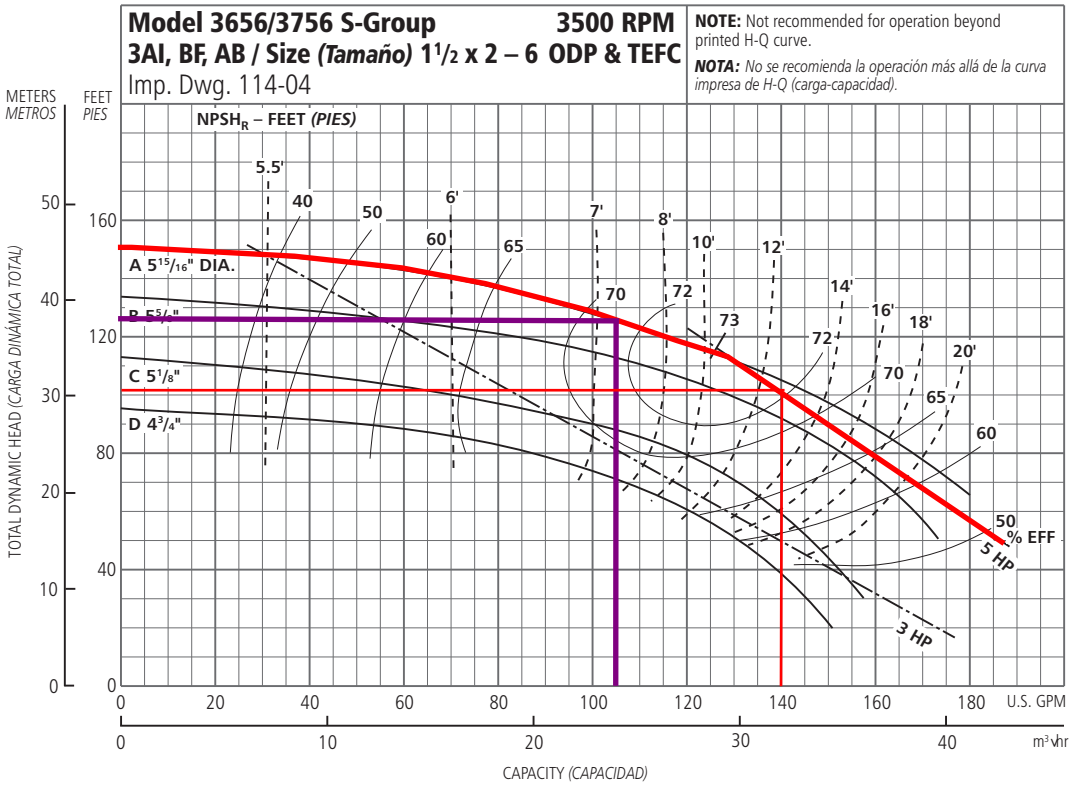
Pump Size, *Tamaño de bomba*

3 = 1½ x 2 – 6(H)
4 = 2½ x 3 – 7
5 = 1½ x 2 – 8
6 = 3 x 4 – 7*
9 = 1 x 2 – 8
22 = 1 x 2 – 7

*Flanged design suction and discharge. *Succión y descarga brida del diseño.*

The 1 x 2 – 8 and 1 x 2 – 7 are only available in Bronze Fitted. *Los tamaños 1 x 2 – 8 y 1 x 2 – 7 están disponibles con accesorios de bronce únicamente.*

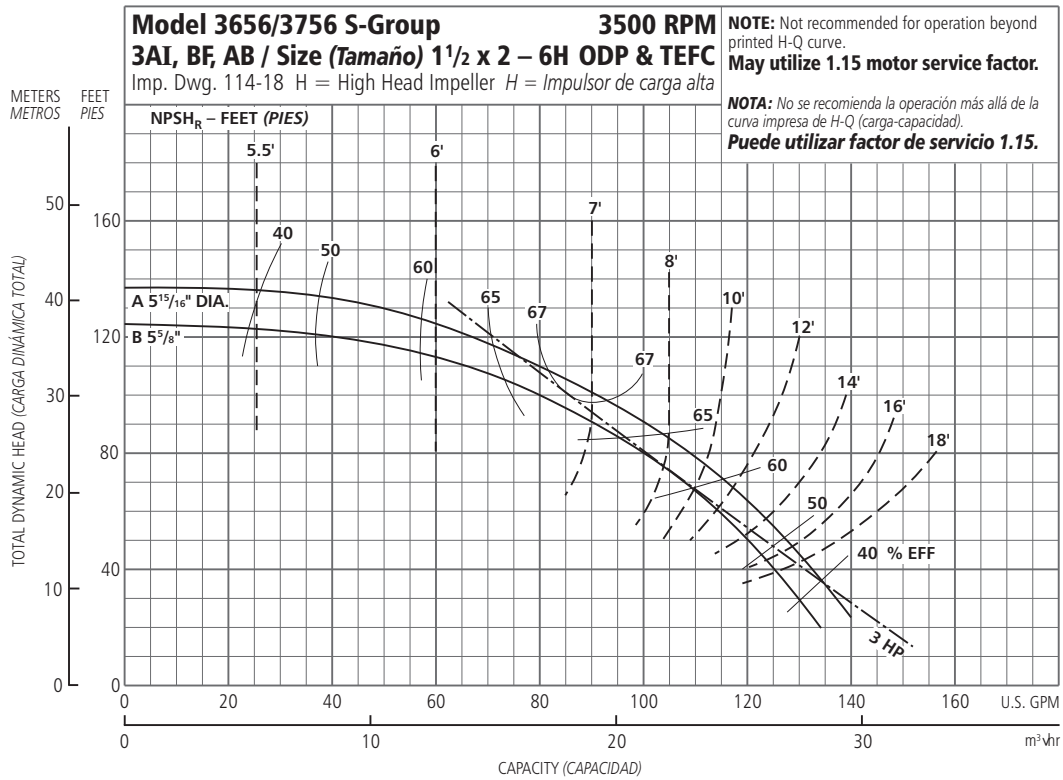
PERFORMANCE CURVES – 60 HZ, 3500 RPM
CURVAS DE DESEMPEÑO – 60 HZ, 3500 RPM



Optional Impeller *Impulsor optativo*	
Ordering Code *Código de pedido*	**Dia.** *Diá.*
A	5 15/16"
B	5 5/8"
C	5 1/8
D	4 3/4

NOTE: Pump will pass a sphere to 5/16" diameter.

NOTA: *La bomba dejará pasar una esfera de hasta 5/16 de pulgada de diámetro.*



Optional Impeller *Impulsor optativo*	
Ordering Code *Código de pedido*	**Dia.** *Diá.*
A	5 15/16"
B	5 5/8

NOTE: Pump will pass a sphere to 3/16" diameter.

NOTA: *La bomba dejará pasar una esfera de hasta 3/16 de pulgada de diámetro.*

(2) Existing Pressure Tanks

WM-SERIES (CLASSIC & CLASSIC QUICK CONNECT MODELS)

CAPTIVE AIR TANKS

EASY TO INSTALL, MAINTAIN, AND SERVICE

Our WM-Series offers features and benefits that steel tanks can't match. From their corrosion-proof composite construction to their lighter weight, easier maintenance and less expensive installation, WM-Series pressure tanks are the preferred choice of professionals, especially when the following advantages are added to the mix:

- Available in two styles:
  - QUICK CONNECT drain assembly, heavy gauge polymer aircell
  - CLASSIC drain assembly, heavy gauge polymer aircell
- Replaceable Aircell – for easier field servicing
- Easy to carry
- Easy and Less Costly to Install – usually requiring only one person and fewer man-hours
- Greater Drawdown than Comparably-Sized Steel Tanks – for greater efficiency
- Won't Rust in Corrosive Environments – particularly important in agricultural and livestock applications, and coastal regions

Tested and Certified by the Water Quality Association (WQA) to NSF/ANSI-61, Section 8 and NSF/ANSI 372.

APPLICATIONS

- Residential
- Light Commercial
- Pressure Boosting

SPECIFICATIONS – CLASSIC QUICK CONNECT

MODEL	CAPACITY GAL / LITER	MAXIMUM OPERATING PRESSURE PSI / kPa / BAR	DRAWDOWN 30/50 SETTING** GAL/LITER	DIAMETER* INCH / CM	OVERALL HEIGHT* INCH / CM	HEIGHT* INLET/OUTLET TO FLOOR INCH / CM	SYSTEM CONNECTION	ASSEMBLY WEIGHT* LB / KG
WM-4 / WM0060 QC	14.5 / 55	125 / 862 / 8.6	4.5 / 17.0	16 / 41	26 / 66	1.75 / 4.4	1" male NPT	16.9 / 7.6
WM-6 / WM0075 QC	19.8 / 75	125 / 862 / 8.6	6.1 / 23.1	16 / 41	32 / 81	1.75 / 4.4	1" male NPT	20.85 / 9.5
WM-9 / WM0120 QC	29.5 / 112	125 / 862 / 8.6	9.1 / 34.4	16 / 41	44 / 112	1.75/ 4.4	1" male NPT	28.80 / 13.0
WM-12 / WM0150 QC	40.3 / 153	125 / 862 / 8.6	12.5 / 47.3	16 / 41	57 / 145	1.75/ 4.4	1" male NPT	35.05 / 15.9
WM-14WB / WM0180 QC	47.1 / 178	125 / 862 / 8.6	14.6 / 55.3	21 / 53	41.3 / 105	2.25 / 5.7	1-1/4" male NPT	46.27 / 21.0
WM-20WB / WM0235 QC	60.0 / 227	125 / 862 / 8.6	18.5 / 70.0	24 / 61	41.5 / 105	2.25 / 5.7	1-1/4" male NPT	52.87 / 24.0
WM-23 / WM0300 QC	79.6 / 301	125 / 862 / 8.6	24.6 / 93.1	21 / 53	62 / 157	2.25 / 5.7	1-1/4" male NPT	71.07 / 32.3
WM-25WB / WM0330 QC	86.7 / 328	125 / 862 / 8.6	26.8 / 101.5	24 / 61	55.25 / 140	2.25 / 5.7	1-1/4" male NPT	77.22 / 35.0
WM-35WB / WM0450 QC	119.7 / 453	125 / 862 / 8.6	37.0 / 140.1	24 / 61	74.25 / 189	2.25/ 5.7	1-1/4" male NPT	102 / 46.4

NOTE: Maximum external operating temperature 120°F (49°C). Maximum internal operating temperature 100°F (38°C). Minimum operating temperature 40°F (4°C).

* Diameter, height and weight may vary slightly without notice.

** In keeping with current industry standards, drawdown factors are based on Boyle's law. Actual drawdowns will vary depending upon system variables, including the accuracy and operation of the pressure switch and gauge and operating temperature of the system.

HERE ARE THE FEATURES THAT SET US APART

1. Heavy-gauge, polymer aircell is chlorine-resistant and fully replaceable
2. One-piece seamless inner shell is molded of high-density polyethylene
3. Outer shell is composed of continuous fiberglass strands sealed with high-grade epoxy resin
4. Sturdy, molded polymeric base is corrosion- and impact-proof
5A. Quick connect, bottom inlet/outlet assembly is custom molded of high-impact engineered polymer
5B. Bottom inlet/outlet one-piece drain is custom molded of high-impact PVC

CLASSIC QUICK CONNECT

CLASSIC

SPECIFICATIONS – CLASSIC

MODEL	CAPACITY GAL / LITER	MAXIMUM OPERATING PRESSURE PSI / kPa / BAR	DRAWDOWN 30/50 SETTING** GAL/LITER	DIAMETER* INCH / CM	OVERALL HEIGHT* INCH / CM	HEIGHT* INLET/OUTLET TO FLOOR INCH / CM	SYSTEM CONNECTION	ASSEMBLY WEIGHT* LB / KG
WM-4 / WM0060 C	14.5 / 55	125 / 862 / 8.6	4.5 / 17.0	16 / 41	26 / 66	1.75 / 4.4	1" male NPT	14.5 / 6.6
WM-6 / WM0075 C	19.8 / 75	125 / 862 / 8.6	6.1 / 23.1	16 / 41	32 / 81	1.75 / 4.4	1" male NPT	17.75 / 8.1
WM-9 / WM0120 C	29.5 / 112	125 / 862 / 8.6	9.1 / 34.4	16 / 41	44 / 112	1.75/ 4.4	1" male NPT	24.75 / 11.2
WM-12 / WM0150 C	40.3 / 153	125 / 862 / 8.6	12.5 / 47.3	21 / 53	57 / 145	2.25 / 5.7	1-1/4" male NPT	65.7 / 29.8
WM-14WB / WM0180 C	47.1 / 178	125 / 862 / 8.6	14.6 / 55.3	24 / 61	41.3 / 105	2.25 / 5.7	1-1/4" male NPT	50 / 22.7
WM-20WB / WM0235 C	60.0 / 227	125 / 862 / 8.6	18.5 / 70.0	24 / 61	41.5 / 105	2.25 / 5.7	1-1/4" male NPT	72.75 / 33.0
WM-23 / WM0300 C	79.6 / 301	125 / 862 / 8.6	24.6 / 93.1	21 / 53	62 / 157	2.25 / 5.7	1-1/4" male NPT	43 / 19.5
WM-25WB / WM0180 C	86.7 / 328	125 / 862 / 8.6	26.8 / 101.5	24 / 61	55.25 / 140	2.25 / 5.7	1-1/4" male NPT	72.75 / 33.0
WM-35WB / WM0450 C	119.7 / 453	125 / 862 / 8.6	37 / 140.1	24 / 61	74.25 / 189	2.25 / 5.7	1-1/4" male NPT	95 / 43.1

NOTE: Maximum external operating temperature 120°F (49°C). Maximum internal operating temperature 100°F (38°C). Minimum operating temperature 40°F (4°C).

* Diameter, height and weight may vary slightly without notice.

** In keeping with current industry standards, drawdown factors are based on Boyle's law. Actual drawdowns will vary depending upon system variables, including the accuracy and operation of the pressure switch and gauge and operating temperature of the system.

Pressure Tank Drawdown Factors

From Flexcond Industries Website

System Pressure (cut-out) PSIG / (kPa) / bar	Mimimum System Pressure (cut-in) -- PSIG / (kPa) / bar																		
	20 (138) 1.38	**25** (173) 1.72	**30** (207) 2.06	**35** (242) 2.41	**40** (276) 2.76	**45** (311) 3.10	**50** (345) 3.45	**55** (380) 3.80	**60** (414) 4.16	**65** (449) 4.48	**70** (483) 4.83	**75** (518) 5.17	**80** (552) 5.51	**85** (587) 5.86	**90** (621) 6.20	**95** (656) 6.55	**100** (690) 6.89	**105** (725) 7.24	**110** (759) 7.58
30 / (207) / 2.06	0.21																		
35 / (242) / 2.41	0.28	0.19																	
40 / (276) / 2.76	0.34	0.26	0.17																
45 / (311) / 3.10	0.39	0.32	0.24	0.16															
50 / (345) / 3.45	0.44	0.37	0.30	0.22	0.15														
55 / (380) / 3.80	0.47	0.41	0.34	0.28	0.21	0.14													
60 / (414) / 4.16	0.50	0.44	0.38	0.32	0.26	0.19	0.13												
65 / (449) / 4.48	0.53	0.48	0.42	0.36	0.30	0.24	0.18	0.12											
70 / (483) / 4.83	0.56	0.50	0.45	0.40	0.34	0.29	0.23	0.17	0.11										
75 / (518) / 5.17		0.53	0.48	0.43	0.38	0.32	0.27	0.22	0.16	0.11									
80 / (552) / 5.51			0.50	0.46	0.41	0.36	0.31	0.26	0.21	0.15	0.10								
85 / (587) / 5.86				0.48	0.43	0.39	0.34	0.29	0.24	0.20	0.15	0.10							
90 / (621) / 6.20					0.46	0.42	0.37	0.32	0.28	0.23	0.19	0.14	0.09						
95 / (656) / 6.55						0.44	0.40	0.35	0.31	0.27	0.22	0.18	0.13	0.09					
100 / (690) / 6.89							0.42	0.38	0.34	0.30	0.26	0.21	0.17	0.13	0.09				
105 / (725) / 7.24								0.41	0.37	0.33	0.29	0.25	0.20	0.16	0.13	0.08			
110 / (759) / 7.58									0.39	0.35	0.31	0.27	0.24	0.20	0.16	0.12	0.08		
115 / (794) / 7.92										0.38	0.34	0.30	0.26	0.23	0.19	0.15	0.11	0.08	
120 / (828) / 8.27											0.36	0.33	0.29	0.25	0.22	0.18	0.15	0.11	0.07
125 / (863) / 8.62												0.35	0.32	0.28	0.25	0.21	0.18	0.14	0.11

For a 46 psi cut in pressure and 58 psi cut out pressure the interpreted values is 0.15.

Table from : https://www.flexconind.com/contractor-engineer/proper-tank-sizing/water-systems.html

APPENDIX C Water Right Information

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

CERTIFICATE OF WATER RIGHT

☐ *Surface Water* (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

☒ *Ground Water* (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

CERTIFICATE NUMBER	PERMIT NUMBER	APPLICATION NUMBER	PRIORITY DATE
G1-00552C	9050	9424	May 3, 1968

NAME
ROBERT P. FAKKEMA

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
4086 - 400th Avenue West	Oak Harbor	Washington	98277

This is to certify that the herein named applicant has made proof to the satisfaction of the Department of Ecology of a right to the use of the public waters of the State of Washington as herein defined, and under and specifically subject to the provisions contained in the Permit issued by the Department of Ecology, and that said right to the use of said waters has been perfected in accordance with the laws of the State of Washington, and is hereby confirmed by the Department of Ecology and entered of record as shown.

PUBLIC WATER TO BE APPROPRIATED

SOURCE
A well - 6"x178'

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	45.0	40.0

QUANTITY, TYPE OF USE, PERIOD OF USE
Community domestic supply - continuously during entire year for a maximum potential of 200 lots

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION/WITHDRAWAL
320 feet West and 1305 feet South of center of Sec. 3

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
	35	34	1 E.	6	Island

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)
Tract A		Plat of Deception Park View Division No. 1

LEGAL DESCRIPTION OF PROPERTY WATER TO BE USED ON

That part of the N½SW¼ and of the North 300 feet of SE¼SW¼ of Sec. 35, T. 34 N., R. 1 E.W.M. lying Westerly of State Highway 525 (1-D).

CERTIFICA

PROVISIONS

Nothing in this permit shall be construed as excusing the permittee from compliance with any applicable federal, state, or local statutes, ordinances, or regulations including those administered by local agencies under the Shoreline Management Act of 1971.

The right to the use of the water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in RCW 90.03.380, 90.03.390, and 90.44.020.

This certificate of water right is specifically subject to relinquishment for nonuse of water as provided in RCW 90.14.180.

Given under my hand and the seal of this office at Olympia, Washington, this 15th *day of* September, *1974*.

JOHN A. BIGGS, *Director*
Department of Ecology

by R. Jerry Bollen
R. JERRY BOLLEN, Assistant Director

ENGINEERING DATA
OK DKK

FOR COUNTY USE ONLY

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
P.O. Box 47600 • Olympia, Washington 98504-7600
(360) 407-6000 • TDD Only (Hearing Impaired) (360) 407-6006

September 13, 1999

Deception Park View Comm. Assoc.
Attn: Elaine Young
5073 N. Deception Circle
Oak Harbor, Washington 98277

RE: Addition of a second well to Water Right Certificate G1-00552C

Dear Ms. Young:

I am writing in response to our telephone conversation on August 30, 1999, and Affidavit received on September 8, 1999, that documents the existence of a second well (well #2) operating under Water Right Certificate G1-00552C. The documentation you provided allows your water system to utilize well #2 in accordance with RCW 90.44.100(3). Your water right file will be amended to reflect the existence of this second well.

The water right application #G1-27583 you submitted on January 19, 1995 is no longer necessary, and will be cancelled.

If you have any questions, I can be reached at (425) 649-7020.

Sincerely,

Sheila Baker
Environmental Specialist
Water Resources Program

Cc: Jan Cyr – U.. S. Department of Agriculture
Derek Pell – DOH
Susie King – King Management

RECEIVED
SEP 16 1999
NW DRINKING WATER

STATE OF WASHINGTON
DEPARTMENT OF HEALTH
1511 Third Ave., Suite 719 • Seattle, Washington 98101-1632

November 15, 1999

BOARD OF DIRECTORS
DECEPTION PARK VIEW WATER ASSOCIATION
C/O KING WATER MANAGEMENT
PO BOX 2446
OAK HARBOR WA 98277

Subject: Deception Park View Water System (ID#18305H) Island County
Well #2 Source Approval
Submittal #96-1203

Members of the Board:

I received a copy of the Department of Ecology's September 13, 1999 letter (from Sheila Baker) verifying that well #2 is covered under the association's existing water right certificate G1-00552C. With reference to my June 18, 1997 letter, the Department of Health now considers well #2 an approved source.

Please give me a call in Seattle at (206) 464-5401 if you have any questions or concerns.

Sincerely,

Derek M. Pell, PE
Regional Engineer
NW Drinking Water Operations

cc: Island County Health Department
Island County Assessors Office
Tom Bennett – Purnell & Associates

Water Right Self-Assessment Form for Small Water System Management Programs and Project Reports

System Name:	System ID#:	Type of System:	Proposed Type of System: (if changing)
Deception Park View Water System	18305 H	Group A Comm	

Water Right Permit, Certificate, Claim # or Exempt *If water right is interruptible, identify limitation in yellow section below	Name on Water Right	FOR NON-MUNICIPAL SUPPLIERS ONLY: Does water right identify a number of connections? If yes, how many?	WFI Source # If a source has multiple water rights, list each water right on separate line	Existing Water Rights Qi = Instantaneous Flow Rate Allowed (GPM or CFS) Qa = Annual Volume Allowed (Acre Feet/Year)			
				Primary Qi Maximum Rate Allowed	Non-Additive Qi Maximum Rate Allowed	Primary Qa Annual Volume Allowed	Non-Additive Qa Annual Volume Allowed
1. G1-00552C	Robert P. Fakkema		Well #1 & Well #2	45		40.0	
2.							
3.							
4.							
			TOTALS =	45		40.0	
			Column Identifiers for Calculations:	A		B	

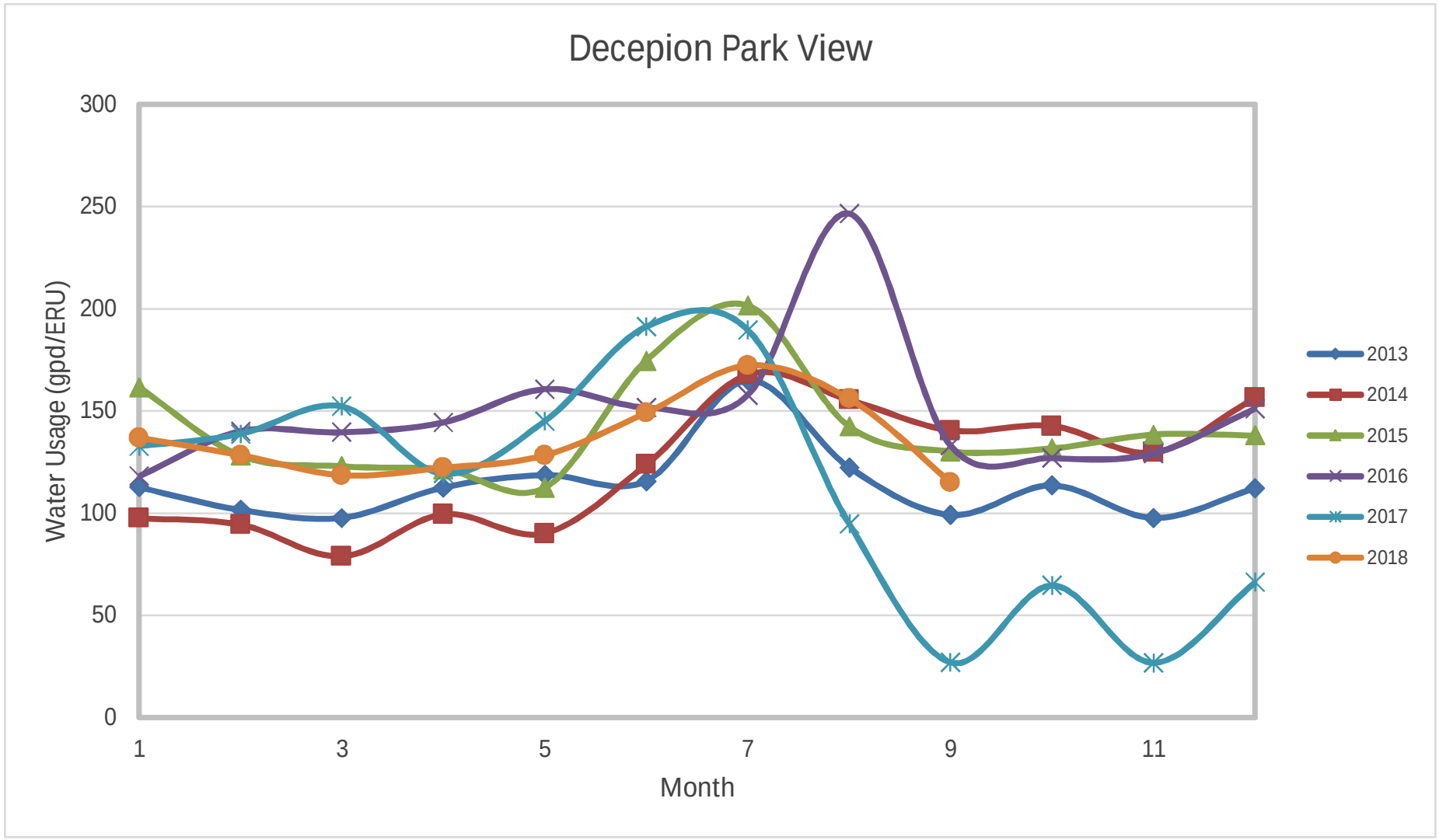
Current Source Production – Most Recent Calendar Year Qi=Maximum Instantaneous Withdrawal from Source. (GPM or CFS) Qa=Maximum Annual Volume Withdrawn (Acre Feet/Year) This includes wholesale water provided to other systems				Forecasted Source Production at Full System Build Out Projected maximum withdrawal from source at full build out. This includes wholesale water provided to other systems			
Total Qi Instantaneous Flow Rate	Excess or (Deficiency) Qi	Total Qa Annual Volume	Excess or (Deficiency) Qa	Total Qi Instantaneous Flow Rate	Excess or (Deficiency) Qi	Total Qa Annual Volume	Excess or (Deficiency) Qa
0, 35	10	0.0, 11.0	29.0	0, 33	12	0.0, 22.4	17.6
35	10	11	29	33	12	22.4	17.6
C	=A-C	D	=B-D	E	=A-E	F	=B-F

Interruptible Water Rights Identify limitations on any water rights listed above that are interruptible	
Permit or certificate #	Time Period of Interruption

INTERTIES: Systems receiving wholesale water complete this section. Wholesaling systems must include water sold through interties in the source production columns above.

Name of Wholesaling System Providing Water	Quantities Allowed In Contract		Currently Purchased Quantity currently purchased through intertie				Forecasted Purchase at Full System Build Out Forecasted quantity purchased through intertie			
	Maximum Qi	Maximum Qa	Maximum Qi Instantaneous Flow Rate	Excess or (Deficiency) Qi	Maximum Qa Annual Volume	Excess or (Deficiency) Qa	Maximum Qi Instantaneous Flow Rate	Excess or (Deficiency) Qi	Maximum Qa Annual Volume	Excess or (Deficiency) Qa
TOTALS =										
	A	B	C	=A-C	D	=B-D	E	=A-E	F	=B-F

APPENDIX D Water Usage Data


Decepion Park View
Water Usage (gpd/ERU)
300
250
200
150
100
50
0
1
3
5
7
9
11
Month
2013
2014
2015
2016
2017
2018

WATER CONSUMPTION PER DAY PER CONNECTION						
Year	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Jan.	113	98	162	118	133	137
Feb.	102	94	128	140	139	128
Mar.	98	79	123	139	152	119
Apr.	113	99	121	144	119	122
May	119	90	113	161	145	128
Jun.	116	124	175	152	191	149
Jul.	165	168	201	158	190	172
Aug.	122	155	142	247	95	156
Sep.	99	140	130	133	27	115
Oct.	114	143	132	127	65	
Nov.	98	130	138	129	27	
Dec.	112	156	138	151	66	
Max.	165	168	201	247	191	172
Min.	98	79	113	118	27	115
Annual Average	114	123	142	150	112	136
Summer Average	126	147	162	**172**	126	148

APPENDIX E Capacity Analysis

AVERAGE DAY DEMAND (ADD) CALCULATION

Date Printed: 1/31/2019

System: Deception Park View
ID No.: 18305 H
Location: Whidbey Island, Island County

Summer ADD is based upon June - September readings

Year	Total Water Usage Gallons	# of Active Connections	Yearly ADD gpd/ERU	Summer ADD gpd/ERU	Total Usage (ac-ft/yr)
2013	2,710,400	65	114	126	8
2014	2,924,370	65	123	147	9
2015	3,370,088	65	142	162	10
2016	3,561,012	65	150	172	11
2017	2,665,292	65	112	126	8
2018	2,421,200	65	136	148	7
Average	2,942,060	65	130	147	9
Minimum	2,421,200	65	112	126	7
Maximum	3,561,012	65	150	172	11

ADD based upon maximum Summer ADD	=	**172**	**gpd/ERU**
Design ADD	=	**200**	**gpd/ERU**

MAXIMUM DAY DEMAND (MDD) CALCULATION

Date Printed: 1/31/2019

System: Deception Park View
ID No.: 18305 H
Location: Whidbey Island, Island County

From DOH Water System Design Manual (Section 5.2.1)

Equation 5-2

MDD **=** ***(1.7)(MADD)***

Where: ***MDD*** = *Maximum Day Demand (gallons/day/ERU)*
MADD = Maximum Monthly Average Day Demand (gallons/day/ERU)

Year	MADD	MDD
2013	*165*	280
2014	*168*	285
2015	*201*	343
2016	*247*	419
2017	*191*	325
2018	*172*	293
Average	191	324
Minimum	165	280
Maximum	247	419
Proposed	264	450

PEAK HOUR DEMAND (PHD) CALCULATION

System: Deception Park View
ID No.: 18305 H
Location: Whidbey Island, Island County

From DOH Water System Design Manual (Section 5.2.4)

Equation 5-1: **PHD = (MDD/1440)[(C)(N) + F] + 18**

Where:

PHD	=	*Peak Hourly Demand, (gallons per minute, gpm)*
C	=	*Coefficient Associated with Ranges of ERUs*
N	=	*Number of Service Connections, ERUs*
F	=	*Factor Associated with Ranges of ERUs*
MDD	=	*Maximum Day Demand, (gpd/ERU)*

Range of N (ERUs)		C	F
15	50	3.0	0
51	100	2.5	25
101	250	2.0	75
251	500	1.8	125
501	1,000,000	1.6	225

This is Table 5-1 in DOH Design Manual

Year	N (ERUs)	MDD (gpd/ERU)	C	F	PHD (gpm)
2013	**65**	**280**	2.5	25	55
2014	**65**	**285**	2.5	25	55
2015	**65**	**343**	2.5	25	63
2016	**65**	**419**	2.5	25	73
2017	**65**	**325**	2.5	25	60
2018	**65**	**293**	2.5	25	56
Current	65	450	2.5	25	77
Approved	69	450	2.5	25	80
Proposed	100	450	2.5	25	**104**

Main Reservoir Water System Storage Capacity Calculations

System: Deception Park View
ID No.: 18305 H
Location: Whidbey Island, Island County

Equations/Calc's in this spreadsheet are in accordance with the DOH's Group A Public Water System Design Manual

Source

Wells	Pump Rate (gpm)	Comment
S02	33	
emergency	0	
Qs:	33	Total minus emergency
QL:	33	
Q's:	0	Total minus largest

Water right limit source capacity to 45 gpm.

of Connections

Year	ERUs (N)	DOH Approved
2018	65	69
Proposed	100	

Reservoir Specifications

Reservoir	ID	Vol (gal)	Vol (cf)	Height (ft)	Base El	Top WS	Total Vol.	Vol/VF
Octagonal	20.4	36,673	4,903	15.00	117	132.00	36,673	2,445
Cylindrical	19.5	33,508	4,480	15.00	115.00	130.00	33,508	2,234
						Total:	**70,200**	**4,680**

Top Dead Storage (DS)

Top WS	Dead Storage Depth (ft)	Top Dead Vol (gal)	Top Dead Vol (res. vf)
130.0	0.5	**2,340**	0.5

Note: Assumed top Dead Storage is 6".

Operational Storage (OS)

Top WS	Operational Depth (ft)	Oper. Level	Oper. Vol. (gal)	Oper. Vol (res. vf)
129.50	0.50	129.00	**2,340**	0.5

Based upon assumed probe settings.

Required Equalizing Storage (ES)

PHD (gpm)	Qs (gpm)	PHD-Qs (gpm)	Ves (gal)	Ves (res vf.)
104	33	71	10,650	2.3

Ves=(PHD-Qs)*150 or Zero

Recommended Standby Storage (SB)

		Single Source			
ADD (gpd/ERU)	N	SB (gal) Single Source	SB per ERU (gal/ERU)	SB (res vf.)	Greater of SB or FF
200	100	40,000	400	8.5	SB

Vsb (Single Source) = (2 days)(ADD)(N) or (200)(N) whichever is greater

Standby Storage (SB) Provided

gallons/ERU	# Conn's	Vsb 2	Vsb (res vf.)
525	100	52,500	11.2

Fire Suppression Storage (FSS)

FF (gpm)	tm (minutes)	Vfss (gal)	Vfss (res. vf)
500	30	15,000	3.2

Vfss=FF*tm

Where: $FSS = (FF)(t_m)$

FF = *Required fire flow rate (gpm)*

t_m = *Duration of FF rate (minutes)*

Bottom Dead Storage (DS)

Res. Bot. Elev.	Top of Dead Storage	Dead Vol (gal)	Dead Vol (res. vf)
115.0	115.5	2,340	0.5

Note: Assumed Dead Storage is bottom 6" of reservoir

Storage Component	Vol (gal)	Res VF
Top Dead Storage	2,340	0.5
Operational Storage (OS)	2,340	0.5
Equalizing Storage (ES)	10,650	2.3
Standby Storage (SB)	52,530	11.2
Fire Suppression Storage (FSS)	15,000	3.2
Dead Storage (DS)	2,340	0.5
Totals:	**70,200**	**15.0**

SYSTEM CAPACITY

System: Deception Park View
ID No.: 18305 H
Location: Whidbey Island, Island County

WATER RIGHT CALCULATIONS

Based on Annual Volume & Average Day Demand (Eqn 6-3):

N = Va/(365*ADD)
Where: N = Number of Service Connections, ERUs
Va = Annual Volume of Water Available from Water Right (gallons/year)
ADD = Average Daily Demand per ERU (gpd/ERU)

	Va (acre-ft/year)	Va (gal/year)	ADD (gpd/ERU)	N (ERUs)
S02	40	13,033,152	200	178

Based on Instantaneous Flow & Maximum Day Demand (Eqn 6-4):

N = Vd/MDD = (Qi*td)/MDD
Where: N = Number of Service Connections, ERUs
Vd = Total Volume of Water Available for Maximum Day's Demand (gpd)
MDD = Maximum Daily Demand per ERU (gpd/ERU)
Qi = Instantaneous Maximum Water Right Flow Rate (gpm)
td = Time that source operates per day (minutes/day)

	Qi (gpm)	td (min/day)	MDD (gpd/ERU)	N (ERUs)	Minutes Pumped/Hr
S02	45	1440	450	144	60

SOURCE CALCULATIONS

Based on Well Production & Max Day Demand:

N = Vd/ADD = (Qs*td)/MDD
Where: N = Number of Service Connections, ERUs
Vd = Total Volume of Water Available for Average Day's Demand (gpd)
MDD = Max Daily Demand per ERU (gpd/ERU)
Qs = Total Well Production Flow rate (gpm)
td = Time that source operates per day (minutes/day)

	Qs (gpm)	td (min/day)	MDD (gpd/ERU)	N (ERUs)	Minutes Pumped/Hr
S02 (Approved Capacity)	33	1440	450	105	60

BOOSTER PUMP CALCULATIONS

Based on Well Production & max Day Demand:

N= [1440(PHD - 18)/MDD -F]/C
Where: N = Number of Service Connections, ERUs
PHD = Peak Hour Demand (gallons/minute) (Booster Pump Capacity)
MDD =Maximum Daily Demand per ERU (gpd/ERU)
F = PHD Coefficient from Table 5-1 (= 225)
C = PHD Coefficient from Table 5-1 (= 1.6)

	Q_B (gpm)	C	F	MDD (gpd/ERU)	N (ERUs)
Booster Pumps	140	2.0	75	450	158

Limiting Factors

Condition	Limiting Factor	ERUs
Water Right- Annual	Va & ADD	178
Water Right - Instananous	Qi & MDD	144
Source	Qs & MDD	105
Booster Pump	Qs & MDD	158
Treatment	Qi & MDD	106

System Capacity (#ERUs): 105
Condition: Source
Limiting Factor: Qs & MDD

Treatment System Capacity Analysis

Hypochlorination Worksheet Calculations
Water System Design Manual - December 2009

Water System Name: **Deceptiion Park View**
Water System Number: 18305 H
Source: Well #2

Water System Operating Parameters

Pressure range of system (open reservoir)		**20**	psi
Average Daily Water Use*		200	gpd/conn
Max. Daily Demand (Design Value - Theoretical)		450	gpd/conn
Number of Approved Connection		83	connections
Number of Existing connections		203	connections
Daily Average Water Use		**16,600**	gpd
Flow Rate at Injection Point	Qs	**33**	gpm
Flow rate from contact chamber	PHD	**104**	gpm

* - Values from current water usage readings

Values used for PHD determination	MDD	450	gpd/ERU
Equation 5-1, WSDM 12/2009	C	2.5	
	F	25	
	N	100	connections

Estimated Required Chlorine Dose

demand		**1.0**	ppm
residual		**1.0**	ppm
Desired Chlorine dose	Cs	**2.0**	ppm

Chlorine Contact Time at Treatment System Inlet & Reservoir Outlet

Pipe Length	50	feet
Pipe Size	2	inches
Pipe Volume	8	gallons
Contact Time in Pipe (100%)	0.25	minutes
Total Pipe Contact Time	**0.2**	minutes
Ct x T *(Pipe)*	**0.2**	min x ppm
Tank Volume	70,200	gallons
Height	15	feet
Volume per foot	4,680	gallons
Top Dead Storage (0.5 feet)	2,340	gallons
Operational Storage (0.5 feet)	2,340	gallons
Equalizing Storage (PHD-Qs)*150	10,641	gallons
Total volume excluded from contact calculations	15,321	gallons
Reservoir Contact Volume (Standby Storage)	**54,879**	gallons
Baffling Efficiency (Top in/Bottom Out)	10%	
Reservoir Contact Time	33	minutes
Total Contact Time *(Pipe + Reservoir)*	**34**	minutes
Ct x T *(Pipe + Reservoir)*	**33.5**	min x ppm
Minimum of 6	okay	

APPENDIX F Water Quality Results

View Sample Detail - WSID 18305H - DECEPTION PARK VIEW

Collect Date	8/3/2016
Lab Number	057
Lab Name	Avocet Environmental Testing
Sample Number	64653
Source	02
Analyte Group	IOC-INORGANIC CONTAMINANTS
Test Panel	IOC-COMPLETE INORGANIC ANALYSIS
Sample Location	s02
Sample Type	Post-Treatment / Finished

Analyte DOH Num	Analyte Name	Result Range	Result Quantity	Maximum Contaminant Level	Units	State Reporting Limit
0010	MANGANESE	EQ	0.0150	0.0500	mg/L	0.0100
0014	SODIUM	EQ	48.0000		mg/L	5.0000
0015	HARDNESS	EQ	120.0000		mg/L	10.0000
0016	CONDUCTIVITY	EQ	400.0000	700.0000	Umhos/cm	70.0000
0017	TURBIDITY	EQ	0.2300		NTU	0.1000
0019	FLUORIDE	EQ	0.5000	4.0000	mg/L	0.2000
0021	CHLORIDE	EQ	31.0000	250.0000	mg/L	20.0000
0004	ARSENIC	LT	0.0010	0.0104	mg/L	0.0010
0005	BARIUM	LT	0.4000	2.0000	mg/L	0.1000
0006	CADMIUM	LT	0.0020	0.0050	mg/L	0.0010
0007	CHROMIUM	LT	0.0200	0.1000	mg/L	0.0070
0008	IRON	LT	0.1000	0.3000	mg/L	0.1000
0009	LEAD	LT	0.0010		mg/L	0.0010
0011	MERCURY	LT	0.0004	0.0020	mg/L	0.0002
0012	SELENIUM	LT	0.0100	0.0500	mg/L	0.0020
0013	SILVER	LT	0.1000	0.1000	mg/L	0.1000
0018	COLOR	LT	15.0000	15.0000	CU	15.0000
0020	NITRATE-N	LT	0.2000	10.0000	mg/L	0.5000
0022	SULFATE	LT	50.0000	250.0000	mg/L	50.0000
0023	COPPER	LT	0.0200		mg/L	0.0200
0024	ZINC	LT	0.2000	5.0000	mg/L	0.2000
0110	BERYLLIUM	LT	0.0008	0.0040	mg/L	0.0003
0111	NICKEL	LT	0.1000	0.1000	mg/L	0.0050
0112	ANTIMONY	LT	0.0060	0.0060	mg/L	0.0030
0113	THALLIUM	LT	0.0020	0.0020	mg/L	0.0010

Records 1 - 25 of 28

Links to external resources are provided as a public service and do not imply endorsement by the Washington State Department of Health

Washington State Department of Health

Division of Environmental Health
Office of Drinking Water

Help

View Sample Detail - WSID 18305H - DECEPTION PARK VIEW	
Collect Date	8/3/2016
Lab Number	057
Lab Name	Avocet Environmental Testing
Sample Number	64653
Source	02
Analyte Group	IOC-INORGANIC CONTAMINANTS
Test Panel	IOC-COMPLETE INORGANIC ANALYSIS
Sample Location	s02
Sample Type	Post-Treatment / Finished

Analyte DOH Num	Analyte Name	Result Range	Result Quantity	Maximum Contaminant Level	Units	State Reporting Limit
0114	NITRITE-N	LT	0.2000	1.0000	mg/L	0.1000
0116	CYANIDE	LT	0.0100	0.2000	mg/L	0.0500
0161	TOTAL NITRATE/NITRITE	LT	0.5000		mg/L	0.5000

Records 26 - 28 of 28

Department of Health, Office of Drinking Water

Street Address:
243 Israel Road S.E. 2nd floor
Tumwater, WA 98501

Mail:
PO BOX 47822
Olympia, WA 98504-7822

Send inquiries about DOH and its programs to the Health Consumer Assistance Office
Comments or questions regarding this Web site? Send email to Environmental Health Application Testing and Support or call 888-457-2467.
For technical issues with this website send email to DOH IT Service Desk or call 360-236-4357.

View Sample Detail - WSID 18305H - DECEPTION PARK VIEW

Collect Date	11/11/2015
Lab Number	174
Lab Name	Exact Scientific Services, Inc
Sample Number	42712
Source	02
Analyte Group	VOC-VOLATILE ORGANIC CONTAMINANTS
Test Panel	VOC1-VOLATILE ORGANIC
Sample Location	s02
Sample Type	Post-Treatment / Finished

Analyte DOH Num	Analyte Name	Result Range	Result Quantity	Maximum Contaminant Level	Units	State Reporting Limit
0027	CHLOROFORM	EQ	14.6000		ug/L	0.5000
0028	BROMODICHLOROMETHANE	EQ	18.1000		ug/L	0.5000
0029	DIBROMOCHLOROMETHANE	EQ	18.5000		ug/L	0.5000
0030	BROMOFORM	EQ	4.1000		ug/L	0.5000
0031	TOTAL TRIHALOMETHANE	EQ	55.3000	80.0000	ug/L	
0045	VINYL CHLORIDE	LT	0.5000	2.0000	ug/L	0.5000
0046	1,1 DICHLOROETHYLENE	LT	0.5000	7.0000	ug/L	0.5000
0047	1,1,1 TRICHLOROETHANE	LT	0.5000	200.0000	ug/L	0.5000
0048	CARBON TETRACHLORIDE	LT	0.5000	5.0000	ug/L	0.5000
0049	BENZENE	LT	0.5000	5.0000	ug/L	0.5000
0050	1,2 DICHLOROETHANE	LT	0.5000	5.0000	ug/L	0.5000
0051	TRICHLOROETHYLENE	LT	0.5000	5.0000	ug/L	0.5000
0052	1,4 DICHLOROBENZENE	LT	0.5000	75.0000	ug/L	0.5000
0053	CHLOROMETHANE	LT	0.5000		ug/L	0.5000
0054	BROMOMETHANE	LT	0.5000		ug/L	0.5000
0055	CHLOROETHANE	LT	0.5000		ug/L	0.5000
0056	METHYLENE CHLORIDE (DICHLOROMETHANE)	LT	0.5000	5.0000	ug/L	0.5000
0057	TRANS- 1,2 DICHLOROETHYLENE	LT	0.5000	100.0000	ug/L	0.5000
0058	1,1 DICHLOROETHANE	LT	0.5000		ug/L	0.5000
0059	2,2 DICHLOROPROPANE	LT	0.5000		ug/L	0.5000
0060	CIS- 1,2 DICHLOROETHYLENE	LT	0.5000	70.0000	ug/L	0.5000
0062	1,1 DICHLOROPROPENE	LT	0.5000		ug/L	0.5000
0063	1,2 DICHLOROPROPANE	LT	0.5000	5.0000	ug/L	0.5000
0064	DIBROMOMETHANE	LT	0.5000		ug/L	0.5000
0065	CIS- 1,3 DICHLOROPROPENE	LT	0.5000		ug/L	0.5000

Records 1 - 25 of 62

Links to external resources are provided as a public service and do not imply endorsement by the Washington State Department of Health

View Sample Detail - WSID 18305H - DECEPTION PARK VIEW

Collect Date	11/11/2015
Lab Number	174
Lab Name	Exact Scientific Services, Inc
Sample Number	42712
Source	02
Analyte Group	VOC-VOLATILE ORGANIC CONTAMINANTS
Test Panel	VOC1-VOLATILE ORGANIC
Sample Location	s02
Sample Type	Post-Treatment / Finished

Analyte DOH Num	Analyte Name	Result Range	Result Quantity	Maximum Contaminant Level	Units	State Reporting Limit
0066	TOLUENE	LT	0.5000	1000.0000	ug/L	0.5000
0067	1,1,2 TRICHLOROETHANE	LT	0.5000	5.0000	ug/L	0.5000
0068	TETRACHLOROETHYLENE	LT	0.5000	5.0000	ug/L	0.5000
0069	TRANS- 1,3 DICHLOROPROPENE	LT	0.5000		ug/L	0.5000
0070	1,3 DICHLOROPROPANE	LT	0.5000		ug/L	0.5000
0071	CHLOROBENZENE	LT	0.5000	100.0000	ug/L	0.5000
0072	1,1,1,2 TETRACHLOROETHANE	LT	0.5000		ug/L	0.5000
0073	ETHYLBENZENE	LT	0.5000	700.0000	ug/L	0.5000
0074	M/P XYLENES (MCL FOR TOTAL)	LT	0.5000		ug/L	0.5000
0075	O- XYLENE (MCL FOR TOTAL)	LT	0.5000		ug/L	0.5000
0076	STYRENE	LT	0.5000	100.0000	ug/L	0.5000
0078	BROMOBENZENE	LT	0.5000		ug/L	0.5000
0079	1,2,3 TRICHLOROPROPANE	LT	0.5000		ug/L	0.5000
0080	1,1,2,2 TETRACHLOROETHANE	LT	0.5000		ug/L	0.5000
0081	O- CHLOROTOLUENE	LT	0.5000		ug/L	0.5000
0082	P- CHLOROTOLUENE	LT	0.5000		ug/L	0.5000
0083	M- DICHLOROBENZENE	LT	0.5000		ug/L	0.5000
0084	1,2 DICHLOROBENZENE	LT	0.5000	600.0000	ug/L	0.5000
0085	TRICHLOROFLUOROMETHANE	LT	0.5000		ug/L	0.5000
0086	BROMOCHLOROMETHANE	LT	0.5000		ug/L	0.5000
0087	ISOPROPYLBENZENE	LT	0.5000		ug/L	0.5000
0088	N-PROPYLBENZENE	LT	0.5000		ug/L	0.5000
0089	1,3,5 TRIMETHYLBENZENE	LT	0.5000		ug/L	0.5000
0090	TERT- BUTYLBENZENE	LT	0.5000		ug/L	0.5000
0091	1,2,4 TRIMETHYLBENZENE	LT	0.5000		ug/L	0.5000

Records 26 - 50 of 62

Links to external resources are provided as a public service and do not imply endorsement by the Washington State Department of Health

View Sample Detail - WSID 18305H - DECEPTION PARK VIEW

Collect Date	11/11/2015
Lab Number	174
Lab Name	Exact Scientific Services, Inc
Sample Number	42712
Source	02
Analyte Group	VOC-VOLATILE ORGANIC CONTAMINANTS
Test Panel	VOC1-VOLATILE ORGANIC
Sample Location	s02
Sample Type	Post-Treatment / Finished

Analyte DOH Num	Analyte Name	Result Range	Result Quantity	Maximum Contaminant Level	Units	State Reporting Limit
0092	SEC- BUTYLBENZENE	LT	0.5000		ug/L	0.5000
0093	P-ISOPROPYLTOLUENE	LT	0.5000		ug/L	0.5000
0094	N-BUTYLBENZENE	LT	0.5000		ug/L	0.5000
0095	1,2,4 TRICHLOROBENZENE	LT	0.5000	70.0000	ug/L	0.5000
0096	NAPHTHALENE	LT	0.5000		ug/L	0.5000
0097	HEXACHLOROBUTADIENE	LT	0.5000		ug/L	0.5000
0098	1,2,3 TRICHLOROBENZENE	LT	0.5000		ug/L	0.5000
0104	DICHLORODIFLUOROMETHANE	LT	0.5000		ug/L	0.5000
0154	1,3 DICHLOROPROPENE	LT	0.5000		ug/L	0.5000
0160	TOTAL XYLENES	LT	0.5000	10000.0000	ug/L	0.5000
0427	EDB (screening)	LT	0.5000		ug/L	0.5000
0428	DBCP (screening)	LT	0.5000		mg/L	0.5000

Records 51 - 62 of 62

Links to external resources are provided as a public service and do not imply endorsement by the Washington State Department of Health

Department of Health, Office of Drinking Water

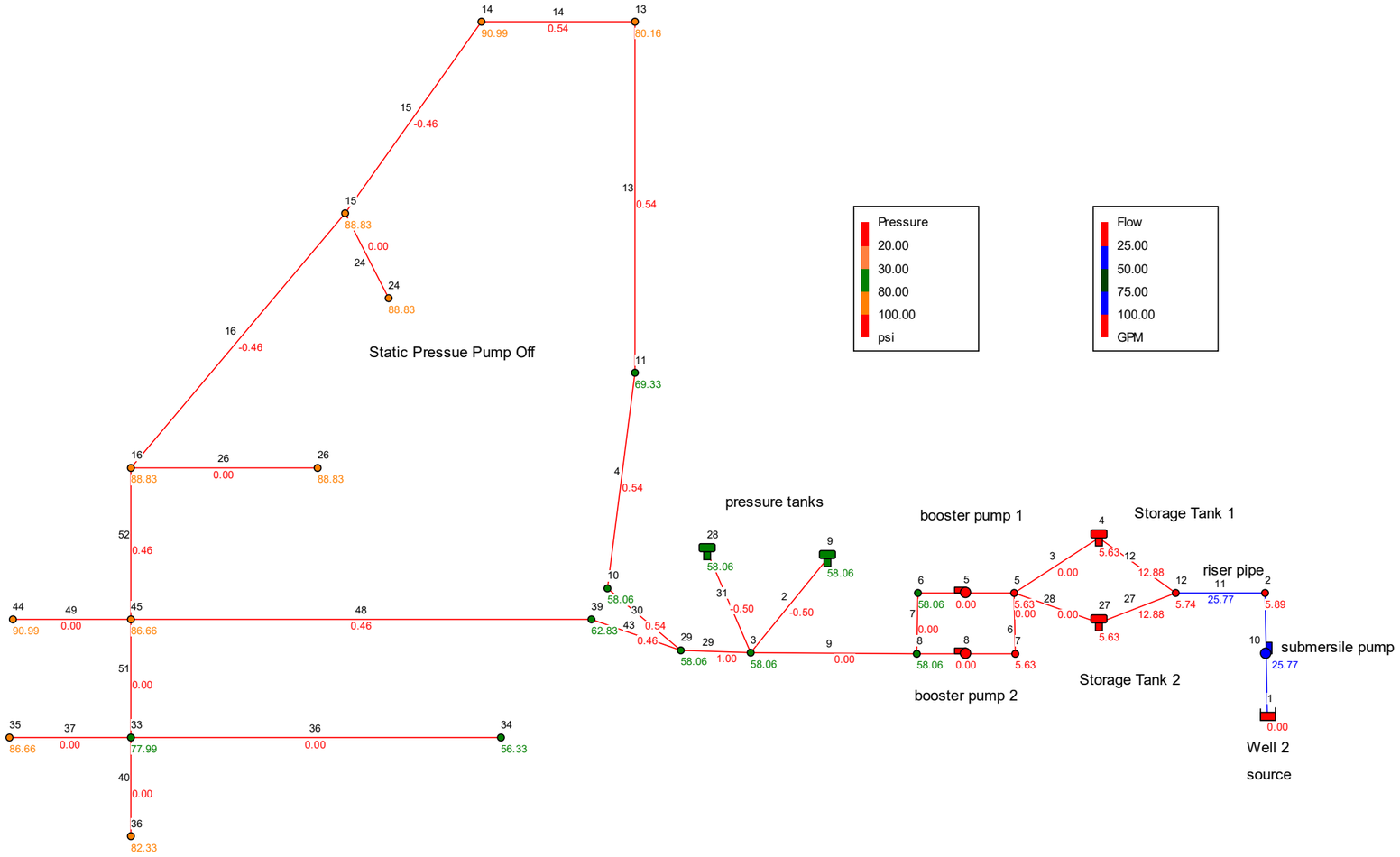
Street Address:
243 Israel Road S.E. 2nd floor
Tumwater, WA 98501

Mail:
PO BOX 47822
Olympia, WA 98504-7822

Send inquiries about DOH and its programs to the Health Consumer Assistance Office
Comments or questions regarding this Web site? Send email to Environmental Health Application Testing and Support or call 888-457-2467.
For technical issues with this website send email to DOH IT Service Desk or call 360-236-4357.

APPENDIX G Hydraulic Modeling

Deception Park View - Static (High Pressure)



Deception Park View - Static (High Pressure)

Network Table - Nodes at 0:00 Hrs

Node ID	Elevation ft	Demand GPM	Pressure psi
Junc 2	101	0.00	5.89
Junc 5	101	0.00	5.63
Junc 6	101	0.00	58.06
Junc 7	101	0.00	5.63
Junc 8	101	0.00	58.06
Junc 10	101	0.00	58.06
Junc 11	75	0.00	69.33
Junc 12	101	0.00	5.74
Junc 3	101	0.00	58.06
Junc 13	50	0.00	80.16
Junc 14	25	1.00	90.99
Junc 15	30	0.00	88.83
Junc 16	30	0.00	88.83
Junc 24	30	0.00	88.83
Junc 26	30	0.00	88.83
Junc 29	101	0.00	58.06
Junc 33	55	0.00	77.99
Junc 34	105	0.00	56.33
Junc 35	35	0.00	86.66
Junc 36	45	0.00	82.33
Junc 39	90	0.00	62.83
Junc 44	25	0.00	90.99
Junc 45	35	0.00	86.66
Resvr 1	-11	-25.77	0.00
Tank 4	101	12.89	5.63
Tank 9	101	-0.50	58.06
Tank 27	101	12.89	5.63
Tank 28	101	-0.50	58.06

Deception Park View - Static (High Pressure)

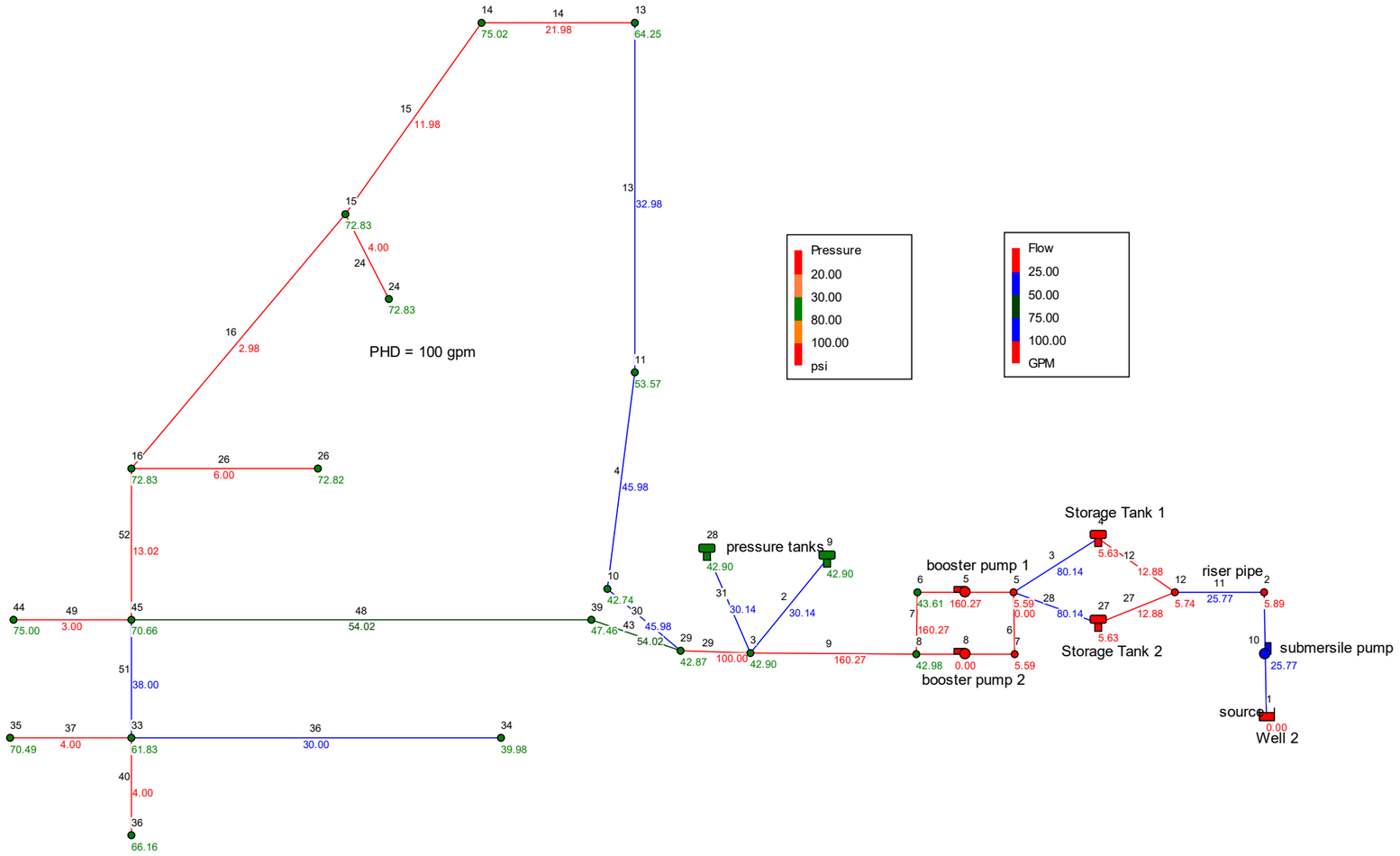
Network Table - Links at 0:00 Hrs

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps
Pipe 3	20	4	130	0.00	0.00
Pipe 6	20	3	130	0.00	0.00
Pipe 7	20	3	130	0.00	0.00
Pipe 9	10	4	130	0.00	0.00
Pipe 4	560	4	130	0.54	0.01
Pipe 11	20	2	130	25.77	2.63
Pipe 12	50	2	130	12.88	1.32
Pipe 2	10	4	130	-0.50	0.01
Pipe 13	370	4	130	0.54	0.01
Pipe 14	320	4	130	0.54	0.01
Pipe 15	345	4	130	-0.46	0.01
Pipe 16	740	4	130	-0.46	0.01
Pipe 24	163	4	130	0.00	0.00
Pipe 26	317	4	130	0.00	0.00
Pipe 27	50	2	130	12.88	1.32
Pipe 28	20	4	130	0.00	0.00
Pipe 29	10	4	130	1.00	0.03
Pipe 30	170	4	130	0.54	0.01
Pipe 31	10	4	130	-0.50	0.01
Pipe 36	515	4	130	0.00	0.00
Pipe 37	185	4	130	0.00	0.00
Pipe 40	110	4	130	0.00	0.00
Pipe 43	170	4	130	0.46	0.01
Pipe 48	600	4	130	0.46	0.01
Pipe 49	180	4	130	0.00	0.00
Pipe 51	310	4	130	0.00	0.00
Pipe 52	70	4	130	0.46	0.01
Pump 5	#N/A	#N/A	#N/A	0.00	0.00
Pump 8	#N/A	#N/A	#N/A	0.00	0.00

Deception Park View - Static (High Pressure)

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps
Pump 10	#N/A	#N/A	#N/A	25.77	0.00

Deception PArk View Peak Hour Demand



Deception PArk View Peak Hour Demand

Network Table - Nodes at 0:00 Hrs

Node ID	Elevation ft	Demand GPM	Pressure psi
Junc 2	101	0.00	5.89
Junc 5	101	0.00	5.59
Junc 6	101	0.00	43.61
Junc 7	101	0.00	5.59
Junc 8	101	0.00	42.98
Junc 10	101	0.00	42.74
Junc 11	75	13.00	53.57
Junc 12	101	0.00	5.74
Junc 3	101	0.00	42.90
Junc 13	50	11.00	64.25
Junc 14	25	10.00	75.02
Junc 15	30	5.00	72.83
Junc 16	30	10.00	72.83
Junc 24	30	4.00	72.83
Junc 26	30	6.00	72.82
Junc 29	101	0.00	42.87
Junc 33	55	0.00	61.83
Junc 34	105	30.00	39.98
Junc 35	35	4.00	70.49
Junc 36	45	4.00	66.16
Junc 39	90	0.00	47.46
Junc 44	25	3.00	75.00
Junc 45	35	0.00	70.66
Resvr 1	-11	-25.77	0.00
Tank 4	101	-67.25	5.63
Tank 9	101	30.14	42.90
Tank 27	101	-67.25	5.63
Tank 28	101	30.14	42.90

Deception PArk View Peak Hour Demand

Network Table - Links at 0:00 Hrs

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps
Pipe 3	20	4	130	80.14	2.05
Pipe 6	20	3	130	0.00	0.00
Pipe 7	20	3	130	160.27	7.27
Pipe 9	10	4	130	160.27	4.09
Pipe 4	560	4	130	45.98	1.17
Pipe 11	20	2	130	25.77	2.63
Pipe 12	50	2	130	12.88	1.32
Pipe 2	10	4	130	30.14	0.77
Pipe 13	370	4	130	32.98	0.84
Pipe 14	320	4	130	21.98	0.56
Pipe 15	345	4	130	11.98	0.31
Pipe 16	740	4	130	2.98	0.08
Pipe 24	163	4	130	4.00	0.10
Pipe 26	317	4	130	6.00	0.15
Pipe 27	50	2	130	12.88	1.32
Pipe 28	20	4	130	80.14	2.05
Pipe 29	10	4	130	100.00	2.55
Pipe 30	170	4	130	45.98	1.17
Pipe 31	10	4	130	30.14	0.77
Pipe 36	515	4	130	30.00	0.77
Pipe 37	185	4	130	4.00	0.10
Pipe 40	110	4	130	4.00	0.10
Pipe 43	170	4	130	54.02	1.38
Pipe 48	600	4	130	54.02	1.38
Pipe 49	180	4	130	3.00	0.08
Pipe 51	310	4	130	38.00	0.97
Pipe 52	70	4	130	13.02	0.33
Pump 5	#N/A	#N/A	#N/A	160.27	0.00
Pump 8	#N/A	#N/A	#N/A	0.00	0.00

Deception PArk View Peak Hour Demand

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps
Pump 10	#N/A	#N/A	#N/A	25.77	0.00

APPENDIX H Seawater Intrusion Analysis

Island County Health Department

P.O. Box 5000 • Coupeville, WA 98239

Island County Seawater Intrusion Protection
Intrusion Risk Rating Certification

Issued: Wednesday, November 7, 2018

Intrusion Rating for Well # 4QD is 'Low Risk'
PwsID/SO#: 18305/2

Wells within 1/2 Mile of Well # 4QD*

Well Key	Owner Name	Well Address	Max Chloride	Water Level Elev	Distance from Center	Total Depth Elev	Loc Acc*
4QC	R P Fakkema	5078 N DECEPTION CIR (from parcel addr	59	19.28	13	-74	-2
GQP	John Sitko	40251 SR 20B, Oak Harbor	49		2264	-21	3
F3K	John & Ronnie Sitko	40219 SR 20	41		1983	-18	3
CDE	Si Heller	0 (from parcel address)	40		2639	-78	3
4QD	Deception Park View Community Assoc.		36		0	-188	2
4PR	Rob VanDyk	515 W. Ducken Road, Oak Harbor, WA 982	32		2188	-103	3

Staff Signature: Doug Fully

Expires: Thursday, November 7, 2019

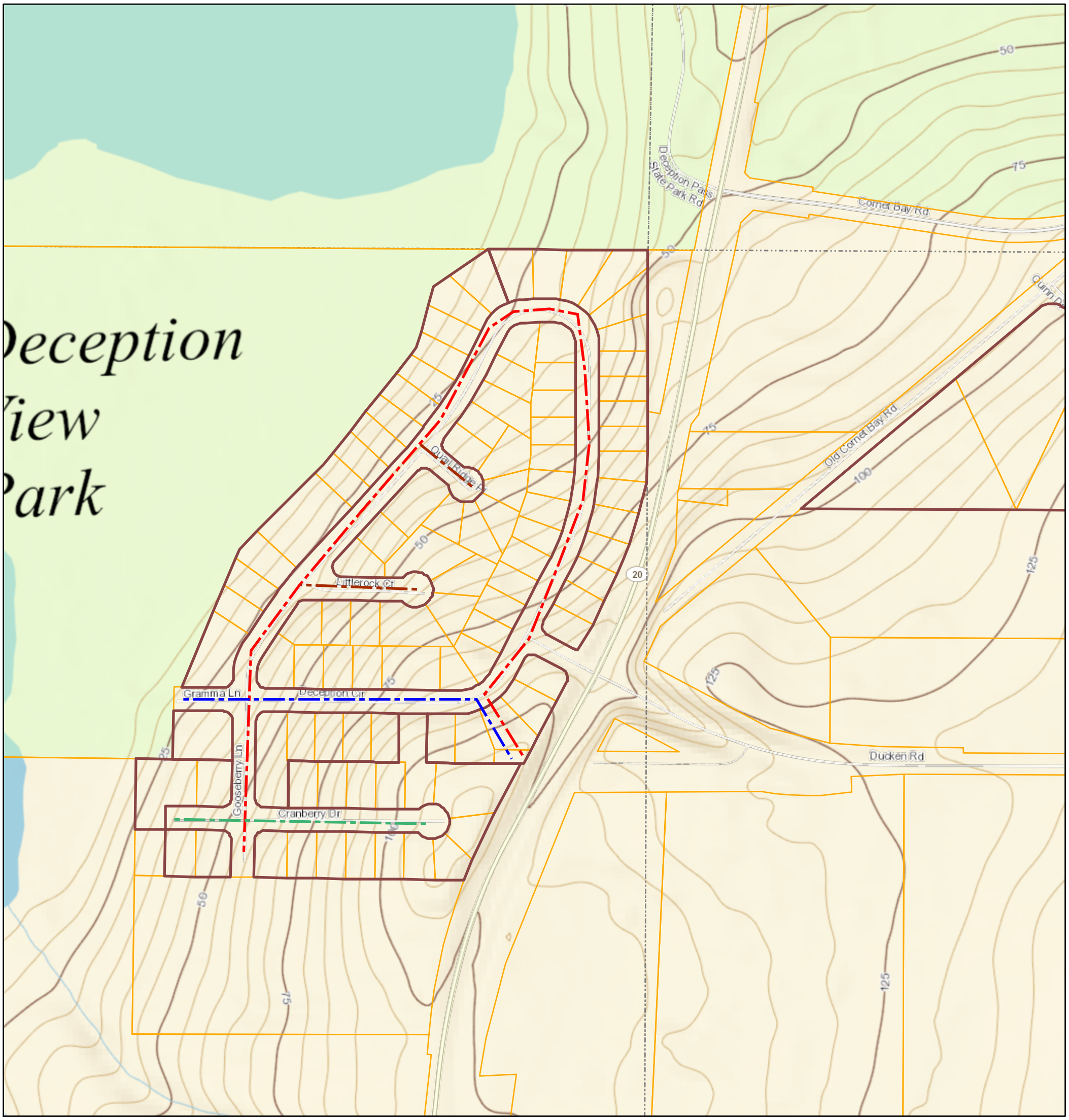
Parcel Acres:

Xcode: 434112070393 34N/01E-35

*** Location Accuracy**

0 = TRS 1 = Parcel 2 = DGPS
3 = Site plan / GE " " = Unknown
< 0 = Elev Surveyed

Topographic_Island county map



11/6/2018 4:34:35 PM

1:4,514

0 0.03 0.07 0.13 mi

0 0.05 0.1 0.2 km

Plats

- Plat

Tideland Only Parcels

- No Adjacent Land
- Parcels
- Quarter Sections
- One Way Directions

- Road Closures

Roads

- Highway
- Collector and Arterial
- Local
- Private

Island County

Island County Parcel Viewer Map Export
DO NOT USE AS A LEGAL DOCUMENT, ACCURACY NOT GUARANTEED