ORDINANCE NO. 3019

AN ORDINANCE OF THE CITY OF ANACORTES, WASHINGTON, RELATING TO THE CITY WATER UTILITY; ADOPTING THE 4-YEAR LIMITED UPDATE TO THE CITY'S WATER SYSTEM PLAN; INCORPORATING THE 4-YEAR LIMITED UPDATE INTO THE CITY COMPREHENSIVE PLAN; AND RATIFYING AND CONFIRMING PRIOR ACTS.

THE CITY COUNCIL OF THE CITY OF ANACORTES, WASHINGTON, does hereby ordain as follows:

SECTION 1. RECITALS AND FINDINGS

1.1 The City of Anacortes ("City") owns and operates a regional water supply system which supplies approximately 22 million gallons per day to approximately 56,000 residential, commercial and industrial customers ("Water Utility"). The Water Utility effectively came into existence in 1919 when the City purchased the water system from Washington Water and Power Company.

1.2 The Water Utility is now part of the combined utility system of City utilities ("System"). The System includes the Water Utility; the City system of storm and surface water management; the City system of garbage and refuse collection and disposal; and the City Sewer Utility.

1.3 The Water Utility provides the entire domestic service for all residential and commercial customers in the City and residential and commercial retail customers in parts of unincorporated Skagit County. And, consistent with the Skagit County Coordinated Water System Plan and the City's original 2011 water system plan, the City has entered into long-term supply contracts with seven wholesale and industrial customers for water service to other municipal and tribal areas and a military base. Those contracts, and contract terms, include: City of Oak Harbor – December 31, 2036; Town of La Conner – December 31, 2036; Skagit PUD –

December 31, 2036; Swinomish Utility Authority – December 31, 2036; Tesoro Refinery and Marketing Company (now Andeavor) – December 31, 2036; Shell Oil Products US (Shell Puget Sound Refinery) – December 31, 2036.

Under Department of Health regulations at the time the City's Water System Plan was adopted, water system plans were to be updated every six years. WAC 246.290.100. Under current Department of Health regulations, water system plans are to be updated every ten years. This 4-year Limited Update effectively converts the City's original 2011 Water System Plan to a ten year plan.

1.5 The City's Determination of Non-Significance on the 4-Year Limited Update pursuant to the State Environmental Policy Act was issued in December **2017**.

1.6 Following published notice, the City conducted a public informational meeting on the 4-Year Limited Update to the City's 2011 Water System Plan for Water Utility customers and others on December 18, 2017.

1.7 The 4-Year Limited Update to the 2011 Water System Plan is consistent with the City's rights and responsibilities under the 1996 Memorandum of Agreement Regarding Utilization of Skagit River Basin Water Resources for Instream and Out of Stream Purposes, commonly referred to as the 1996 Memorandum of Agreement. The parties to the Memorandum of Agreement are the Skagit PUD, Skagit County, Washington State Department of Ecology, Washington State Department of Fish and Wildlife, the Swinomish Indian Tribal Community, the Upper Skagit Indian Tribe, and the Sauk-Suiattle Indian Tribes. The Water System Plan is also consistent with the Coordinated Water System Plan for Skagit County.

1.8 The City Council, having considered the 4-Year Limited Update to the 2011 Water System Plan and any comment thereon, determines it appropriate to adopt the Plan for the 2010 - 2029 planning period.

1.9 The 4-Year Limited Update to the 2011 Water System Plan is also adopted as part of the City Comprehensive Plan, consistent with the Growth Management Act (RCW 36.70A.070) and City planning authority (RCW 35A.63.062).

SECTION 2. WATER SYSTEM PLAN APPROVED

The Updated City of Anacortes Water System Plan is hereby approved and adopted as the City's Water System Plan and the City's system and plan for Water Utility improvements.

SECTION 3. COMPREHENSIVE PLAN AMENDED

The Updated Water System Plan approved and adopted by this Ordinance supersedes and replaces amends the City's original 2011 Water System Plan and by this Ordinance is hereby incorporated into the City Comprehensive Plan.

SECTION 4 RATIFICATION AND CONFIRMATION

All acts prior to and consistent with this ordinance are herby ratified and confirmed.

SECTION 5 EFFECTIVE DATE

This Ordinance is both subject to State regulatory oversight and an exercise of a power delegated to the City legislative body; and, therefore, not subject to referendum. This ordinance shall take effect and be in force five (5) days from and after its passage, approval and publication in the manner required by law.

SECTION 6 ADOPTION

PASSED by the City Council and APPROVED by the Mayor of the City of Anacortes, Washington, this 18th day of December, 2017 at a regular open public meeting thereof.

Laurie Gere, Mayor

ATTEST:

Steve D. Hoglund, City Clerk/Treasurer

APPROVED AS TO FORM:

Darcy James Swetnam, WSBA **40530**,
City Attorney

REPORT

CITY OF ANACORTES

2012 WATER SYSTEM PLAN

4-YEAR LIMITED UPDATE

On March 8, 2017, City of Anacortes staff met with Department of Health (DOH) staff to discuss the options available for water system planning given recent legislation that now allows water system plans to be approved by the DOH for ten years rather than six years. The City's current Water System Plan (WSP) was approved by the DOH on March 7, 2012. Options discussed were for the City to do a 2-year existing plan extension, a 4-year limited update, or a new 10-year plan. Through that discussion, the City decided to proceed with a request for a 4-year limited update and prepared this report to support the request. Guidance from the DOH was to build on the existing plan with updated information in the following areas:

- Update the historical water demand data, including the successful impact of conservation on demand. Update Figure 1-3.
- Explain how the lack of capacity identified in Table 1-4, Source and Storage Analysis, has been or will be addressed.
- Provide an update to the Peak Hour Demand Conditions/deficiencies noted on page 1-10
- Discuss status of service area adjustments with the Skagit PUD.
- Check with wholesale customers to update demand projections/verify City's capacity will be adequate for the extended planning period.
- Provide an Asset Management/critical infrastructure analysis update.
- Conduct a self-assessment for any gaps or catch-up for this limited plan update.
- Conduct a consumer meeting to summarize the WSP update elements.
- Document City Council plan approval prior to DOH final approval.
- Provide SEPA documentation.
- Provide Local Government Consistency from appropriate planning agencies.
- Provide a narrative cover letter with professional engineer seal discussing current plan validity.

SYSTEM CAPACITY

Demand Forecast Update

Figure 1-3 was updated using data from the attached updated Table 4-10, "Demand Forecast (With Additional Conservation)". For the City's retail system, the update included replacing projected average day demands for residential and commercial accounts with actual data for the years 2008 through 2016. The methodology used for the original retail projections was to multiply the projected number of residental and commercial accounts by the "water use factors" for each. The water use factors were the

average daily demand for each type of account for the years 2005 through 2007. The number of accounts was grown at 2% per year.

That methodology for projecting the retail demand was used with the new projection except the water use factors were updated, using the average for years 2014 through 2016. The number of accounts was increased from the 2016 numbers at 2% per year, as with in the original projection. In 2016, the City adopted a new Comprehensive Plan that projected the population of Anacortes in the year 2036 at 22,293. With a 2016 population of 16,398, that growth rate is approximately 1.8%. Therefore, 2% growth is thought to be conservative in terms of projecting demand.

To update the wholesale portion of the demand projection, each wholesale customer was contacted, mostly by phone. The responses are as follows:

- Shell: no changes in the foreseeable future. The average of average day demand for years 2014 through 2016 (7.21 mgd) was held for years 2017 through 2029.
- Tesoro (now Andeavor): No foreseeable changes in flow other that a project in 2018 that will increase their flow by 45 gallons per minute (gpm) and another project in 2021 that will increase flow by another 100 gpm. Those two increases were included in the forecast and the projected flow was otherwise held constant.
- Oak Harbor: Recommended using the projection in their 2013 water system plan.
- Skagit PUD: Recommended not making any changes to the original projection.
- La Conner: Recommended using the projection from their 2009 water system plan.
- Swinomish: Recommended not making any changes to the original projection.
- Del Mar: Del Mar believes they are at or near build-out and recommended not increasing the projection beyond current use. They think the demand might go down as a result of a significant waterline replacement project anticipated in the next few years.

No changes were made in the "Future Industrial Block" or "Non-Revenue", and the same peaking factor of 1.5 was used in the update of the table.

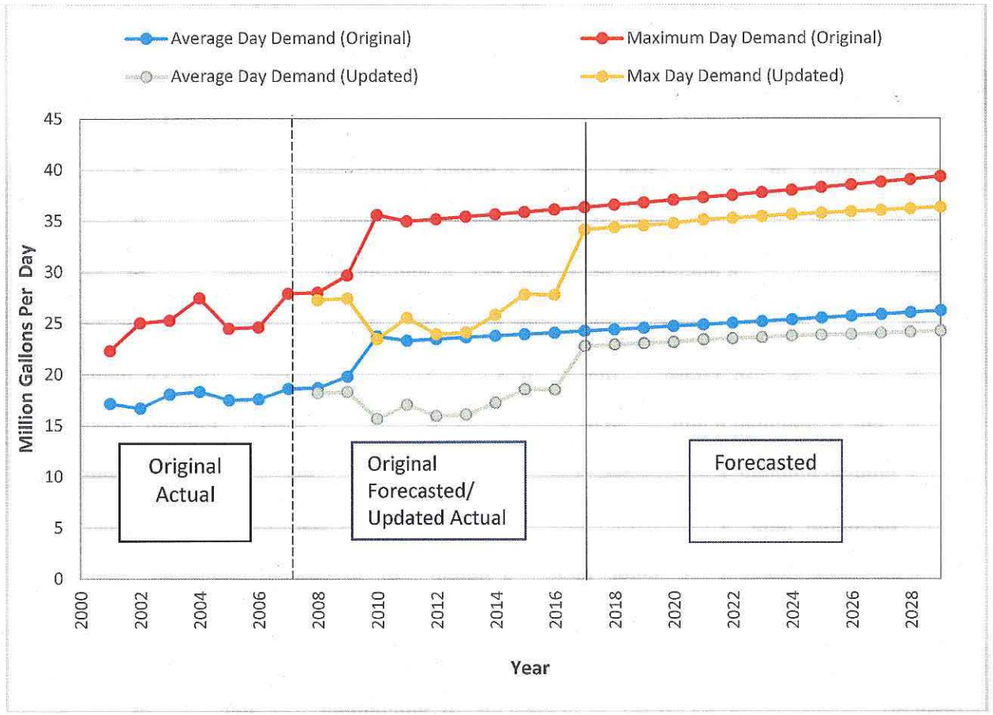

Figure 1-3 Updated Demand Forcast Summary (With Conservation)

As can been see in Figure 1-3, the City's annual water demand for the years 2008 through 2016 has been below that projected in the original demand forecast. Also, the adjusted projections for years 2017 through 2029 remain below the original projections. Therefore, except as discussed below, the conclusions of the plan are still valid.

Source and Storage Update

Subsection 6.2.2 of the WSP provides a discussion of the Source Capacity Evaluation that was performed. That effort identified the current capacity of 3-MG Pump Station as "insufficient to provide supply for these (High, Mid, A Avenue, Rock Ridge, Castilleja, and The Pointe) zones starting prior to 2015." This was also reported in Table 1-4.

A manifestation of the problem was the difficulty in filling the Skyline Reservoir. While the 29th Street Reservoir and Skyline Reservoir were constructed at the same elevation, the Skyline Reservoir is located 4 miles further away from the source (the 3MG Reservoir/Pump Station) than the 29th Street Reservoir. Due to head loss, the 29th Street Reservoir would fill faster than the Skyline Reservoir and would routinely be full before the Skyline Reservoir. An interim solution that was employed was the installation of flow control valves, controlled by the WTP, at both reservoirs. This allows both reservoirs

to fill and has, at least in the near term, solved the problem with filling the reservoirs. However, modeling has demonstrated that under future maximum day demand (MDD) conditions, this solution will not be adequate.

The City contracted with MWH Americas Inc. to evaluate the situation and identify solutions. Their report was completed in 2012. The modeling consultant, HDR Engineering, performed extended period hydraulic model simulations of five alternative solutions to the problem of filling the Skyline Reservoir during future MDD conditions. Of the five alternative solutions that were modeled, only an increase to the capacity of the 3MG Reservoir Pump Station appeared to result in the desired filling and draining of the Skyline Reservoir during both current and future MDD conditions.

The MWH report recommends three new equally sized horizontal splitcase centrifugal pumps of similar type and physical dimensions to the existing large pumps at the pump station. The new pumps should be sized so two pumps operating 24 hours per day can meet the future MDD of 4.06 million gallons. One of the three pumps will remain out of service for redundancy. Variable frequency drives are recommended. This project is in the Capital Improvement Plan and the City anticipates doing this work in 2019/2020.

Peak Hour Demand/Deficiencies Update

Subsection 6.5.4 of the WSP discusses modeling results for peak hour analysis. The analysis identifies certain areas that had pressure less than 20 psi during current and 20-year conditions, and identifies possible solutions to problems. Also, subsection 6.5.6 discusses model result for Fire Flow Analysis. The analysis identifies areas with deficient fire flows and proposes possible solutions. These results are summarized in Subsection 1.5.

Proposed solutions are outlined in Table 10-1, CIP "Projects Identified by System Analysis". Progress has been made on several of those projects. Referencing Table 10-1, work completed includes predesign on project P-3 with construction anticipated in 2019 and 2020, as discussed above. Completed projects include Projects D-3, D-4, D-8, D-9, and D-11. Other projects to increase pipe size/fire flow not specifically identified in Table 10-1 have also been completed. Work to increase pipe size in the Skyline area will begin in 2018 and will likely take several years to complete.

In 2017, the modeling consultant, HDR Engineering, updated the model with as-built information provided by the City for water projects completed since the model was created. The model continues to be a useful tool particularly to do "what-if" scenarios to verify the City's waterline projects are accomplishing desired results.

Water Use Efficiency Update

In 2008, Anacortes adopted a goal of saving over 30 million gallons over a seven-year period ending in 2014. As shown in the updated Table 4-10, the difference between the projected residential average day demand (ADD) and the actual residential ADD in 2009 is approximately 0.09 MGD, or approximately 32 million gallons for the year. By that measure, the goal was reached in the first year. And that trend carried through the remaining years to 2014 and beyond. So the goal was well surpassed. As shown in the updated Figure 4-10, residential ADD for each year from 2008 through 2016, has been below the projected ADD. In fact, residential ADD has been below the 2007 actual amount in each of those years except 2016. It is noted that starting in 2014, there has be a sharp increase in commercial consumption

going well beyond the increase in the number of commercial accounts. The reason for this is not well understood at this time but will be monitored by the City. It is interesting to note that there has been a reduction in consumption from the City's wholesale customers that provide residential water.

In 2016, the City adopted a new water conservation goal and new water conservation measures to accomplish the goal. The new goal is to decrease residential water consumption by 917,500 gallons per year for the following 6 years. The City will continue to do many of the things it did before, including distributing leak detection tablets, providing education on websites and at local festivals and community events. In addition to those things, the City has adopted a program that includes an Appliance Energy Efficient Rebate Program for clothes washers, dishwashers, and toilets; Energy Savings Kit/WaterSense shower head giveaways; and shower timer giveaways.

RETAIL SERVICE AREA

Service Area Adjustment Update

Item 6 in Subsection 2.3 of the WSP mentions that an update of the Coordinated Water System Plan (CWSP) is anticipated and that discussions would likely occur as a part of that process regarding adjustments to the City of Anacortes/Skagit PUD services area. WSP Figure 2-2 shows the areas of possible adjustments. One area is generally east of the Swinomish Channel along the City's transmission lines. The other area is the PUD service area on Fidalgo Island. Work has not begun on updating the CWSP. And discussions have not occurred on the area east of the Swinomish Channel. However, several discussions have occurred regarding the PUD's service area on Fidalgo Island becoming the City's service area. The PUD's interest in such an adjustment relates to the logistics of maintenance activities so far removed from the PUD's other areas of responsibilities. The City is open to continuing the discussion. Due to resent changes in the PUD management, particularly on the PUD Commission, further discussions will probably wait for a time for the new commissioner to become more familiar with the situation.

OPERATION AND MAINTENANCE

Asset Management Update

As discussed in WSP Subsection 9.1, the operation and maintenance (O&M) of the City's water system is divided within the Public Work Department between the Water Treatment Division and the Operations Division. The Treatment Division is responsible for the Water Treatment Plant (WTP), pump stations, and reservoirs. The Operations Division is responsible for the transmission pipelines and distribution system including PRVs. Currently, the City uses two different asset management programs, one for the Treatment Division and another for the Operations Division. This came about because the two programs were developed at different times.

The Water Treatment Division uses a preventive maintenance and asset management program by Antero. The water treatment plant (WTP) project provided an opportunity to develop an asset management program and the current program was developed when the new WTP was coming on line in 2013, along with a complete electronic O&M manual system. The program allows staff to create,

schedule, and plan work orders as well as manage corrective actions requests. In addition, the program helps staff analyze equipment costs to help determine equipment replacement schedules. Inventory management is another component of the program that staff use to track spare parts and consumables in order to complete scheduled maintenance tasks.

In 2015, the Engineering and Operations Divisions began implementing an asset management system by Cartegraph to track everyday maintenance of utilities with the City. This system is used for all of the Operation Divisions assests, not just water assets, and Cartegraph was determined to be the best fit for that purpose. For the water system, valves, hydrants, blowoffs, PRVs, ARVs, cathodic protection, water laterals, and all water lines are tracked. The system has the ability to track costs involved with completed maintenance and upgrades to the system. This tracking will help in planning future upgrades of our assets. The implementation of this program is continuing and more management tools may continue to be added in the future.

Time will tell if the City maintains two systems or merges to one system in the future. For now, each system is working well for each division.

Critical Infrastructure Analysis Update

The City of Anacortes participated in the 2014 update of the Skagit County Natural Hazard Mitigation Plan that provides information to assist governmental jurisdictions and agencies and others in understanding the hazard related issues facing citizens, businesses, government and the environment. The document serves as a guide to reduce vulnerability and minimize loss from future natural hazard events. The Hazard Mitigation Plan discusses natural hazard identification/rating and mitigation in general and then specifically for each jurisdiction in Skagit County, including the City of Anacortes. This is not a water system specific evaluation but certain water system components are identified as critical facilities, including the water treatment plant, reservoirs, and distribution system. The plan concludes Anacortes is most vulnerable to severe storms, flooding, and earthquakes and identifies natural hazard mitigation strategies and projects which include seismic analysis and upgrade of existing structures.

Other than the Skagit County plan, the City has not done a formal water system-specific hazard mitigation analysis/plan that is relevant in the current planning period. The City will consider completing a formal analysis for both natural and human hazard in the future. However, an informal analysis is always performed in the development of the capital improvement plan (CIP) and in project execution. That is, a fundamental component of identifying projects for the CIP involves a recognition of threats and vulnerabilities to the water system. The projects themselves are seen as opportunities to upgrade the system for such hazards beyond what may be the original purpose for the project. The new water treatment plant, for example, was not constructed solely for the purpose of hazard mitigation, but that was certainly incorporated in its design. For example, seismic vulnerability was evaluated and resulted in the installation of over 600 piling to mitigate for the liquefaction threat. Also, the new WTP was constructed to withstand at least a 100 year storm event by placing all openings above the 100-year flood elevation. And the WTP now has emergency generators that can supply the average day demand for seven days. Another example is the Blue Heron Circle 3 MG Reservoir project. One of the factors that led the City to replace, rather than rehabilitate, the existing reservoir was its seismic vulnerability. The old reservoir did not meet current seismic standards and there was no practical way to bring it into compliance. The new reservoirs that are being built to replace the old one meet current standards.

GAP ANALYSIS

There are two issues not discussed in the original WSP that will need to be resolved in the near future. Both have to do with the water treatment plant. One pertains to the re-rating of the filter capacity and the other pertains to disinfection using chlorine gas.

Filter Rating

The new City of Anacortes Water Treatment Plant (WTP) was designed and constructed to have a firm treatment production capacity of 42 million gallons per day (MGD), based on the WSP 20-year demand projection, and a hydraulic capacity of 54.9 MGD, based on the City's overall water right. The new plant has eight rapid sand filters of equal size. With one filter offline, a rated capacity of 42 MGD relies on a permitted flow rate of 7.41 gallons per minute per square foot of filter surface area (gpm/sf). The DOH's standard permitted capacity for rapid sand filtration is 6 gpm/sf. The intention was to perform a pilot study once the new plant came on line to demonstrate the higher flow rate was permissible. A pilot plan was prepared and a pilot study was completed which the City felt demonstrated filter effectiveness at the higher flow rate. However, the DOH was not satisfied with this initial study and is requiring further study. The City is preparing to perform this additional study.

While the updated demand projections are below that of the original WSP, the rated capacity of the new WTP necessary to meet future demand projections depends on DOH approval of the higher flow rate. This is an issue the City will need to resolve.

Chlorine Gas Disinfection

The new WTP was designed using chlorine gas disinfection. This was the disinfection process used in the old plant and it was the preference of the WTP staff for the new plant during design. Recently, the Department of Ecology (DOE) raised concern about the use of chlorine gas because of the possibility of gas leaving the WTP sight in the case of a catastrophic failure of the system, and the potential adverse effect on the general public such an event might have. A recent DOE inspection of the chlorine gas disinfection system, which is housed in its own containment building equipped with a scrubber system and other safeguards, found the system to be a good design. However, a question the City is currently evaluating is whether the ongoing operation of the system with its rigorous procedural requirements, will be so onerous that it would be worthwhile to switch to a different form of chlorine disinfection.

The capital and operational costs associated with switching to a hypochlorite system, either one that uses a 12.5% solution or one that utilizes on-site generation, is currently being considered.

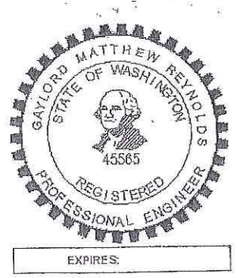

Table 4-10 (Updated) Demand Forecast (With Additional Conservation)

Calendar Year	Relevance of Year	Demographics[1]		Water Use Factors (gpd)[2]		Demand													
						Average Day Demand (ADD mgd)													Maximum Day Demand (MDD mgd)[16]
						Retail				*Wholesale*					*Future Industrial Block[12]*	Future Agricultural Block[13]	Non Revenue[14]	Total[15]	
		Residential Accounts	Commercial Accounts	Per Residential Account	Per Commercial Account	Residential[3]	Commercial[4]	Shell[5]	Tesoro[6]	Oak Harbor[7]	Skagit PUD[8]	La Conner[9]	Swinomish[10]	Del Mar[11]					
2000	Actual	n/a	n/a	n/a	n/a	0.94	0.69	6.36	5.11	2.35	1.28	0.40	0.09	0.02	n/a	n/a	-0.16	17.10	~~25.64~~
2001	Actual	n/a	n/a	n/a	n/a	0.95	0.75	6.75	5.37	2.26	0.59	0.38	0.09	0.02	n/a	n/a	0.01	17.15	22.30
2002	Actual	n/a	n/a	n/a	n/a	0.98	0.51	7.17	5.04	2.29	0.62	0.53	0.10	0.02	n/a	n/a	-0.58	16.69	25.03
2003	Actual	n/a	n/a	n/a	n/a	1.10	0.79	6.69	5.28	2.56	1.24	0.53	0.12	0.03	n/a	n/a	-0.27	18.06	25.29
2004	Actual	n/a	n/a	n/a	n/a	1.20	0.78	6.74	5.74	2.40	1.00	0.41	0.10	0.02	n/a	n/a	-0.09	18.30	27.45
2005	Actual	n/a	n/a	n/a	n/a	1.17	0.65	6.60	5.16	2.36	0.59	0.38	0.09	0.02	n/a	n/a	0.48	17.49	24.49
2006	Actual	n/a	n/a	n/a	n/a	1.18	0.56	6.36	5.48	2.29	1.04	0.38	0.06	0.02	n/a	n/a	0.19	17.58	24.61
2007	Actual	6,505	994	n/a	n/a	1.15	0.52	7.21	6.02	2.40	0.92	0.37	0.09	0.02	n/a	n/a	0.11	18.60	27.90
2008	Non WSP Yr	~~6,516~~ 6,538	~~986~~ 1,007	~~182.7~~ 156.40	~~593.0~~ 492.0	~~1.19~~ 1.02	~~0.58~~ 0.50	~~6.79~~ 6.79	~~5.18~~ 5.76	~~2.48~~ 2.21	~~1.33~~ 0.92	~~0.44~~ 0.35	~~0.12~~ 0.10	~~0.05~~ 0.02	n/a	n/a	0.51	~~18.67~~ 18.18	~~28.01~~ 27.27
2009	Non WSP Yr	~~6,644~~ 6,558	~~1,005~~ 1,015	~~182.1~~ 171.41	~~592.1~~ 473.9	~~1.21~~ 1.12	~~0.60~~ 0.48	~~6.80~~ 7.31	~~6.12~~ 4.88	~~2.56~~ 2.36	~~1.33~~ 1.08	~~0.44~~ 0.39	~~0.12~~ 0.11	~~0.07~~ 0.03	n/a	n/a	0.53	~~19.78~~ 18.29	~~29.67~~ 27.44
2010	WSP – Yr 1	~~6,775~~ 6,580	~~1,025~~ 1,022	~~181.9~~ 155.43	~~591.2~~ 443.2	~~1.23~~ 1.02	~~0.61~~ 0.45	~~6.80~~ 6.99	~~6.12~~ 3.28	~~2.64~~ 2.06	~~1.33~~ 0.78	~~0.44~~ 0.33	~~0.12~~ 0.09	~~0.07~~ 0.03	~~3.40~~ n/a	~~0.34~~ n/a	0.61	~~23.72~~ 19.38	~~35.58~~ 29.07
2011	WSP – Yr 2	~~6,908~~ 6,618	~~1,045~~ 1,023	~~181.6~~ 150.78	~~590.3~~ 430.4	~~1.26~~ 1.00	~~0.62~~ 0.44	~~6.80~~ 6.76	~~6.12~~ 4.93	~~2.73~~ 2.04	~~0.71~~ 0.75	~~0.53~~ 0.34	~~0.12~~ 0.11	~~0.08~~ 0.04	~~3.40~~ n/a	~~0.34~~ n/a	0.60	~~23.31~~ 20.75	~~34.96~~ 31.13
2012	WSP – Yr 3	~~7,044~~ 6,652	~~1,066~~ 1,021	~~181.4~~ 145.89	~~589.5~~ 478.7	~~1.28~~ 0.97	~~0.63~~ 0.49	~~6.80~~ 6.04	~~6.12~~ 4.21	~~2.81~~ 2.04	~~0.73~~ 0.78	~~0.53~~ 0.34	~~0.12~~ 0.13	~~0.08~~ 0.04	~~3.40~~ n/a	~~0.34~~ 0.15	0.61	~~23.46~~ 19.34	~~35.18~~ 29.01
2013	WSP – Yr 4	~~7,183~~ 6,728	~~1,087~~ 1,009	~~181.1~~ 150.20	~~588.7~~ 492.1	~~1.30~~ 1.01	~~0.64~~ 0.50	~~6.80~~ 6.38	~~6.12~~ 4.53	~~2.89~~ 1.99	~~0.76~~ 0.23	~~0.53~~ 0.34	~~0.12~~ 0.12	~~0.09~~ 0.05	~~3.40~~ n/a	~~0.34~~ 0.28	0.62	~~23.61~~ 19.45	~~35.41~~ 29.18
2014	WSP – Yr 5	~~7,324~~ 6,810	~~1,108~~ 1,016	~~181.1~~ 150.73	~~587.9~~ 722.7	~~1.33~~ 1.03	~~0.65~~ 0.73	~~6.80~~ 6.83	~~6.12~~ 5.19	~~2.97~~ 1.98	~~0.78~~ 0.14	~~0.53~~ 0.35	~~0.13~~ 0.12	~~0.09~~ 0.05	~~3.40~~ n/a	~~0.34~~ 0.18	0.62	~~23.76~~ 20.62	~~35.64~~ 30.93
2015	WSP – Yr 6	~~7,468~~ 6,894	~~1,130~~ 1,019	~~181.1~~ 158.77	~~587.9~~ 896.9	~~1.35~~ 1.09	~~0.66~~ 0.91	~~6.80~~ 7.29	~~6.12~~ 5.17	~~3.05~~ 2.04	~~0.80~~ 0.50	~~0.53~~ 0.41	~~0.13~~ 0.13	~~0.09~~ 0.06	~~3.40~~ n/a	~~0.34~~ 0.30	0.63	~~23.91~~ 21.93	~~35.87~~ 32.90
2016	WSP – Yr 7	~~7,615~~ 6,989	~~1,152~~ 1,026	~~181.1~~ 171.30	~~587.9~~ 814.7	~~1.38~~ 1.20	~~0.68~~ 0.84	~~6.80~~ 7.52	~~6.12~~ 5.33	~~3.13~~ 2.07	~~0.82~~ 0.15	~~0.53~~ 0.38	~~0.13~~ 0.12	~~0.10~~ 0.06	~~3.40~~ n/a	~~0.34~~ 0.21	0.63	~~24.07~~ 21.91	~~36.10~~ 32.87
2017	WSP – Yr 8	~~7,765~~ 7129	~~1,175~~ 1047	~~181.1~~ 160.3	~~587.9~~ 811.5	~~1.41~~ 1.14	~~0.69~~ 0.85	~~6.80~~ 7.21	~~6.12~~ 5.39	~~3.21~~ 2.34	0.84	~~0.53~~ 0.41	0.14	~~0.10~~ 0.06	3.40	0.34	0.64	~~24.23~~ 22.76	~~36.34~~ 34.14
2018	WSP - Yr 9	~~7,918~~ 7271	~~1,198~~ 1067	~~181.1~~ 160.3	~~587.9~~ 811.5	~~1.43~~ 1.17	~~0.70~~ 0.87	~~6.80~~ 7.21	~~6.12~~ 5.39	~~3.29~~ 2.41	0.86	~~0.53~~ 0.41	0.14	~~0.11~~ 0.06	3.40	0.34	0.65	~~24.38~~ 22.91	~~36.57~~ 34.37
2019	WSP - Yr 10	~~8,074~~ 7417	~~1,222~~ 1089	~~181.1~~ 160.3	~~587.9~~ 811.5	~~1.46~~ 1.19	~~0.72~~ 0.88	~~6.80~~ 7.21	~~6.12~~ 5.39	~~3.38~~ 2.48	0.89	~~0.53~~ 0.41	0.14	~~0.11~~ 0.06	3.40	0.34	0.65	~~24.54~~ 23.04	~~36.81~~ 34.56
2020	WSP - Yr 11	~~8,232~~ 7565	~~1,246~~ 1111	~~181.1~~ 160.3	~~587.9~~ 811.5	~~1.49~~ 1.21	~~0.73~~ 0.90	~~6.80~~ 7.21	~~6.12~~ 5.39	~~3.46~~ 2.52	0.91	~~0.53~~ 0.41	0.15	~~0.11~~ 0.06	3.40	0.34	0.66	~~24.70~~ 23.16	~~37.05~~ 34.74
2021	WSP - Yr 12	~~8,394~~ 7716	~~1,270~~ 1133	~~181.1~~ 160.3	~~587.9~~ 811.5	~~1.52~~ 1.24	~~0.75~~ 0.92	~~6.80~~ 7.21	~~6.12~~ 5.53	~~3.54~~ 2.54	0.93	~~0.53~~ 0.42	0.15	~~0.12~~ 0.06	3.40	0.34	0.67	~~24.86~~ 23.41	~~37.29~~ 35.12
2022	WSP - Yr 13	~~8,560~~ 7871	~~1,295~~ 1155	~~181.1~~ 160.3	~~587.9~~ 811.5	~~1.55~~ 1.26	~~0.76~~ 0.94	~~6.80~~ 7.21	~~6.12~~ 5.53	~~3.62~~ 2.58	0.95	~~0.53~~ 0.42	0.15	~~0.12~~ 0.06	3.40	0.34	0.67	~~25.02~~ 23.51	~~37.53~~ 35.27
2023	WSP - Yr 14	~~8,728~~ 8028	~~1,321~~ 1178	~~181.1~~ 160.3	~~587.9~~ 811.5	~~1.58~~ 1.29	~~0.78~~ 0.96	~~6.80~~ 7.21	~~6.12~~ 5.53	~~3.70~~ 2.61	0.97	~~0.53~~ 0.42	0.15	~~0.13~~ 0.06	3.40	0.34	0.68	~~25.18~~ 23.62	~~37.78~~ 35.43
2024	WSP - Yr 15	~~8,900~~ 8189	~~1,347~~ 1202	~~181.1~~ 160.3	~~587.9~~ 811.5	~~1.61~~ 1.31	~~0.79~~ 0.98	~~6.80~~ 7.21	~~6.12~~ 5.53	~~3.78~~ 2.65	1.00	~~0.53~~ 0.43	0.16	~~0.13~~ 0.06	3.40	0.34	0.69	~~25.35~~ 23.76	~~38.02~~ 35.64
2025	WSP - Yr 16	~~9,075~~ 8353	~~1,373~~ 1226	~~181.1~~ 160.3	~~587.9~~ 811.5	~~1.64~~ 1.34	~~0.81~~ 0.99	~~6.80~~ 7.21	~~6.12~~ 5.53	~~3.87~~ 2.67	1.02	~~0.53~~ 0.43	0.16	~~0.13~~ 0.06	3.40	0.34	0.69	~~25.52~~ 23.84	~~38.28~~ 35.76
2026	WSP - Yr 17	~~9,253~~ 8520	~~1,400~~ 1250	~~181.1~~ 160.3	~~587.9~~ 811.5	~~168~~ 1.37	~~0.82~~ 1.01	~~6.80~~ 7.21	~~6.12~~ 5.53	~~3.95~~ 2.68	1.04	~~0.53~~ 0.43	0.16	~~0.14~~ 0.06	3.40	0.34	0.70	~~25.69~~ 23.93	~~38.53~~ 35.90
2027	WSP - Yr 18	~~9,435~~ 8690	~~1,428~~ 1275	~~181.1~~ 160.3	~~587.9~~ 811.5	~~1.71~~ 1.39	~~0.84~~ 1.03	~~6.80~~ 7.21	~~6.12~~ 5.53	~~4.04~~ 2.69	1.06	~~0.53~~ 0.43	0.17	~~0.14~~ 0.06	3.40	0.34	0.71	~~25.86~~ 24.02	~~38.80~~ 36.03
2028	WSP - Yr 19	~~9,621~~ 8864	~~1,456~~ 1301	~~181.1~~ 160.3	~~587.9~~ 811.5	~~1.74~~ 1.42	~~0.86~~ 1.06	~~6.80~~ 7.21	~~6.12~~ 5.53	~~4.13~~ 2.70	1.09	~~0.53~~ 0.44	0.17	~~0.15~~ 0.06	3.40	0.34	0.71	~~26.04~~ 24.13	~~39.06~~ 36.20
2029	WSP - Yr 20	~~9,810~~ 9041	~~1,485~~ 1327	~~181.1~~ 160.3	~~587.9~~ 811.5	~~1.78~~ 1.45	~~0.87~~ 1.08	~~6.80~~ 7.21	~~6.12~~ 5.53	~~4.23~~ 2.71	1.11	~~0.53~~ 0.44	0.17	~~0.15~~ 0.06	3.40	0.34	0.72	~~26.23~~ 24.22	~~39.34~~ 36.33

1. From the demographics tables. Per Anacortes' Utility Billing Department, "residential" is defined as single family residences and churches and "commercial" is defined as multifamily residences and all non-residential retail consumers with the exception of churches and the refineries. 2008-2016 from actual water use data. 2017-2029 uses 2.0% growth rate.

2. ~~For 2008-2014, the water use factors from the water use factor table are reduced to match the estimated savings from the 2008-2014 conservation program. For the 2015-2029, the water use factors were held constant since conservation savings beyond 2014 have not been identified.~~ 2008-2016 from actual water use data. 2017-2029 is the 2014, 2015, and 2016 average amount per residential or commercial account.

3. For 2000-2007, this is actual consumption from Anacortes' Utility Billing Department. ~~For 2008 forward, this is the number of residential accounts multiplied by the water use per residential account.~~ 2008-2016 from actual water use data. 2017-2029 is the projected number of residential water account multiplied by the 2014, 2015, and 2016 average amount per residential account.

4. For 2000-2007, this is actual consumption from Anacortes' Utility Billing Department. ~~For 2008 forward, this is the number of commercial accounts multiplied by the water use per commercial account.~~ 2008-2016 from actual water use data. 2017-2029 is the projected number of commercial water account multiplied by the 2014, 2015, and 2016 average amount per commercial account.

5. Data for 2000-2008 are actual consumption. ~~For 2009 to 2029, 6.8 mgd wasused per guidance from Shell staff.~~ 2008-2016 from actual water use data. 2017-2029 use the average consumption for 2014, 2015, and 2016 per discussion with Shell.

6. Data for 2000-2008 are actual consumption. ~~For 2009-2029, the quantity stipulated in the 2005-2007 wholesale contract is used, which is 2,235 MG or 6.12 mgd.~~ 2008-2016 from actual water use data. 2017-2029 use last year's ADD plus a 0.06 mgd increase in 2018 and a 0.14 mgd increase in 2021, per discussion with Tesoro.

7. For 2000-2007, this is actual consumption from Anacortes Utility Billing Department. ~~The remaining years are based on the City of Oak Harbor's 2003 Water System Plan, which includes a demand forecast for the year 2023. The years between 2007 and 2023 were interpolated. Years 2024-2029 were extrapolated based on the growth rate between 2022 and 2023, which was approximately 2%.~~ 2008-2016 from actual water use data. 2017-2029 from Table 2-14 of the City of Oak Harbor 2013 water system plan.

8. .For 2000-2007, this is actual consumption from Anacortes' Utility Billing Department. ~~For 2008-2010, the quantity stipulated in the current wholesale contract was used which is 485 MG or 1.3 mgd. For 2011, used 260 MG or 0.7 mgd since Skagit PUD expects to decrease their purchases to this amount from Anacortes due to changes in their system. For 2012-2029, the new 260 MG or 0.7 mgd contract amount is increased by the system wide demand annual growth rates from Skagit PUD's 2007 Water System Plan, which ranges from 2.2% to 3.1% between 2012 and 2029.~~ 2008-2016 from actual water use data. The Skagit PUD recommended not changing the original projection.

9. For 2000-2007, this is actual consumption from Anacortes' Utility Billing Department. ~~For 2008-2010, the quantity stipulated in the current wholesale contract is used, which is 162 MG or 0.4 mgd. For 2011-2029, either the current contract amount of the highest 2000-20007 demand is used, whichever is larger.~~ 2008-2016 from actual water use data. 2017-2029 from Table 2.7 of the City of La Conner 2009 water system plan (per guidance from La Conner PW Director).

10. For 2000-2007, this is actual consumption from Anacortes' Utility Billing Department. For 2008-2010, the quantity stipulated in the current wholesale contract is used, which is 42 MG or 0.12 mgd. Fro 2029 used 150% of the 2010 number, based on guidance from Swinomish utility staff. For 2011 to 2028, used a straightline interpolation between 2010 and 2029. The Swinomish recommended not changing the original projection.

11. Del Mar has historically used water from their own wells and Anacortes water. They are shifting to using 100% Anacortes water. For 2000-2007, this is actual consumption from Anacortes Utility Billing Department. ~~Used 0.07 mgd for 2009 and 0.15 mgd for 2029, per guidance from City staff. IInterpolated years in between. For 2008 interpolated between 2007 actuals and 2009 forecast.~~ 2008-2016 from actual water use data. From 2017, use 0.06 mgd based on discussion with Del Mar. (Del Mar believe they are at or near buildout and anticipate no more growth – in fact they might experience a decrease in demand due to an upcoming significant waterline replacement project.)

12. This is a placeholder for a potential future large industrial user. This demand was developed using 50% of the 2007 Shell demand.

13. This is a placeholder for potential future agricultural water that might be provided by Anacortes. Since Skagit PUD provides agricultural water within the county, the volume of agricultural water provided by Skagit PUD was deemed an appropriate benchmark for additional agricultural water that might be provided by Anacortes. Therefore, this future agricultural block was developed using 100% of the 2007–2008 average agricultural water provided by Skagit PUD.
14. For 2000-2007, the actual non-revenue amount for each year was used. The wide range in non-revenue water between 2000-2007, including some negative numbers, is due to a meter problem. The problematic meters have recently been replaced. Anacortes' historical non-revenue number were not used for the projections. For 2008 forward, two components of non-revenue is estimated. The first component represents non-revenue water in Anacortes' retail service area (flushing, firefighting, distribution system leaks, etc). That component is calculated as the sum of the residential and commercial demands multiplied by 10%, which is typical for non-revenue water as a percent of billed consumption for water utilities. The second component represents transmission system leaks and is calculated as the sum of all other demands (refineries, wholesale customers, and future blocks) multiplied by 2%, which acknowledges some possible transmission system leakage, but doe not plan for unrealistically high amount of non-revenue water.
15. The sum of the retail, wholesale, future blocks, and non-revenue water.
16. For 2000-2007, the actual peaking factor for each year is used. For 2008 forward, a peaking factor of 1.5 (the most commonly occurring peaking factor between 1998 and 2007) is applied to the average day demand.

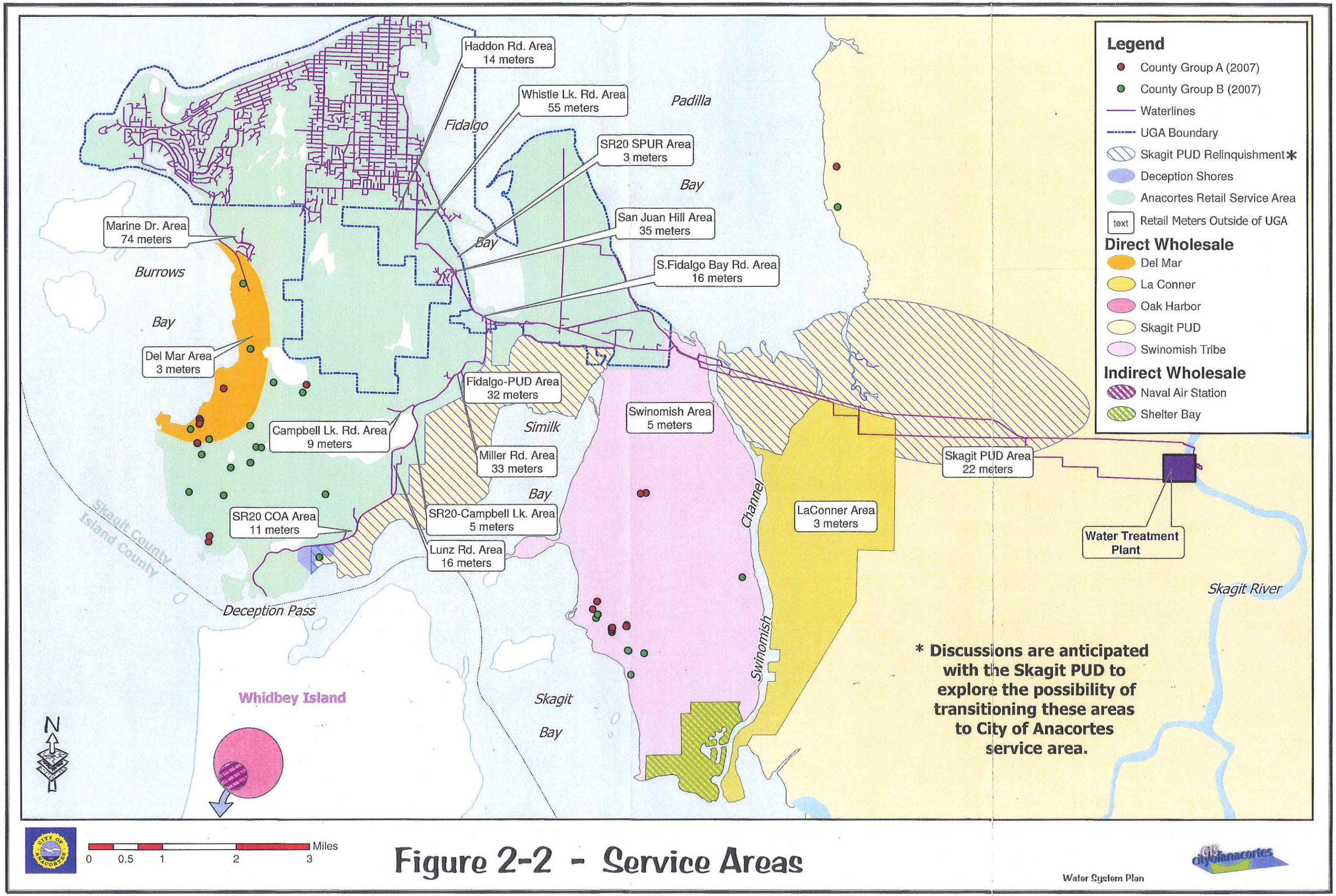

Figure 2-2 - Service Areas