

TULUKSAK, ALASKA

Water Treatment Plant/Washeteria Improvements



FINAL DRAFT PRELIMINARY ENGINEERING REPORT

March 2018



ALASKA NATIVE
TRIBAL HEALTH
CONSORTIUM

Prepared for:
Alaska Native Tribal Health Consortium
and Tuluksak Native Community



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**Tuluksak Native Community
Preliminary Engineering Report
Water Treatment Plant / Washeteria Improvements
March 2018**

The technical material and data contained in this report were prepared under the supervision and direction of the undersigned, whose seal as a Professional Engineer is affixed below.

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Acronyms and Abbreviations

%	percentage
°F	degree Fahrenheit
ADA	Americans with Disabilities Act
ADEC	Alaska Department of Environmental Conservation
AEA	Alaska Energy Authority
ANTHC	Alaska Native Tribal Health Consortium
BIA	Bureau of Indian Affairs
BTU	British Thermal Unit
CE2	CE2 Engineers, Inc.
DCCED	Alaska Department of Commerce, Community, and Economic Development
FY	fiscal year
gpcd	gallons per capita per day
gpd	Gallons per day
gpm	gallons per minute
MCL	maximum contaminant limit
HDPE	high density polyethylene
NPV	net present value
O&M	operation and maintenance
PER	Preliminary Engineering Report
RMW	Remote Maintenance Worker
RUBA	Rural Utility Business Advisor
R&R	Repair and Replacement
TNC	Tuluksak Native Community
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USPW	Uniform Series Present Worth
VSW	Village Safe Water Program
WST	water storage tank
WTP	water treatment plant
WTP/W	water treatment plant/washeteria
YKHC	Yukon Kuskokwim Health Cooperation

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United States Army Corp of Engineers (USACE). 1998. Alaska Communities Flood Hazard Data, Tuluksak.

United States Census Bureau (USCB). 2018. American Fact Finder, 2012-2016 American Community Survey 5-year Estimates, Online Database, Tuluksak.

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1. Project Planning

The Alaska Native Tribal Health Consortium (ANTHC), in cooperation with the Tuluksak Native Community (TNC) and Village Safe Water (VSW), retained CRW Engineering Group, LLC (CRW) to provide preliminary engineering services for water treatment plant (WTP) and washeteria improvements.

This Preliminary Engineering Report (PER) has been written in accordance with the U.S. Department of Agriculture-Rural Development (USDA-RD) Rural Utilities Service's Bulletin for water and sewer facilities. It evaluates project need, existing conditions, and reasonable alternatives.

The planning, design, and construction of sanitation facilities in Tuluksak has been in progress for over 20 years. Available records indicate that planning documents regarding community-wide sanitation improvements were published in 1995, 1999, and 2006. Based on those investigations, a piped water and sewer system was recommended and accepted by the community. In subsequent reviews by potential funding agencies, the community's capacity for operating and managing these systems was considered. From those reviews, it was determined that additional analysis of alternatives was needed before funding could be provided for a fully piped system.

1.1 Location

Tuluksak is located on the south bank of the Tuluksak River, approximately 1.5 miles upstream of its junction with the Kuskokwim River (Figure 1). The village is 35 miles northeast of Bethel. It lies at approximately 61.1025° North Latitude and 160.9617° West Longitude and is located in the Bethel Recording District (Section 27, Township 012 North, Range 066 West, Seward Meridian). The area encompasses 3.1 square miles of land and 0.1 square miles of water.

Tuluksak can be accessed by a State-owned 2,461-foot long by 30-foot wide gravel airstrip year-round. Barges deliver freight during the summer, and an ice road on the Kuskokwim River provides access to Bethel in the late winter. Residents use fishing boats, skiffs, snow machines, and all-terrain vehicles (ATVs) for local transportation.

The sale, importation, or possession of alcohol is banned in the village. The primary employers are the school, TNC, and local services. Little commercial fishing occurs. Subsistence activities provide most of the food for the community. A map showing the approximate locations of community buildings and facilities is shown on Figure 2.

1.2 Environmental Resources Present

1.2.1 History and Culture Summary

Tuluksak is a traditional Yupik Eskimo village with a fishing and subsistence livelihood. The name was first published in 1861 as "Tul'yagmyut", an Eskimo word meaning "related to loon." The 1880 U.S. Census noted a population of 150 living in the village. A city government was formed in 1970, but was dissolved in 1997. The community is governed by the Tribal Council.

1.2.2 Climate and Weather

Tuluksak falls within the western transitional climate zone, with long, cold winters and shorter, warm summers. Monthly climate data is presented in Table 1.

Table 1 – Climate Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (°F)	12	15.4	20.9	33.1	49.6	59.9	62.6	59.7	52.1	35.8	23.4	14.1	36.6
Average Min. Temperature (°F)	-0.8	1.4	4.9	17.2	32.6	43.1	48	46.6	38.6	24.4	11.3	1.2	22.4
Average Total Precipitation (in.)	0.77	0.71	0.75	0.72	0.95	1.55	2.26	3.35	2.5	1.47	1.29	1.06	17.4
Average Total Snow Fall (in.)	7.9	7.3	8.5	5.4	1.8	0.1	0	0	0.3	4.1	10	10.3	55.7

Source: Western Regional Climate Center: Bethel, Period of Record 8/01/1923 to 6/9/2016 (WRCC, 2016)

Key: °F – degree Fahrenheit in – inches

1.2.3 Topography

The area surrounding Tuluksak is flat with wet tundra areas. The undisturbed areas of Tuluksak are forested with black spruce, some mature white spruce, and willow brush. The community itself is partially forested.

1.2.4 Geology and Soil Conditions

General, near-surface geology in Tuluksak is primarily the result of reworked floodplain deposits. The typical ground surface is covered by a thin layer (6 to 12 inches thick) of organic soil over silt with silty sand at depth. Sporadic permafrost is present throughout the project area. Where permafrost has been encountered, it was normally at a depth of 8 feet or greater, and the material was generally dense sand.

The Utility Core Site, an area dedicated for the development of utility infrastructure (see Figure 2), is underlain by an organic mat and organic silt that extends to depths of 2 to 5.5 feet. The organic soils are underlain by fine-grained sand with 8 to 20 percent silt. Where frozen, the organic silt is icy. Based on the average moisture content of the frozen sand, the material has a thaw strain potential of 2% to 8%, with an average value of about 4%. Therefore, for every foot of sand that thaws, about 0.5 inches of settlement is expected.

1.2.5 Flood, Erosion, and Seismic Hazards

According to the U.S. Army Corps of Engineers (USACE) and the residents of Tuluksak, the community is subject to flooding. The USACE report, *Alaska Communities Flood Hazard Data 1998*, has published a flood of record, which occurred in the 1970s with a flood elevation of 3.9 feet (31.05 feet based upon Alaska Department of Commerce, Community, and Economic Development, Division of Community and Regional Affairs' [DCCED] Community Profile Mapping vertical control). The flood of record was based on water marks on the pilings under the old school. A flood gauge was placed on an upstream piling of the old National Guard Armory at the 31.05-foot mark. The USACE recommended building elevation is 5.9 feet (33.05 feet DCCED). The approximate finished floor elevation of the existing water treatment plant/washeteria (WTP/W) is 31 feet. The estimated 100-year flood elevation is 30.23 feet (NAVD 88). The community does not participate in the

National Flood Insurance Program. A copy of the USACE Alaska Communities Flood Hazard Data sheet for Tuluksak is provided in Appendix A.

Tuluksak is located in Seismic Zone 1 and seismic hazards are low, as reported by the Alaska Earthquake Information Center and in the Structural Condition Survey, presented in Appendix D. Current code prescribes seismic forces for the WTP/W facility are slightly higher than used in the original design. However, Tuluksak is in an area of low seismic activity, and wind pressures control the design of building lateral support systems.

1.2.6 Vegetation and Wetlands

Wetlands have not been delineated in or near Tuluksak; however, a review of the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory map indicates that wetlands are prevalent in the project area (see map in Appendix A). Proposed improvements in undeveloped areas of the community will require coordination with the USACE to confirm whether or not a wetlands permit will be required.

1.2.7 Surface Hydrology

The Tuluksak River is about 101 miles long and drains an area of approximately 830 square miles. The headwaters are approximately 1,750 feet above sea level and drain the northwest part of the Kilbuck Mountains. The Tuluksak River flows westerly through the village of Tuluksak and into the Kuskokwim River. From its headwaters to its mouth, the Tuluksak River drops about 1,400 feet in elevation.

1.2.8 Historic Sites

An archaeological survey, conducted in May 2003 for a community-wide piped water and sewer system, concluded that no historic properties would be affected. Additional archaeological survey work, performed in April 2014 for the wastewater lagoon project, confirmed that there are no historic properties eligible for inclusion in the National Register of Historic Places in Tuluksak. Additional archaeological information is presented in Appendix A.

1.2.9 Endangered Species

Tuluksak does not contain any threatened or endangered species and is not located within a designated critical habitat area. A review of the USFWS Information, Planning, and Conservation System website did not produce any endangered species or critical habitats in or around Tuluksak. In addition, an email from Kimberly Klein, an Endangered Species Biologist with the USFWS, in March 2014 states that “there are no listed species there” and no further consultation is required with the USFWS for this project. See Appendix A for a copy of the email.

1.3 Population Trends

The historic and projected populations for Tuluksak are presented in Table 2. According to the Alaska Department of Labor, the 2017 population of Tuluksak is 367. While the precise growth rate for small villages like Tuluksak is difficult to predict, it can be reasonably assumed to follow the Bethel Census Area population projections. Using the State’s projected growth rate (1% over the next 20 years) for the Bethel Census Area and linear extrapolation, the population of Tuluksak in the design year 2037 is estimated at 438 people.

Table 2 – Population Growth

Year	Tuluksak Population
1970	195
1980	236
1990	358
2000	428
2010	373
2017	367
2020	379
2030	411
2037	438

1.4 Community Demographics

Tuluksak is one of the poorest communities in rural Alaska. The median household income is \$24,625. The average unemployment rate for ages 20 to 54 is 36.8 percent, and roughly 65 percent of the population lives below the poverty level. There are approximately 100 housing units in the community and about 90 of them are occupied. The median age in the community is 24.7 years.

1.5 Community Engagement

This project included correspondence with the community via telephone, email, and facsimile. The following people contributed to the information included in this report:

- Charlie Atseriak – TNC Accountant
- Kristy Napoka – Washeteria Manager
- Robert Allain – Former WTP operator
- Jerah Peter – Current WTP operator
- Willie Phillip – Electric Utility Manager
- Jim Hartz – Director of Maintenance, Yupiit School District
- Robert White – Yukon Kuskokwim Health Corporation (YKHC) Remote Maintenance Worker (RMW)
- Brian Lefferts – Director, Office of Environmental Health and Engineering at YKHC
- Jacques Cooper – Concerned Resident

2. Existing Facilities

2.1 Location Map

The approximate locations of existing sanitation facilities are shown on Figure 4.

2.2 History

The general history of sanitation facilities in the Tuluksak is as follows:

- Early 1980's – The WTP/W was designed and constructed by the Indian Health Service (IHS) to serve 27 new Department of Housing and Urban Development (HUD) homes and 39 pre-existing homes. The project included a well, WTP/W facility with a watering point, and a sewage lagoon.
- 1995 – VSW prepared a Sanitation Facilities Preliminary Engineering Study. The study analyzed options for improving water and sewer service, including a piped water and sewer system and a truck haul system. Community consensus could not be reached and the study was not finalized.
- 1999 - CE2 Engineers, Inc. (CE2) was hired by the community/VSW to revisit the 1995 study and evaluate three water and sewer service options. The options included: a piped water and sewer system, truck haul water and sewer system, and on-site wells and septic systems. The community decided to proceed with a piped water and sewer system.
- 2003 - The water treatment process in the WTP was optimized with the addition of a higher capacity well pump, raw water pre-heat and static mixers, and liners were installed in the WSTs. Two wells were also drilled on the old Tuluksak Airport property. It was subsequently learned that an easement for the wells could not be obtained, so the wells were abandoned.
- 2005 - Two additional groundwater wells were installed between the airport property and the Utility Core Site. The wells, while high in iron, manganese, arsenic, and organics, produced better quality and a higher yield than the well at the WTP/W.
- 2006 – CE2 was hired to re-evaluate the water and sewer system alternatives evaluated in the 1999 Preliminary Engineering Study. A piped water and sewer system was recommended and accepted by the community. In subsequent reviews by funding agencies, the community's capacity for operating and managing these systems was considered. From those reviews, it was determined that additional analysis of alternatives was needed before funding could be provided for a piped water and sewer system.
- 2006/2007 – CE2 completed a water treatment study for the 2005 wells.
- 2012 - An energy audit of the WTP/W was performed by ANTHC.
- 2012 to 2016 - A new sewage lagoon, force main, lift station, and partial gravity sewer system were constructed. The lift station wet well and building were constructed and the mechanical and electrical systems in the building were substantially completed. The force main to the new lagoon was installed, with the exception of the terminal manhole and outfall to the lagoon. The force main glycol piping was installed, but was not connected to the power plant heat recovery system or charged with glycol. The primary cell and honey bucket dump station at the new lagoon were completed and the percolation cell is nearly complete. The lagoon transfer piping, fence, gates, power supply, monitoring tubes, and seeding have not been started.

- 2014 – CRW was hired by the Community/VSW to assess the feasibility of installing a piped water and sewer system in the Community. The scope was later changed to a PER for Water Treatment Plant and Washeteria facility improvements. A draft report was prepared but never completed.
- 2015 - Most of the improvement recommended in the 2012 energy audit were completed. Improvements included: a new oil-fired water heater, new boiler (#1 position), new boiler controls and burners, new chimney cap for Boiler #2, new programmable thermostats, repairs to the washeteria baseboard heat fin tube, new raw water heat-add controls and circulation pump, new circulation pumps and controls for the school water supply loop, new auto air relief valves, new raw water meter, and the replacement of all incandescent bulbs with light-emitting diode (LED) lamps.
- 2017 - The community received a \$1-million grant to complete construction of the sewage lagoon, lift station, force main, and heat recovery system. A portion of the grant will also be used to determine the best route to connect the school's wastewater system to the lift station. Construction of the improvements will begin when TNC's Best Practice Scores reach 60 points. Whether or not the improvements are put into service, will be a function whether the performance of the power plant is sufficiently reliable to keep the force main from freezing.

2.3 Condition of Existing Facilities

Key components of the existing WTP/W Facility are described in the following subsections. Each subsection summarizes numerous inspections, site visits, studies, and reports. Trip and inspection reports are presented in Appendix D.

2.3.1 Water Source

The existing well, located adjacent to the WTP/W Facility, was constructed in 1981. Records indicate that the well is 49 feet deep, screened from 34 to 49 feet, and has a static water level of 10.5 feet. Water from the well is high in iron, and moderately high in manganese and color. Arsenic is present in the water as well. The well is reportedly capable of producing up to 30 gallons per minute (gpm), but flow restrictions in the raw water heat exchanger restrict the flow to about 10 gpm.

The existing WTP/W well does not meet the minimum separation distance from existing bulk fuel storage tanks (approximately 25 feet from the well), honey bucket hoppers, and other possible sources of contamination. The well is not adequately protected from flooding and is located in a low area subject to ponding.

In 2005, two 6-inch wells were drilled to approximately 190 feet below grade at the Utility Core Site. Test pumping provided a sustained pumping rate of 75 gallons per minute, with a specific capacity of 5.14 gpm per vertical foot for each well.

A summary of raw water quality data for the WTP well and 2005 wells, along with the maximum contaminant levels (MCL) for drinking water, are presented in Table 3. The bold values are results that exceed the MCLs. The results for the WTP well are from a single sampling event in 1994. The results for the 2005 wells are from samples collected in July 2006 after pumping the wells at 18 gpm for 2 to 3 weeks to stabilize water quality.

Table 3 – Raw Water Quality Data (Existing WTP Well and the 2005 Wells)

Water Parameter	Existing WTP Well (1994)	Well #1-2005 (July 2006)	Well #2-2005 (July 2006)	MCL
Primary				
Arsenic	37 µg/l	36.3 µg/l	49.9 µg/l	10.0 µg/l
Barium	366 µg/l	146 µg/l	184 µg/l	2000 µg/l
Nitrate-N (measured as nitrogen)	NT	ND	ND	10.0 mg/l
Nitrite-N (measured as nitrogen)	NT	ND	ND	1.0mg/l
Total Potential Trihalomethane	NT	69.7 µg/l	140 µg/l	80 µg/l
Total Potential HAA5	NT	60.1 µg/l	147 µg/l	60 µg/l
Turbidity	370 NTU	0.85 NTU	1.99 NTU	0.5 NTU
Secondary				
Chloride	8.13 mg/l	3.09 mg/l	1.96 mg/l	250 mg/l
Iron	70.5 mg/l	6.99 mg/l	8.41 mg/l	0.3 mg/l
Manganese	1.89 mg/l	0.331 mg/l	0.326 mg/l	0.05 mg/l
pH	6.7	7.06	6.98	6.5 to 8.5
Sodium	4.73 mg/l	2.65 mg/l	2.47 mg/l	250 mg/l
Sulfate	8.46 mg/l	2.18 mg/l	ND	250 mg/l
Total Dissolved Solids	180 mg/l	176 mg/l	185 mg/l	500 mg/l
True Color	NT	65 PCU	55 PCU	15 PCU
Zinc	14 µg/l	ND	ND	500 µg/l
Other				
Ammonia (as nitrogen)	NT	.36 mg/l	.96 mg/l	Tested on-site
Calcium	29.8 mg/l	36.1 mg/l	29.9 mg/l	
Primary	NT	45 mg/l	60 mg/l	Tested on-site
Dissolved Oxygen	NT	5.7 mg/l	5.8 mg/l	Tested on-site
Hardness as CaCO ₃	103 mg/l	106 mg/l	104 mg/l	
Hydrogen sulfide	NT	0.04 mg/l	0.02 mg/l	Tested on-site
Langlier Index @40F	-1	-1.15	-1.28	
Langlier Index @140F	NT	-0.07	-0.2	
Magnesium	7.04 mg/l	3.85 mg/l	5.08 mg/l	
Total Alkalinity as CaCO ₃	110 mg/l	108 mg/l	108 mg/l	
Total Organic Carbon	NT	47.1 mg/l	48.0 mg/l	See Note
Total Organic Carbon, dissolved	NT	44.8 mg/l	45.7 mg/l	See Note
UV254	NT	0.0540 cm ⁻¹	0.0900 cm ⁻¹	

Note: Organic carbon values from the laboratory for raw water were very high, making their values suspect. Organic carbon values from water samples taken when the wells were installed (2005) were 2.1 mg/l for total organic carbon and 1.7 mg/l for dissolved organic carbon

Key:

CaCO₃ – Calcium Carbonate

cm – centimeter

F – degrees Fahrenheit

MCL – Maximum Contaminant Level for drinking water

ND – no detection within test limits

NT – not tested

µg/l – micrograms per liter

mg/l – milligrams per liter

NTU – nephelometric turbidity units

PCU – platinum cobalt units

WTP – Water Treatment System

UV – ultra violet light

A 2007 water treatment study by CE2 found the water from the 2005 wells was readily treatable using pre-oxidation and conventional filtration.

2.3.2 Water Treatment and Storage

The existing water treatment system is a Class 1 system and includes: heat addition, oxidation, sedimentation, pressure filtration, and disinfection. Water from the well is preheated to approximately 45 degrees Fahrenheit (°F), injected with potassium permanganate, and allowed to settle overnight in one of the two 10,000-gallon tank inside the WTP. The next morning, the supernate is filtered through a greensand filter, injected with chlorine, and stored in the second 10,000-gallon tank for distribution. Once the supernate is transferred from the settling tank, the remaining precipitate is flushed to the lagoon. The capacity of the treatment system with everything working properly is about 4,500 gpd. Current challenges with the system include:

- The raw water supply line from the well periodically freezes.
- The discharge line to the lagoon freezes at least once every winter.
- A partially plugged heat exchanger limits the flow from the well to about 10 gpm.
- A broken or plugged manifold in the sand filter will not allow the media to be backwashed.
- Fuel shortages due to insufficient storage capacity and poor planning/management.
- Community power outages which disrupt the treatment process and are one of the causes for the water supply line freezing.

Other significant deficiencies include:

- An insufficient air gap on the water to backwash waste line.
- Lack of backflow prevention on the water supply lines used to prepare chemical solutions.
- Lack of a flow switch on the potassium permanganate line.
- A single wall heat exchangers on the water heating system.

The two 10,000-gallon WSTs are 35-year-old uninsulated, bolted steel tanks. They have been repaired multiple times and, in 2003, were retrofitted with liners to limit leakage. Condensation from the tanks continues to be a problem and is the cause for some of the floor rot in the WTP.

2.3.3 Water Distribution

The only facilities with piped water service are the school, teacher housing, and the project office/camp building. Everyone else self-hauls water from the Kuskokwim River or the WTP/W watering point. Based on a review of sales records for the watering point and discussions with local residents, the majority of residents get their water from rain catchments in the summer and the Kuskokwim River the winter. The few residents who purchase water from the watering point reportedly only use it for doing laundry. Watering point sales average about 40 gpd for the entire population (367 people). The primary complaints about the water include; taste, chlorine smell, dirty looking (see Photo 1), makes



in

Photo 1 – Drinking water sample from the WTP

people sick, and skin rashes. Residents do not get their water from the Tuluksak River (although closer to the community), because it is not as clear as the Kuskokwim River, tastes bad, and the orange color stains laundry.

2.3.4 WTP/W Building

The structure itself is in reasonably good condition, but most of the finishes, appliances, controls, and equipment are beyond the point of repair. The electrical system is not up to code and the plumbing and heating systems, with the exception of the improvements made in 2015, are in a state of disrepair. The Boiler #2 is near the end of its useful life, with substantial corrosion (see Photo 2). Several sections of the floor and subfloor are rotted all the way through and need to be replaced. The rot was caused by water from the washing machines, leaks and condensation from the WSTs, and leaks from the boilers (see Photo 3). Water stains on the roof beams indicate there may be a leak or leaks in the metal roof.



Photo 2 – Boiler and piping corrosion.

There are currently four operable washers, four dryers, and two showers. The four washers and three of the four dryers are residential grade units and the dryers are electric. The fourth dryer is an older commercial unit and is heated with the boiler. Most customers purchase a dryer load for each washer load, but some residents do fewer dryer loads and hang their clothes at home to dry. A review of the daily sales sheets for the washeteria indicates usage varies from four to 24 loads of laundry per day, with an average of about 14 loads per day. The facility has the capacity for about 40 loads per day. If every household in the community used the facility to wash two loads of laundry per week, the average daily usage would be about 27 loads per day. One explanation provided for the relatively low usage is that the facility has been so unreliable many homeowners have purchased their own washing machines (Danby brand or similar).



Photo 3 – Rotting floor near boilers.

The two showers in the washeteria are in poor condition and are generally used less than one time per day. The majority of residents take steams and when asked if they would switch to taking showers if the water quality was better and the showers were newer most indicated they would not. Their preferences for steams included: safety, social reasons, convenience (you can take a steam any time you want verses during washeteria hours), you do not have to pay for steams, and the belief that steams are healthier. Some residents indicated they got rashes after using the washeteria showers.

2.3.5 Wastewater Collection, Treatment, and Disposal

There are currently four different wastewater collection and disposal systems in the community: the WTP/W system, the school system, the nearly complete community system, and the honey bucket haul system. The WTP/W system consists of a 700-foot long, 4-inch diameter gravity sewer main from the WTP/W to a single cell, unpermitted, and percolating wastewater lagoon approximately 200 feet south of the community. The system was constructed in the early 1980s and is in poor condition. The backwash line from the WTP to the gravity sewer main has a significant leak (see Photo 4). The lagoon is entirely overgrown with brush and trees up to 6-inches in diameter. The sewer main freezes every winter and has had numerous breaks – flooding the area with wastewater. When this occurs, the WTP/W is forced to close until the pipe is thawed and/or repaired. This can take days to weeks (6 weeks in December 2017/January 2018) and has forced the school to close on many occasions. Per Jim



Photo 4 – Leaking WTP backwash line.

Hartz, Director of Maintenance for the school district, the Tuluksak School on average is closed 9 to 12 days each year as a result of water shortages. In 2014, the school was closed for 3 weeks straight when the water distribution system froze.

The Yupiit School District (YSD) operates a second piped collection system for the school and teacher housing. The system serves six to eight buildings and consists of a combination of aboveground gravity sewer lines, force mains, and a couple small pump stations. Wastewater from the system is discharged to a single cell, unpermitted, percolating wastewater lagoon less than 100 feet from the east side of the school. The lagoon is substantially overgrown with brush and odor is an issue in the spring. The school district is interested in connecting to the community system, when complete, and closing their lagoon.

The third system is the nearly complete community system which includes: two gravity sewer mains; a lift station just north of the WTP/W lagoon; a 6-inch diameter 2,400-foot long force main; and a new two cell, percolating wastewater lagoon (Community Lagoon) and honey bucket dump station approximately 2,200 feet south of the community. The WTP/W, teen center, clinic, a store, and six houses could potentially be connected to the gravity sewer main that runs parallel to the WTP/W sewer main. The school, with some rerouting of its collection system and additional piping, could potentially be connected to the same sewer main or to the gravity main that extends eastward from the lift station.

The fourth system is a honey bucket haul system where residents haul their waste in 5-gallon buckets to honey bucket hoppers (80-gallon high density polyethylene [HDPE] containers) scattered throughout the community. The TNC transports and dumps the hoppers in the honey bucket portion

of the new Community Lagoon. Most of the hoppers have leaks, or their lids are missing, so raw sewage leaks/spills on the roads during transport. The areas around the hoppers are unsanitary and the hoppers are rarely cleaned. Some residents dump greywater next to their homes to reduce the amount of wastewater they have to haul and avoid the collection stations. The old honey bucket pit near the landfill is no longer used.

2.3.6 Solid Waste Landfill

TNC owns and operates a Class III municipal solid waste landfill (Permit # SW3A176-22). The facility is open to the public and is located approximately 1,500 feet from the community and 2,000 feet from the Tuluksak River. The landfill is authorized to accept municipal waste, ash, inert waste, and construction and demolition debris. Septage may also be accepted in the designated septage pit. The permit for the facility expires on April 6, 2022. The facility was last inspected by the Alaska Department of Environmental Conservation in August 2016, and at the time was reportedly in fair condition – scoring 83 points out of a possible 155 points.

2.4 Financial Status of Existing Facilities

The TNC budget tracking system includes approximately 20 categories. Some categories generate revenue, while others are purely expenses and need to be subsidized from other categories.

The three categories related to the sanitation systems are Laundry, Sewage Hauling, and Water Plant. A breakdown of the expenses and revenues posted to each category is not available, but our understanding (based on telephone communications with TNC's accountant) is as follows:

- Laundry – The revenue includes washer, dryer, and shower fees and snack and water sales. Expenses are limited to the labor costs for the washeteria attendants and washeteria manager, electricity, and some supplies. The category does not include any general administrative expenses, the costs for purchasing the snacks, or the water and fuel required to run the facility.
- Sewage Hauling – The revenue for this category comes from the collection of monthly fees for honey bucket hopper service. Every household in the community is supposed to pay the fee, but few if any do other than TNC employees. The hopper service fee is automatically deducted from employee pay checks. Expenses are limited to the labor costs for haul drivers and gas for the vehicles. The costs for general administrative expenses, vehicle and hopper repairs, and waste disposal are not included.
- Water Plant – The school is the only revenue source for this category. The school pays a yearly amount minus the costs for any assistance (fuel, replacement parts, labor for repairs, etc.) they provide to help keep the facility running. Expenses for this category include the operator's wages, electricity, supplies, freight charges, water quality testing, and training. General administrative expenses, repair and replacement costs, and the fuel to heat the facility are not included.

Fiscal Years (FY) 2015 through 2017 expenses and revenues for each category are presented in Table 4. As can be seen from Table 4, the revenue and expenses for some categories vary substantially from year to year. Whether this is the result of operational changes, onetime costs, or inconsistent accounting practices is unknown. It should also be noted that the net balances at the bottom of the table, although true for the data provided, do not represent the complete story. The Tuluksak Traditional Power Utility, which is owned by TNC, has approximately \$270,000 in loans from the State of Alaska bulk fuel revolving

loan program. The utility has paid off most of its loan from October 2014, but has yet to make any payments on its loans from 2015, 2016, and 2017. For the last 2 years, the utility has borrowed approximately \$96,000 per year. Per Eli Jacobson, Local Government Specialist with Rural Utility Business Advisor (RUBA), the TNC is current with Worker's Compensation Insurance, but is behind on their federal taxes. Per Charlie Atseriak, TNC's accountant, TNC owes the Internal Revenue Service about \$75,000.

Table 4 – FY 2014 to FY 2016 Revenues and Expenses

Expense Category	FY 2015 Revenue	FY 2015 Expenses	FY 2016 Revenue	FY 2016 Expenses	FY 2017 Revenue	FY 2017 Expenses
Advance Fee's	\$5,735		\$3,892		\$4,513	
Clinic	\$24,884	\$17,472	\$24,884	\$20,019	\$20,737	\$13,697
Community Events						
Contract Support			\$73,873		\$36,358	
Fines			\$500			
Fund Raising			\$2,113	\$2,113	\$100	\$100
Gaming	\$80,580	\$93,537	\$102,079	\$100,903	\$60,726	\$74,024
General Admin		\$44,057		\$92,138		\$39,922
Laundry	\$14,961	\$33,160	\$19,943	\$23,755	\$29,325	\$28,507
Lease's	\$6,200		\$16,900		\$19,700	
PCE (Energy Assistance)	\$53,796		\$118,918		\$63,073	
Police		\$107,396		\$78,734		\$88,681
Post Office	\$24,879	\$23,759	\$24,879	\$23,719	\$24,879	\$22,172
Ramah BIA Settlement			\$261,493			
Repairs and Replacement (R&R)				\$15,572		\$9,590
Sales Tax	\$14,461		\$23,927		\$15,724	
Sewage Hauling	\$14,561	\$14,561	\$25,692	\$25,692	\$22,329	\$35,342
State Revenue	\$48,574		\$32,566		\$34,175	
Teen Center		\$16,865		\$8,919		\$807
Utility (Power)	\$320,364	\$235,266	\$323,151	\$305,607	\$206,069	\$317,126
Water Plant	\$65,892	\$63,272	\$60,000	\$60,720	\$85,005	\$44,414
Other	\$10,109		\$581		\$15	
Total	\$684,996	\$649,345	\$1,115,391	\$757,891	\$622,728	\$674,383
Net Balance	\$35,651		\$357,500¹		-\$51,656	

Notes: ¹ Includes a onetime settlement of \$261,493 from the BIA.

Key: FY – Fiscal Year January 1 – December 31.

BIA – Bureau of Indian Affairs

PCE – Power Cost Equalization Program

2.4.1 Utility Management

VSW and the RMW Program, in collaboration with RUBA and ANTHC, have developed criteria for assessing operations and maintenance capacity of rural water and wastewater utilities. The criteria, referred to as Operations and Maintenance (O&M) Best Practices, is used to determine eligibility and prioritization for community sanitation projects. Best practices scores are broken into three categories: Technical, Managerial, and Financial. In the most recent report, dated March 1, 2018, Tuluksak scored 35 out of 100 possible points. A copy of the report is provided in Appendix A.

2.4.2 User Fees

The current rates for water and sewer service are \$40 per household per month for honey bucket hopper services, \$75,000 per year for school water service, and \$0.25 per gallon for water from the watering point. The watering point does not have a meter, so water is sold by the container size. The school rate is based on the use of up to 3,500 gpd and was increased \$15,000 per year in 2017. Current washeteria rates are \$4.00 per washer load, \$3.00 per dryer load, and \$2.00 per shower.

2.4.3 Operator Certifications

There are two operators in Tuluksak with current certificates for water treatment. Kristy Napoka holds a "Small Water System Treated" certificate, which expires on December 31, 2018. Jerah Peter holds a "Small Water System Treated" certificate, which expires on December 31, 2020.

2.5 Land Ownership

Major land owners in the community include Tulkisarmute, Inc., TNC, and the Moravian Mission Church. Land use in the project area is primarily residential with some public facilities, such as the school and teacher housing, clinic, teen center, and several commercial establishments. A land status map of the various plats and subdivisions are shown on Figure 3.

2.5.1 Land Ownership in Proposed Project Area

A lease agreement between Tulkisarmute, Inc. (Lessor) and TNC (Lessee) was recorded on February 25, 2005, for the Utility Core Site. Rent on the lease is \$1 per year for 30 years. The lease is an interim measure, recognizing that the land will eventually be conveyed to TNC under the provisions of Section 14(c)(3) of the Alaska Native Claims Settlement Act.

A lease agreement between Tulkisarmute, Inc. (Lessor) and TNC (Lessee) was recorded on February 25, 2005, for an access road right-of-way (ROW) to the Utility Core Site and the landfill site. Rent on the lease is \$1 per year for 30 years.

A lease agreement between the City of Tuluksak (Lessor) and the Association of Village Council Presidents Regional Housing Authority (Lessee) was recorded on August 27, 1986, for the property on which the existing WTP/W facility is located. A copy of this lease is provided in Appendix C.

In 2014, Lot 1 of the old Tuluksak Airport property was subdivided into Lots 5, 6, and 7. Lots 5 and 6 were transferred as supplemental native allotments. Lots 7, which is adjacent to the Utility Core Site, was transferred to the U.S. Government in 2014. In October 2017, Lot 7 was transferred from the U.S. Government to Tulkisarmute, Inc.

Copies of the above lease agreements and other relevant site control documents are provided in Appendix C.

2.6 Water, Energy and Waste Audits

In 2012, ANTHC completed an energy audit for the Tuluksak WTP/W. This audit identified seven items that had an estimated installed price of \$20,650 (2012 Dollars) and an average annual energy savings of \$14,985. In 2014-2015, ANTHC received funding to implement the identified energy improvements and provide onsite operator training in the areas of hydronics, boilers, fuel systems, water plant operations, lighting, and electric heat. The ANTHC-Rural Energy Initiative does not have any future or identified projects for Tuluksak.

A 2016 Sanitary Survey identified four significant deficiencies in the water system, including: a lack of adequately certified operators, no backflow prevention device on the school service, lack of drainage away from the well, and no backup disinfection unit. Other, less significant deficiencies pertaining to backflow prevention and sample siting plans were also noted. A copy of the sanitary survey is provided in Appendix A.

3. Need for Project

TNC is actively seeking to improve the quality of life for its residents. A significant part of this endeavor is improving the community's sanitation facilities, including the WTP/W. The project under consideration will improve health and safety conditions, and meet the anticipated water demands for the 20-year planning period.

3.1 Health, Sanitation, and Security

When a community system struggles to reliably provide potable water, many consumers tend to obtain water from non-potable water sources using unprotected means. This is exactly the case in Tuluksak, where the majority of the residents get their water from the Kuskokwim River. The few residents that do get water from the watering point reportedly only use it for doing laundry. In this regard, the problems with Tuluksak's current facility, as detailed in Section 2, are health and safety risks for the community. The treatment system is challenged by high levels of iron, manganese, and arsenic in the well water. When the contaminants are not sufficiently removed, the water has an orange tinge, lots of precipitate, and is unpalatable (see Photo 5). Replacing the existing water treatment system with a system capable of consistently producing safe, palatable water should reduce the community's use of non-potable water sources. Providing additional water storage will help to eliminate water shortages and having a safe and fully operational washeteria may encourage more sanitary washing practices.

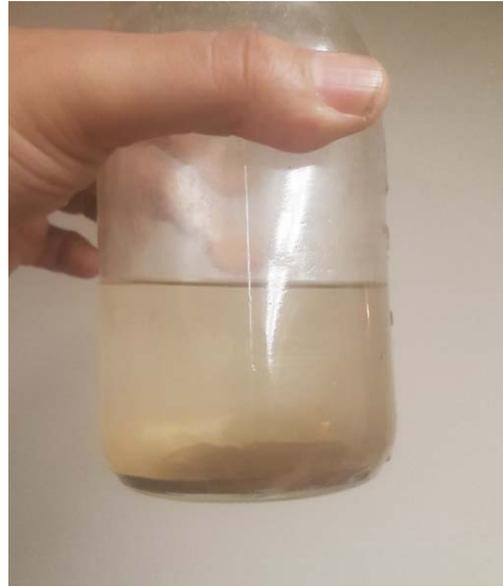


Photo 5 – Drinking water sample from WTP (Feb 2018).

Eliminating the use of honey buckets would further improve the health and sanitation of the community, but is beyond the scope of this study.

3.2 Aging Infrastructure

The existing WTP/W facility was constructed in 1982 and has deteriorated past the point of routine maintenance. The structure itself is in reasonably good condition, but most of the finishes, appliances, controls, and equipment are beyond the point of repair. The existing electrical system is not up to code and the plumbing and heating systems, with the exception of the improvements made in 2015, are in a state of disrepair. Water leaks have caused significant floor rot and there is not sufficient storage capacity to serve the community when there is an equipment failure or emergency situation.

The current water source is vulnerable to contamination and is high in iron and manganese. The treatment system is old, inefficient, and labor-intensive. In order to produce water that meets primary drinking water standards, significant oversight is needed by an experienced operator who understands the nuances of the aging equipment.

The Washeteria portion of the building does not meet the needs of the community. The laundry equipment and shower facilities are in poor condition and most residents have resorted to other means of doing their laundry and washing. The gravity sewer line for the building freezes every winter, disrupting water treatment and washeteria operations. Over the last three winters (2015-2017), the school has been closed for 9 to 12 days each year for lack of water. In 2014, the school was shut down for 3 weeks straight when the water distribution system froze. So far, this year (2018), the school has already been closed 8 days and the washeteria and watering point have been closed for more than 3 weeks.

3.3 Reasonable Growth

The existing water treatment system barely has the capacity to meet current demands, and the community is expected to grow at a rate of 1% per year for the next 20 years. The operators are currently working 7 days a week to keep up and, if a problem develops that takes more than a day to resolve, they have to shut down the washeteria and often the school.

4. Alternatives Considered

4.1 Description

Three alternatives were considered for this PER. The alternatives were developed from discussions with potential funding agencies, the ANTHC, VSW, and residents of Tuluksak.

- Alternative 1 – New WTP/W at the Utility Core Site.
- Alternative 2 – Rehabilitate Existing WTP/W.
- Alternative 3 – Rehabilitate Existing Washeteria, and New WTP at the Utility Core Site.

All three alternatives include: connecting the new (2005) wells, abandoning the WTP/W well, installing a 35,000-gallon WST, and the continuation of water service to the school.

4.2 Design Criteria

Design criteria for the alternatives are presented in Table 5.

Table 5 – Design Criteria

General	
Design Period	20 Years
Design Population	438
Environmental Conditions	
Mean Annual Temperature	29.5°F
Mean Annual Precipitation	17.36 in
Mean Annual Snowfall	55.7 in
Heating Degree Days (65°F Base)	12,932
3-Second Wind Gust (ASCE 7-10, Risk Category II)	142 mph
Snow Load (Alaska ASCE 7 Table 7-1)	40 psf
Water System	
Average Daily Demand (2017)	4,350 gpd
Average Daily Demand (2037)	6,070 gpd
Emergency Water Storage	5 to 7 days @ ADD

Key:

ASCE – American Society of Civil Engineers
 ADD – Average Daily Demand
 °F – degree Fahrenheit
 gpd – gallons per day

in – inches
 mph – miles per hour
 psf – pounds per square foot

4.2.1 Water Demand

Water demands for the current and future systems were estimated based on available data from Tuluksak and other communities with similar water and sewer systems (i.e., honey buckets, a watering point, and limited piped service). The demands were broken into four different categories: watering point/self-haul, WTP backwash, Washeteria, School and Teacher Housing, and Clinic, Teen Center, and Store. Current water use from the watering point is about 0.15 gallons per capita per day (gpcd). For the future demand, it was assumed that the watering point demand would increase to 1 gpcd with improved water quality and by reducing the charge per gallon from \$0.25 to \$0.10. For future washeteria demand, it was assumed the current laundry demand (1 load/household/week) would remain the same, but that the demand for showers would increase from the current demand of about 10 showers/week for the entire community to 1 shower/household per week. Increasing the shower demand is counter to community input (they like steams) but with a new, safer, clean facility with water that does not cause rashes, it is anticipated the demand will increase. A summary of the results is presented in Table 6, and the water demand calculations are presented in Appendix B.

Table 6 – Average Daily Water Demands

System	Current Demand (2017) GPD	Future Demand (2037) GPD
Watering Point/Self Haul	40	320
WTP Backwash	1,200	970
Washeteria	400	770
School and Teacher Housing	2,710	3,260
Clinic, Teen Center, and Store	–	750
Total	4,350	6,070

Key: GPD – Gallons per day; WTP – Water Treatment Plant

Notes:

- 1 – School contract is authorized to use up to 3,000 gpd
- 2 – Assumes self-haul water and honey buckets will still be in use

4.2.2 Water Source

The proposed water source is ground water from the two wells drilled near the Utility Core Site in 2005. Both wells produced plenty of water and the levels of iron and manganese 5 to 10 times are lower than the existing WTP/W well. The wells are also much deeper, making them less vulnerable to contamination. One well should be used as the primary well and the other as backup, or the water from both wells should be blended. Alternating the wells is not recommended due to the water quality differences of the two wells.

4.2.3 Raw Water Transmission

The raw water transmission line, from the selected wells to the WTP, would consist of a 3-inch HDPE supply and 2-inch HDPE return line, contained within a 16-inch Arctic carrier pipe. The transmission line would also include electric heat trace to help thaw the lines in the event of a freeze up.

4.2.4 Water Treatment

The water treatment system should be sized to meet the maximum day future water demands and be designed to meet the current and anticipated drinking water regulations. Raw water quality data for the 2005 wells indicates that iron, manganese, arsenic, color, and turbidity removal will be required. Organic contaminants will also need to be removed to reduce the formation of disinfection byproducts (DBPs).

For the purpose of this report, and based on the findings of the 2007 Water Treatment Study by CE2, it is assumed the treatment process will be conventional filtration with pre-oxidation. A schematic of the process is shown on Figure 5. The process would include the following steps/operations:

1. Pump raw water from the well(s) to the WTP at approximately 25 gpm.
2. Heat the well water to 45°F to 50°F prior to chemical addition.
3. Inject an oxidizer, such as potassium permanganate, into the process stream – followed by an in-line static mixer.
4. Pass the water through a detention tank to allow additional time for the iron to oxidize and begin to develop a floc.
5. Inject a coagulant, or combination of coagulants, into the process stream prior to the filter system.
6. Flocculation, sedimentation, and filtration to take place in a package filter plant.
7. After filtration, inject a disinfectant, such as chlorine, into the process stream.
8. If required, inject a pH adjuster, such as soda ash, into the process stream.
9. Pump the treated water to the WST.

The proposed treatment process falls under the Class II treatment system classification and, as such, the primary and back-up operators will be required to have “Water Treatment II” certifications.

4.2.5 Water Storage

The WST should be sized for at least 5 days of storage, at the design average daily demand. The proposed volume of the WST is 35,000 gallons. The tank would be located outside and adjacent to the WTP/W building.

4.2.6 Water Distribution

A watering point and water line to the school/teacher housing and project office/camp would be provided. The line would consist of a 4-inch HDPE supply pipe and a 2-inch HDPE return line contained within a 16-inch Arctic carrier pipe. The water distribution line would also include electric heat trace to help thaw the lines in the event of a freeze up.

4.2.7 Water Treatment Plant / Washeteria Building

The recommended alternative would include either a new building, rehabilitating the existing WTP/W building, or a combination of both. The foundation for any new buildings would be a post and pad foundation on a gravel pad. The finished floor would be at least 2 feet above the estimated 100-year flood elevation of 30.23 feet.

Rehabilitating the existing WTP/W would include the recommendations detailed in the Structural Condition Survey Report, in Appendix D. The recommendations include: tightening the foundation bracing; replacing the flooring in the boiler room; and replacing the stairs, railings, and windows.

4.2.8 Wastewater Collection, Treatment, and Disposal

For the purpose of this report, and until the community lagoon, lift station, and force main are completed and TNC has the capacity to operate those facilities, wastewater from the WTP/W alternatives will be conveyed to the existing WTP/W lagoon by gravity sewer or by force main. Gravity sewer lines will consist of a 4-inch HDPE line inside a 12-inch Arctic carrier pipe with electric heat trace. Force mains will consist of a 3-inch HDPE pipe and two HDPE glycol lines contained within a 16-inch Arctic carrier pipe.

Once the lagoon, lift station, and force main are completed, and there is a reliable means of keeping the force main from freezing (power plant/heat recovery system or an alternative heating system), it will then be possible to connect the school, WTP/W, clinic, teen center, store and potentially a few houses to the community collection system and close out the school and WTP/W lagoons.

4.2.9 Heat Recovery System

The partially-complete heat recovery system in the Power Plant will be completed and used to help heat any new facilities. According to the mechanical inspection report, provided in Appendix D, approximately 180,000 to 200,000 British Thermal Units (BTU) per hour of waste-heat could be recovered from the Power Plant. Heat recovery piping will consist of 2-inch Aquatherm blue pipe contained within an 8-inch Arctic carrier pipe.

4.3 Alternative 1 – New WTP/W at Utility Core Site

4.3.1 Description

Alternative 1 would construct a new WTP/W at the Utility Core Site and install a water line to maintain service to the school and project office/camp. The existing WTP/W building could be repurposed for some other use. Alternative 1 would include the following:

- A new WTP/W facility at the Utility Core Site.
- Completing and connecting the 2005 wells at the Utility Core Site.
- A raw water transmission line from wells to the new WTP/W.
- A wastewater pump station piped to the community sewage lagoon force main.
- Reconfiguring the force main to discharge to the old WTP/W lagoon.
- An insulated 35,000-gallon WST with fill and draw piping.
- A 10,000-gallon, double wall fuel storage tank.
- A circulating water line with service to the school/teacher housing and project office/camp.
- Upgrades in the Power Plant to connect the heat recovery system to the WTP/W.

4.3.2 Map

Site and Floor Plans for Alternative 1 are shown on Figures 6 and 7.

4.3.3 Environmental Impacts

Historic Site Impacts

None – There are no known historic properties in the project area.

Endangered Species Impacts

None – There are no designated critical habitat areas or threatened or endangered species in the project area.

Wetland Impacts

All of the improvements, with the exception of the short section of the force main to the old lagoon and the water line between the new WTP/W and the school, will be constructed in uplands or on existing gravel pads. Installing the force main and water line may require a wetlands permit.

4.3.4 Land Requirements

No additional land requirements are anticipated for this alternative.

4.3.5 Potential Construction Problems

Shallow groundwater and discontinuous permafrost may be encountered during the installation of buried piping. The existing WTP/W facility would continue to operate and serve the community during construction of the new facility, so temporary facilities would not be required.

4.3.6 Sustainability Considerations

Alternative 1 would construct a reliable sanitation facility for Tuluksak. Sustainability considerations include:

- The new building will be energy efficient, decreasing electricity and fuel consumption.
- Recovered heat from the power plant will be used to heat the WTP/W and the associated pipe lines.

4.3.7 Advantages/Disadvantages

Primary advantages of Alternative 1:

- Lowest O&M cost of the three alternatives.
- New, more energy-efficient building.
- Existing service can be maintained while the new WTP/W is constructed.
- Old WTP/W building can be repurposed for other village use (housing, offices, etc.).
- The building could be expanded to accommodate additional equipment for a piped water and sewer system.

Primary disadvantages for Alternative 1:

- The WTP/W would be further from town, making it less convenient to get water and do laundry.

4.4 Alternative 2 – Rehabilitate Existing WTP/W

4.4.1 Description

Alternative 2 would rehabilitate the existing WTP/W facility at its current location and maintain water service to the school and project office/camp. Alternative 2 would include the following:

- A rehabilitated WTP/W facility at the current location. The interior of the building would be gutted and replaced with all new electrical, plumbing, equipment, and finishes. The metal roof would be replaced, and the building would be painted. New stairs and an American with Disabilities Act (ADA) ramp would be installed.
- Completing the 2005 wells at the Utility Core Site.
- A raw water transmission line from wells to the rehabilitated WTP/W facility.
- A connection to the recently constructed community gravity sewer main.
- Installing a new pump station or completion of the existing lift station.
- Installing a short force main from the pump station or lift station to the old WTP/W lagoon.
- An insulated 35,000-gallon WST with fill and draw piping.
- A 10,000-gallon, double wall fuel storage tank.
- Upgrades in the Power Plant to be able to heat the raw water transmission line with recovered heat.

4.4.2 Map

Site and Floor Plans for Alternative 2 are shown on Figures 8 and 9.

4.4.3 Environmental Impacts

Historic Site Impacts

None – There are no known historic properties in the project area.

Endangered Species Impacts

None – There are no designated critical habitat areas or threatened or endangered species in the project area.

Wetland Impacts

All of the improvements, with the exception of the raw water transmission line between the wells, the WTP/W, and the short section of force main between the pump station and the lagoon, will be constructed in uplands. Installation of the water line and force main may require a wetlands permit.

4.4.4 Land Requirements

No additional land requirements are anticipated for this alternative.

4.4.5 Potential Construction Problems

This alternative would require the construction/mobilization of a temporary washeteria and water treatment system. Demolition of the building interior could encounter asbestos and lead-based paint, which may require special handling and disposal. Shallow groundwater and discontinuous permafrost may be encountered during the installation of buried piping.

4.4.6 Sustainability Considerations

Alternative 2 would construct a reliable sanitation facility for Tuluksak. Sustainability considerations include:

- The new appliances and electrical/mechanical systems will be more energy-efficient.
- Recovered heat from the power plant would be used to heat the raw water line and pre-heat the water prior to treatment.

4.4.7 Advantages/Disadvantages

Primary advantages for Alternative 2:

- Makes use of an existing structure.
- Existing well could be used as an emergency back-up.
- Existing facility is centrally located in the community.

Primary disadvantages for Alternative 2:

- Construction complexity (requires temporary facilities to maintain service during rehabilitation of the building).
- Potential exposure to hazardous materials associated with renovation work (asbestos, lead-based paint).
- Limited space available to accommodate additional equipment for a piped water and sewer system.
- The existing structure is 36 years old.

4.5 Alternative 3 – Rehabilitate Existing Washeteria and New WTP at Utility Core Site

4.5.1 Description

Alternative 3 would rehabilitate the existing Washeteria facility and construct a new WTP at the Utility Core Site. This alternative would also construct a water line between the new WTP and the old Washeteria. Alternative 3 would include the following:

- A new WTP building at the Utility Core Site.
- Completing the two wells drilled in 2005.
- A raw water transmission line from wells to the new WTP at the Utility Core Site.
- An insulated 35,000-gallon WST with fill and draw piping.
- A 10,000-gallon, double wall fuel storage tank at Utility Core Site.
- A circulating water distribution line with service to the Washeteria, school/teacher housing, and project office/camp.
- A wastewater pump station for the WTP, with connection to the community sewage lagoon force main.
- Reconfiguring the force main to discharge to the old WTP/W lagoon.
- A new washeteria in the existing building. The interior of the building would be gutted and replaced with all new electrical, plumbing, equipment, and finishes. The existing metal roof would be replaced, and the building would be painted. New stairs and an ADA ramp would be installed.
- A sewer service connection to the recently completed Community gravity sewer main.
- Installation of a new pump station or completion of the existing lift station.

- Installation of a short force main from the pump station or lift station to the old WTP/W lagoon.
- A 5,000-gallon fuel storage tank at the existing Washeteria site.
- Upgrades in the Power Plant to connect the heat recovery system to the new WTP.

4.5.2 Map

Site and Floor Plans for Alternative 3 are shown on Figures 10, 11, and 12.

4.5.3 Environmental Impacts

Historic Site Impacts

None – There are no known historic properties in the project area.

Endangered Species Impacts

None – There are no designated critical habitat areas or threatened or endangered species in the project area.

Wetland Impacts

With the exception of the short section of the force main to the old lagoon and the water line between the new WTP and the rehabilitated Washeteria, all of the improvements will be constructed in uplands or on existing gravel pads. Installing the force main and water line may require a wetlands permit.

4.5.4 Land Requirements

No additional land requirements are anticipated for this alternative.

4.5.5 Potential Construction Problems

This alternative would require the construction/mobilization of a temporary washeteria facility. Rehabilitation of the building interior could encounter asbestos and lead-based paint, which may require special handling and disposal. Shallow groundwater and discontinuous permafrost may be encountered during the installation of buried piping.

4.5.6 Sustainability Considerations

Alternative 3 will construct a reliable sanitation facility for Tuluksak. Sustainability considerations include:

- The new WTP building and associated equipment will be energy efficient, decreasing electricity and fuel consumption.
- Waste heat from the Power Plant will be used to heat the WTP and waterline to the washeteria.

4.5.7 Advantages/Disadvantages

Primary advantages for Alternative 3:

- The Washeteria will continue to be centrally located in the community.
- Makes use of an existing structure so the project could be constructed in phases; able to keep existing WTP online until new WTP is completed.
- WTP building could be expanded to accommodate additional equipment for a piped water and sewer system.

Primary disadvantages for Alternative 3:

- Two separate facilities will be more expensive to operate and maintain.
- Two pump stations needed for wastewater disposal, more sewer main to maintain.

4.6 Cost Estimates

4.6.1 Capital Costs

The estimated capital costs for each alternative are presented in Table 7. Two costs are shown for Alternative 1. The first cost assumes that all the materials for the project would shipped to Tuluksak and the WTP/W building would be built on site. The second cost assumes modular construction at an offsite location. Each module would be 100% complete (all finishes, plumbing, mechanical, process, electrical, etc.), the modules would be assembled and tested prior to shipment, and then disassembled, shipped to Tuluksak, and stitched back together. The only building components that would be site built would be the foundation, stairs and landings, the ADA ramp for the Washeteria, and a roof over the top of modules. The costs shown in Table 7 include design and construction administration services, 5% for American Iron and Steel compliance, a 15% contingency and 10% for project administration. Detailed cost estimates for each alternative are provided in Appendix E.

Table 7 – Capital Costs

Alternative	Capital Cost ¹
Alternative 1 - New WTP/W at Utility Core Site	
Site Built Building	\$7,127,000
Modular Building	\$6,120,000
Alternative 2 - Rehabilitate Existing WTP/W	\$6,976,000
Alternative 3 - Rehabilitate Existing Washeteria and New WTP at Utility Core Site	\$8,014,000

Notes: ¹ Rounded to the nearest \$1,000.

Key: WTP – water treatment plant W – washeteria

4.6.2 O&M Costs

The estimated annual costs for each alternative are presented in Table 8. The cost estimates are based on the current population, and assume: self-haul water and honey buckets will continue to be used, and the community lagoon, lift station, and force main will not be operational. The cost estimates for Alternatives 2 and 3 assume the new gravity sewer main near the washeteria will be utilized, and all three alternatives assume the Heat Recovery System (HRS) at the Power Plant will be completed and be fully operational. The estimated annual costs include the Repair & Replacement (R&R) costs for short lived assets. Detailed O&M cost estimates for each alternative are provided in Appendix E.

Table 8 – O&M Costs

Alternative	Annual Cost¹
Alternative 1 - New WTP/W at Utility Core Site	\$114,000
Alternative 2 - Rehabilitate Existing WTP/W	\$128,000
Alternative 3 - Rehabilitate Existing Washeteria and New WTP at Utility Core Site	\$142,000

Notes: ¹ Rounded to the nearest \$1,000.

Key: WTP – water treatment plant W – washeteria

5. Selection of an Alternative

5.1 Life Cycle Cost Analysis

A life cycle cost analysis was performed to compare the net present value (NPV) of each alternative. The analysis estimates the cost of owning and operating an asset for the entirety of its lifespan. The NPV equation and variables are defined as:

$$NPV=C+USPW(O\&M)-SPPW(S)$$

Where C is the estimated capital cost of the alternative, USPW is the uniform series present worth factor applied to the annual O&M costs of the alternative, and SPPW(S) is the single payment present worth of the salvage value, which, for this project, is assumed to be zero.

The USPW is a function of the Office of Management and Budget “real” discount rate (i) and the lifespan of the asset (n). For a 20-year life (n=20), the February 2018 discount rate is 0.2 % and the USPW is 19.59. The NPV of each alternative is presented in Table 9.

Table 9 – Estimated Life Cycle Cost

Alternative	Cost ¹
Alternative 1 - New WTP/W at Utility Core Site – Modular Building	\$8,353,000
Alternative 2 - Rehabilitate Existing WTP/W	\$9,483,000
Alternative 3 - Rehabilitate Existing Washeteria and New WTP at Utility Core Site	\$10,795,000

Notes: ¹ Rounded to the nearest \$1,000.

Key: WTP – water treatment plant W – washeteria

5.1.1 Non-Monetary Factors

In addition to the life cycle cost analysis, several non-monetary factors were considered in the selection of an alternative. Those factors included:

- Operator Requirements – The less maintenance required and the simpler to operate, the better.
- Construction Challenges – The fewer potential construction problems, the better.
- Fundability – The lower the capital cost, the more likely the project will be funded.
- Sustainability – The lower the O&M and deferred maintenance costs, the better.
- Community Preference – The stronger the commitment, the better.

Each factor for each alternative was assigned a score from 1 to 5 (least favorable to most favorable) in comparison to the other alternatives. In addition, a weighting factor was added to give preference to the most important issues. The weighted scores were then totaled to determine the alternative that had the highest score and should best serve the community. The results of the analysis are presented in Table 10.

Table 10 – Non-Monetary Factors Matrix

Evaluation Criteria	Weight	Alternative 1		Alternative 2		Alternative 3	
		Score	Weighted	Score	Weighted	Score	Weighted
Operator Requirements	3	3	9	3	9	2	6
Construction Challenges	2	4	8	1	2	2	4
Fundability	2	4	8	3	6	2	4
Sustainability	3	5	15	4	12	3	9
Community Preference	3	5	15	4	12	3	9
Total Weighted Score			55		41		32

6. Proposed Project (Recommended Alternatives)

The recommended alternative is Alternative 1 – New WTP/W Facility at the Utility Core Site. This alternative has the lowest life cycle and O&M costs, poses the fewest construction challenges, and is preferred by the community. A preliminary site plan for the facility and associated improvements is shown on Figure 6. A conceptual floor plan for the building is shown on Figure 7.

6.1 Preliminary Project Design

6.1.1 Water Source

The proposed water source is groundwater from the two wells drilled near the Utility Core Site in 2005. Both wells are capable of producing up to 75 gpm, and the water is of relatively good quality.

6.1.2 Water Treatment

The proposed water treatment system should be sized to provide at least 43,000 gallons per week (2037 design demand), without the need for the operators to work weekends or overtime. A flow rate of 20 gpm should meet this goal and not exceed the available heat from the Power Plant for raw water heat addition. The treatment facility should be designed for the removal of organics, iron, manganese, arsenic, and color. Conventional treatment with pre-oxidation and a packaged filtration unit was the recommended process from a previous water treatment study, and is the basis for the cost estimates in this report. Once the water is filtered, it will be disinfected with chlorine prior to entering the WST and distribution system.

6.1.3 Water Storage

A 35,000-gallon WST is proposed to meet the maximum day demand and provide enough water for a few days use in event of an equipment failure. The tank would be constructed adjacent to the WTP/W facility at the Utility Core Site. The WST foundation will be a gravel pad with a corrugated metal ring wall. The height of the pad should be coordinated with the finish floor elevation of the WTP and be at or above the 100-year flood elevation. If the WTP is constructed in advance of a new WST, then the two existing, leaking, 10,000-gallon tanks in the washeteria could be used until the new tank is constructed.

6.1.4 Water Distribution

Water distribution lines for service to the school and teacher housing, and the project office/camp would consist of a 4-inch HDPE supply and 2-inch HDPE return line contained inside a 16-inch Arctic carrier pipe. The water distribution line would also include electric heat trace to thaw the line, in the event of a freeze-up.

6.1.5 Water Treatment Plant/Washeteria Building

The new building will consist of five 14-foot wide x 36-foot long x 14-foot high modules with a minimum of 8 inches of insulation in the exterior walls, and 12 inches of insulation in the floor and ceiling. The exterior walls of the modules will be constructed of corrugated metal or clad with metal siding and the tops of the modules will be covered with a site-built metal roof. The building foundation will be a post and pad foundation on a gravel pad. The finished floor elevation would be at least 2 feet above the estimated 100-year flood elevation of 30.23 feet.

The Washeteria would include four washers, four dryers, and three unisex bathrooms – one of which would be ADA compliant. The Washeteria would also include an office with room for storage. The WTP portion of the building would include a mechanical room, office/lab, chemical room, bathroom, and water treatment area with storage space. The water treatment area would include the filtration equipment and associated tanks and pumps, the water distribution system equipment, and the heat exchangers and pumps for the various water and glycol loops.

The pumps and motors should be as energy efficient as reasonably possible. The building thermostats should be programmable for automatic setbacks, and most if not all of the lighting fixtures should have LED lamps and be controlled with photocells or occupancy sensors as appropriate. Consideration should also be given to the installation air-source heat pumps, heat recovery ventilation units, and solar photovoltaic panels.

6.1.6 Wastewater Collection, Treatment, and Disposal

Unless the community lagoon, lift station, and force main are completed and operational prior to construction of the new WTP/W, wastewater from the new WTP/W would be conveyed to the old WTP/W lagoon with the use of a pump station and two short sections of force main. The force mains would consist of a 3-inch HDPE wastewater line and two 2-inch HDPE glycol lines contained inside a 16-inch Arctic carrier pipe. The new force mains would be connected to the existing force main for the new sewage lagoon. The existing force main is a 6-inch HDPE pipe with two 2-inch circulating glycol lines for freeze protection. The existing lines would be cut, isolation valves installed, and the new force main and glycol lines connected to the existing ones. A similar scenario would occur at the proposed force main extension/outfall to the old WTP/W lagoon. The glycol would be heated and circulated from the new WTP/W building.

The new pump station would be located within or adjacent to the WTP/W building and be sized to accommodate the backwash flows from the water treatment system. Duplex pumps would be installed and a minimum flow rate of 100 gpm is recommended to flush/scour the force mains.

6.1.7 Waste-Heat Recovery

The partially completed heat recovery system in the Power Plant would be completed and a heat recovery loop would be installed between the Power Plant and the new WTP/W building. The loop would be constructed with 2-inch Aquatherm blue pipe, contained inside an 8-inch Arctic carrier pipe. Recovered heat from the Power Plant would be used to: pre-heat the water from the wells, heat the WST, heat the WST fill and draw piping, the water line to the school, the glycol lines for the force mains, the WTP/W building, and generate hot water for the washeteria.

6.2 Project Schedule

The project schedule will be driven by funding availability. The proposed schedule for design and construction is as follows:

- Design – 6 to 9 months pending the award of funding
- Procurement of the modular building – 2 to 3 months following completion of the design
- Fabrication of the modular building – 4 to 6 months
- Shipment of the building – June following completion and testing of the building
- Initial site work to prepare for receipt of the building – June/July

- Arrival of the building – July/August
- Balance of the site work and completion of the building – 2 to 3 months
- Facility startup/grand opening – October 20xx (1-year from the time of procurement)

6.3 Permit Requirements

It is anticipated that the following agencies will need to be contacted, and permitting secured, prior to construction:

- USACE – Wetlands Permitting
- ADEC – Approval to Construct
- State of Alaska Department of Natural Resources – Water Rights
- State of Alaska Fire Marshall – Plan Review and Approval

6.4 Sustainability Considerations

Alternative 1 will provide a reliable and affordable sanitation facility for Tuluksak. The facility will be energy efficient, require less labor to make water, and use recovered heat from the Power Plant to reduce fuel consumption. Funding to operate and maintain the facility will be generated through a combination of washeteria user fees and water services fees from the school.

6.5 Total Project Cost Estimate

The total estimated cost for the proposed project is \$6,120,000. This includes design and construction administration services, 5% for American Iron and Steel compliance, a 15% contingency and 10% for project administration. A breakdown of the cost is presented on Table 11. General costs for project management, freight, housing, superintendent labor, etc. were allocated and applied to each item. An itemized breakdown of the costs and assumptions made in preparing the cost estimate is provided in Appendix E.

Table 11 – Proposed Project Capital Costs

Item	Cost
Raw Water Well Connection (W-WW)	\$86,976
WTP/W Modular Building (W-WP/C-WA)	\$3,098,501
Wastewater Piping and Pump station (S-BF and S-LS)	\$317,719
Water Storage Tank (W-WT)	\$369,456
Bulk Fuel Storage (M-IF)	\$111,524
Water Distribution Piping (W-BD)	\$451,582
Heat Recovery Upgrades (E-HR)	\$172,072
<i>Subtotal</i>	\$4,607,830
<i>AIS Compliance (5%)</i>	\$230,392
<i>Contingency (15%)</i>	\$725,733
<i>Project Administration (10%)</i>	\$556,396
Total Estimated Capital Cost	\$6,120,000

Note: Rounded to the nearest \$1,000.

Key: W-WW – Water Well W-WP – Water Treatment Plant
 C-WA – Washeteria M-IF – Fuel Farm
 W-BD – Buried Distribution Main E-HR – Heat Recovery System
 % – Percent W-WT – Water Tank

6.6 Annual Operating Budget

6.6.1 Income

A combination of Washeteria fees and water service fees will be used to fund operation and maintenance of the new WTP/W. It is assumed that laundry and shower demands will remain about the same, the current rates for washers, dryers, and showers will be increased by \$1.00, and the rate for water from the watering point will be reduced to \$0.10/gallon. It is further assumed that, when the Community Lagoon, lift station and force main become operational, that the additional costs for those facilities will be offset by the collection of wastewater fees from the school, clinic, teen center, and store. A breakdown of Estimated Annual Revenue is provided in Table 12.

Table 12 – Estimated Annual Revenue

Source	Rate	Unit	Quantity	Annual Income
School				
Water Service	\$18,750	Every 3 Months	4	\$75,000
Washeteria				
Washers	\$5.00	Load	5,096	\$25,480
Dryers	\$4.00	Load	4,368	\$17,472
Showers	\$3.00	Shower	546	\$1,638
Watering Point	\$0.10	Gallon	14,600	\$1,460
			Total	\$121,000

Note: Rounded to the nearest \$1,000

6.6.2 Annual O&M Costs

The estimated annual O&M cost for the proposed project is \$114,000. This includes a combination of O&M and R&R/Short-Lived Asset costs. A breakdown of the annual cost by cost category is presented in Table 13. An itemized breakdown of the costs and the assumptions made in developing the O&M and R&R costs is provided in Appendix E.

Table 13 – Estimated Project Annual Costs

Cost Category	Annual Cost
Administration	\$17,500
Labor	\$49,000
Materials	\$4,000
Electricity	\$14,100
Heating oil	\$9,300
Miscellaneous	\$5,900
R&R (Short Lived Assets)	\$14,000
Total Estimated Annual Cost	\$114,000

Note: Rounded to the nearest \$1,000

Key: R&R – Repair and Recovery

6.6.3 Debt Repayments

Grants, rather than loans are planned for construction of the proposed improvements.

6.6.4 Reserves

Debt Service Reserve

The TNC has no reserves and is struggling to pay back their fuel loans (approximately \$270,000). They are also behind on the tax payments (approximately \$75,000).

Short-Lived Asset Reserve

Replacement costs for short-lived assets were calculated and included in the annual O&M cost. A summary of the costs is provided in Table 14.

Table 14 – Summary of Short-Lived Assets

FIVE YEAR REPLACEMENT ASSETS	Unit	Number	Cost	Life (Yr)	Replacement Cost
Raw water line circ pumps	Each	2	\$500	5	\$1,104
Submersible well pumps	Each	2	\$1,250	5	\$2,760
Chemical pumps	Each	3	\$2,000	5	\$6,624
Total 5-Year Budget					\$10,489
Annual Budget					\$2,100
TEN YEAR REPLACEMENT ASSETS	Unit	Number	Cost	Life (Yr)	Replacement Cost
Boiler circ pumps	Each	2	\$500	10	\$1,219
Process heat circ pumps	Each	2	\$750	10	\$1,828
Mixers	Each	2	\$1,500	10	\$3,657
Filter effluent pump	Each	1	\$3,500	10	\$4,266
Backwash pump	Each	1	\$4,500	10	\$5,485
Air blower	Each	1	\$4,000	10	\$4,876
WST circ pumps	Each	2	\$500	10	\$1,219
Pressure pumps	Each	2	\$2,250	10	\$5,485
Water main circ pumps	Each	2	\$750	10	\$1,828
Water heater	Each	1	\$3,500	10	\$4,266
Washers	Each	4	\$4,700	10	\$22,917
Dryers	Each	4	\$5,400	10	\$26,330
Lift Station pumps	Each	2	\$3,750	10	\$9,142
Force main glycol circ pumps	Each	2	\$500	10	\$1,219
HRS circ pumps	Each	2	\$750	10	\$1,828
Total 10-Year Budget					\$95,569
Annual Budget					\$9,560
FIFTEEN YEAR REPLACEMENT ASSETS	Unit	Number	Cost	Life (Yr)	Replacement Cost
Bldg unit heaters	Each	8	\$750	15	\$8,075
Heat exchangers					
Raw water	Each	1	\$3,500	15	\$4,711
Water storage tank	Each	1	\$2,500	15	\$3,365
Water distribution	Each	1	\$3,500	15	\$4,711
Force main glycol	Each	1	\$2,500	15	\$3,365
Heat recovery system	Each	2	\$4,000	15	\$10,767
Total 15-Year Budget					\$34,993
Annual Budget					\$2,340
TOTAL ANNUAL CONTRIBUTION, 5, 10 & 15 Year Needs					\$14,000

7. Conclusion and Recommendations

7.1 Conclusions

The situation in Tuluksak is dire and requires serious change. Challenges include:

- The existing WTP/W is beyond the point of minor repairs.
- The water treatment system does not have the capacity to meet daily demands.
- The quality of the water from the WTP is so poor that most residents do not use it and nobody drinks it without additional treatment.
- The WTP well is shallow and vulnerable to contamination.
- The well and or WTP wastewater line freeze each winter causing water shortages. The school for the last 3 years has been closed for 9 to 12 days for lack of water. In 2014 the school was shut down for 3 weeks straight. In winter 2017/18 the washeteria was closed for 6 weeks straight when the wastewater line froze.
- The Power Plant is in a state of disrepair and power outages are common.
- TNC has a shortage of fuel storage capacity which forces them to have to truck or fly in fuel which is very expensive.
- TNC is more than \$300,000 in debt to the State of Alaska and the Internal Revenue Service.

Meanwhile, 300 plus people are suffering the consequences of years of poor management and failed governance. No one purposely put the community in this situation, but the situation has become so desperate that there is almost no way out without a significant influx of assistance, some changes in funding requirements, and a willingness of the community to accept responsibility for the current situation and embrace change.

The fundamental problem in Tuluksak is a financial one. The sanitation challenges, as significant as they are, are fairly easily resolved, but not without a solid financial plan. A business cannot be successful without the right tools, a product that people are willing to pay for, and a means of enforcing payment for services. That is exactly the case in Tuluksak. The community does not have an effective business model, there is little demand for the water being produced, and there is no current means of forcing people to pay for honey bucket hopper service. As a result, there are huge cost inefficiencies, no one knows the real costs of doing business, critical needs go unsupported, making payroll is a problem, employees (especially the good ones) get frustrated and leave, and moral and accountability are low.

As identified in the previous sections of this report, the best alternative for addressing the challenges with the existing WTP/W is a new modular facility at the Utility Core site. This option has the lowest life cycle and O&M costs, poses the fewest construction challenges, takes advantage of existing wells with better water quality, and is consistent with the community's long-term goal for a community wide piped water and sewer system. However, the facility will not be sustainable unless current accounting and business practices are improved, the Power Plant and heat recovery system are fully operational, washeteria labor costs are reduced, and the fees for laundry and showers are increased.

7.2 Recommendations

The following recommendations are provided for implementing the proposed project, increasing revenue, reducing costs, and improving the sustainability and health and safety of the community.

Project Implementation

- Concurrent with the design, assist the community in developing an effective business model and a plan for repayment of its debts.
- Prior to or in coordination with the design of the new WTP/W the following investigations /analyses should be performed:
 - Review of available geotechnical information to determine if additional investigation is warranted.
 - Pump testing and additional water quality analysis of the four wells near the Utility Core site. Little to no information is available for the 2003 wells, and it's been 12 years since the 2005 wells were tested. The wells should be pumped for a minimum of 1-week at the same rate and frequency proposed for operation of the WTP (20 gpm, 8 hours/day, and 5 days/week) prior to sampling.
 - In coordination with the well investigation, a water treatment study should be performed to determine if the proposed treatment process (pre-oxidation and conventional filtration) can be simplified. The proposed process is a Level 2 system and very few rural WTP operators are able to achieve Level 2 certification.
- Evaluate the various types of dryers (hydronic, propane, electric, etc.) to determine which would be best for the new washeteria. The proposed floor plan assumes hydronic dryers and the benefit of recovered heat from the Power Plant.
- Consider the need for an emergency generator to power critical systems.
- Consider converting the proposed storage/office space in the new washeteria to a guest room for visitors. The guest room could provide an additional source of revenue and the need for an office could be eliminated with the use of prepay cards or tokens.

Other Infrastructure Improvements

- \$1-million dollar grant for completion of the Community Lagoon, lift station, force main and heat recovery system.
 - Coordinate completion of the heat recovery system with the Alaska Energy Authority (AEA). The AEA provides assistance to the electric utility and is planning a pilot project for Tuluksak that may include minor improvements to the Power Plant, as well as additional operator and utility management training.
 - Review the school's wastewater collection system to determine the most cost-effective way of connecting the school to the new community system while maintaining the ability to discharge to the school lagoon in emergency situations. The school district is interested in connecting to the new system but is understandably cautious given the poor performance of the WTP.

- If construction of the proposed WTP/W is going to be delayed beyond connection of the school to the community system, install an electric boiler and glycol circulation pump in the lift station to keep the force main from freezing during power outages and when the HRS is down for maintenance or repair. The boiler and pump would be powered from the school's power system and the costs for the electricity to run the equipment would be subtracted from the school's quarterly payments for water service. Per Jim Hartz, the school's power system has adequate capacity to power the equipment and the district would be willing to do so if connected to the community wastewater system.
- Seek additional funding to connect the existing WTP/W, school, clinic, teen center and store to the community wastewater system. The revenue generated by serving these facilities should be sufficient to cover the annual costs for the lift station and force main.
- Close out the school and WTP/W lagoons once the lift station and force main have been successfully operated for at least 2 years without service interruption.
- Seek additional funding to increase fuel storage capacity in the community. The power plant currently run out of fuel each winter and has to either have it trucked in on the ice road from Bethel or flown in, in 55-gallon drums. The Electric Utility is about 30,000-gallons short. The WTP/W also runs out of fuel each winter. Fuel trucked in costs about \$3/gallon more than barge delivery and fuel flown in is \$6 to \$7/gallon more than barge delivery. Providing an additional 40,000 gallons of storage should result in savings on the order of \$90,000 to \$100,000/year.

Administration / Management Changes

- Consider outsourcing TNC's accounting and financial responsibilities to an independent third-party business management consultant. The consultant would be responsible for reviewing TNC's current financial situation, establishing a repayment plan for existing debt, establishing budgets in consultation with TNC, developing a reporting system that meets RUBA's requirements, and the invoicing and collections for the water, sewer and electric utilities. The consultant would be hired with the goal of building community capacity and transferring the responsibilities back to TNC once a system is established and TNC has the capacity to run it. The transition is expected to take two to three years and during that time the consultant will need to have total control over all expenditures. Oversight of the consultant's activities could potential be provided by RUBA, and the consultant's services would need to be coordinated with the assistance YKHC is providing through their Utility Management Assistance Program.
- Establish separate enterprise accounts for the Water & Sewer Utility and the Electric Utility. The finances for the two utilities would be managed separately from TNC's other business making it easier to monitor the budgets, control expenditures, and adjust the utility rates accordingly.
- Identify a single person to manage the day to day operations of the Water & Sewer and Electric utilities. Combining the management responsibilities should improve accountability, provide for better coordination between the two utilities, improve collections, and offer cost savings through the sharing of resources and coordination of purchases. The AEA Circuit Rider and YKHC RMW programs would still be utilized for technical support.
- Use the Ampy prepayment electric meters in each house for the collection of honey bucket hopper fees and customer debt. Each time a customer makes a payment for electricity, a portion of the payment would go toward hopper fees and debt repayment. The priorities for

payment would be hopper fees, debt repayment and then electricity. In order for this to be successful, the combined additional costs for debt repayment and hopper service would need to be affordable. Given the fact that no one other than TNC employees are used to paying for hopper service, consideration might be given to starting with a reduced rate (less than the current fee of \$40/month) and adjusting it over time as customers adapt to it. A rate of \$25/month per household would generate approximately \$27,000/year.

- Consideration should be given to the hours of operation and staffing for the washeteria. The washeteria is currently operating at less than half capacity and at a substantial financial loss. Two possibilities for reducing costs include reducing the hours of operation and installing card readers or token assemblies to eliminate the need for a full time attendant. The O&M cost and revenue estimates for the proposed WTP/W assume the labor hours would be reduced to 3 to 4 hours per day for facility maintenance and the laundry and showers fees would be increased \$1.00.

Agency Involvement

- The following programs are currently being implemented to promote change and help guide the Tuluksak to a path of sustainability:
 - ANTHC – Strategic Path Forward
 - YKHC – Utility Management Assistance Program and Pathway to Pipes
 - ADEC – Village Safe Water Program
 - AEA - Utility Training Pilot Program
 - DCCED – Rural Utility Business Advisor Program

These programs are well intentioned, but unfortunately do not all have the same vision or goals for improvement. Consideration should be given to forming an advisory group and identifying a single lead agency to work with the community. Without a coordinate effort and consistent message, its unlikely significant improvement will occur and every time there is a change in local leadership, which is inevitable, the project may be delayed. TNC has had three different tribal administrators and numerous council member changes in just the last couple years.

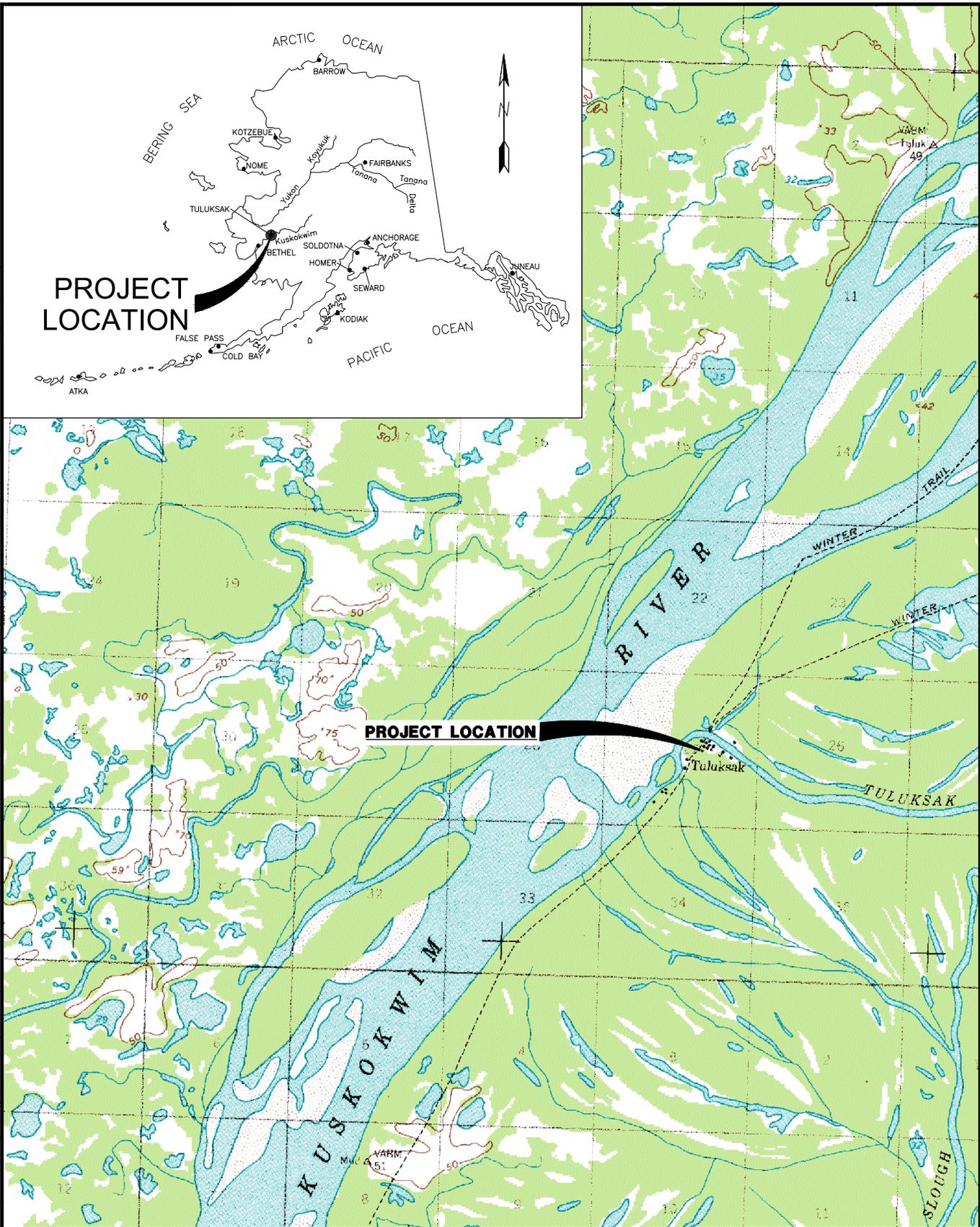
- Best Practice score - With a commitment from TNC to allow their business operations to be managed by a third-party consultant, consider making an exception with regard to the minimum Best Practice score for funding eligibility. The community is in dire need of the proposed improvements and is unlikely to ever achieve a score of 60 without a new facility and substantial assistance.

Figures

Included:

- 1) Figure 1 – Vicinity Map
- 2) Figure 2 – Community Map
- 3) Figure 3 – Land Status Map
- 4) Figure 4 – Existing Sanitation Facilities Map
- 5) Figure 5 – Proposed Water Treatment Schematic
- 6) Figure 6 – Alternative 1 – WTP/W at Utility Core Site – Site Plan
- 7) Figure 7 – Alternative 1 – WTP/W at Utility Core Site – Floor Plan
- 8) Figure 8 – Alternative 2 – Rehab Existing WTP/W – Site Plan
- 9) Figure 9 – Alternative 2 – Rehab Existing WTP/W – Floor Plan
- 10) Figure 10 – Alternative 3 – Rehab Washeteria and New WTP – Site Plan
- 11) Figure 11 – Alternative 3 – New WTP at Utility Core Site – Floor Plan
- 12) Figure 12 – Alternative 3 – Rehab Washeteria – Floor Plan

FILE NAME: \\crweng.com\Projects\JobsData\30306.60 ANTHC-Tuluksak Washeteria-WTP_PER\00_CADD\02_Figures\01_PER\30306.60_Figure 1 - Vicinity Map.dwg

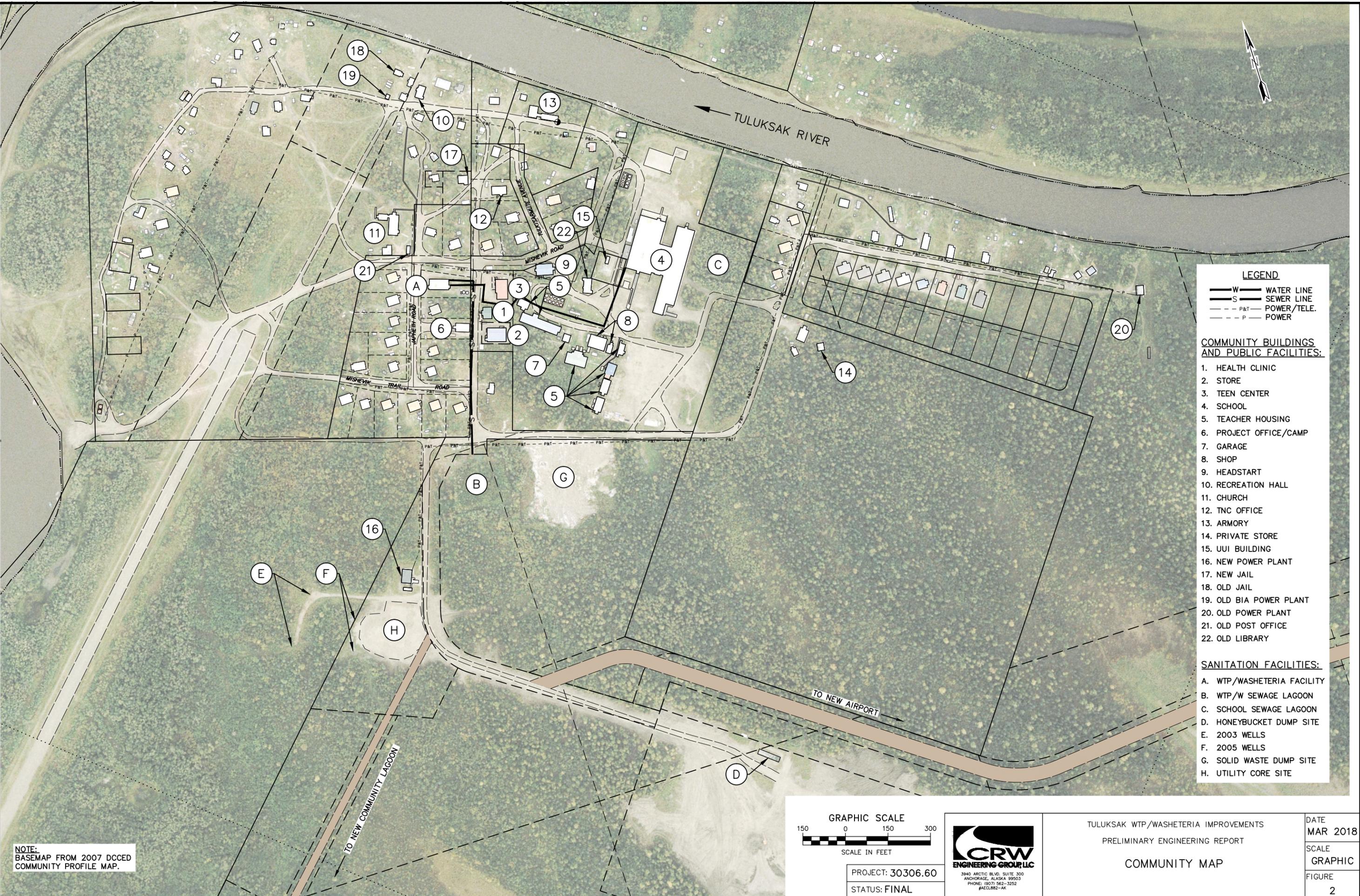


STATUS: FINAL

PRELIMINARY ENGINEERING REPORT
WTP/WASHETERIA IMPROVEMENTS
TULUKSAK, AK
VICINITY MAP

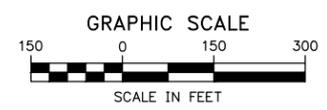
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NOTE:
BASEMAP FROM 2007 DCCD
COMMUNITY PROFILE MAP.

- LEGEND**
- W — WATER LINE
 - S — SEWER LINE
 - - - P&T — POWER/TELE.
 - - - P — POWER
- COMMUNITY BUILDINGS AND PUBLIC FACILITIES:**
1. HEALTH CLINIC
 2. STORE
 3. TEEN CENTER
 4. SCHOOL
 5. TEACHER HOUSING
 6. PROJECT OFFICE/CAMP
 7. GARAGE
 8. SHOP
 9. HEADSTART
 10. RECREATION HALL
 11. CHURCH
 12. TNC OFFICE
 13. ARMORY
 14. PRIVATE STORE
 15. UUI BUILDING
 16. NEW POWER PLANT
 17. NEW JAIL
 18. OLD JAIL
 19. OLD BIA POWER PLANT
 20. OLD POWER PLANT
 21. OLD POST OFFICE
 22. OLD LIBRARY
- SANITATION FACILITIES:**
- A. WTP/WASHETERIA FACILITY
 - B. WTP/W SEWAGE LAGOON
 - C. SCHOOL SEWAGE LAGOON
 - D. HONEYBUCKET DUMP SITE
 - E. 2003 WELLS
 - F. 2005 WELLS
 - G. SOLID WASTE DUMP SITE
 - H. UTILITY CORE SITE

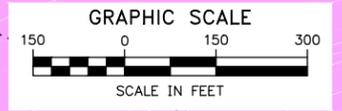
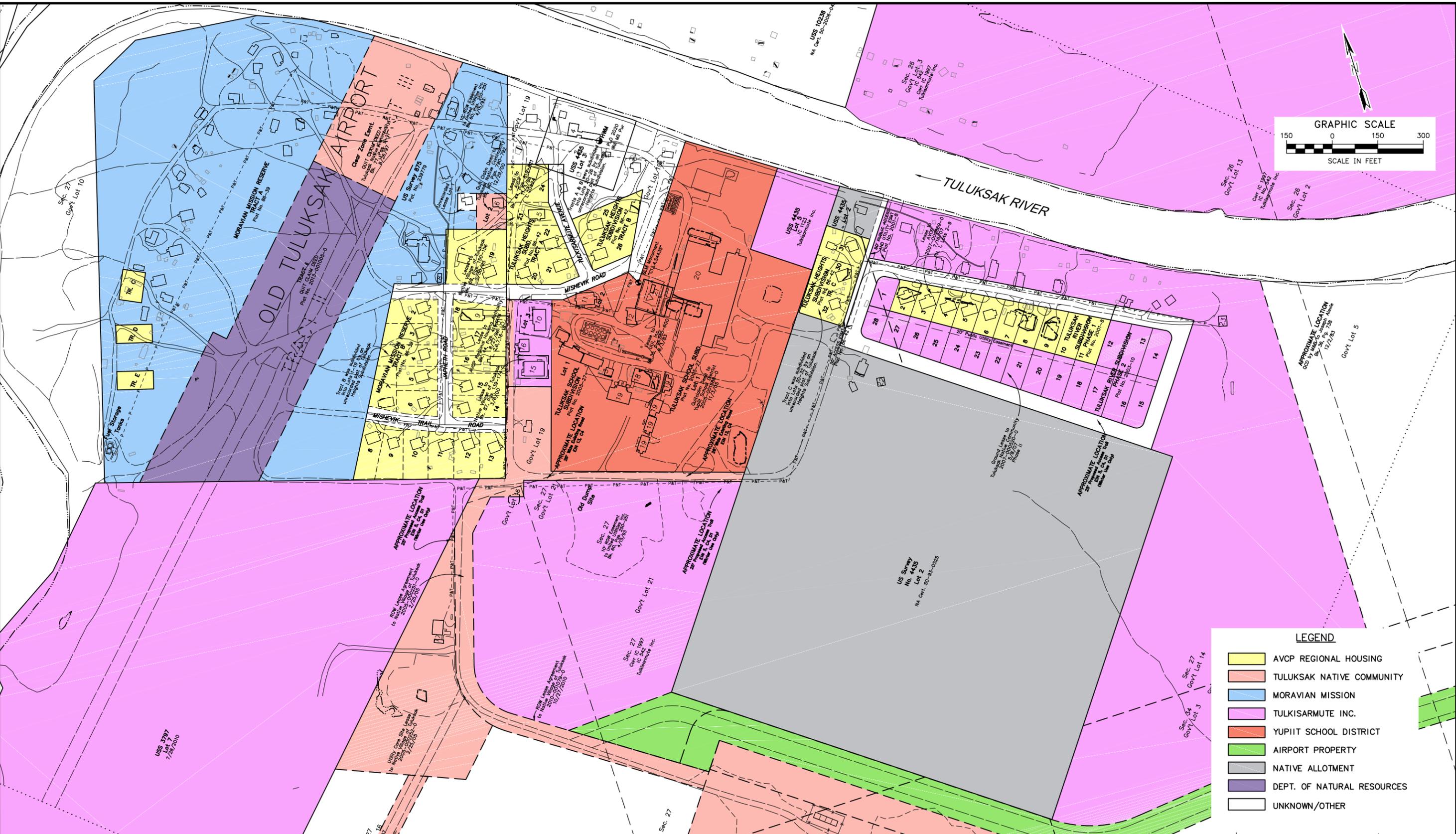


PROJECT: 30306.60
STATUS: FINAL



TULUKSAK WTP/WASHETERIA IMPROVEMENTS
PRELIMINARY ENGINEERING REPORT
COMMUNITY MAP

DATE
MAR 2018
SCALE
GRAPHIC
FIGURE
2



LEGEND

[Yellow Box]	AVCP REGIONAL HOUSING
[Orange Box]	TULUKSAK NATIVE COMMUNITY
[Blue Box]	MORAVIAN MISSION
[Pink Box]	TULKISARMUTE INC.
[Red Box]	YUPIIT SCHOOL DISTRICT
[Green Box]	AIRPORT PROPERTY
[Grey Box]	NATIVE ALLOTMENT
[Purple Box]	DEPT. OF NATURAL RESOURCES
[White Box]	UNKNOWN/OTHER

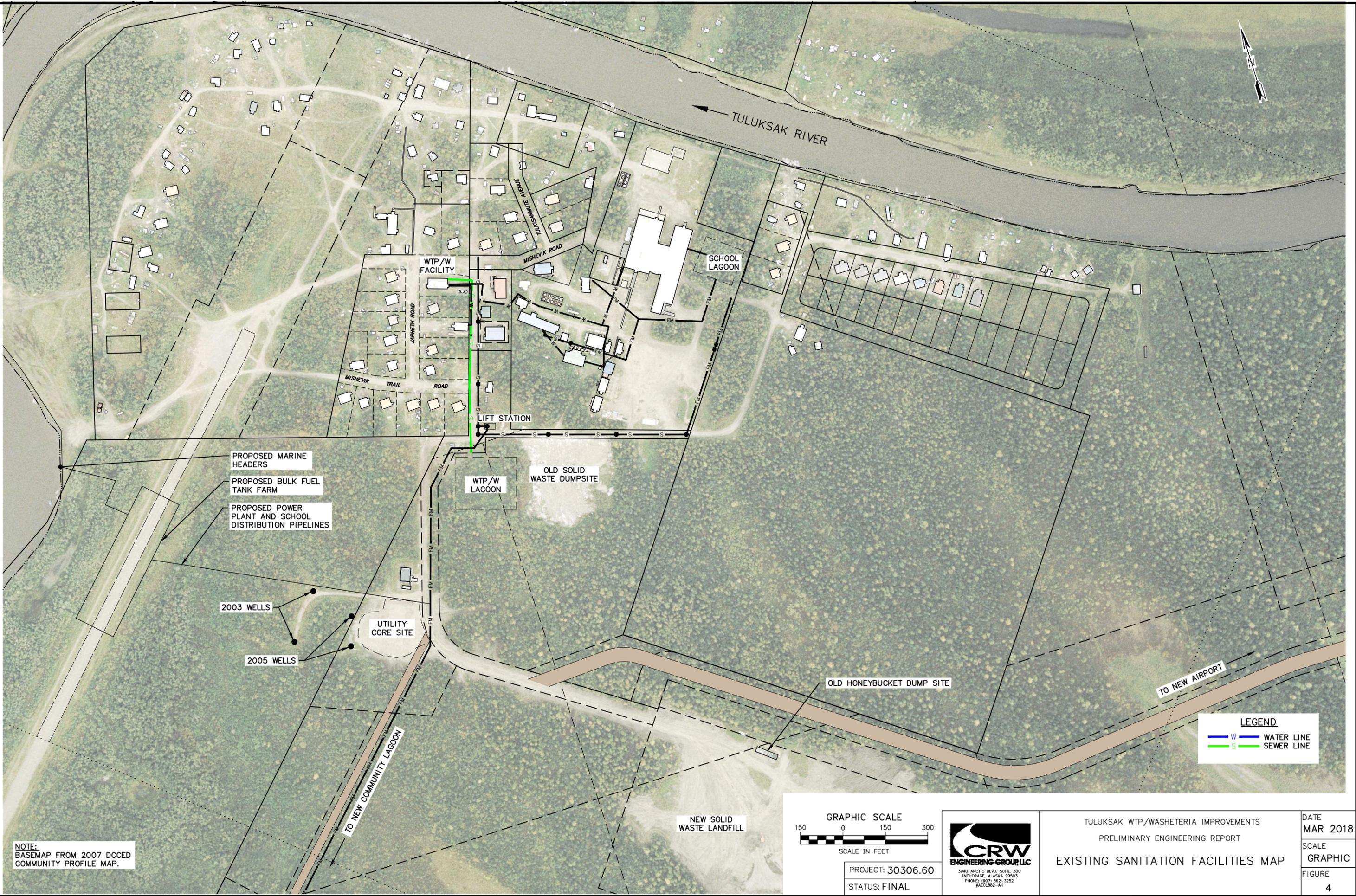


TULUKSAK WTP/WASHETERIA IMPROVEMENTS
 PRELIMINARY ENGINEERING REPORT
 LAND STATUS MAP

PROJECT: 30306.60
 STATUS: FINAL

DATE
 MAR 2018
 SCALE
 GRAPHIC
 FIGURE
 3

File: \\crweng.com\Projects\JobsData\30306.60 ANTHC-Tuluksak Washeteria-WTP_PER\00 CADD\02 Figures\01 PER\30306.60_Figure 4 - Existing Sanitation Facilities Map.dwg



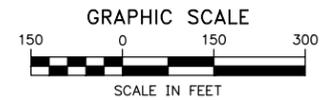
NOTE:
BASEMAP FROM 2007 DCCD
COMMUNITY PROFILE MAP.

- PROPOSED MARINE HEADERS
- PROPOSED BULK FUEL TANK FARM
- PROPOSED POWER PLANT AND SCHOOL DISTRIBUTION PIPELINES

- 2003 WELLS
- 2005 WELLS

LEGEND

W WATER LINE
S SEWER LINE

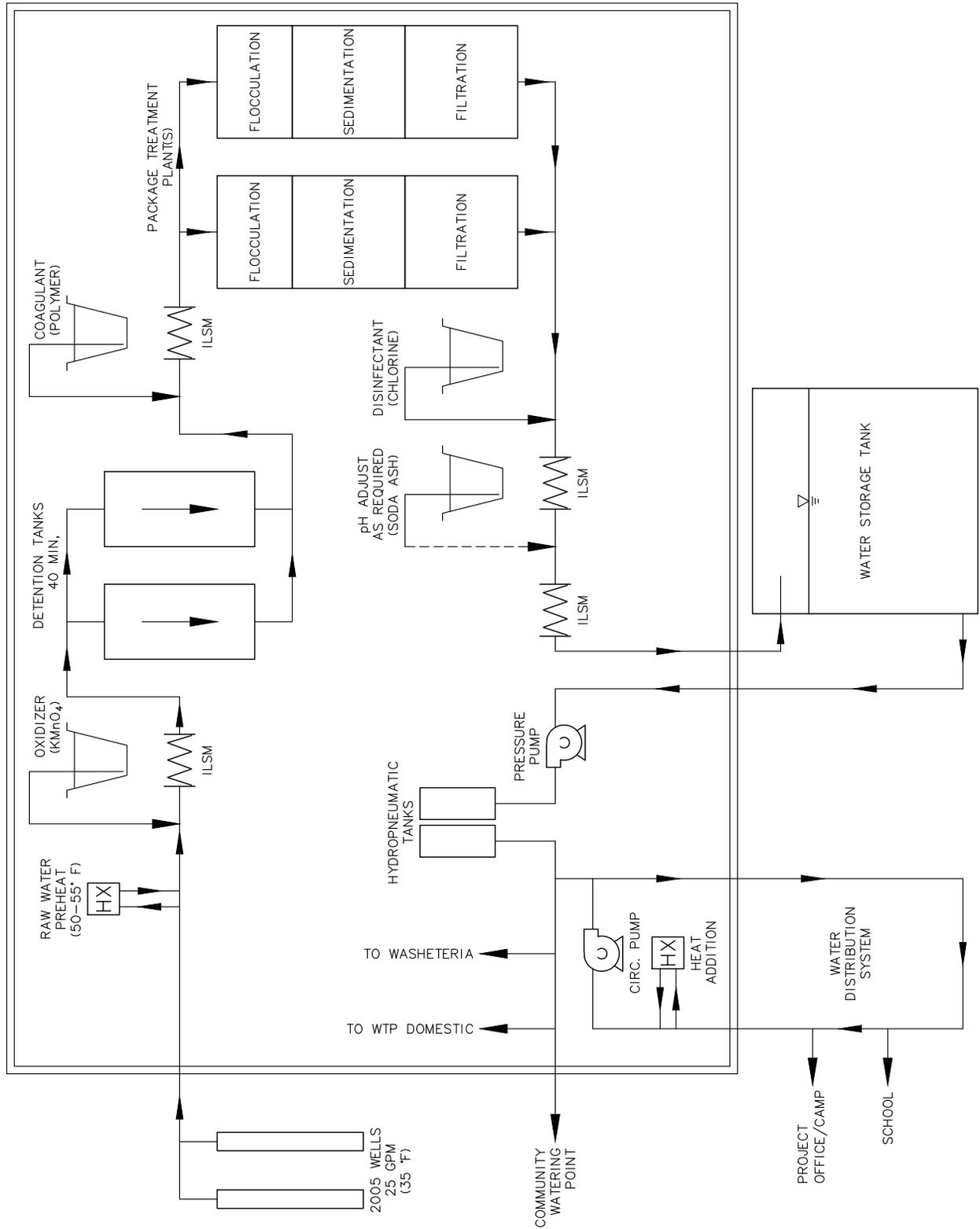


3940 ARCTIC BLVD., SUITE 300
ANCHORAGE, ALASKA 99503
PHONE: (907) 562-3252
FAC: 862-44

TULUKSAK WTP/WASHETERIA IMPROVEMENTS
PRELIMINARY ENGINEERING REPORT
EXISTING SANITATION FACILITIES MAP

PROJECT: 30306.60
STATUS: FINAL

DATE
MAR 2018
SCALE
GRAPHIC
FIGURE
4

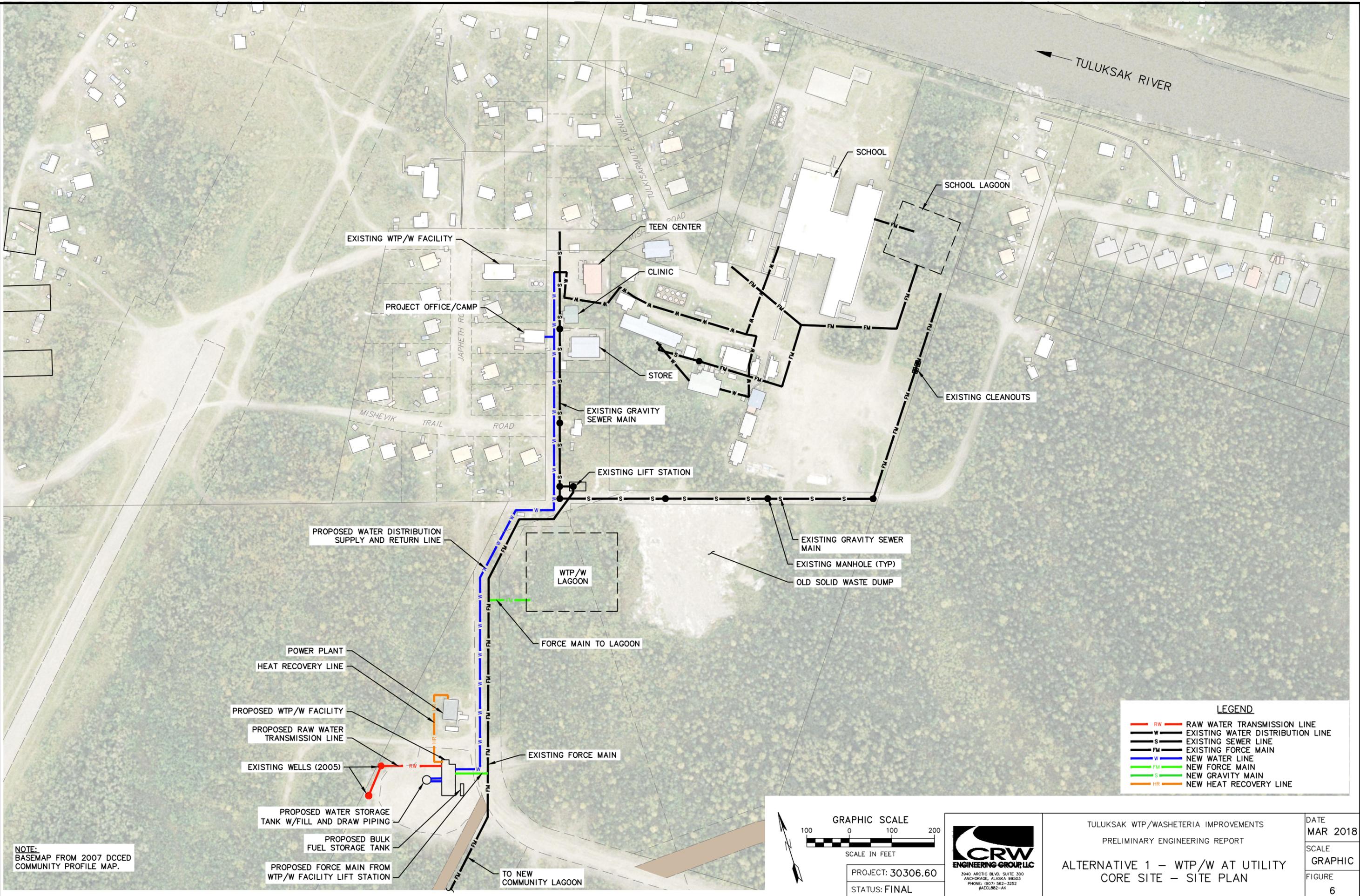


STATUS: FINAL

PRELIMINARY ENGINEERING REPORT
WTP/WASHETERIA IMPROVEMENTS
TULUKSAK, AK
PROPOSED WATER TREATMENT SCHEMATIC

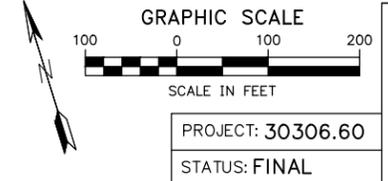
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Drawn By:	RWB
Scale:	NTS
Date:	MAR 2018
Figure:	5

File: \\crweng.com\Projects\JobsData\30306.60 ANTHC-Tuluksak Washeteria-WTP_PER\00_CADD\02_Figures\01_PER\30306.60_Figure 6 - Alternative 1 Site Plan.dwg



NOTE:
BASEMAP FROM 2007 DCCD
COMMUNITY PROFILE MAP.

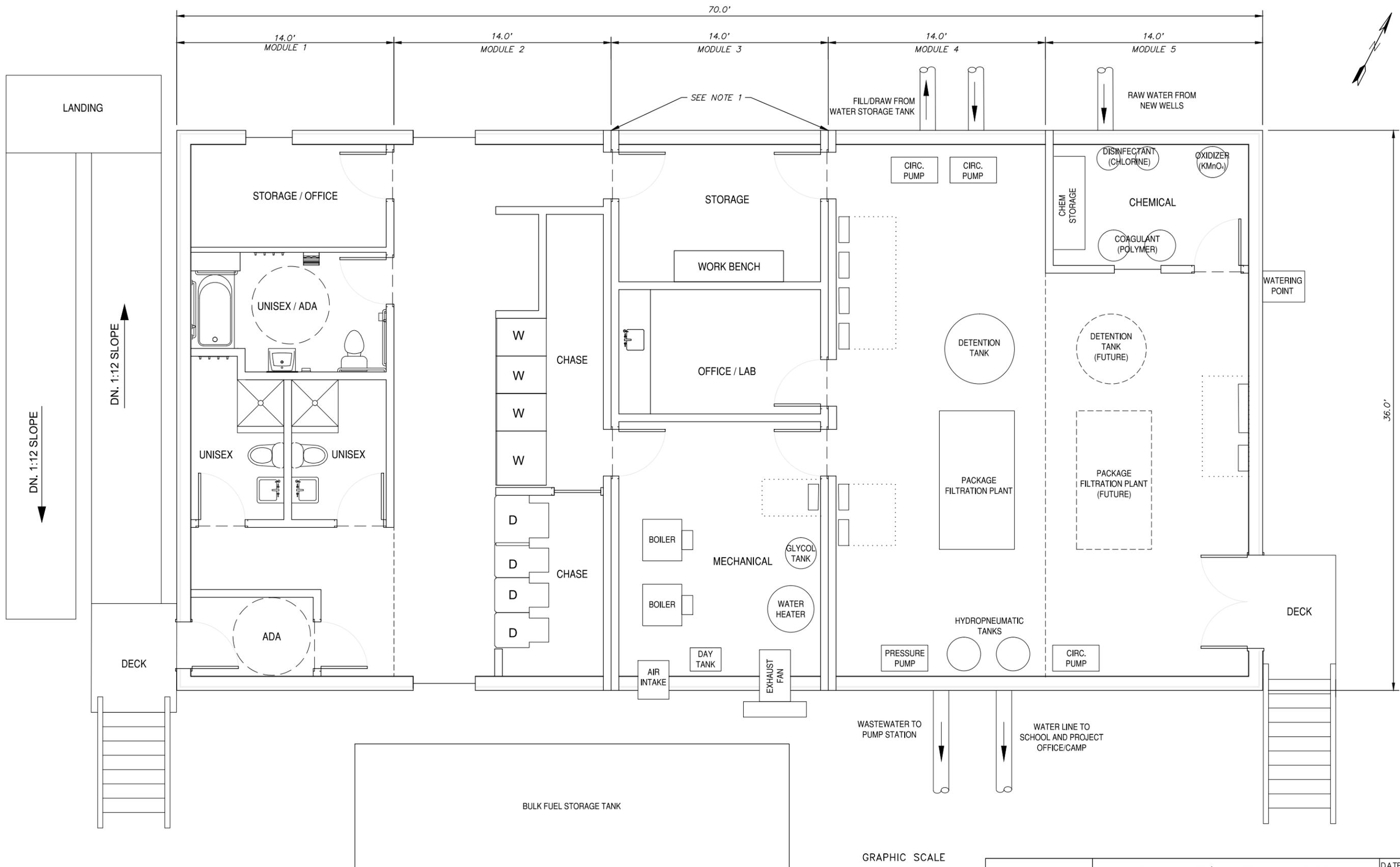
LEGEND	
	RAW WATER TRANSMISSION LINE
	EXISTING WATER DISTRIBUTION LINE
	EXISTING SEWER LINE
	EXISTING FORCE MAIN
	NEW WATER LINE
	NEW FORCE MAIN
	NEW GRAVITY MAIN
	NEW HEAT RECOVERY LINE



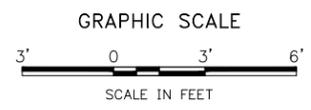
TULUKSAK WTP/WASHETERIA IMPROVEMENTS
PRELIMINARY ENGINEERING REPORT
ALTERNATIVE 1 - WTP/W AT UTILITY
CORE SITE - SITE PLAN

DATE
MAR 2018
SCALE
GRAPHIC
FIGURE
6

File: \\crweng.com\Projects\JobsData\30306.60_ANTHC-Tuluksak Washeteria-WTP_PER\00_CADD\02_Figures\01_PER\30306.60_Figure 7 - Alternative 1 Floor Plan.dwg



NOTES
 1. THE DOUBLE WALL BETWEEN MODULES 2 AND 4 WOULD NOT BE REQUIRED IF THE FACILITY IS FIELD BUILT IN TULUKSAK.



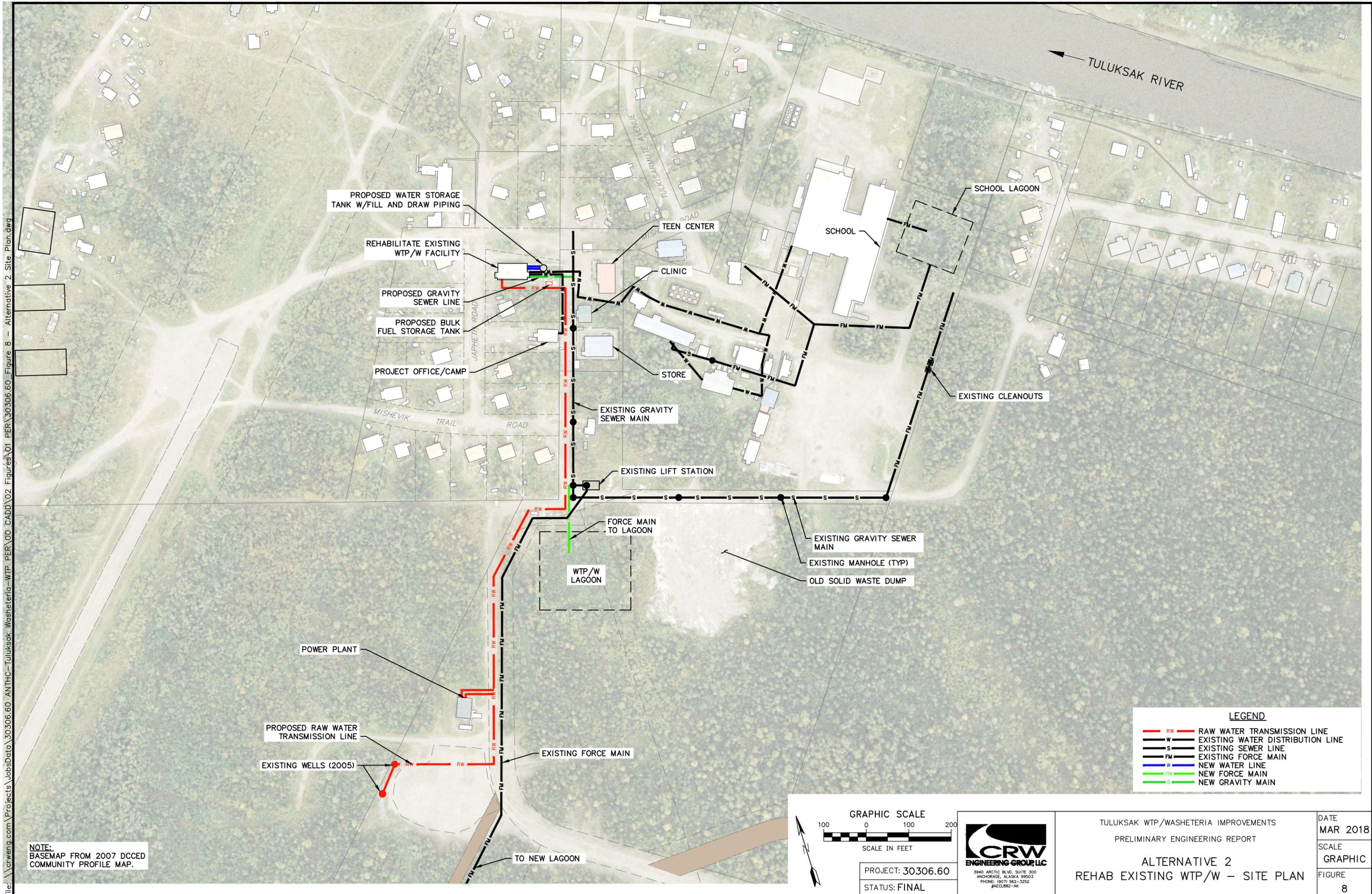
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TULUKSAK WTP/WASHETERIA IMPROVEMENTS
 PRELIMINARY ENGINEERING REPORT
 ALTERNATIVE 1 - WTP/W AT
 UTILITY CORE SITE - FLOOR PLAN

DATE
 MAR 2018
 SCALE
 GRAPHIC
 FIGURE
 7

File: \\crweng.com\Projects\JobsData\30306.60-ANTHC-Tuluksak-Wastewater-WTP_PER\00_CADD\02_Figures\01_PER\30306.60_Figure 8 - Alternative 2 Site Plan.dwg



PROPOSED WATER STORAGE TANK W/FILL AND DRAW PIPING

REHABILITATE EXISTING WTP/W FACILITY

PROPOSED GRAVITY SEWER LINE

PROPOSED BULK FUEL STORAGE TANK

PROJECT OFFICE/CAMP

TEEN CENTER

CLINIC

STORE

EXISTING GRAVITY SEWER MAIN

EXISTING LIFT STATION

FORCE MAIN TO LAGOON

WTP/W LAGOON

EXISTING GRAVITY SEWER MAIN

EXISTING MANHOLE (TYP)

OLD SOLID WASTE DUMP

POWER PLANT

PROPOSED RAW WATER TRANSMISSION LINE

EXISTING WELLS (2005)

EXISTING FORCE MAIN

TO NEW LAGOON

SCHOOL LAGOON

SCHOOL

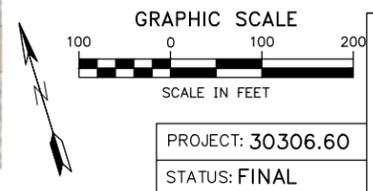
EXISTING CLEANOUTS

TULUKSAK RIVER

LEGEND

- RW RAW WATER TRANSMISSION LINE
- W EXISTING WATER DISTRIBUTION LINE
- S EXISTING SEWER LINE
- FM EXISTING FORCE MAIN
- W NEW WATER LINE
- FM NEW FORCE MAIN
- S NEW GRAVITY MAIN

NOTE:
BASEMAP FROM 2007 DCCED
COMMUNITY PROFILE MAP.



TULUKSAK WTP/WASHETERIA IMPROVEMENTS
PRELIMINARY ENGINEERING REPORT

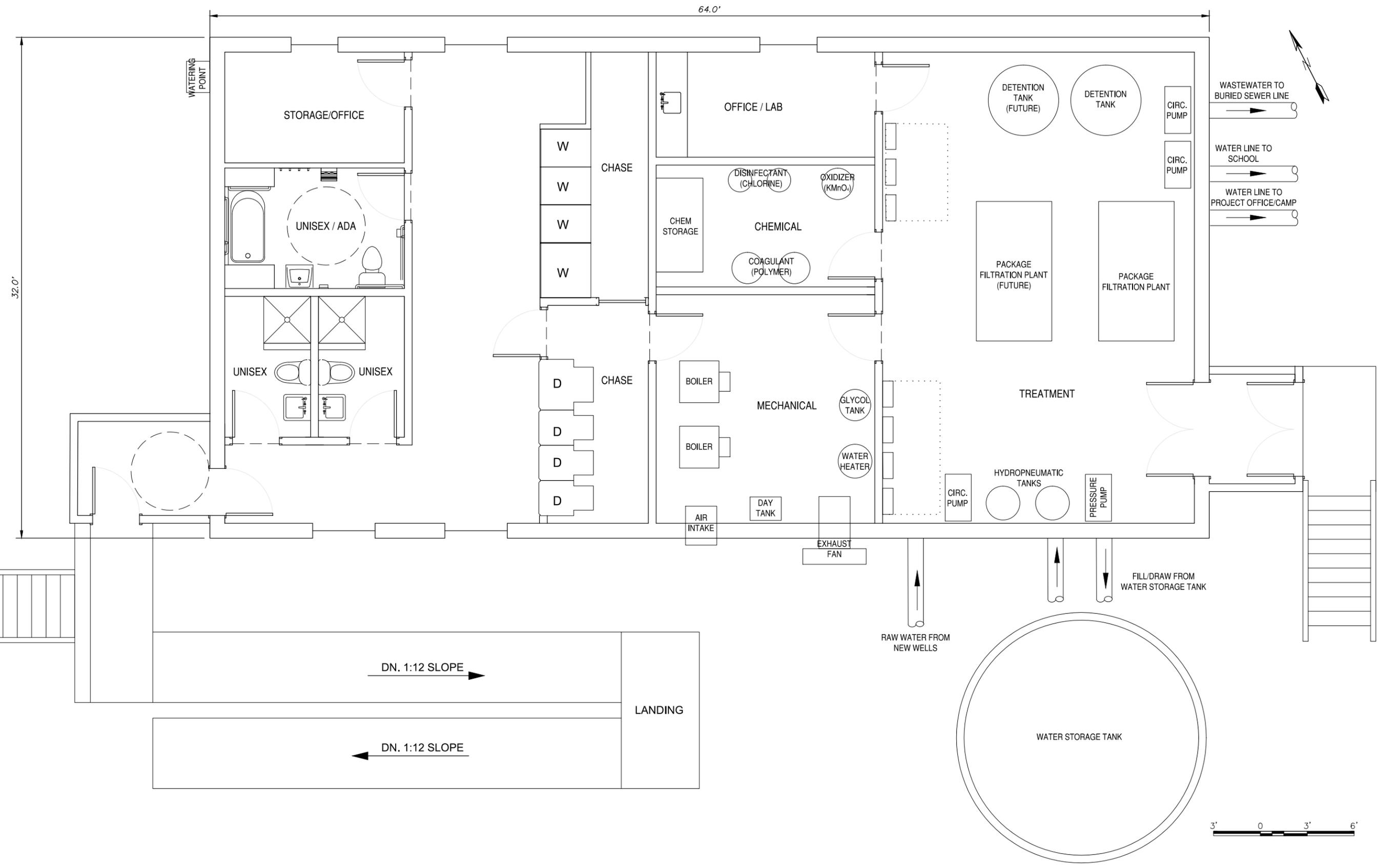
ALTERNATIVE 2
REHAB EXISTING WTP/W – SITE PLAN

DATE
MAR 2018

SCALE
GRAPHIC

FIGURE
8

File: \\crweng.com\Projects\JobsData\30306.60 ANTHC-Tuluksak Washeteria-WTP_PER\00 CADD\02 Figures\01 PER\30306.60_Figure 9 - Alternative 2 Floor Plan.dwg



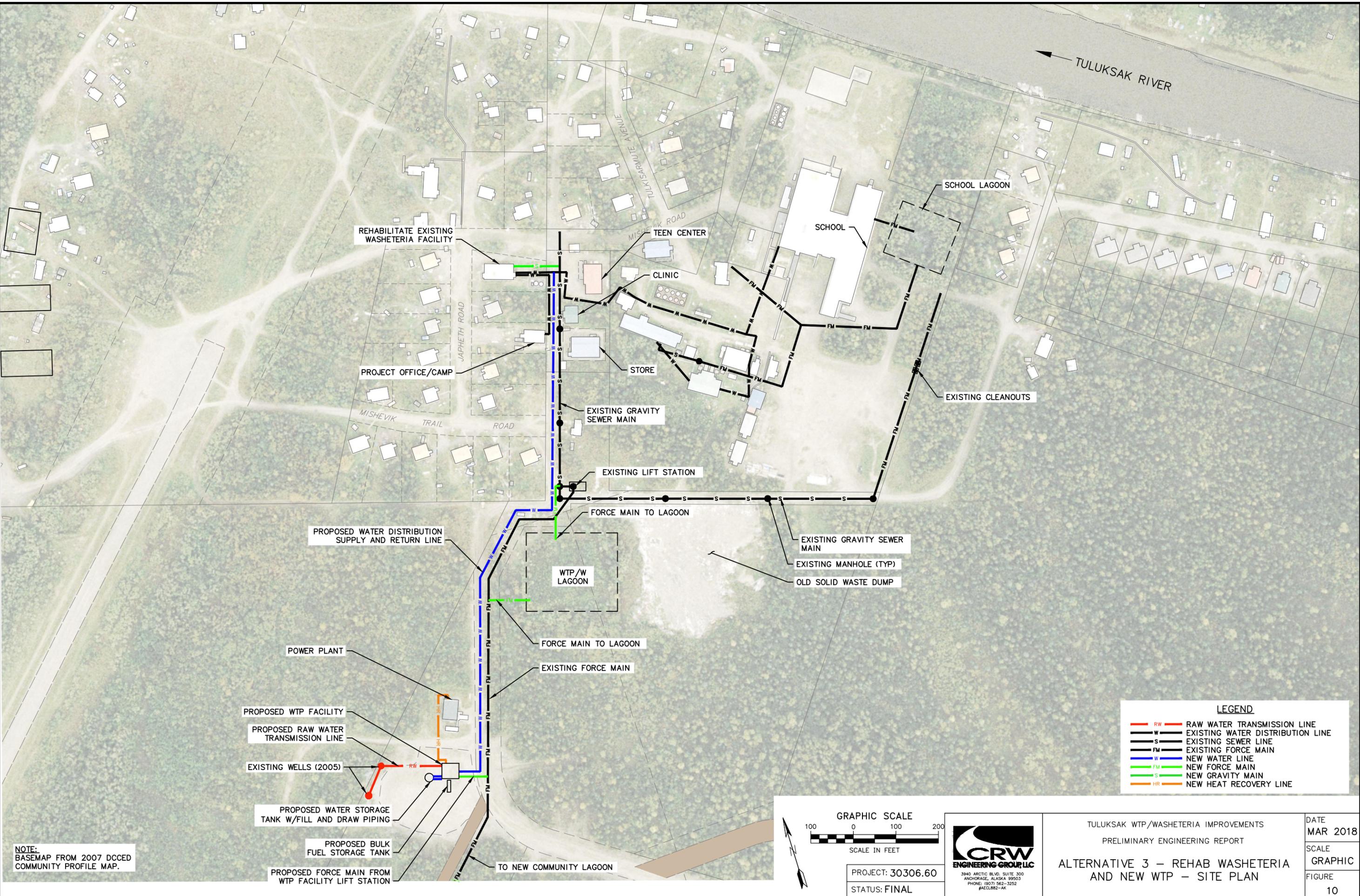
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TULUKSAK WTP/WASHETERIA IMPROVEMENTS
 PRELIMINARY ENGINEERING REPORT
 ALTERNATIVE 2
 REHAB EXISTING WTP/W – FLOOR PLAN

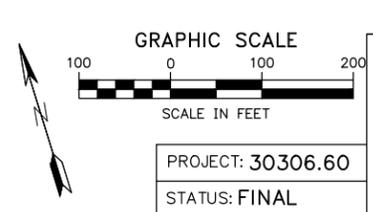
DATE
 MAR 2018
 SCALE
 GRAPHIC
 FIGURE
 9

File: \\crweng.com\Projects\JobsData\30306.60 ANTHC-Tuluksak Washeteria-WTP PER\00 CADD\02 Figures\01 PER\30306.60 Figure 10 - Alternative 3 Site Plan.dwg



NOTE:
BASEMAP FROM 2007 DCCD
COMMUNITY PROFILE MAP.

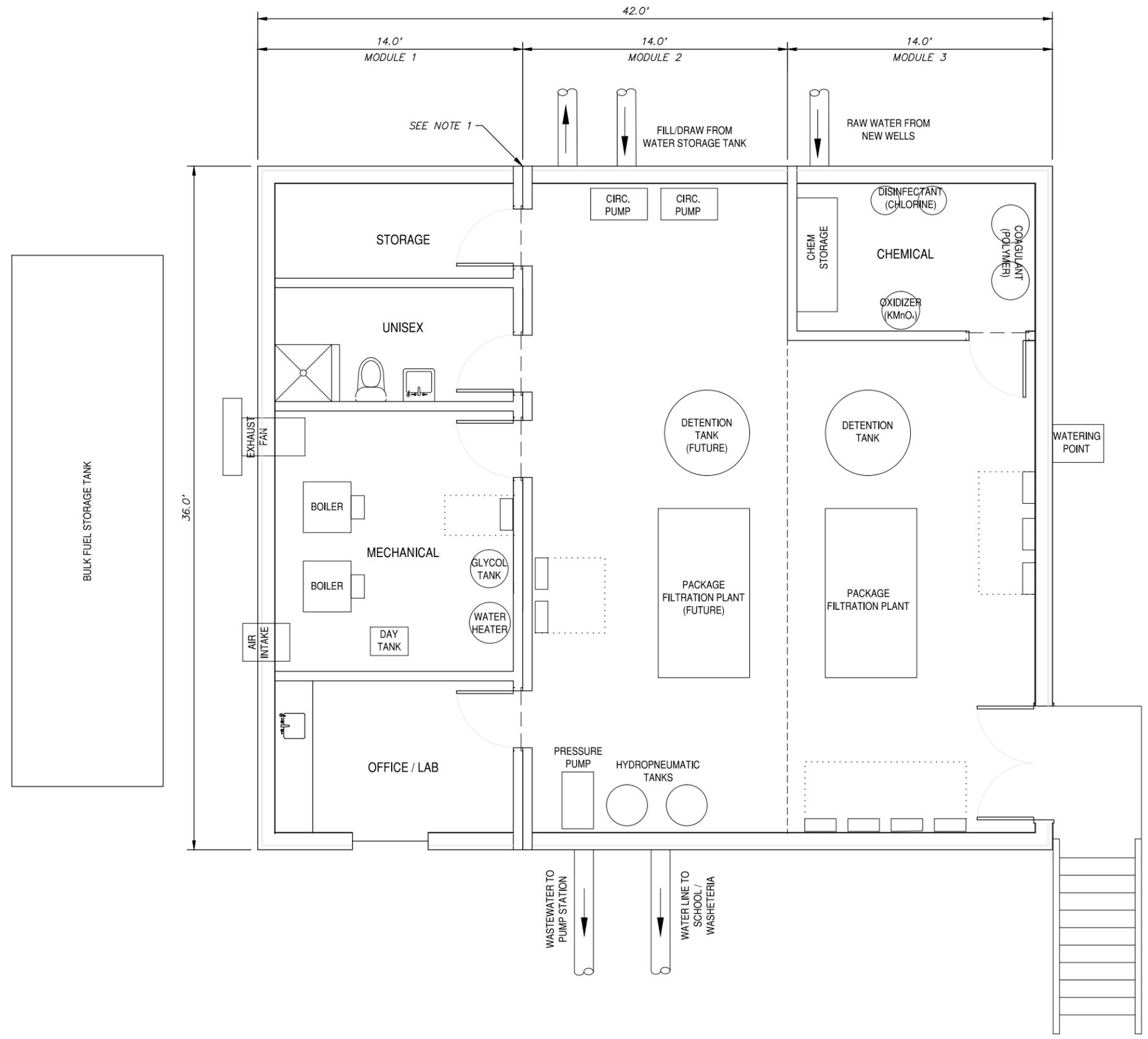
LEGEND	
— RW	RAW WATER TRANSMISSION LINE
— W	EXISTING WATER DISTRIBUTION LINE
— S	EXISTING SEWER LINE
— FM	EXISTING FORCE MAIN
— W	NEW WATER LINE
— FM	NEW FORCE MAIN
— S	NEW GRAVITY MAIN
— HR	NEW HEAT RECOVERY LINE



TULUKSAK WTP/WASHETERIA IMPROVEMENTS
PRELIMINARY ENGINEERING REPORT
ALTERNATIVE 3 – REHAB WASHETERIA
AND NEW WTP – SITE PLAN

DATE
MAR 2018
SCALE
GRAPHIC
FIGURE
10

File: \\crweng.com\Projects\JobsData\30306.60 ANTHC-Tuluksak Washeteria-WTP_PER\00 CADD\02 Figures\01_PER\30306.60_Figure 11-12 - Alternative 3 Floor Plans.dwg



NOTES
 1. THE DOUBLE WALL BETWEEN MODULES 1 AND 2 WOULD NOT BE REQUIRED IF THE FACILITY IS FIELD BUILT IN TULUKSAK.

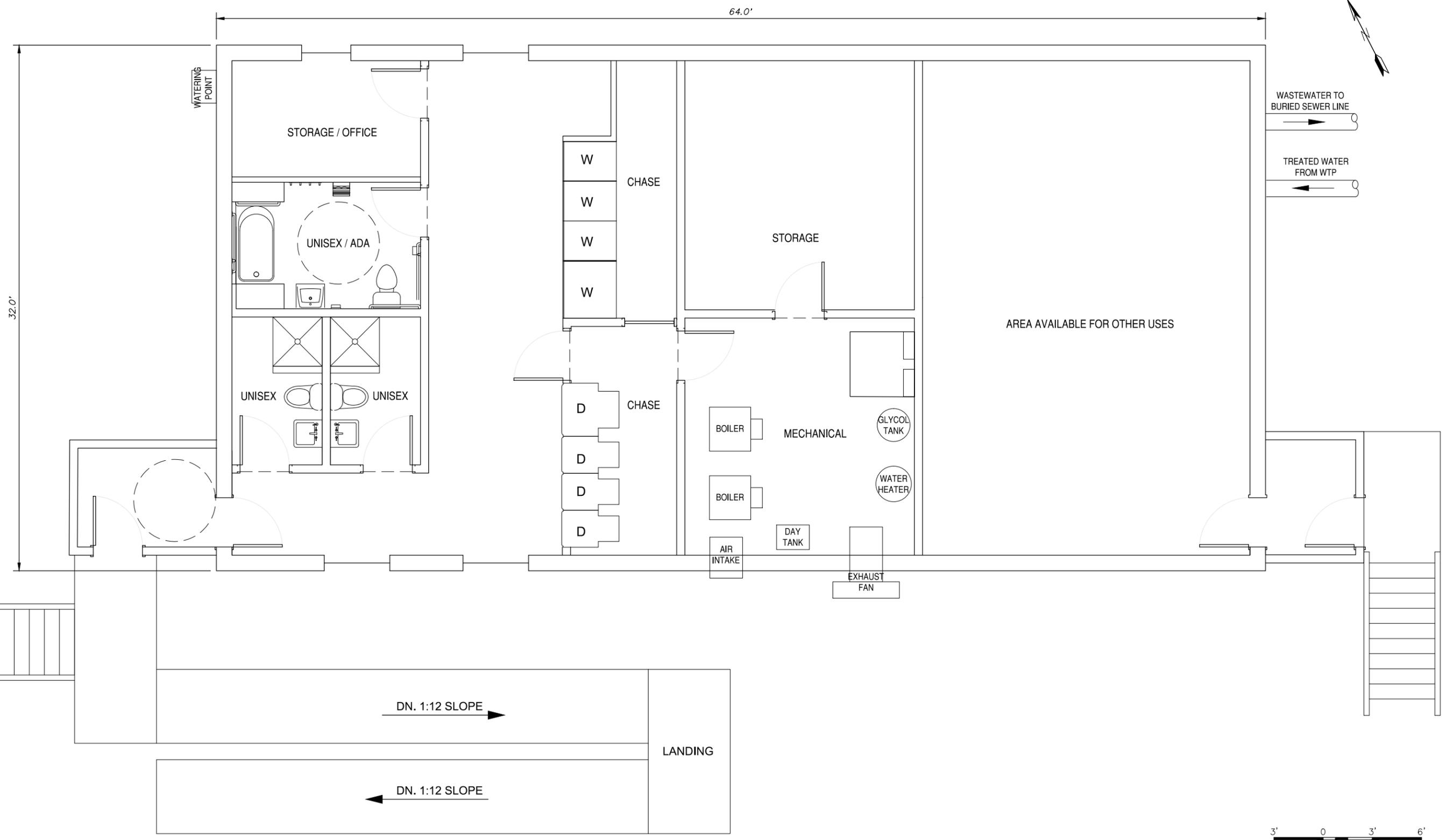
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TULUKSAK WTP/WASHETERIA IMPROVEMENTS
 PRELIMINARY ENGINEERING REPORT
 ALTERNATIVE 3 - NEW WTP AT UTILITY
 CORE SITE - FLOOR PLAN

DATE
 MAR 2018
 SCALE
 GRAPHIC
 FIGURE
 11

File: \\crweng.com\Projects\JobsData\30306.60_ANTHC-Tuluksak Washeteria-WTP_PER\00_CADD\02_Figures\01_PER\30306.60_Figure 11-12 - Alternative 3 Floor Plans.dwg



PROJECT: 30306.60
 STATUS: FINAL



TULUKSAK WTP/WASHETERIA IMPROVEMENTS
 PRELIMINARY ENGINEERING REPORT
 ALTERNATIVE 3 - REHAB WASHETERIA -
 FLOOR PLAN

DATE
 MAR 2018
 SCALE
 GRAPHIC
 FIGURE
 12

Appendix A

Correspondence and Reference Data

Included in this appendix:

- 1) Flood Hazard Report (2 pages)
- 2) USFWS Wetlands Inventory Map (1 page)
- 3) IPaC Natural Resource Report (4 pages)
- 4) USFWS Endangered Species Email (2 pages)
- 5) Archaeological Survey (15 pages)
- 6) 2018 Best Practices Scoring (1 page)
- 7) 2016 Sanitary Survey (55 pages)
- 8) Operator Certificates (2 pages)

STATUS	unincorporated	LAST FLOOD EVENT	
POPULATION	443	FLOOD CAUSE	
BUILDINGS		ELEVATION	
RIVER SYSTEM	Kuskokwim River	FLOOD OF RECORD	
COASTAL AREA	none	FLOOD CAUSE	
		ELEVATION	
NFIP STATUS	not participating	WORST FLOOD EVENT	
FLOODPLAIN REPORT	yes	FLOOD CAUSE	
FLOOD INSURANCE STUDY	no	FLOOD GAUGE	yes

Comments:

1970's flood level	3.9
Recommended building elevation	5.9

The worst floods remembered by residents were those of the 1970's. The flood of record was based on water marks on the pilings under the school. High Water Elevation (HWE) signs were placed at three locations in the community at the elevation of the water marks with the sign's water symbol at the flood elevation. HWE #1 is on the piling under the generator building of the Henry Lott Memorial Elementary School, on the streamward, upstream corner of the building. HWE #2 is on a piling on the upstream, shoreward corner of the old National Guard Armory. HWE #3 is on a utility pole approximately 50 ft downstream from the Tuluksak Library.



HWE #1



HWE #2



HWE #3

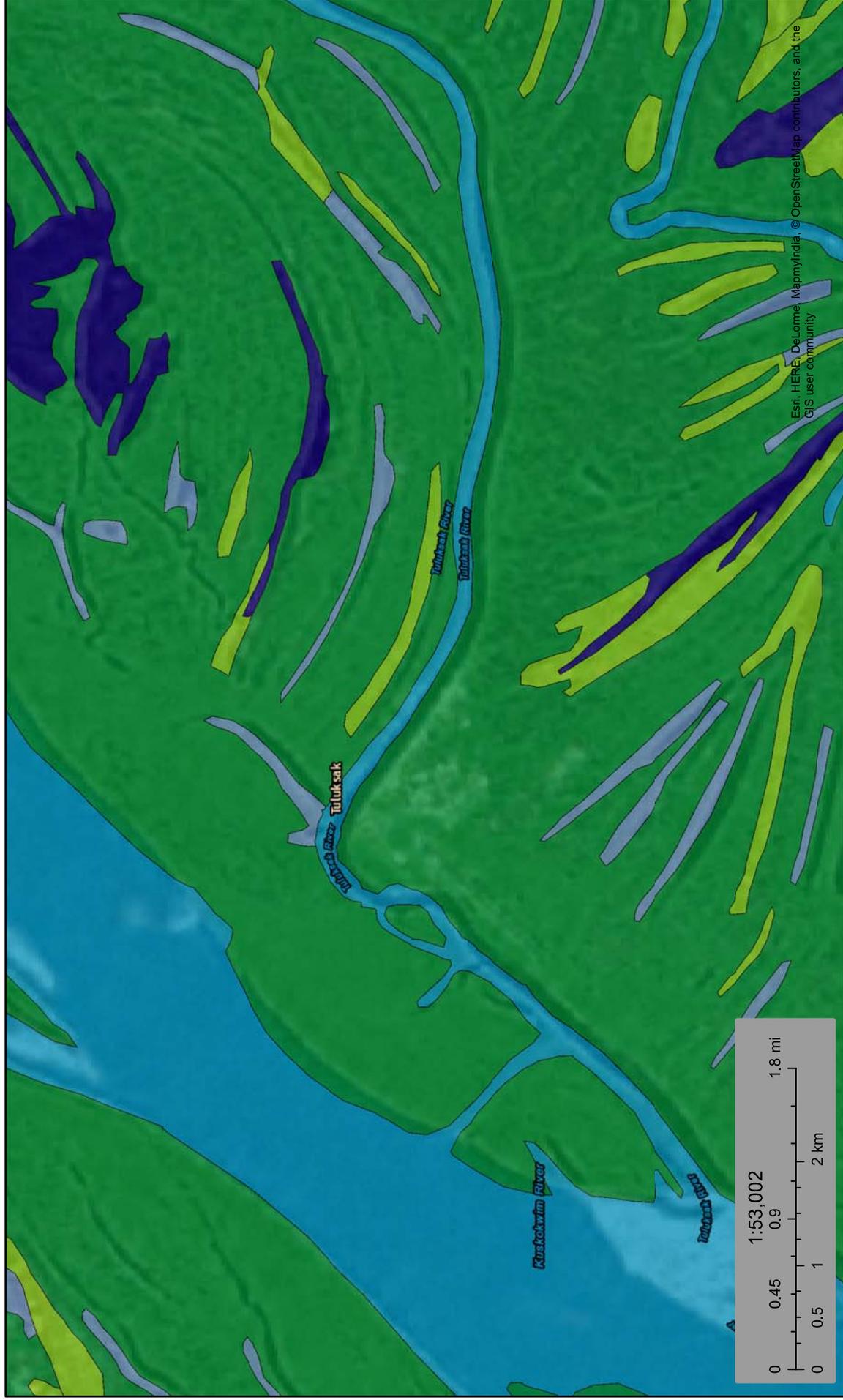
Floodplain Manager | (907) 753-2610



U.S. Fish and Wildlife Service

National Wetlands Inventory

Tuluksak, AK PER



Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community

March 21, 2017

- Estuarine and Marine Deepwater
- Freshwater Forested/Shrub Wetland
- Other
- Estuarine and Marine Wetland
- Freshwater Pond
- Riverine
- Freshwater Emergent Wetland
- Lake

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.



U.S. Fish and Wildlife Service

Natural Resources of Concern

This resource list is to be used for planning purposes only — it is not an official species list.

Endangered Species Act species list information for your project is available online and listed below for the following FWS Field Offices:

Anchorage Fish and Wildlife Field Office
605 WEST 4TH AVENUE, ROOM G-61
ANCHORAGE, AK 99501
(907) 271-2888

Project Name:

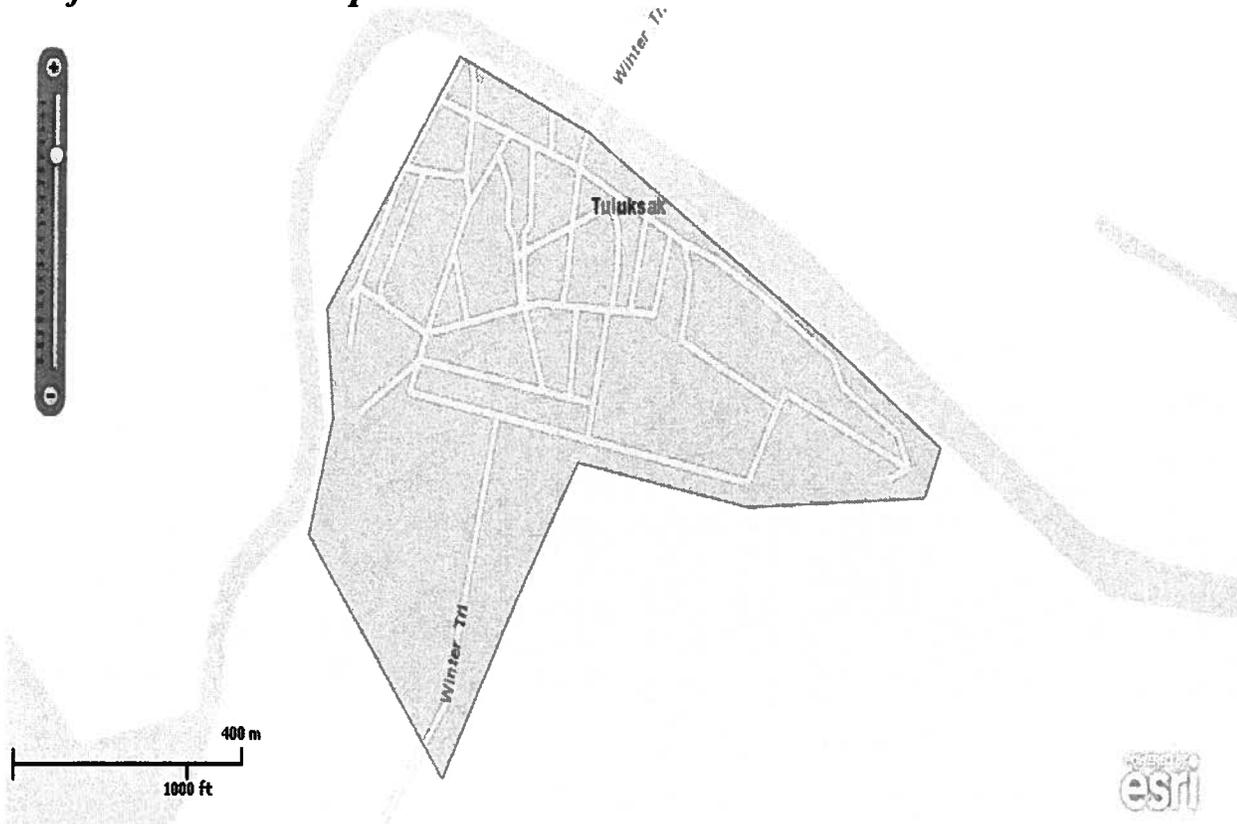
82301.00 Tuluksak WTP&W PER



U.S. Fish and Wildlife Service

Natural Resources of Concern

Project Location Map:



Project Counties:

Bethel, AK

Geographic coordinates (Open Geospatial Consortium Well-Known Text, NAD83):

MULTIPOLYGON (((-160.9662759 61.1042737, -160.9620294 61.1034234, -160.9540472 61.1010385, -160.9505281 61.0998978, -160.9510431 61.0993378, -160.9567937 61.0992341, -160.9623298 61.0997319, -160.9643897 61.0981141, -160.9667072 61.096185, -160.9710845 61.098923, -160.9703099 61.1002296, -160.9705245 61.1014533, -160.9662759 61.1042737)))

Project Type:

Water Supply / Delivery



U.S. Fish and Wildlife Service

Natural Resources of Concern

Endangered Species Act Species List (USFWS Endangered Species Program).

There are no listed species found within the vicinity of your project.

Critical habitats within your project area:

There are no critical habitats within your project area.

FWS National Wildlife Refuges (USFWS National Wildlife Refuges Program).

There are 1 refuges in your refuge list

Yukon Delta National Wildlife Refuge (907) 543-3151 P.O. BOX 346 BETHEL, AK99559	refuge profile
---	--------------------------------

FWS Migratory Birds (USFWS Migratory Bird Program).

Most species of birds, including eagles and other raptors, are protected under the Migratory Bird Treaty Act (16 U.S.C. 703). Bald eagles and golden eagles receive additional protection under the Bald and Golden Eagle Protection Act (16 U.S.C. 668). The Service's Birds of Conservation Concern (2008) report identifies species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become listed under the Endangered Species Act as amended (16 U.S.C 1531 et seq.).

Migratory bird information is not available for your project location.

NWI Wetlands (USFWS National Wetlands Inventory).

The U.S. Fish and Wildlife Service is the principal Federal agency that provides information on the extent and status of wetlands in the U.S., via the National Wetlands Inventory Program (NWI). In addition to impacts to wetlands within your immediate project area, wetlands outside of your project area may need to be considered in any evaluation of project impacts, due to the hydrologic nature of wetlands (for example, project activities may affect local hydrology within, and outside of, your immediate project area). It may be helpful to refer to the USFWS National Wetland Inventory website. The designated FWS office can also assist you. Impacts to



U.S. Fish and Wildlife Service

Natural Resources of Concern

wetlands and other aquatic habitats from your project may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal Statutes. Project Proponents should discuss the relationship of these requirements to their project with the Regulatory Program of the appropriate U.S. Army Corps of Engineers District.

The following wetlands intersect your project area:

Wetland Types	NWI Classification Code	Approximate Acres
Riverine	R2UBH1	5108.038178
Freshwater Forested/Shrub Wetland	PSS1C	8.164574
Freshwater Forested/Shrub Wetland	PSS1C	8171.651746
Freshwater Pond	PAB3H1	14.014931
Freshwater Forested/Shrub Wetland	PSS1C	3749.468122

David Beiswenger

From: Randlett, Susan A (DEC) <susan.randlett@alaska.gov>
Sent: Wednesday, April 23, 2014 12:54 PM
To: David Beiswenger
Subject: FW: FW: Official Species list for project: Tuluksak - Relocated Lagoon

Categories: Filed by Newforma

David,
FYI.
Susan

From: Klein, Kimberly [mailto:kimberly_klein@fws.gov]
Sent: Tuesday, March 25, 2014 1:55 PM
To: Randlett, Susan A (DEC)
Subject: Re: FW: Official Species list for project: Tuluksak - Relocated Lagoon

Hi Susan,
Tuluksak is too far interior to be eider habitat. There are no listed species there. I will look at our database to see why this is reported as eider habitat. Thank you for letting us know. No further consultation with USFWS for this project is needed. Thanks.

Kimberly Klein
Endangered Species Biologist
U.S. Fish and Wildlife Service
(907) 786-3479 until April 5, 2014
(907) 271-2066 thereafter
Kimberly_Klein@fws.gov

On Wed, Mar 19, 2014 at 1:44 PM, Randlett, Susan A (DEC) <susan.randlett@alaska.gov> wrote:

Kimberly,

As I understand the GIS auto-response, Tuluksak is habitat for endangered Eiders.

This project has a very long history. The consultation letter December 23, 2004, #2005-046, seemed to ok work from the perspective of endangered species. There may have been correspondence since then not readily available to me.

The prior lagoon site, and new site, are in a map. Can you advise me how to proceed?

Thank you for your time. This one is not urgent.

Susan

Susan Randlett
Village Safe Water
Alaska Department of Environmental Conservation
555 Cordova Street
Anchorage, AK 99501

-----Original Message-----

From: fwhq_ecos_support@fws.gov [mailto:fwhq_ecos_support@fws.gov]
Sent: Wednesday, March 19, 2014 11:45 AM
To: Randlett, Susan A (DEC)
Subject: Official Species list for project: Tuluksak - Relocated Lagoon

This email contains a US Fish and Wildlife Service official species list for your project (Tuluksak - Relocated Lagoon) from the following office:

Anchorage Fish and Wildlife Field Office
605 WEST 4TH AVENUE, ROOM G-61
ANCHORAGE, AK 99501
(907) 271-2888

If you have any problems opening the document, please contact our help desk at
<http://ecos.fws.gov/ecos/helpdesk.do>

NOTE: The following office(s) also have jurisdictions that overlap your project location. You will receive an automatically generated official species list for them as well.

Fairbanks Fish and Wildlife Field Office
101 12TH AVENUE
ROOM 110
FAIRBANKS, AK 99701
(907) 456-0203

Mark E. Pipkin
Walking Dog Archaeology
P.O. Box 244752
Anchorage, AK 99524-4752
(907) 278-9724 or 227-4413
Fax: (907) 278-9725
e-mail: walkdog@alaska.com

Mr. Chuck Eggener
CE₂, Inc.
P.O. Box 232946
Anchorage, AK 99523-2946
(907) 349-1010 fax: (907)349-1015
e-mail: c.eggener@ce2engineers.com

Re: Tuluksak archaeological survey.

June 19, 2003

Dear Mr. Eggener;

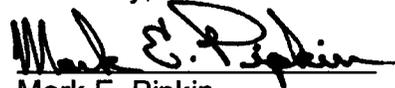
As per your request I have conducted an archaeological survey of the Tuluksak Water and Sewer Project area. This was a pedestrian survey that consisted of a walkover of all the proposed utility easements that will contain the water and sewer mains, and the proposed location of the new wells, sewage lagoon and landfill.

Prior to the survey, I performed a preliminary review of the known literature concerning the village. This revealed that the village's name first appears in the historical record in Tikhmeniev's 1861 work from information that is presumed to have originated from Lt. Zagoskin's 1843 journey up the Kuskokwim River. Its population was reported by Petroff in 1882 (1882:17) and then by Nelson 1899 (1983::102) as being 150 people. The name was attributed to mean 'raven' by Orth although Oswald suggests (1980:84) that it is derived from the Eskimo word for a type of loon or black brant. The original village was on the other side of the Tuluksak River. In 1912 a group of Japanese built a log store on the opposite side of the river. A Bureau of Education school was open nearby in 1930 and the village migrated to this new location. A sawmill was constructed in the village in 1950 to construct houses for the local residents, and a Nation Guard Armory was founded there in 1960. Tuluksak was incorporated as a Second Class City in 1970.

A review of the Alaska Historical Resource Survey (AHRS) revealed that there are no known historic properties immediately within the project's area of potential effect.

This was confirmed by the physical survey of the project area. No historic properties or any other cultural indicators other than those associated with the modern village or recent construction were discovered. I will prepare a detailed report of the survey in the first week of July. If you have any questions please feel free to contact me at the numbers provided above.

Sincerely,



Mark E. Pipkin
Consulting Archaeologist
Walking Dog Archaeology

MEP:mep

References :

Nelson, Edward W.

1983 *The Eskimo About Bering Strait*. Smithsonian Institution Press.
Washington D.C.

Orth, Donald J.

1971 *Dictionary of Alaska Place Names*. Geological Survey Professional
Paper 567. United States Government Printing Office. Washington D.C.

Oswalt, Wendell H.

1980 *Historic Settlements Along the Kuskokwim River, Alaska*. Alaska
State Library Monograph No. 7. Juneau.

Petroff, Ivan

1882 *Population, Industries and Resources of Alaska -10th U.S. Census*
Department of Interior, Census Office. Government Printing Office.
Washington D.C.

**Tuluksak Water and Sewer Project
2003 Archaeological Survey**

**Prepared for
CE², Inc.**

By

Mark E. Pipkin



**PO Box 244752
Anchorage, Alaska
99524-4752**

July 2003

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Project Background	1
Tuluksak	2
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The 2003 Archaeological Survey.....	5
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Figure 2. Tuluksak project area - detail.	5

Project Background

Village Safe Water is undertaking a project to upgrade the water and sewer system in the village of Tuluksak, Alaska. This project will entail the installation of main water and sewer mainline within approximately three miles utility easement. Also slated to be constructed are a water treatment plant and water storage tank that is to be placed on an approximately four-acre lot on the southwest part of the village, a new well site, a sewage lagoon and solid waste site that are to be placed in an approximately twenty-acre parcel southeast of the village, and a road leading to the new landfill and sewage lagoon. Engineering and construction administration is to be done by CE², Inc. This project is a Federal undertaking. This necessitated the review process dictated by section 106 of the 1966 National Historic Preservation Act. As a result, it was determined that the project area should be the subject of an archaeological survey to determine if there were any Historic Properties in the project's area of potential effect. CE², Inc. contracted with Walking Dog Archaeology to preform the archaeological survey. This survey was conducted by Mark Pipkin on May30-31, 2003.

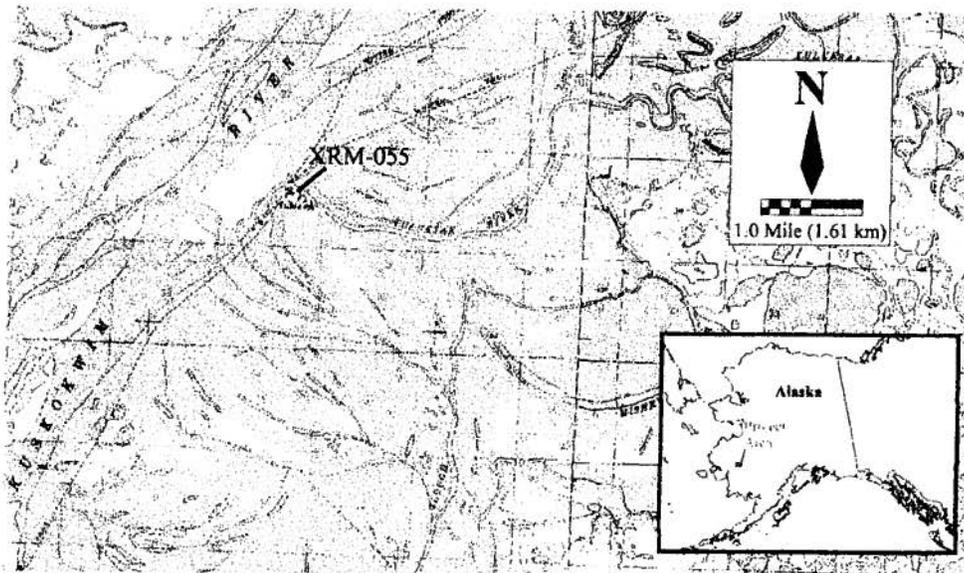


Figure 1. Tuluksak project area (modified from U.S.G.S. Quadrangles Russian Mission A-5 and A-6).

Tuluksak

Tuluksak is situated on the south bank of the Tuluksak River at its confluence with the Kuskokwim River. It is located approximately 35 miles northeast of Bethel and 370 miles west of Anchorage¹. The nearby terrain is of relatively low relief with an elevation of slightly of less than 50 feet above sea level. The terrain is flat, and in some areas swampy. The vegetation is a riverine tundra with stands of birch, spruce, alder and willow. The village is unincorporated with a population of 461, of which the vast majority are Yupik Eskimo (ADCED 2003).

Area Prehistory and History

Archaeological evidence suggests that western Alaska has been occupied for at least the last 10,000 to 11,000 years. Humans were undoubtedly present in the Yukon-Kuskokwim region from a corresponding early date but evidence for an early occupation has yet to be found. People may have occupied parts of the delta but populations were probably small. This, combined with the tendency for the rivers to meander, may have severely restricted any early population's archaeological visibility. The earliest evidence for human occupation in the Yukon-Kuskokwim delta belongs to the Norton tradition. This Eskimoan culture has been found along much of the western and northern coasts of Alaska and date from 2,500 to 1,500 years ago. Some researchers have speculated that earlier cultures were not sufficiently technologically adapted to efficiently utilize the riverine environment of the delta. Norton developed the necessary technology to utilize this environment allowing for both population and territorial expansion. Thus, in this scenario Norton was able to expand into this virtually unpopulated region (see Shaw 1982:68-72; 1983:358-360; 2001: personal communication). They may have displaced or absorbed incipient populations, but as noted above, evidence for an early presence

¹ Specifically it is located at 61° 6' N 160° 57' W - NE 1/4 of Section 27, T12N, R66W, Seward Meridian, U.S.G.S. Quadrangle Russian Mission A-6.

in the delta has not been forthcoming.

Following Norton there appears to be a relatively smooth transition into the later Thule tradition. This was part of a larger pan-Eskimo transition that saw the diffusion of modern Eskimo cultural traits to every corner of the Eskimo world from southern Alaska to Greenland. It was a regional variation of this culture, the Kuskowagamiut, who were present on the lower Kuskokwim at the time of contact with the Euro-Americans in the last quarter of the 18th century.

While actual physical contact with Europeans was limited during this early period, their impact on Eskimo society was not. When Captain Cook first explored of the mouth of the Kuskokwim in 1778, he noted that the inhabitants already possessed some trade goods (Bancroft 186:209-210). Russian traders affiliated with the Lebedov-Lastochkin Company entered the Kuskokwim region in the early 1790's, and they too found an abundance of trade goods that had entered the area via aboriginal trade routes (Zagoskin 1967:9-10; Oswalt 1980a:9). Various Russian traders visited the area during the next two decades but the first systematic exploration of the Kuskokwim did not occur until the 1828-1830 expedition of Ensign Vasilev. The lack of guides, poor weather, and the threat of hostilities resulted in little geographic or ethnographic information being collected (Zagoskin 1967:79-80; Tikhmenev 1978:181; Oswalt 1990:46-47).

In 1832, the Russian-American Company established the trading post, Kolmakovskiy Redoubt, at the confluence of the Kuskokwim and Holitna Rivers. With the expanded Russian presence and trade followed small pox. It entered Alaska from the south in 1836. Part of a larger epidemic affecting much of the northwest coast of North America, it struck Sitka in December and spread throughout much of southeast Alaska that winter. It decimated native populations in south-central Alaska the next spring and by June had reached the Kuskokwim (Arndt 1985:4). It raged in the Yukon-Kuskokwim delta for another year and in some places killed between 40 and 60 percent of the population (Petroff 1882:40; VanStone 1967:99-100; Arndt 1985:8, 10; Fortune 1992:235). The epidemic altered Kuskowagamiut culture and their view of the outside world. Some of the Kuskokwim people thought the Russians had intentionally brought this scourge upon them. In at least one instance a Russian trader was killed in revenge for spreading the disease (Oswalt 1980a:20; Fortune 1992:235). Zagoskin suggested

that the epidemic was responsible for the rapid conversion of many of the survivors to Christianity (Zagoskin 1967:100). Others have suggested the contrary. As noted previously many natives viewed the Russians as the cause for the disease and resisted conversion. Some even believed that the disease resulted from poison placed in the communion cups by Russian Orthodox priests (VanStone 1967:100; Kan 1988:51; see also Dumond 1996). It was not until 1846 that Church penetrated into the delta and not until 1861 that a priest was permanently stationed on the Kuskokwim (Oswalt 1966:110; VanStone 1967:24).

The next three decades saw a limited increase of Russian cultural influence. Although the Kuskowagamiut were heavily involved in the fur trade, this trade still flowed through traditional systems, and although they acquired some new material goods their technology remained predominately traditional (Oswalt 1967:107-109). With the American purchase of Alaska in 1867 commercial interests in the fur trade on the Kuskokwim was transferred from the Russian-American Company to the Hutchinson, Kohl & Company, which was bought the next year by the Alaska Commercial Company. This ever-increasing rate of commercial influence led to greater cultural change for the Kuskowagamiut.

In 1900, another major epidemic of measles, influenza and perhaps whooping cough sweep across western Alaska. It is estimated that perhaps a quarter of all southwestern Alaskan Eskimos died during this epidemic with deaths were reported in nearly every village (Oswalt 1966:115; Wolfe 1982:91, 115, Fienup-Riordan 1988:442). Some parts of the lower Kuskokwim perhaps lost as much as half of their population (Fortuine 1989:224). A Moravian missionary and physician, Joseph Romig, traveled down river trying to help the sick. He described the scene he encountered.

The misery of the people seemed to be complete. They were cold, they were hungry and thirsty and weak, with no one to wait on them. The dead often remained for days in the same tent with the living, and in many cases were never removed. Those that recovered left the tent to fall on the dead as the only covering for the remains of relatives and friends. Children cried for food, and no one was able to give it to them. At one place some passing strangers heard the crying of children, and upon examination found only some children left with both parents dead in the tent. Thus the situation continues from the source to the mouth of the river (Wolfe 1982:110 with reference).

Religion was continuing to make profound changes into the Kuskokwim region. In

the 1880's, under the leadership of Sheldon Jackson, missionary work in Alaska was divided up between various Protestant denominations, with the Moravians being entrusted with the Kuskokwim region and established a mission at the present site of Bethel in 1884 (Oswalt 1966:112, Mitchell 1997:92).

Tuluksak first appears in the historical record in Tikhmeniev's 1861 work from information that is presumed to have originated from Lt. Zagoskin's 1843 journey up the Kuskokwim River. Its population was reported in the 1880 U.S. Census as 150 people (Petroff 1882:17, Nelson 1983:102). The 1890 Census reported that it had 62 people living in four houses (Porter 1893:164). The name was attributed to mean 'raven' by Orth (1971:991), although Oswalt suggests that it is derived from the Eskimo word for a type of loon or black brant (1980:84). The original village was on the other side of the Tuluksak River. In 1912, a group of Japanese built a log store on the opposite side of the river. A Bureau of Education school was open nearby in 1930 and the village migrated to this new location. A sawmill was constructed in the village in 1950 to construct houses for the local residents and a Nation Guard Armory was founded there in 1960. Tuluksak was incorporated as a Second Class City in 1970. This city government was disbanded in 1997.

The 2003 Archaeological Survey

The archaeological survey of the Tuluksak Water and Sewer Project area consisted of the physical inspection of the approximately three miles of utility easements where the mainline water and sewer lines are to be placed, the four-acre lot where the water treatment plant and water storage tank is to be located, the new well site, the 20-acre site where the sewage lagoon and solid waste site is to be placed and the road leading to these sites. The areas around the village buildings that may be disturbed by the installation of individual water and sewer service lines were also inspected. Many of the areas surveyed were within the village and along existing roads, and thus had excellent ground visibility. Some areas, such as the utility easement on the southeast portion of the village and the lot where the water treatment plant is to be located were heavily vegetated with stands of spruce and birch,

thus restricting ground visibility.

Prior to the actual archaeological survey consultations were undertaken with the staffs the State Historic Preservation Office (SHPO). This revealed that the only known historic property in the project area was the village itself (XRM-055). This also revealed that the only archaeological work that had been done previously in the vicinity of the project area was a survey of nearby Native allotments by the Bureau of Indian Affairs that found no historic properties (see Jesperson 1984).

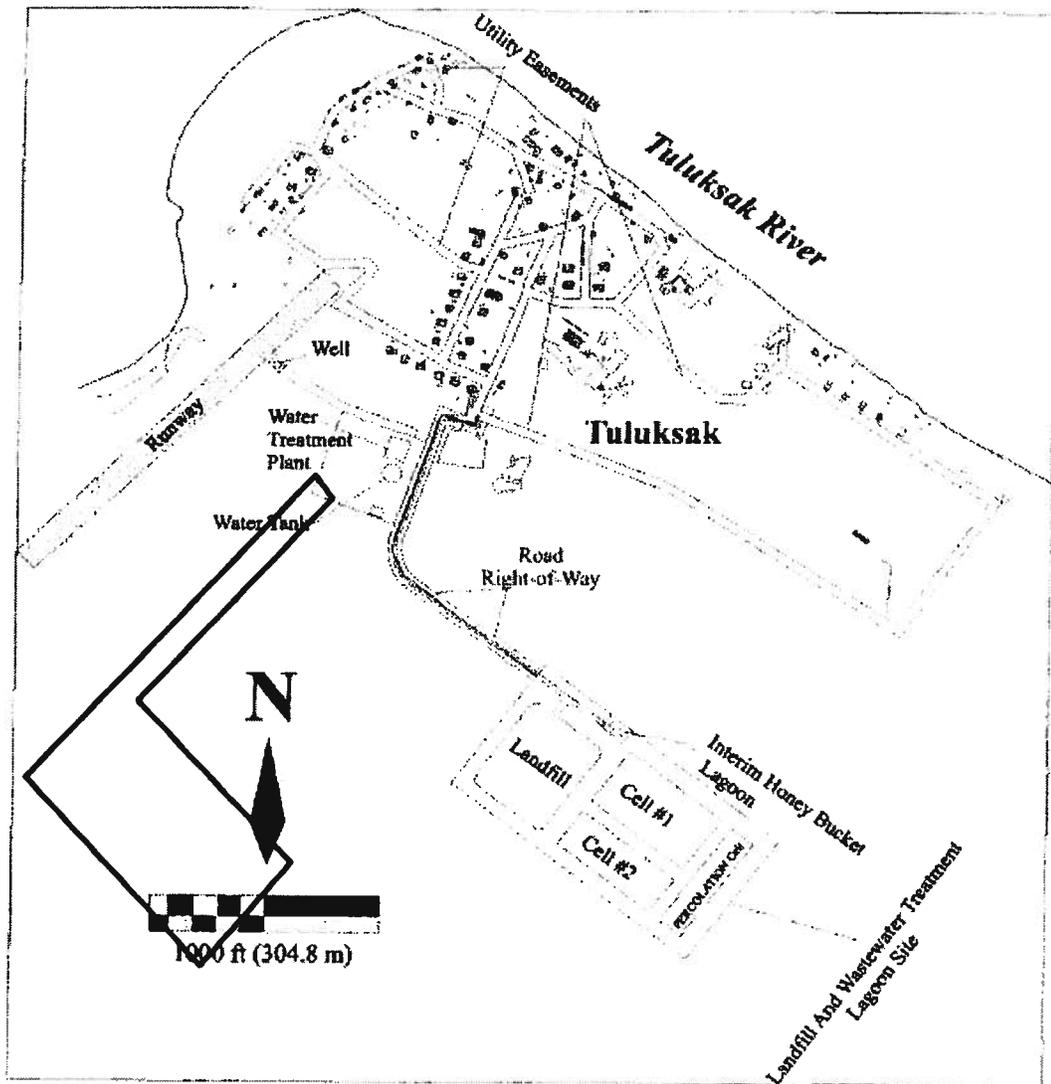


Figure 2. Tuluksak project area - detail.

The actual archaeological survey was conducted by Mark Pipkin on May30-31, 2003. This consisted of a pedestrian walkover of the project areas in an effort to identify any visible surface features, artifacts, or other cultural indicators. Subsurface testing was judgmental, and none was conducted due to the low archaeological potential encountered in the project area .

During No historic properties that would have been potentially eligible for inclusion on the National Register of Historic Places or any other cultural indicators other than those associated with the modern occupation of the village were observed anywhere in the project's area of potential effect. Therefore, it is recommended that a finding of No Historic Properties be given for this project.

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2018 Best Practices Score

Tuluksak

March 1, 2018

Category		O&M Scoring Criteria	Possible	Score		
Technical	Operator Certification	Utility has more than one operator certified to the level of the water system	10	3		
		Primary operator is certified to the level of the water system and the backup operator holds some level of certification in water treatment or distribution	7			
		Primary operator is certified to the level of the water system and the backup operator holds no certification or there is no backup operator	5			
		Utility has one or more operators certified at some level in water treatment or distribution	3			
		Utility has no certified operators	0			
	System Classification: Water Treatment 1 Primary Operator: <i>Kristy Napoka</i> Certification Level: <i>Small Treated</i> Backup Operator: <i>Jerah Peter</i> Certification Level: <i>Small Treated</i>					
	Preventive Maintenance Plan	Utility has a written PM plan; PM is performed on schedule; records of completion are submitted on a quarterly basis and have been verified	25	15		
		Utility has a written PM plan; performance of PM and record keeping are not consistent	15			
		Utility has no PM plan or performs no PM	0			
	Compliance	Utility had no Monitoring and Reporting violations during the past year	10	0		
Utility had up to five Monitoring and Reporting violation during the past year		5				
Utility had more than five Monitoring and Reporting violation during the last year		0				
<i>8 Monitoring and Reporting Violations in 2017</i>						
Managerial	Utility Management Training	A person who holds a position of responsibility for management of the utility has completed a DCRA approved Utility Management course or other utility management training course within the last five years	5	0		
	Attendee: <i>N/A</i> Course: <i>N/A</i> Date: <i>N/A</i>					
	Meetings of the Governing Body	The utility owner's governing body meets routinely consistent with the local ordinance/bylaw requirements and receives a current report from the operator	5	2		
The utility owner's governing body meets routinely consistent with the local ordinance/bylaw requirements		2				
The utility owner's governing body does not meet		0				
Financial	Budget	Utility owner and the Utility have each adopted a realistic budget and budget amendments are adopted as needed; Accurate monthly budget reports are prepared and submitted to the governing body	15	10		
		Either the Utility or the Utility owner has adopted and implemented a budget, the other has not	13			
		Either the Utility or the Utility owner has adopted a budget, but it is not being implemented	10			
		Utility owner and the Utility have not adopted a budget	0			
	Revenue	Utility is collecting revenue sufficient to cover the Utility's operating expenses and to contribute to a repair and replacement account	20	0		
		Utility is collecting revenue sufficient to cover expenses	15			
		Utility has a fee schedule and a collection policy that is followed	5			
		Utility has no fee structure or collection policy	0			
	Worker's Compensation Insurance	Utility has had a worker's compensation policy for all employees for the past two years and has a current policy in place	5	5		
		Utility has a current worker's compensation policy in place for all employees	2			
Utility has no worker's compensation policy		0				
Payroll Liability Compliance	Utility has no past due tax liabilities and is current with all tax obligations	5	0			
	Utility owes back taxes, but has a signed payment agreement, is current on that agreement, and is up-to-date with all other tax obligations	2				
	Utility is not current with its tax obligations and/or does not have a signed repayment agreement for back taxes owed	0				
CIP O&M Score		0	SDS O&M Score	6	TOTAL SCORE	35



YUKON-KUSKOKWIM HEALTH CORPORATION

“Working Together to Achieve Excellent Health”

January 9, 2017

Justin Fenzl
Environmental Program Specialist
ADEC – Drinking Water Program

Re: 2016 Sanitary Survey for Tuluksak Water System, PSWID #2270223

Dear Mr. Fenzl,

I have completed the Sanitary Survey of the Tuluksak Water System, PSWID #2270223. The onsite inspection of the water system was conducted on 11/9/2016. Attached is the completed Sanitary Survey and preliminary deficiency report for your review. The following documents are attached:

1. 1 page – Signed copy of the ESS generated certification letter
2. 4 pages – Sanitary Survey Deficiency Report
3. 24 pages – Sanitary Survey Responses
4. 3 pages – Location Data Forms and Well logs
5. 4 page – RTCR
6. 1 page – Treatment Schematic
7. 17 pages – Photo Log

I have copied the owner/operator of the system with this preliminary report. I thank them for allowing me to conduct their survey, and I appreciate their efforts in accompanying me during the Sanitary Survey.

Please copy me with the final Sanitary Survey Letter issued to Tuluksak with the final determination and level of deficiencies and corrective actions necessary. If you have any questions about the survey or my findings, please contact me at (907) 543-6422.

Thank you,

Michael Vicente

Michael Vicente
Field Environmental Health Officer
YKHC, Office of Environmental Health and Engineering
P.O. Box 528
Bethel, AK 99559
(907) 543-6422
Michael_Vicente@ykhc.org

Public Water System Sanitary Survey Certification

Please find attached the completed Sanitary Survey for

TULUKSAK WATER SYSTEM - 2016

PWSID#: AK2270223

The Survey ID number : 5595

I hereby certify this survey was completed by me personally on 13/9/2017

and is accurate and complete.

I have provided the public water system a copy of this survey in accordance with 18 AAC 80.430(g). I have notified DEC and the public water system owner of any found findings of preliminary deficiencies within the required timeframe in accordance with 18 AAC 80.430(h)(i) on this date 33~~1~~; 14239.

Printed Name

Michael Vicente

Signature

Michael Vicente

Date

11/9/2017

Sanitary Survey - Deficiency Report

PWS Number: AK2270223

Survey Date: 1/9/2017

Survey Name: TULUKSAK WATER SYSTEM - 2016

User Name: Michel Vicente

Sanitary Survey Category:

SDWIS Severity Code: Recommendation

General / Background Info / Classification

Does the PWS have Final Approval to Operate? (If yes, list approvals granted by DEC in notes.)

Answer Recorded No

Comments:

Notes: Since Kristy started working at the plant she has been working with DEC to get the plant compliant to state regulations. Required sampling has been completed and the final paper work is in progress.

Days to Correct Deficiency: 0

SDWIS Deficiency Description: FATO

SDWIS Severity Code: Significant Deficiency

General / Background Info / Operator/Contact Info and Certification

Is at least one operator adequately certified for the system classification level? (Specify system level in notes for Water Treatment and/or Water Distribution as required by the Operator Certification Program.)

Answer Recorded No

Comments:

Notes: The system is classified as a level 1 system.

Days to Correct Deficiency: 30

SDWIS Deficiency Description: CERT

Sanitary Survey Category: DS

SDWIS Severity Code: Deficiency**DS DISTRIBUTION SYSTEM - (Active) / Cross Connections**

If backflow preventers are installed, are they tested? (Describe testing schedule or frequency. Include the date they were last tested and the name of the tester.)

Answer Recorded No**Comments:**

Notes:

Days to Correct Deficiency: 120

SDWIS Deficiency Description: NCRM

SDWIS Severity Code: Significant Deficiency**DS DISTRIBUTION SYSTEM - (Active) / Cross Connections**

Are there any other cross-connections in the system with inadequate protection? (i.e. air gaps or backflow prevention not installed at all appropriate locations, such as boiler make-up water, hose bibbs, etc. Describe in detail and provide well labeled photo(s).)

Answer Recorded Yes**Comments:**

Notes: No backflow prevention device on the service to the school.

Days to Correct Deficiency: 30

SDWIS Deficiency Description: CCDD

Sanitary Survey Category: MR

SDWIS Severity Code: Deficiency**Regulations/Monitoring/Data Verification / General**

Does the system have a DEC-approved sample siting plan for total coliform (RTCR)?

Answer Recorded No**Comments:**

Notes: A RTCR was submitted to the DEC on 3/31/16 and the system is waiting for approval. A copy of the submitted RTCR is attached.

Days to Correct Deficiency: 120

SDWIS Deficiency Description: SPLN

Sanitary Survey Category: SO

SDWIS Severity Code: Significant Deficiency**Sources / Groundwater / WL WELL - (Active) / General**

Is well site properly drained (i.e. sloping away from the casing for 10 feet in all directions)?

Answer Recorded No**Comments:**

Notes:

Days to Correct Deficiency: 30

SDWIS Deficiency Description: DRNG

Sanitary Survey Category: TR

SDWIS Severity Code: Deficiency**TP TREATMENT PLANT - (Active) / General / Cross Connections**

If backflow preventers are installed, are they tested? (Describe testing schedule or frequency. Include the date they were last tested and the name of the tester.)

Answer Recorded No**Comments:**

Notes:

Days to Correct Deficiency: 120

SDWIS Deficiency Description: NCRM

SDWIS Severity Code: Significant Deficiency**TP TREATMENT PLANT - (Active) / Chlorination / Hypochlorination**

Is there a back-up disinfection unit? (Describe in notes if it is on-line and operational. Filtration avoidance systems cannot have an NA answer; all other types of systems that do not have back-up disinfection should be NA.)

Answer Recorded No**Comments:**

Notes:

Days to Correct Deficiency: 5

SDWIS Deficiency Description: SWTD

Sanitary Survey - Survey Responses

PWS Number: AK2270223

Survey ID: 5595

Survey Date: 1/9/2017

Survey Name: TULUKSAK WATER SYSTEM - 2016

User Name: Michel Vicente

Question Number

General / SDWIS Site Visit Info

- | | | |
|---|--|--|
| 1 | Reason for the visit: | <input checked="" type="checkbox"/> SNSV - Sanitary Survey |
| 2 | Date of the survey: | <u>11/09/2016</u> |
| 3 | Status of the survey: | <input checked="" type="checkbox"/> C - Completed |
| 4 | Last name of inspector: | <u>Vicente</u> |
| 5 | First name of inspector: | <u>Michael</u> |
| 6 | Inspector organization: | <u>Yukon Kuskokwim Health Corporation</u> |
| 7 | Name of system representative participating in survey: | <u>Kristy Napoka & Jerah Peter</u> |
| 8 | Other parties participating: | <u>NA</u> |

General / SS Organization

Pre-Inspection:

- | | | |
|---|---------------------------------------|--|
| 1 | Checklist of pre-inspection tasks: | |
| 2 | Phone contact with responsible party? | <input checked="" type="checkbox"/> Yes
<input type="checkbox"/> No |

Question Number

-
- 3 Reviewed correspondence relative to the system to be inspected, including current Boil Water Notices and Public Notifications? Yes
 No
- 4 Reviewed previous sanitary survey report, including all deficiencies? Yes
 No
- 5 Reviewed previous Level 1 and Level 2 Assessments (if applicable)? Yes
 No
 NA
- 6 Obtained a copy of the RTCR sample siting plan from DEC to be used during the site visit for the RTCR special monitoring evaluation? Yes
 No
- 7 Reviewed compliance monitoring results and compliance records? Yes
 No
- 8 Reviewed plans/documents on file? (Note CT (concentration X contact time) and operational requirements for disinfection specified in engineering approval letters, number of storage tanks, etc.) Yes
 No
- 9 Verified both the certification level required for the water system and the certification level of the operator(s) online at the DEC Operator Certification Program? Yes
 No
- <https://myalaska.state.ak.us/dec/water/opcert/Home.aspx?p=SystemSearch>
- 10 Reviewed Source Water Assessment and delineated protection area, if available? Yes
 No
 Not Available
- 11 Reviewed the Vulnerability Assessment (VA)/Emergency Response Plan (ERP) or Priority Measures Plan (PMP) Certification form? Yes
 No
- 12 Reviewed the DW Program letter and checklist regarding a protected source determination (if applicable)? Yes
 No
 NA
- 13 Obtained data dump to review and provide to the water system for reference? Yes
 No
- 14 Obtained full sanitary survey question set to record items on site that are not covered by this sanitary survey question set? Yes
 No

General / SS Organization

Post-Inspection:

- 1 Date official notification provided to DEC regarding potential deficiencies: 11/09/2017
- 2 Date inspector notified water system regarding potential deficiencies: 11/09/2017
- 3 If applicable, date inspector notified water system of any variance between the written evaluation and the verbal de-briefing or any draft version of the report: _____
- 4 **Checklist of items needed for a complete survey:**
- 5 Cover letter: Yes
 No
- 6 Deficiency Report: Yes
 No
- 7 Completed survey questions: Yes
 No
- 8 Photo log: Yes
 No
- 9 System site plan map (include source location and vicinity map): Yes
 No
- 10 System schematic(s) (i.e. treatment, distribution, etc.): Yes
 No
 NA
- 11 Lat/Long form for all sources (other facilities as applicable): Yes
 No
- 12 Well log (if available): Yes
 No
 NA
- 13 Please comment on any issues that are not addressed through the questions (i.e. additional deficiencies or findings). NA

General / Background Info

Name / Location:

- 1 Name of public water system: TULUKSAK WATER SYSTEM
- 2 PWSID: AK2270223
- 3 Physical address: Unknown
- 4 Total system design water production/treatment capacity in gallons per day (gpd): 10000
- 5 Average daily production (gpd): 4500

General / Background Info

Classification:

- 1 SDWIS activity status: Active
- 2 Primary water source: GW - Groundwater SW - Surface Water
 GWP - Groundwater Purchase
 SWP - Surface Water Purchase
 GWUDISW- Ground water und
- 3 Transient population: 0
- 4 Residential population: 373
- 5 Non-transient population (i.e. workers, students, etc.): 10
- 6 Number of service connections: 2
- 7 How many services are metered? 2

Notes: The school and washeteria are metered.

Question Number

- 8 Is water obtained from another PWS? (If yes, list in notes the name of the water system or business and the PWSID, if applicable.) Yes No
- 9 Does the system sell/provide water to another water system or business? (If yes, list in notes the name of the water system or business and PWSID, if applicable.) Yes No
 Notes:
- 10 Does the PWS have Final Approval to Operate? (If yes, list approvals granted by DEC in notes.) Yes No Unknown
 Notes:
- 11 Have there been modifications to the system since the last survey? (Include all changes to the water system from the source through the distribution and additional water haul vehicles.) Yes No
- 12 Date(s) and description of modification(s): Two transfer pumps and a double walled heat exchanger have been installed.
 Notes:
- 13 Have these modifications been approved by DEC? (List approvals obtained.) Yes No NA Unknown
- 14 Is the system only open on a seasonal basis? (If yes, list the dates of operation in notes.) Yes No
- 15 If seasonal system, does the entire distribution system stay pressurized throughout the year? (If no, explain in notes) Yes No NA
- 16 If seasonal system, list off-season point of contact information, including: name(s), address(es), and phone number(s). NA

General / Background Info

Owner:

- 1 Owner type: F - Federal P - Private L - Local S - State Government M - Mixed N - Native American
- 2 Legal owner first name/entity name: Tuluksak Native Community
- 3 Legal owner last name (NA if entity): NA

Question Number

- 4 Owner's mailing street address: P.O. BOX 95

- 5 Owner's mailing address city: TULUKSAK

- 6 Owner's mailing address state: AK

- 7 Owner's mailing address zip code: 99679-0095

- 8 Owner's telephone number (daytime): 907-695-6420

- 9 Owner's telephone number (emergency): Kristy Napoka 907-695-2047

- 10 Owner's fax number: 907-695-6932

- 11 Owner's email address: kristy_m_napoka@yahoo.com

General / Background Info

Operator/Contact Info and Certification:

- 1 Does this PWS require a certified operator? Yes
 No
- 2 Primary operator's first name: Kristy

- 3 Primary operator's last name: Napoka

- 4 Primary operator's street address: P.O. BOX 95

- 5 Primary operator's address city: Tuluksak

Question Number

- 6 Primary operator's address state: AK
- 7 Primary operator's address zip code: 99679
- 8 Primary operator's telephone: 907-695-2047
- 9 Primary operator's email address: kristy_m_napoka@yahoo.com
- 10 Primary operator's certification level(s): (Specify all that apply and list WT, WD, etc. and expiration date(s) in notes.)
Notes: Expires 12/31/2018
- | | |
|---|---|
| <input type="checkbox"/> Small - Untreated | <input type="checkbox"/> Level 2 |
| <input checked="" type="checkbox"/> Small - Treated | <input type="checkbox"/> Level 3 |
| <input type="checkbox"/> Provisional | <input type="checkbox"/> Level 4 |
| <input type="checkbox"/> Level 1 | <input type="checkbox"/> No Certification |
- 11 List all secondary operators and their certification level(s): (Include WT, WD, etc. and expiration date(s) in notes.)
Notes: They have no certifications.
- 12 Is at least one operator adequately certified for the system classification level? (Specify system level in notes for Water Treatment and/or Water Distribution as required by the Operator Certification Program.)
Notes: The system is classified as a level 1 system.
- | |
|--|
| <input type="checkbox"/> Yes |
| <input checked="" type="checkbox"/> No |
- 13 Does the system have an alternate method of system supervision? (i.e. maintenance contract, remote supervision, etc. If yes, describe in notes.)
- | |
|--|
| <input type="checkbox"/> Yes |
| <input checked="" type="checkbox"/> No |
- 14 If yes, does the system have a DEC approved Alternate Method of System Supervision (AMOSS) plan? (If yes, describe in notes.)
- | |
|--|
| <input type="checkbox"/> Yes |
| <input checked="" type="checkbox"/> No |
| <input type="checkbox"/> NA |
- 15 Emergency contacts: Day - name(s) and telephone number(s): Kristy Napoka 907-695-2047
- 16 Emergency contacts: Night - name(s) and telephone number(s): (907)-695-2047

General / Background Info

Previous Survey Info:

- 1 Date of last sanitary survey: 10/23/2013
- 2 Last survey conducted by: (Name and Organization)
Notes: Yukon Kuskokwim Health Corporation
- Brian Berube

Question Number

- 3 Have all deficiencies noted during the previous survey been corrected? Yes
 No
 NA

- 4 Have all defects from Level 1 and Level 2 Assessments conducted since the last sanitary survey, been corrected? Yes
 No
 NA

- 5 If the answer to either of the previous two questions is "no" list the remaining uncorrected deficiencies and defects:
(During the site visit, the survey inspector must document the status of unresolved deficiencies/defects; use photo documentation where applicable.) NA

General / Background Info

Current Survey Info:

- 1 Is standby or auxiliary power available? Yes
 No
 NA
Notes:

- 2 If standby or auxiliary power is available is it in operable condition and well maintained (i.e. tested and noted in a log book)? Yes
 No
 NA

- 3 What parts of the system does the auxiliary power supply? The generator can power the entire system.

- 4 Does the system have a master meter? (Describe the master meter or system of meters used to comply with the master meter requirement: meters measuring treated, wasted, and distributed water. Provide photos with locational labels of these meter(s).) Yes
 No
 NA
Notes:
 Unknown

- 5 Is the master meter operable? (Explain, i.e. flow through meter, etc.) Yes
 No
 NA
Notes:

- 6 If the system is under a current Boil Water Notice or other Public Notification requirement, is the notice posted on-site as required? Yes
 No
 NA

Management / General

- 1 Does the management keep separate financial records reflecting the costs of operating and maintaining this system? Yes
 No

- 2 Are the finances and budget satisfactory to cover costs of operating the water system in a safe manner (i.e. water samples, energy costs, operations, maintenance, staff training, etc.)? Yes
 No
Notes:

Question Number

- 3 Are routine operations and maintenance records being kept? Yes
 No
Notes:
- 4 Are routine maintenance schedules established and adhered to for all components of the water system? Yes
 No
- 5 Is there a fee schedule? (If yes, describe in notes.) Yes
 No
Notes:
- 6 Is there sufficient personnel? Yes
 No
- 7 Are supplies and maintenance parts inventories adequate? Yes
 No
- 8 Are complaints logged in and responded to? (If any major complaints have been received since the last sanitary survey, describe in notes.) Yes
 No

Emergency Preparedness/Security / General

- 1 Are the appropriate emergency preparedness plans available for review by the sanitary survey inspector? Yes
 No
Vulnerability Assessment (VA) and Emergency Response Plan (ERP) for systems serving a population of 1,000 or more.
Priority Measures Plan (PMP) for systems serving a population of less than 1,000.
- 2 Is the plan accessible to all authorized personnel? Yes
 No
 NA
- 3 Is training on the emergency response or priority measures plan provided? (If yes, list the date of the most recent training in notes.) Yes
 No
 NA
Notes:
- 4 Does the plan include a call list or chain of command? Yes
 No
 NA
- 5 Does the system have an alternate source of water in the event that the system's primary source of water is contaminated or shut down? (If yes, list the source(s) in the notes field.) Yes
 No
 NA
Notes:
- 6 Is the system secured as appropriate (i.e. locks, lighting, fences, etc.)? Yes
 No

Regulations/Monitoring/Data Verification / General

- 1 Are all components and chemicals used in contact with the water certified to ANSI/NSF standards for drinking water; include treatment chemicals, filters/housings, etc.? (List any that are not ANSI/NSF certified, in notes.) Yes
 No
 Unknown
- 2 Does the system have a DEC-approved sample siting plan for total coliform (RTCR)? Yes
 No
Potential Deficiency
 Notes: A RTCR was submitted to the DEC on 3/31/16 and the system is waiting for approval. A copy of the submitted RTCR is attached.
- 3 Is a total coliform sample siting plan available for review? (If no, use the sample siting plan obtained from the DW Program to answer the following questions.) Yes
 No
- 4 Does the sample siting plan accurately represent the entire distribution system's current configuration? (Include addition or removal of distribution lines, pressure zones, system loops, or sample locations, etc. If no, explain in notes.) Yes
 No
- 5 For a seasonal system on quarterly monitoring, do the time periods listed on the sample siting plan match the actual periods of highest demand? Explain in notes. Yes
 No
 NA
- 6 Does the system have a supply of extra total coliform sample bottles available? (Minimum of 4 bottles for systems with a groundwater source and 3 for systems with surface water or GWUDISW sources.) Yes
 No
- 7 If applicable, does the system have a sample siting plan for Lead and Copper, DBP, LT2, etc., available for review? Yes
 No
 NA
 Notes: They have a lead and copper site plan.
- 8 **Does the water system maintain the following records? (Please review these records.)**
- 9 Bacteriological/Microbiological Analysis - 5 years retention. Yes
 No
- 10 Chemical Analysis - 10 years retention. Lead and Copper (all analyses, reports, surveys, letters, evaluations, schedules, determinations, etc.) - 12 years retention. Yes
 No
- 11 Turbidity Data (monthly operator reports) - 5 years retention. Turbidity values exceeding 5 NTU - 10 years retention. Conventional or direct systems: continuous, individual (3 or more filters) or combined filter effluent readings - 3 years retention. Yes
 No
 NA
- 12 Disinfection Residual Data (monthly operator reports) - 5 years retention. Groundwater systems, if applicable, DEC-specified minimum disinfection residual - 10 years retention. Yes
 No
 NA
- 13 Records of actions taken to correct violations - 3 years retention. Yes
 No
 NA

Question Number

- | | | |
|----|--|---|
| 14 | Groundwater systems: documentation of corrective actions following a source water fecal positive sample result - 10 years retention. | <input checked="" type="checkbox"/> Yes
<input type="checkbox"/> No
<input type="checkbox"/> NA |
| 15 | Reports, summaries, communications, and corrective action documentation related to sanitary surveys - 10 years retention. | <input checked="" type="checkbox"/> Yes
<input type="checkbox"/> No |
| 16 | Reports, summaries, or communications related to Public Notifications, including CCRs as applicable - 3 years retention. | <input checked="" type="checkbox"/> Yes
<input type="checkbox"/> No
<input type="checkbox"/> NA |
| 17 | Variances and/or exemptions - 5 years retention after the expiration date. | <input checked="" type="checkbox"/> Yes
<input type="checkbox"/> No
<input type="checkbox"/> NA |
| 18 | Monitoring Plans (as applicable): Microbiological and Turbidity - 5 years retention. Chemical, IDSE, System Specific Study Plan, Stage 2 DBP, etc. - 10 years retention. | <input checked="" type="checkbox"/> Yes
<input type="checkbox"/> No
<input type="checkbox"/> NA |
| 19 | Disinfection Profile and Benchmark - 10 years retention. | <input checked="" type="checkbox"/> Yes
<input type="checkbox"/> No
<input type="checkbox"/> NA |
| 20 | Records of both DEC-specified requirements for membranes and failures in membrane integrity/operations - 5 years retention. | <input checked="" type="checkbox"/> Yes
<input type="checkbox"/> No
<input type="checkbox"/> NA |
| 21 | Emergency Response Plan or Priority Measure Plan - 2 years retention or until replaced by update. Certification of Compliance with Emergency Preparedness Requirements (initial and updates) - 2 years retention or until replaced by updated certification. | <input checked="" type="checkbox"/> Yes
<input type="checkbox"/> No
<input type="checkbox"/> NA |

Sources / General

General:

- | | | |
|---|---|---|
| 1 | Are there any abandoned wells in the delineated protection area? (If yes, note the location(s) on the system site plan map.) | <input type="checkbox"/> Yes
<input checked="" type="checkbox"/> No
<input type="checkbox"/> Unknown |
| 2 | If yes, are they properly decommissioned? | <input type="checkbox"/> Yes
<input type="checkbox"/> No
<input checked="" type="checkbox"/> NA
<input type="checkbox"/> Unknown |
| 3 | Are there any unused wells in the delineated protection area? (If yes, note the location(s) on the system site plan map.) | <input type="checkbox"/> Yes
<input checked="" type="checkbox"/> No
<input type="checkbox"/> Unknown |
| 4 | If yes, are they maintained in a safe and sanitary condition? | <input type="checkbox"/> Yes
<input type="checkbox"/> No
<input checked="" type="checkbox"/> NA
<input type="checkbox"/> Unknown |
| 5 | Does the system have a Source Water Protection Plan and is it being implemented properly to protect the source? (Explain in notes.) | <input type="checkbox"/> Yes
<input checked="" type="checkbox"/> No |

Sources / Groundwater

WL WELL - (Active) / General:

1	What is the name of this well? (List local and DEC name/number.)	Well WL001
2	Does the system have a well log? Survey Inspector: A COPY MUST BE SUBMITTED TO DEC AND THE DNR WELTS WELL LOG ID LISTED IN NOTES IF AVAILABLE.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
3	Is well site properly drained (i.e. sloping away from the casing for 10 feet in all directions)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Potential Deficiency		
4	Is the well casing intact (i.e. unsealed hole or break, corrosion, visible damage, etc.)? Describe the condition in notes.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
	Notes: The condition of the well casing is unknown. The well casing is enclosed in an intact bolted plywood box.	
5	Is there documented 10 feet of continuous well grout? If not, is there a visible or documented seal around the casing (i.e. concrete pad, bentonite layer, or other approved seal)? Note condition of the surface around the casing, using a description and photo documentation.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
6	Is sanitary seal or well cap properly installed to seal the casing?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
7	How often is the well inspected by the operator or owner?	Daily
8	Does the system have any of the listed potential contaminant sources within the specified distance in the list below, that do not have a separation distance waiver? Wastewater Treatment/Disposal (200') Private Sewer Line (100') Community Sewer Line (200') Septic Tank (200') Leach Field (200') Bulk Fuel Storage (100') Fuel Line (100')	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
9	List the measured distance from the drinking water source to all contaminant sources listed in the above question and any applicable separation distance waivers.	NA
10	List any other contaminant sources and their distances from the drinking water source.	NA
11	How far away is the nearest surface water? (i.e. lake, river, slough, etc.)	0.2 miles from the Tuluksak River

Question Number

- 12 Does casing extend at least 12 inches above the floor or ground? (List height in notes.) Yes
 No
Notes:
- 13 If vented, is well vent screened with the return bend facing downward and terminating 18 inches above ground level or above maximum flood level, whichever is higher? (If no, describe in notes.) Yes
 No
 NA
Notes:
- 14 Is there a source water sample tap or other means present to sample source water? (Note location on system schematic. Describe sampling method if not from a sample tap.) Yes
 No
- 15 If the well has been determined to be a protected water source, are all the conditions still being met as specified in the DW Program letter/checklist? Yes
 No
 NA

Sources / Groundwater

WL WELL - (Active) / Pumps:

- 1 What type of pump(s) does the system have? (i.e. centrifugal, hand pump, jet, positive displacement, submersible, vertical turbine, etc.)
Notes:
- 2 Are pumps and pump controls in good operating condition? Yes
 No
- 3 Is the electrical wiring maintained properly? (If no, describe in notes.) Yes
 No
- 4 Does the electrical wiring pose an immediate safety hazard? (If yes, describe in notes.) Yes
 No
- 5 Are there spare pumps or critical pump parts readily available? Yes
 No

Sources / Groundwater

WL WELL - (Active) / General:

- 1 What is the name of this well? (List local and DEC name/number.)

TP TREATMENT PLANT - (Active) / General

Monitoring:

- 1 Are compliance and process monitoring sample taps in the correct location(s) (i.e. entry point to distribution, after filtration, etc.)? (List any missing sample taps and show location of all sample taps on the system schematic.) Yes
 No

Question Number

- 2 List test equipment in the treatment plant. (List make, model, and use; include on-line and hand held testing equipment.) HACH CN-66 Cl Test Kit, HACH IR-18 Iron Test, HACH MN-5 Manganese Test Kit
- 3 Are testing facilities and equipment orderly and well maintained? Yes
 No
- 4 Are proper calibration standards and reagents used for analyses? Yes
 No
 NA
- 5 Are the reagents used in testing past the expiration date? Yes
 No
 NA
- 6 **Did the operator demonstrate competence with standard testing methods for the following: (Operator must demonstrate all control tests applicable to the system, document results in the notes section of each applicable test.)**
- 7 Turbidity: Yes
 No
 NA
Notes:
- 8 pH/Temperature: Yes
 No
 NA
Notes:
- 9 Fluoride: Yes
 No
 NA
Notes:
- 10 Disinfection Residual: Yes
 No
 NA
Notes:
- 11 Other (i.e. orthophosphate, jar testing, etc.): Yes
 No
 NA
- 12 CT (concentration X contact time) readings and calculations: Yes
 No
 NA

TP TREATMENT PLANT - (Active) / General

Cross Connections:

- 1 Are there any unprotected cross-connections in the treatment system that pose an immediate health risk? (Describe in detail and provide well labeled photo(s).) Yes
 No
- 2 Does the system have any high hazard cross-connections with inadequate protection (i.e. check valve on the filter supply line, solo valve, etc.)? (Describe in detail and provide well labeled photo(s).) Yes
 No

Question Number

- 3 Are there any other cross-connections in the system with inadequate protection (i.e. air gaps or backflow prevention not installed at all appropriate locations, such as treatment drain lines, backwash lines, instrument waste lines, etc.)? (Describe in detail and provide well labeled photo(s).) Yes No
- 4 If system has air gaps, are there any less than 2 times the diameter of the drain or waste line? (Describe in detail and provide well labeled photo(s).) Yes No NA
- 5 If backflow preventers are installed, are there any problems that may hinder operation or testing (i.e. leaking, improper installation, etc.)? (Describe in detail and provide well labeled photo(s).) Yes No NA
- 6 If backflow preventers are installed, are they tested? (Describe testing schedule or frequency. Include the date they were last tested and the name of the tester.) Yes No NA
- 7 Are any backflow prevention devices installed in a pit? (If yes, describe in detail and provide well labeled photo(s).) Yes No NA
- 8 Are backflow prevention device drains provided with a suitable air gap? Yes No NA
- 9 Has the system operator been trained to identify and control cross-connections? Yes No
- 10 Is there a written cross-connection control plan or program? Yes No

TP TREATMENT PLANT - (Active) / General

Other Treatment Chemicals:

- 1 Does the system add chemicals that are not listed on the data dump? Yes No
- 2 What additional chemicals are added? (List manufacturer and product for each and document point of injection on the system treatment schematic.) NA
- 3 Is chemical feed equipment maintained and in operable condition? (If no, describe in notes.) Yes No NA
- 4 Are critical spare parts for chemical feed equipment readily available? Yes No NA
- 5 Are there adequate means of mixing the chemicals into the water downstream of chemical feed points (i.e. adequate line distance after chemical addition, static or mechanical mixers, etc.)? (Describe in notes.) Yes No NA

Question Number

- 6 Are records maintained for quantity of each chemical used? Yes
 No
 NA

- 7 Are dosages for each chemical calculated on at least a daily basis? (If no, how often is this done?) Yes
 No
 NA

- 8 Are concentrations for each chemical added monitored at appropriate locations on at least a daily basis? (Examples: chlorine residual at outlet of CT tank and/or entry point to the distribution, fluoride at the entry point to the distribution, etc.) Yes
 No
 NA

- 9 Are backflow prevention devices installed on water lines used for mixing chemical dilutions? Yes
 No
 NA

- 10 Are the chemicals properly stored to prevent risk of contamination, fire or explosion? Yes
 No
 NA

- 11 Is chemical feed equipment connected to flow switches? Yes
 No
 NA

- 12 Are flow switches installed in the correct location? Yes
 No
 NA

- 13 Are flow switches periodically checked to ensure chemical feed equipment does not operate without water flowing? (If yes, list how often in notes.) Yes
 No
 NA

TP TREATMENT PLANT - (Active) / Chlorination

Hypochlorination:

- 1 What type of disinfectant is used (i.e. calcium or sodium hypochlorite)? (Also list manufacturer, product name, and NSF certification information.) Drytec Granular Calcium hypochlorite

- 2 Is the disinfection equipment operated and maintained properly? Yes
 No

- 3 If hypochlorite is used, are the solutions being made to the proper concentration and in a safe manner? (Describe in notes.) Yes
 No
 NA
Notes: Mixing instructions are mounted above mixing vats.

- 4 Are proper residual test kits available and are they being maintained? Yes
 No
 NA

- 5 Is the operator trained to use and conduct monitoring of disinfectant? Yes
 No
 NA

Question Number

- 6 Is there adequate chlorine residual at the entry point to the distribution system? (The higher of 0.2 mg/L or level required to meet CT.) Yes
 No
 NA
Notes:
- 7 Are disinfectant residual measurements being made and recorded at the same time and location in the distribution system as the total coliform bacteria sample is collected? Yes
 No
 NA
- 8 Is there a detectable disinfectant residual being maintained throughout the distribution system? Yes
 No
 NA
- 9 Is there sufficient CT (concentration X contact time) between the disinfection point and the first point of use? (Attach readings for temperature, pH, free chlorine residual, peak flow rate, and tank volume or level, description of CT tank, and calculations. Also note locations of samples used to obtain the readings.) Yes
 No
 NA
Notes:
- 10 Is there a back-up disinfection unit? (Describe in notes if it is on-line and operational. Filtration avoidance systems cannot have an NA answer; all other types of systems that do not have back-up disinfection should be NA.) Yes
 No
 NA
- 11 Is there an auto switch-over for disinfection units to prevent a break in disinfection? (Filtration avoidance systems cannot have an NA answer; all other types of systems that do not have auto switch-over should be NA.) Yes
 No
 NA
- 12 If there is not a back-up disinfection unit, are critical spare parts for disinfection equipment readily available? Yes
 No
 NA
- 13 Are disinfection units hooked up to flow switches that prevent the addition of disinfectant when no water is flowing? (If yes, note how often they are checked.) Yes
 No
Notes:
- 14 Is disinfectant feed proportional to water flow? Yes
 No
 NA
- 15 Is there an adequate quantity of disinfectant readily available? Yes
 No
- 16 Is the disinfectant properly stored? Yes
 No
 NA

TP TREATMENT PLANT - (Active) / Filtration

General:

- 1 Is filtration equipment maintained and in operable condition? (List make and model of turbidimeter.) Yes
 No

Question Number

- 2 Are turbidimeters calibrated with primary standards following manufacturer's recommendations as to frequency and method? (List frequency and/or schedule in notes.) Yes
 No
Notes:

TP TREATMENT PLANT - (Active) / Filtration

Greensand:

- 1 What is the treatment objective? Removal of Iron and Manganese.
- 2 How many filters are there? 1
- 3 Are filters pressure or gravity? Pressure
 Gravity
- 4 What is the filter media type? Green sand
- 5 If there is a view port, describe condition of the media (i.e. media height, visible mud packing, etc.). No viewing port.
- 6 How often is the media inspected? (Note findings of the last inspection, if available.) Monthly
- 7 What is the total surface area including all filters in ft²? 12.56
- 8 What is the flow rate through the filters in gpm? 10
- 9 How is backwash frequency determined (i.e. turbidity, iron levels, time in service, etc.)? Operators backwash everytime water is transferred.
- 10 Is backwash flow measured? Yes
 No
Notes:
- 11 Can backwash rate of flow be adjusted? Yes
 No
Notes:
- 12 What is the source of water used for backwashing? Finished water

Question Number

- 13 Is there air assisted backwash capability/air scour? Yes
 No
- 14 Is the source of air provided by an oil-less compressor/blower or one that uses food grade lubricants? Yes
 No
 NA
- 15 Is there equal flow through all filters? Yes
 No
- 16 Is flow to the filter(s) controlled with a device such as a rate of flow controller? Yes
 No
- 17 Is there a surface wash? Yes
 No
- 18 Can surface wash arm rotation be verified? Yes
 No
 NA
- 19 How is it determined that backwash is complete and the filters can be returned to service (i.e. turbidity, grab sample, visual check, time, etc.)? Visual check
- 20 Does the system filter water to waste after backwash and before returning the filter to service? Yes
 No
- 21 If the system filters to waste, is a sufficient air gap or backflow prevention provided? Yes
 No
 NA
- 22 Is pressure drop monitored across the filter(s)? Yes
 No
- 23 Is greensand regenerated? (If yes, explain how, i.e. permanganate, chlorine, etc.) Yes
 No
Notes:

TP TREATMENT PLANT - (Active) / Other

Permanganate:

- 1 What is the treatment objective (i.e. oxidation of iron/manganese, regeneration of greensand media, etc.)? Oxidation of Fe and Mn
- 2 What chemical is added? (List manufacturer and product for each, and document point of injection on the system treatment schematic.) KMnO4 Organic Industries

Question Number

- | | | |
|---|---|--|
| 3 | Is chemical feed equipment maintained and in operable condition? | <input checked="" type="checkbox"/> Yes
<input type="checkbox"/> No |
| 4 | Are critical spare parts for chemical feed equipment readily available? | <input checked="" type="checkbox"/> Yes
<input type="checkbox"/> No |
| 5 | Are there adequate means of mixing the chemicals into the water downstream of chemical feed points (i.e. adequate line distance after chemical addition, static or mechanical mixers, etc.)?
Notes: There is a static mixer. | <input checked="" type="checkbox"/> Yes
<input type="checkbox"/> No |
| 6 | How is proper chemical dose determined? | <u>Feed rates are adjusted according to the quality of the water. Instructions are posted by mixing vats</u> |
| 7 | How is chemical overfeed prevented (i.e. flow switch, etc.)? | <u>Flow switch</u> |
| 8 | Are the chemicals properly stored to prevent risk of contamination, fire or explosion? | <input checked="" type="checkbox"/> Yes
<input type="checkbox"/> No |

Storage / ST STORAGE TANK - (Active)

- | | | |
|---|--|---|
| 1 | What is the name of this storage facility? (List local and DEC name/number.) | <u>Storage tank</u> |
| 2 | How many storage tank(s) make up this storage facility? (Describe in notes.) | <u>1</u> |
| 3 | List all other type(s) of structure(s)/tank(s) that are present in the system that are not listed on the data dump (i.e. bladder, elevated, ground, hydropneumatic, reservoir, underground). | <u>Treatment tank and two hydroneumatic tanks</u> |
| 4 | What does this storage tank hold? | <input type="checkbox"/> Raw Water
<input type="checkbox"/> Filtered Water
<input type="checkbox"/> Disinfected Water
<input checked="" type="checkbox"/> Filtered and Disinfected Water |
| 5 | Is treated water storage covered? | <input checked="" type="checkbox"/> Yes
<input type="checkbox"/> No
<input type="checkbox"/> NA |
| 6 | Is this storage facility used to meet disinfectant contact time? | <input checked="" type="checkbox"/> Yes
<input type="checkbox"/> No |
| 7 | Is the water in the tank(s), at the time of the inspection, enough to meet applicable demand and/or disinfection contact time requirements? (Note the volume or water level in tank, if possible.) | <input checked="" type="checkbox"/> Yes
<input type="checkbox"/> No
<input type="checkbox"/> Unknown |

Question Number

- | | | |
|----|--|--|
| 8 | Date initially put into service? | 03/01/1978 |
| 9 | What is the volume of the tank(s) in gallons? | 10000 |
| 10 | On what date was the tank(s) last inspected? | 11/08/2016 |
| | Notes: The tank is inspected monthly. | |
| 11 | On what date was the tank(s) last cleaned? | 11/08/2016 |
| 12 | Does surface run-off drain away from the storage tank(s)? | <input checked="" type="checkbox"/> Yes
<input type="checkbox"/> No |
| | Notes: Indoor tank | |
| 13 | Are overflow and drain lines screened or covered, and do the lines terminate a minimum of 2 times the diameter of the water outlet pipe above the ground or storage? (If no, describe in notes.) | <input checked="" type="checkbox"/> Yes
<input type="checkbox"/> No |
| 14 | Are vents screened or covered, and turned downward; and do the lines terminate a minimum of 2 times the diameter of the water outlet pipe above the ground or storage? (If no, describe in notes.) | <input checked="" type="checkbox"/> Yes
<input type="checkbox"/> No |
| 15 | Is the hatch watertight? (If no, describe in notes.) | <input checked="" type="checkbox"/> Yes
<input type="checkbox"/> No
<input type="checkbox"/> NA |
| 16 | Is the hatch locked? | <input checked="" type="checkbox"/> Yes
<input type="checkbox"/> No
<input type="checkbox"/> NA |
| 17 | Is the storage tank(s) clean and free from contamination? (If no, describe in notes.) | <input checked="" type="checkbox"/> Yes
<input type="checkbox"/> No
<input type="checkbox"/> Unknown |
| 18 | Is the storage tank(s) structurally sound? | <input checked="" type="checkbox"/> Yes
<input type="checkbox"/> No |
| 19 | Can the storage tank(s) be isolated from the system? | <input checked="" type="checkbox"/> Yes
<input type="checkbox"/> No |
| 20 | Are leaks evident at the time of inspection? | <input type="checkbox"/> Yes
<input checked="" type="checkbox"/> No |

Question Number

- 21 Is the storage tank(s) lined or coated? (If yes, describe in notes.) Yes
 No
 Unknown
Notes:
- 22 Is the storage tank(s) interior coating or liner peeling or cracking? (If yes, describe in notes.) Yes
 No
 NA
 Unknown
- 23 Is storage tank(s) safely accessible to inspector? Yes
 No

DS DISTRIBUTION SYSTEM - (Active) / General

- 1 Describe any problems that have occurred in the distribution system since the last sanitary survey. The school line froze in 2014. The damage was repaired.
- 2 Are fire hydrants connected to the distribution system? (If yes, describe in notes any problems or cross-connections related to the hydrants and if they are used for flushing.) Yes
 No
- 3 Is there any portion of the distribution system that has a pressure less than 20 psi? Yes
 No
- 4 Are there any materials used in the distribution system that should not be in contact with drinking water? (If yes, explain in notes.) Yes
 No
 Unknown
- 5 Is there a leak detection program? (If yes, describe in notes.) Yes
 No
Notes:
- 6 Was asbestos cement pipe used in the system? Yes
 No
 Unknown
- 7 Is there a routine main and dead-end water flushing program? (If yes, describe in notes.) Yes
 No
 NA
- 8 Are the check valves, water meters, etc., maintained and operating properly? (If no, explain in notes.) Yes
 No
- 9 Is system adequately protected from freezing? (If no, explain in notes.) Yes
 No
Notes:
- 10 Are heat exchangers used in conjunction with the water system? Yes
 No

Question Number

- | | | |
|----|--|--|
| 11 | If heat exchangers are used, what type? | <input type="checkbox"/> Single Walled
<input checked="" type="checkbox"/> Double Walled
<input type="checkbox"/> NA |
| 12 | Is glycol used? (If yes, list type in notes.) | <input type="checkbox"/> Yes
<input checked="" type="checkbox"/> No |
| 13 | For circulating systems, what is the temperature of the water leaving from and returning to the plant? | <u>Coming into the plant at 46F and leaving the plant at 50F.</u> |

DS DISTRIBUTION SYSTEM - (Active) / Cross Connections

- | | | |
|---|---|--|
| 1 | Are there any unprotected cross-connections in the distribution system that pose an immediate health risk? (Describe in detail and provide well labeled photo(s).) | <input type="checkbox"/> Yes
<input checked="" type="checkbox"/> No
<input type="checkbox"/> Unknown |
| 2 | Does the system have any high hazard cross-connections with inadequate protection? (Describe in detail and provide well labeled photo(s) of all high hazard connections to industry, wastewater treatment plants, clinics, etc., that are not adequately protected.) | <input type="checkbox"/> Yes
<input checked="" type="checkbox"/> No
<input type="checkbox"/> Unknown |
| 3 | Potential Deficiency
Are there any other cross-connections in the system with inadequate protection? (i.e. air gaps or backflow prevention not installed at all appropriate locations, such as boiler make-up water, hose bibbs, etc. Describe in detail and provide well labeled photo(s).)
Notes: No backflow prevention device on the service to the school. | <input checked="" type="checkbox"/> Yes
<input type="checkbox"/> No |
| 4 | If system has air gaps, are any less than 2 times the diameter of the drain or waste line? (Describe in detail and provide well labeled photo(s).) | <input type="checkbox"/> Yes
<input checked="" type="checkbox"/> No
<input type="checkbox"/> NA |
| 5 | If backflow preventers are installed, are there any problems that may hinder operation or testing? (i.e. leaking, improper installation, etc. Describe in detail and provide well labeled photo(s).) | <input type="checkbox"/> Yes
<input checked="" type="checkbox"/> No
<input type="checkbox"/> NA |
| 6 | Potential Deficiency
If backflow preventers are installed, are they tested? (Describe testing schedule or frequency. Include the date they were last tested and the name of the tester.) | <input type="checkbox"/> Yes
<input checked="" type="checkbox"/> No
<input type="checkbox"/> NA |
| 7 | Are any backflow preventers installed in a pit? (If yes, describe in detail and provide well labeled photo(s).) | <input type="checkbox"/> Yes
<input checked="" type="checkbox"/> No
<input type="checkbox"/> NA |
| 8 | Are backflow preventer drains provided with a suitable air gap? | <input checked="" type="checkbox"/> Yes
<input type="checkbox"/> No
<input type="checkbox"/> NA |
| 9 | If the water system has a water haul fill point, do the water supply lines have appropriate backflow prevention? (List backflow prevention type in notes.)
Notes: Since the watering point broke people collect water from the hose in the washeteria. The hose is left to rest on a hook to create an air gap. If the hose is to fall off of the hook it would rest in the bucket causing risk of backflow. | <input checked="" type="checkbox"/> Yes
<input type="checkbox"/> No
<input type="checkbox"/> NA |

Question Number

- 10 Has the system operator been trained in identifying and controlling cross-connections? Yes
 No
- 11 Is there a written cross-connection control program? Yes
 No

DS DISTRIBUTION SYSTEM - (Active) / Pumps

- 1 Are pumps used in the distribution system? (i.e. pressure, circulation, etc. List use of each pump or group of pumps.) Yes
 No
Notes:
- 2 Are pumps and pump controls in good operating condition? Yes
 No
 NA
- 3 Are there spare pumps or critical spare pump parts readily available? Yes
 No
 NA
- 4 Is the electrical wiring maintained properly? (If no, describe in notes.) Yes
 No
 NA
- 5 Does wiring pose an immediate safety hazard? (If yes, describe in notes.) Yes
 No
 NA

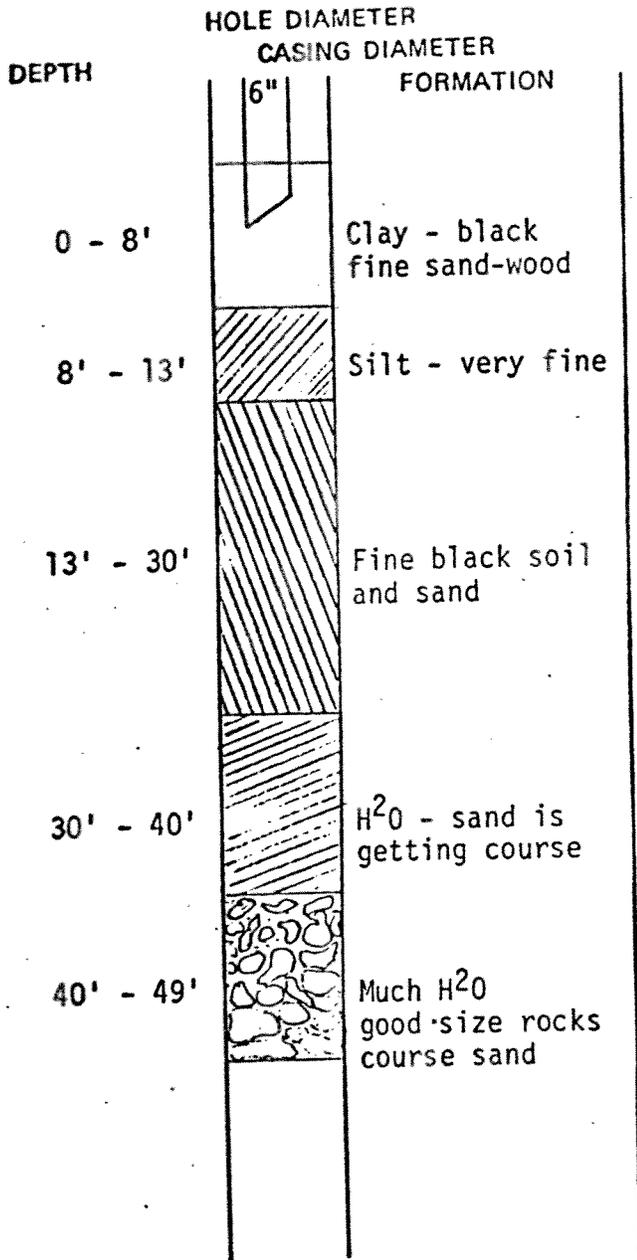
DS DISTRIBUTION SYSTEM - (Active) / Hydropneumatic tanks

- 1 Does the system have a hydropneumatic tank(s)? Yes
 No
Notes:
- 2 At the time of inspection, are all tanks water tight? (i.e. not leaking) Yes
 No
 NA
- 3 Are the exterior surfaces and tank supports in good condition? (If no, explain condition in notes and include photo.) Yes
 No
 NA
- 4 Are the hydropneumatic tanks in a condition that represents an immediate threat to health or safety, or are in danger of failure? (Describe in notes.) Yes
 No
 NA

WELL LOG

U.S. PUBLIC HEALTH SERVICE, DIVISION OF INDIAN HEALTH

LOCATION Tuluksak, Alaska DATE STARTED July 27, 1981
 DATE COMPLETED August 7, 1981 DRILLER Fowler - Anderson
 TOTAL DEPTH OF WELL 49 FT. CASING INSTALLED 45' DIAMETER 6"
 GROUT 10' SCREEN SIZE 15 ~~XXXX~~ 2-1/2 LENGTH _____
 STATIC WATER LEVEL 10'6" TOC _____ HRS. PUMPED 24@ 28 GPM DRAWDOWN 7'10" FT.



SOIL DATA TO 15 FT.
 FEET THAWED _____
 BOTTOM OF FROST & MATERIAL _____
 SEASONAL OR PERMA FROST Seasonal

WATER DATA FIELD TEST
 TASTE None
 APPEARANCE FRESH Clear
 AFTER 24 HOURS Brownish
 IRON -
 CHLORIDES -
 TDS _____

PUMP TEST 10'6" - STATIC LEVEL
 PUMPING LEVEL 17'10" @ 28 GPM
 AFTER 24 HRS.

HIGHEST RECOMMENDED PUMP RATE _____
 WILL STATIC LEVEL CHANGE WITH
 TIDES negative OR FROST _____

DEVELOP PROCEDURE Surge block

ESTIMATED MAN HOURS FOR DRILLING _____ HOURS FOR TOTAL JOB _____

CREW Mark Anderson - Glen Fowler



Department of Environmental Conservation
 Division of Environmental Health
 Drinking Water Program
 555 Cordova Street
 Anchorage, AK 99501
 Phone: (907) 269-7549



ALASKA PUBLIC WATER SYSTEM LOCATIONAL DATA COLLECTION FORM

Public Water System Name: Tuluksak Water System	PWS ID#: 2270223										
Name of Person Determining Lat/Long: Michael Vicente	Phone: (907) 543-6422										
Name of Person Completing Form: Michael Vicente	Phone: (907) 543-6422										
Local Facility Name: Tuluksak Water System	Date Collected: 11/9/2016										
	Date Completed: 1/8/2016										
1) Facility Type. (Check one)											
Sources: <input checked="" type="checkbox"/> Wellhead <input type="checkbox"/> Surface Water Intake <input type="checkbox"/> Treatment Plant											
Well #1											
2) The date the latitude and longitude were researched or collected. Example: 06/30/2007											
<table style="margin-left: auto; margin-right: auto;"> <tr> <td style="border: 1px solid black; padding: 2px;">1</td> <td style="border: 1px solid black; padding: 2px;">1</td> <td style="border: 1px solid black; padding: 2px;">/</td> <td style="border: 1px solid black; padding: 2px;">0</td> <td style="border: 1px solid black; padding: 2px;">9</td> <td style="border: 1px solid black; padding: 2px;">/</td> <td style="border: 1px solid black; padding: 2px;">2</td> <td style="border: 1px solid black; padding: 2px;">0</td> <td style="border: 1px solid black; padding: 2px;">1</td> <td style="border: 1px solid black; padding: 2px;">6</td> </tr> </table>		1	1	/	0	9	/	2	0	1	6
1	1	/	0	9	/	2	0	1	6		
3) Latitude in decimal degrees. Must be recorded in WGS 84. For Alaska, latitudes are between 51 and 80 North. Give data to available accuracy. Example: +56.234230											
<table style="margin-left: auto; margin-right: auto;"> <tr> <td style="border: 1px solid black; padding: 2px;">+</td> <td style="border: 1px solid black; padding: 2px;">6</td> <td style="border: 1px solid black; padding: 2px;">1</td> <td style="border: 1px solid black; padding: 2px;">.</td> <td style="border: 1px solid black; padding: 2px;">0</td> <td style="border: 1px solid black; padding: 2px;">5</td> <td style="border: 1px solid black; padding: 2px;">9</td> <td style="border: 1px solid black; padding: 2px;">4</td> <td style="border: 1px solid black; padding: 2px;">0</td> <td style="border: 1px solid black; padding: 2px;"> </td> </tr> </table>		+	6	1	.	0	5	9	4	0	
+	6	1	.	0	5	9	4	0			
4) Longitude in decimal degrees. Must be recorded in WGS 84. For Alaska, longitudes are generally -126 to -180 West. The minus sign means "West." Use + for "East." Example: -136.23423											
<table style="margin-left: auto; margin-right: auto;"> <tr> <td style="border: 1px solid black; padding: 2px;">-</td> <td style="border: 1px solid black; padding: 2px;">1</td> <td style="border: 1px solid black; padding: 2px;">6</td> <td style="border: 1px solid black; padding: 2px;">0</td> <td style="border: 1px solid black; padding: 2px;">.</td> <td style="border: 1px solid black; padding: 2px;">5</td> <td style="border: 1px solid black; padding: 2px;">7</td> <td style="border: 1px solid black; padding: 2px;">6</td> <td style="border: 1px solid black; padding: 2px;">4</td> <td style="border: 1px solid black; padding: 2px;">3</td> </tr> </table>		-	1	6	0	.	5	7	6	4	3
-	1	6	0	.	5	7	6	4	3		
5) Are the latitude/longitude coordinates taken at the Wellhead /Intake? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If No, describe the proximity to the wellhead/intake (for example, 30 feet NW of the wellhead or intake)											
6) Type of GPS Unit used to determine latitude and longitude. (Describe unit and model number) Garmin GPSmap 62											
7) Lat/long accuracy in meters. GPS accuracy is typically encoded in the unit's display. The datum used must be in WGS 84. Example: 30. (meters)											
<table style="margin-left: auto; margin-right: auto;"> <tr> <td style="border: 1px solid black; padding: 2px;"> </td> <td style="border: 1px solid black; padding: 2px;"> </td> <td style="border: 1px solid black; padding: 2px;"> </td> <td style="border: 1px solid black; padding: 2px;">1</td> <td style="border: 1px solid black; padding: 2px;">7</td> <td style="border: 1px solid black; padding: 2px;">.</td> <td style="border: 1px solid black; padding: 2px;"> </td> <td style="border: 1px solid black; padding: 2px;"> </td> </tr> </table> Meters					1	7	.				
			1	7	.						
8.) Site map or aerial image identifying the location of the facility must be provided to assist DEC Staff verify the lat/long location in the State geospatial database. (As-build, Google Maps, Google Earth, MSN Live Earth, Yahoo Maps are all acceptable.)											
<input checked="" type="checkbox"/> Yes a map with approximate location has been provided.											

Well Schematic

Crosshairs: Well #1

Lat.: +61.05940

Long.: -160.57643

Inner red line: 100ft

Outer red line: 200ft





Alaska Department of Environmental Conservation

Revised Total Coliform Rule- Sample Siting Plan for Systems Operating Year-Round

All public water systems (PWS) are required to have an approved sample siting plan. These plans are required to be updated when changes occur that could alter the number of samples collected or the sample locations. *Examples: population increase or decrease, water line extensions, changes in monitoring frequency, etc.*

Systems Operating Year-Round

I. General Information			
PWS Name:		PWSID #:	
PWS Address:			
Contact Name:		Phone #:	
E-mail:		Fax #:	
Water System Type:	Community	Non-Transient Non-Community	Transient Non-Community
Population Served (# of):	_____ Residents	_____ Non-Transient	_____ Transient _____ Total Pop
Number of Service Connections: _____			
Number of Routine Samples Required: _____ per _____ Month _____ Quarter			
Source Types:	Ground Water	Purchased Ground Water	
(Check all that apply)	Surface Water	Purchased Surface Water or GWUDISW*	
	GWUDISW*	Filtration Avoidance System (Surface Water)	
<i>*Ground Water Under Direct Influence of Surface Water</i>			

Guidelines for Sample Site Selection

- * Identify total coliform sample locations that adequately represent the entire distribution system(s)
- * Swivel taps, outside taps, automatic/motion-sensing faucets, hoses, water treatment devices and combined hot and cold water faucets should be avoided
- * Routine sample sites should be accessible for routine and repeat testing
- * Three Repeat samples are required following each total coliform positive routine sample (Systems with wells must also collect a raw source water sample from each active well). Repeat sampling sites should be selected as follows:
 - * One must be collected from the original routine site that tested total coliform positive
 - * One must be collected from within five service connections upstream
 - * One must be collected from within five service connections downstream
- * For systems on quarterly monitoring, you will be required to collect 3 samples the month following a total coliform positive sample. Since the sample site selection will depend on the specific circumstances surrounding the positive sample(s) these sample sites do not need to be included in this plan
- * Ground water source samples must be taken from raw water sample taps

Please return this form to your DEC Drinking Water Program Office.

A copy of this completed sample siting plan must be maintained on file at the PWS.

Anchorage DEC Office
 555 Cordova Street
 Anchorage, AK 99501
 Fax: 269-7650

Fairbanks DEC Office
 610 University Ave.
 Fairbanks, AK 99709
 Fax: 451-2188

Soldotna DEC Office
 43335 K-Beach Road
 Suite 11
 Soldotna, AK 99669
 Fax: 262-2294

Wasilla DEC Office
 1700 E. Bogard Road
 Building B, Suite 103
 Wasilla, AK 99654
 Fax: 376-2382

II. Sampling Information

A. Routine Sample Rotation Schedule

Routine Sample Site	1st Quarter			2nd Quarter			3rd Quarter			4th Quarter		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.												
2.												
3.												
4.												
5.												

B. Routine and Repeat Sample Locations

Routine Sample Sites Location/Address	Repeat Sample Sites Location/Address
1.	1-1 Original sample site
	1-2 Upstream
	1-3 Downstream
2.	2-1 Original sample site
	2-2 Upstream
	2-3 Downstream
3.	3-1 Original sample site
	3-2 Upstream
	3-3 Downstream
4.	4-1 Original sample site
	4-2 Upstream
	4-3 Downstream
5.	5-1 Original sample site
	5-2 Upstream
	5-3 Downstream

C. Reasons for choosing sample locations

1.
2.
3.
4.
5.

Tuluksak Water System
PWSID: 270223



E. Sample Interval Description

Describe below how you plan to ensure that samples are collected at evenly spaced time intervals:

Example for systems collecting 1 sample/month - We plan to collect our routine sample the first week of each month

Example for systems collecting multiple samples/month - We plan to collect our routine samples every Tuesday throughout the month

Example for systems collecting 1 sample/quarter - We plan to collect our routine sample the first month of each quarter

F. Groundwater Rule Triggered Source Water Monitoring

If you answer "No" to the question below, you are required to perform source water monitoring, from each active well under the Groundwater Rule in the event of a routine total coliform positive sample. This sampling is in addition to the repeat sampling required by the RTCR. Enter your source sample site information in the table below. If you need more space, attach additional sheets.

Do you provide DEC-approved 4-log treatment of viruses for all your groundwater sources?

Yes

No

N/A- We do not have any wells or all of our water is treated as SW or GWUDISW
(There are no wells in the distribution system that bypass surface water treatment.)

Groundwater Rule Triggered Source Water Monitoring	
Source ID/Name	Description of location of raw water sample tap

DEC Area Office: _____ Date Received: ____/____/____

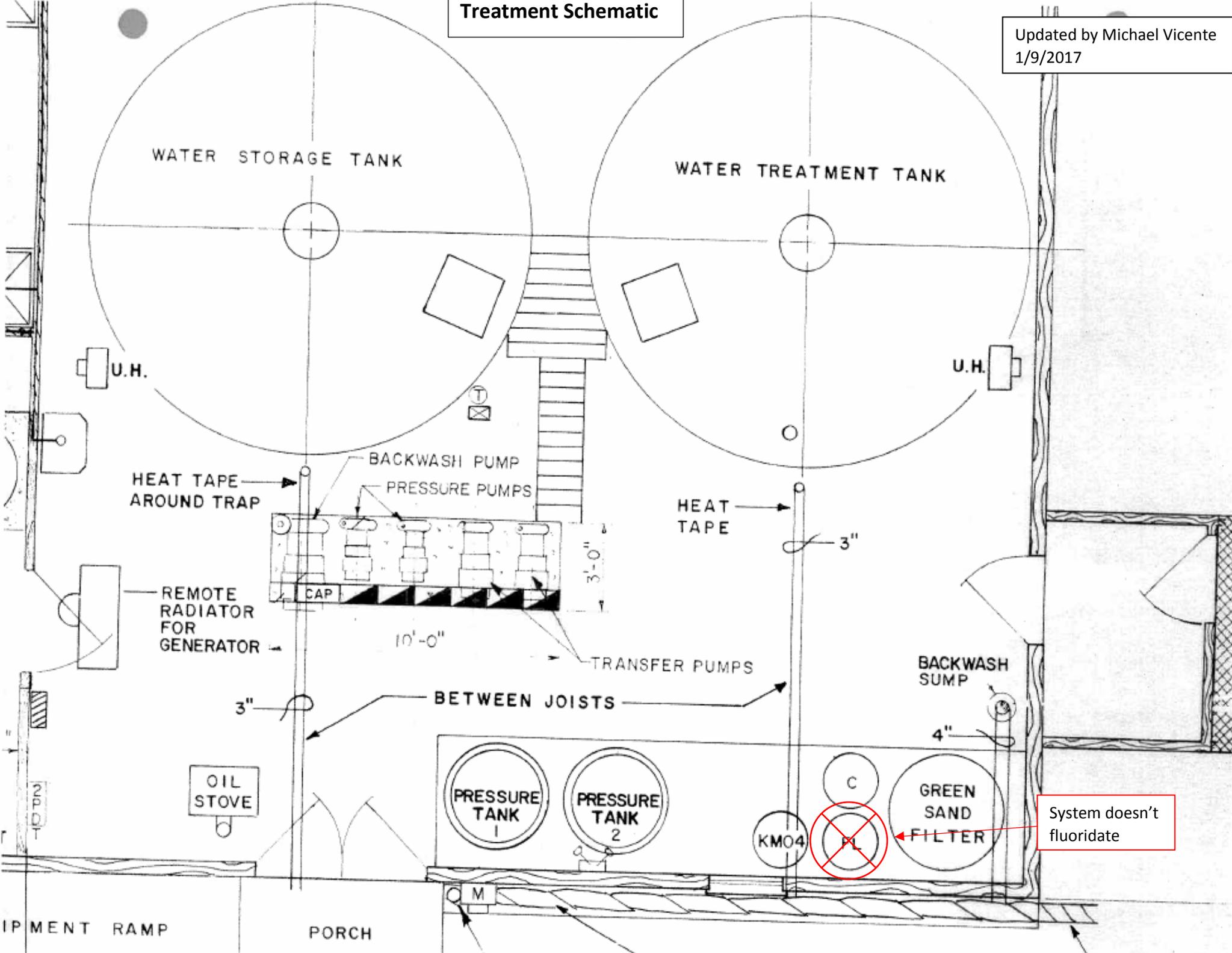
Sample Siting Plan deemed complete and satisfactory? Yes No

Comments:

State Reviewer Signature: _____ Date: ____/____/____

Treatment Schematic

Updated by Michael Vicente
1/9/2017



System doesn't fluoridate



Tuluksak Water Plant



Well 1



Raw water entry and sample tap



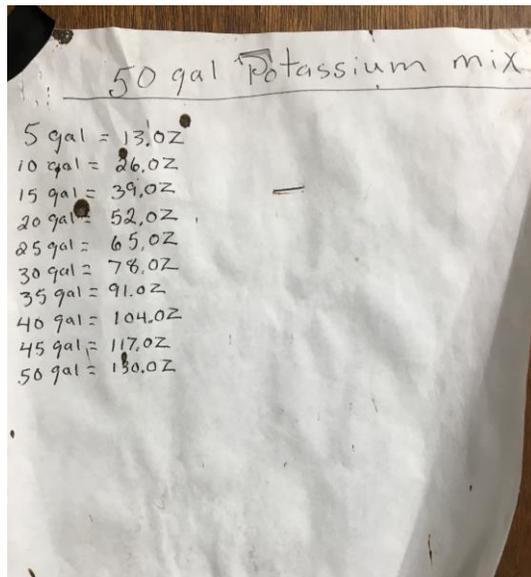
Raw water meter



1st KMNO₄ injection point



KMNO₄ vat and pump



50 gallon KMNO₄ mixing instructions



Static mixer



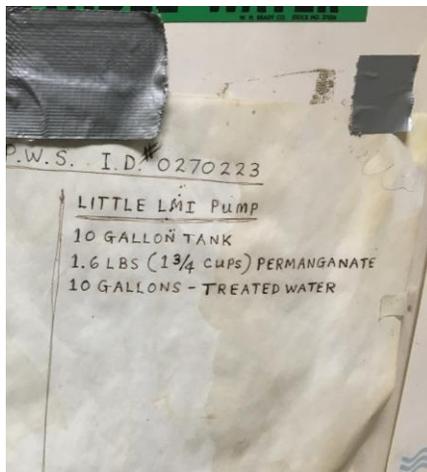
Single walled heat exchanger



Treatment tank



2nd KMNO₄ vat and pump



10 gallon KMNO₄ mixing instructions



2nd KMNO₄ injection point and static mixer



Transfer pumps



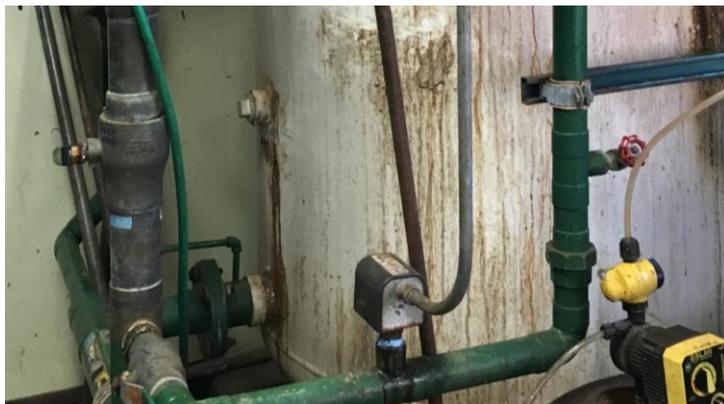
Pressure pumps



Pump controls



Green sand filter



Flow switch



Chlorine vat and pump



Chlorine injection point



Storage tank treated water



Storage tank overflow



Master meter



Backwash pump



Backwash surge tank



Backwash meter



2 pressure tanks



Double walled heat exchange on the line for the school



Service meter on the school line



Inlet and outlet from the school



Old watering point



Self haul watering point



Self haul watering point



Alaska Certified Water/Wastewater Operator Database

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- [System Search](#)
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Operator Information

Operator Name: Kristy M. Napoka

Active Certificates

Certificate #	Certificate	Issue Date	Exp. Date	Drinking Water Core CEUs	Renewal Req. Met?
22407	Small Water System Treated	5/26/2016	12/31/2018	1.80	Yes

[Register for an Exam](#)

Current Employer

(If blank, no employment information is on file)

System Name	System Type/Class
Tuluksak Water System - Tuluksak Water Treatment System	Water Treatment Class 1

Additional Operator Information

[Click here to request additional information about your operator record.](#)

[Operator Certification Home Page](#)

Department of Environmental Conservation
 Division of Water
 410 Willoughby Ave., Ste. 303, P.O. Box 111800, Juneau, AK 99811-1800
 Phone: (907) 465-5180 || Fax: (907) 465-5177 || TDD: Alaska Relay: 1 (800) 770-8973

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- [My Profile](#)

Operator Information

Operator Name: Jerah Peter

[Manage Your Operator Profile](#)

Active Certificates

Certificate #	Certificate	Issue Date	Exp. Date	Drinking Water Core CEUs	Renewal Req. Met?
17561	Small Water System Treated	1/28/2015	12/31/2020	0.00	No

[Register for an Exam](#)

Current Employer

(If blank, no employment information is on file)

System Name	System Type/Class
Tuluksak Water System - Tuluksak Water Treatment System	Water Treatment Class 1

Additional Operator Information

[Click here to request additional information about your operator record.](#)

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Department of Environmental Conservation
Division of Water
410 Willoughby Ave., Ste. 303, P.O. Box 111800, Juneau, AK 99811-1800
Phone: (907) 465-5180 || Fax: (907) 465-5177 || TDD: Alaska Relay: 1 (800) 770-8973



Appendix B

Design Calculations

Included in this appendix:

- 1) Treatment System Classification (1 page)
- 2) Water System Demand (2 pages)
- 3) Washeteria Water Demand (1 page)
- 4) Building Heat Loss (4 pages)

Component Category	Existing System	Package Conventional Treatment System
Peak System Size (40 GPM = 58,000 GPD)	2	4
Water Source	2	2
Raw Water Add Heat System	2	2
Oxidation (KMnO4)	4	4
Coagulation (Primary)	0	5
Rapid Mix (In-Line Static)	1	1
Mechanical Flocculator	0	8
Sedimentation Process	0	2
Filtration (Granular Media)	8	8
Disinfection (Powdered Hypochlorite)	3	3
pH Adjustment	0	3
Storage	3	0
On-Site Treatment (Municipal Lagoon)	0	0
Other Treatment	2	0
TOTAL SCORE	27	42
SYSTEM CLASS	I	II

Class I is 1-30 Points

Class II is 31 - 55 Points

Current Water Demand (2017)

Population (2017) 363 people

Watering Point Demand **40 gpd**
0.15 gpcd

Current WP Users

WP Users for 365 days/year

185 customers

WP Users for 165 days/year

163 customers

(Teachers, Staff and Students use school water for 200 days)

School Demand **2,710 gpd**
988,050 gallons per year

Teachers 15 people

Staff 18 Assumed people

Students 145 people

Teacher Usage 65 gpcd

Student and Staff Usage 20 gpcd

School Year 200 days

Teacher Housing Year 270 days

Basketball Showers 70 People/week
20 gal/shower
52 week/year

WTP Backwashing Demand (Existing) **1,200 gpd**
(Per Bob White - RMW)

Washeteria Demand **400 gpd**
From Washeteria Demand Spreadsheet 0.3 gpm

Other Facilities **0 gpd**
None

Average Daily Demand (ADD) **4,350 gpd**
Sum of Watering Point, School, WTP Backwashing,
Washeteria and other demands 3.0 gpm

Peak Hour Demand (6 times ADD) **19 gpm**
Does not consider backwash or fire flows

Maximum Day Demand (2 times ADD) **8,700 gpd**
7 gpm

Average Water Use **12 gpcd**

Future / Design Water Demand (2037)

Population (2037) 438 people

Watering Point Demand **320 gpd**

1 gpcd

Future WP Users

WP Users for 365 days/year

224 customers

WP Users for 165 days/year

196 customers

(Teachers, Staff and Students use school water for 200 days)

School Demand

3,260 gpd

1,188,300 gallons per year

Future Teachers plus family

18 people

Future Staff

22 Assumed future Staff

Future Students

174 Assumed future students

Teacher Usage

65 gpcd

Student and Staff Usage

20 gpcd

School Year

200 days

Teacher Housing Year

270 days

Basketball Showers

85 People/week

20 gal/shower

52 week/year

Backwashing Demand (Future)

970 gpd

Assumes 2 times per week @ 150 gpm for 15 minutes

Washeteria Demand

770 gpd

From Washeteria Demand Spreadsheet

0.5 gpm

Other Facilities

750 gpd

Clinic, teen center and store

Average Daily Demand (ADD)

6,070 gpd

Sum of Watering Point, School, WTP Backwashing, Washeteria and other demands

4.2 gpm

Peak Hour Demand (6 times ADD)

45 gpm

Does not consider backwash or fire flows

Maximum Day Demand (2 times ADD)

12,140 gpd

9 gpm

Average Water Use

14 gpcd

Tuluksak Washeteria Water Demand

Current Population (2017 AKDOL)	363 people	92 occupied homes
Future Design Population (year 2037)	438 people	112 occupied homes
Days/Week Washeteria Open	7 days	

Estimated Water Use

Showers	20 gallons/shower
Washers	28 gallons/load

Estimated Facility Use

Showers (current)	10 showers/week
Showers (future)	1 showers/household/week
Washers	1 loads/household/week

Weekly Washeteria Water Demand

(Based on assumed use)

Current Showers	200 gallons	
Current Washers	2,576 gallons	
Total	2,776 gallons	Existing Daily Demand 397 gpd
Future Showers	2,240 gallons	
Future Washers	3,136 gallons	
Total	5,376 gallons	Future Daily Demand 768 gpd

Building Heat Loss

Project: Alternative 1 - New WTP/Washeteria at the Utility Core Site

Project No.: _____

Calculated By: _____

LOCATION	Tuluksak
ANNUAL HEATING DEGREE DAYS (Based on 65°F Degree Day, DD)	12932
INDOOR DESIGN TEMPERATURE (T_i , °F)	68
OUTDOOR DESIGN TEMPERATURE (T_o , °F)	-27
TOTAL BUILDING HEAT LOAD (Q_L , BTU/Hr)	52,381
VENTILATION HEAT LOAD (Q_v , BTU/Hr)	123984
VENTILATION OPERATING HOURS (Hrs/day)	8
TYPE OF HEATING SYSTEM	Unit Heaters
HEATING SYSTEM EFFICIENCY (DOE Seasonal Efficiency)	80.0%
ANNUAL BUILDING HEATING CONSUMPTION (BTU/year)	213,912,303
ANNUAL VENTILATION HEATING CONSUMPTION (BTU/Year)	7,032,285
TOTAL ANNUAL HEATING CONSUMPTION (BTU/Year)	220,944,588
FUEL TYPE (Electricity, Propane, Gas, Fuel Oil, etc.)	Fuel Oil
FUEL UNIT VALUE	Gallon
FUEL HEATING VALUE (BTU/Unit)	138500
COST/UNIT OF FUEL (\$/Unit)	\$5.00
YEARLY FUEL USAGE (Unit/Year)	1,595 Gallon
YEARLY FUEL COST (\$/Year)	\$7,976.34

Building Heat Loss

Project: Alternative 2 - Rehabilitated WTP/Washeteria

Project No.: _____

Calculated By: _____

LOCATION	Tuluksak
ANNUAL HEATING DEGREE DAYS (Based on 65°F Degree Day, DD)	12932
INDOOR DESIGN TEMPERATURE (T_i , °F)	68
OUTDOOR DESIGN TEMPERATURE (T_o , °F)	-27
TOTAL BUILDING HEAT LOAD (Q_L , BTU/Hr)	53,353
VENTILATION HEAT LOAD (Q_v , BTU/Hr)	123984
VENTILATION OPERATING HOURS (Hrs/day)	8
TYPE OF HEATING SYSTEM	Unit Heaters
HEATING SYSTEM EFFICIENCY (DOE Seasonal Efficiency)	80.0%
ANNUAL BUILDING HEATING CONSUMPTION (BTU/year)	217,882,216
ANNUAL VENTILATION HEATING CONSUMPTION (BTU/Year)	7,032,285
TOTAL ANNUAL HEATING CONSUMPTION (BTU/Year)	224,914,501
FUEL TYPE (Electricity, Propane, Gas, Fuel Oil, etc.)	Fuel Oil
FUEL UNIT VALUE	Gallon
FUEL HEATING VALUE (BTU/Unit)	138500
COST/UNIT OF FUEL (\$/Unit)	\$5.00
YEARLY FUEL USAGE (Unit/Year)	1,624 Gallon
YEARLY FUEL COST (\$/Year)	\$8,119.66

Building Heat Loss

Project: Alternative 3 - New WTP at the Utility Core Site

Project No.: _____

Calculated By: _____

LOCATION	Tuluksak
ANNUAL HEATING DEGREE DAYS (Based on 65°F Degree Day, DD)	12932
INDOOR DESIGN TEMPERATURE (T_i , °F)	68
OUTDOOR DESIGN TEMPERATURE (T_o , °F)	-27
TOTAL BUILDING HEAT LOAD (Q_L , BTU/Hr)	29,412
VENTILATION HEAT LOAD (Q_v , BTU/Hr)	123984
VENTILATION OPERATING HOURS (Hrs/day)	8
TYPE OF HEATING SYSTEM	Unit Heaters
HEATING SYSTEM EFFICIENCY (DOE Seasonal Efficiency)	80.0%
ANNUAL BUILDING HEATING CONSUMPTION (BTU/year)	120,112,743
ANNUAL VENTILATION HEATING CONSUMPTION (BTU/Year)	7,032,285
TOTAL ANNUAL HEATING CONSUMPTION (BTU/Year)	127,145,028
FUEL TYPE (Electricity, Propane, Gas, Fuel Oil, etc.)	Fuel Oil
FUEL UNIT VALUE	Gallon
FUEL HEATING VALUE (BTU/Unit)	138500
COST/UNIT OF FUEL (\$/Unit)	\$5.00
YEARLY FUEL USAGE (Unit/Year)	918 Gallon
YEARLY FUEL COST (\$/Year)	\$4,590.07

Building Heat Loss

Project: Alternative 3 - Rehabilitated Washeteria

Project No.: _____

Calculated By: _____

LOCATION	Tuluksak
ANNUAL HEATING DEGREE DAYS (Based on 65°F Degree Day, DD)	12932
INDOOR DESIGN TEMPERATURE (T_i , °F)	68
OUTDOOR DESIGN TEMPERATURE (T_o , °F)	-27
TOTAL BUILDING HEAT LOAD (Q_L , BTU/Hr)	50,717
VENTILATION HEAT LOAD (Q_v , BTU/Hr)	123984
VENTILATION OPERATING HOURS (Hrs/day)	8
TYPE OF HEATING SYSTEM	Unit Heaters
HEATING SYSTEM EFFICIENCY (DOE Seasonal Efficiency)	80.0%
ANNUAL BUILDING HEATING CONSUMPTION (BTU/year)	207,118,653
ANNUAL VENTILATION HEATING CONSUMPTION (BTU/Year)	7,032,285
TOTAL ANNUAL HEATING CONSUMPTION (BTU/Year)	214,150,939
FUEL TYPE (Electricity, Propane, Gas, Fuel Oil, etc.)	Fuel Oil
FUEL UNIT VALUE	Gallon
FUEL HEATING VALUE (BTU/Unit)	138500
COST/UNIT OF FUEL (\$/Unit)	\$5.00
YEARLY FUEL USAGE (Unit/Year)	1,546 Gallon
YEARLY FUEL COST (\$/Year)	\$7,731.08

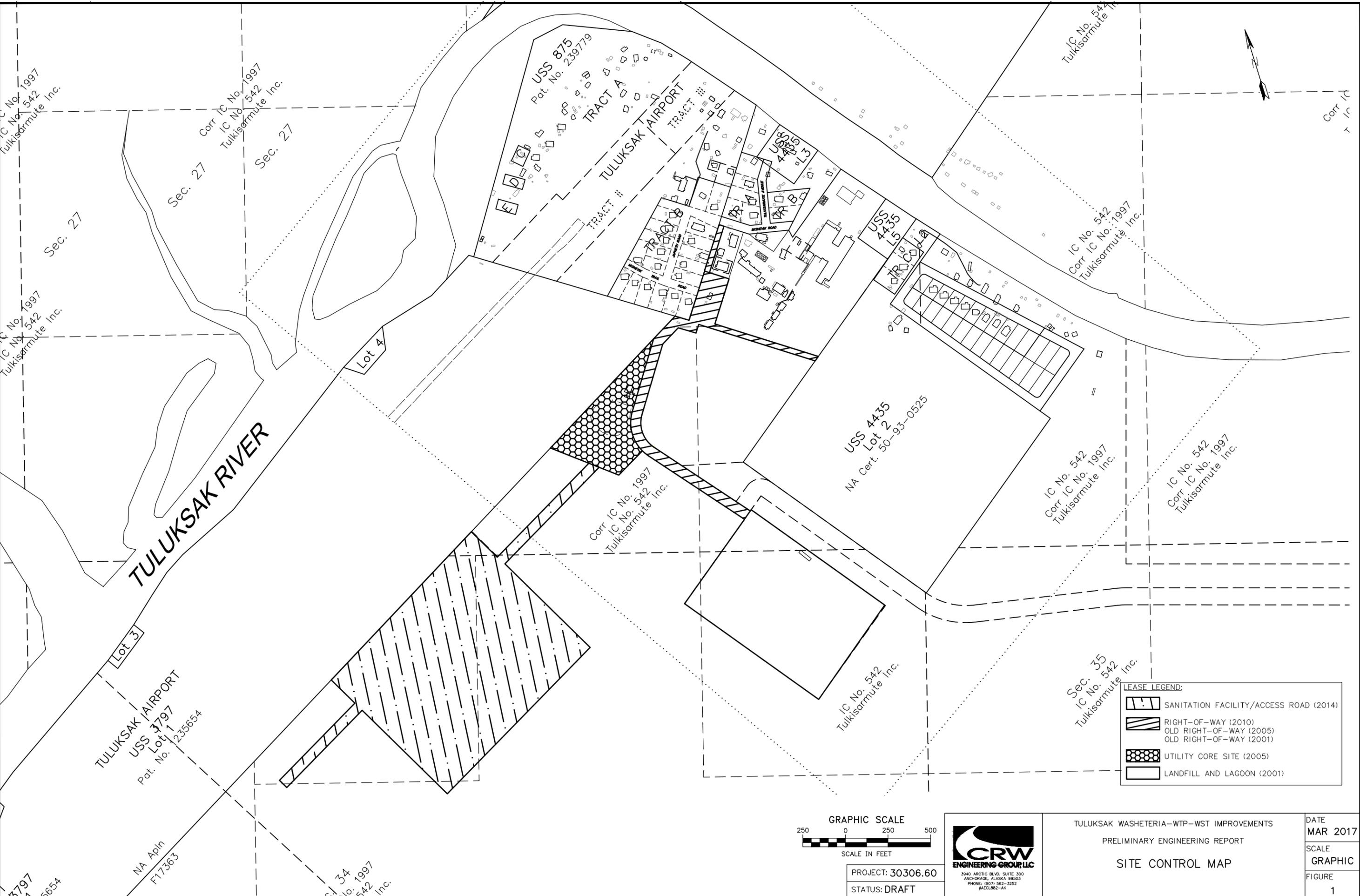
Appendix C

Site Control Documents

Included in this appendix:

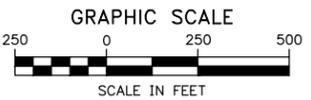
- 1) Survey Control Map (1 page)
- 2) Sanitation Facility/Access Road Lease (7 pages)
- 3) Most Recent Right-of-way Lease (2010) (9 pages)
- 4) Old Right-of-way Lease (2005) (8 pages)
- 5) Old Right-of-way Lease (2001) (8 pages)
- 6) Utility Core Site Lease (8 pages)
- 7) Landfill and Lagoon Lease (8 pages)
- 8) US. Survey No. 3797 (Old Airport Plats) (1 page)
- 9) Old Airport – Department of Transportation Letter (1 page)
- 10) Old Airport – Quitclaim Deed (2 pages)
- 11) U.S. Patent for US Survey No. 3797 lots, 4, 7, and 8 (3 pages)

File: \\crweng\esm\Projects\JobsData\30306.60\ANTHC-Tuluksak Washeteria-WTP\PER\09\CADD\02\Figures\06 Site Control\30306.60 Site Control Map.dwg



LEASE LEGEND:

	SANITATION FACILITY/ACCESS ROAD (2014)
	RIGHT-OF-WAY (2010) OLD RIGHT-OF-WAY (2005) OLD RIGHT-OF-WAY (2001)
	UTILITY CORE SITE (2005)
	LANDFILL AND LAGOON (2001)



PROJECT: 30306.60
STATUS: DRAFT



TULUKSAK WASHETERIA-WTP-WST IMPROVEMENTS
PRELIMINARY ENGINEERING REPORT
SITE CONTROL MAP

DATE
MAR 2017
SCALE
GRAPHIC
FIGURE
1

To be recorded at the Bethel Recording Office
To be returned to:
Tuluksak Native Community
P.O. Box 95
Tuluksak, Alaska 99679

LEASE AGREEMENT
(Community Sanitation Facility and Access Road)

THIS LEASE, made and entered into this 21st day of April, 2014, between Tulkisarmute, Inc., whose address is P.O. Box 65, Tuluksak, Alaska 99679 hereinafter called "LESSOR", and Tuluksak Native Community whose address is P.O. Box 95, Tuluksak, AK 99679, hereinafter called the "LESSEE".

The parties recognize that since the land encompassed by this lease will be used for community use or expansion, such land will eventually be reconveyed under the provisions of Section 14(c)(3) of the Alaska Natives Claims Settlement Act (ANSCA). The purpose of this lease is to serve as an interim measure until such reconveyance takes place.

The parties agree as follows:

1. The Premises. The Lessor hereby leases to the Lessee the surface estate of the real property located within Sections 27 and 34, Township 12 N, Range 66W, Seward Meridian, Alaska, shown on Appendix A to this document, and described as follows:

A PORTION OF TULKISARMUTE, INC. PROPERTY LOCATED WITHIN SECTIONS 27 AND 34, TOWNSHIP 12 NORTH, RANGE 66 WEST, SEWARD MERIDIAN, TULUKSAK, ALASKA, BEING SITUATED WITHIN THE BETHEL RECORDING DISTRICT, STATE OF ALASKA AS SHOWN ON ATTACHEMENT A AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS;

COMMENCING FROM A BRASS CAPPED MONUMENT MARKING CORNER 2, USS 3797, SOUTH 30°26'38" WEST, A DISTANCE OF 997.68' TO THE POINT OF BEGINNING (P.O.B.), THENCE ALONG THE FOLLOWING 12 COURSES:

- 1) S 44°22'00"W, A DISTANCE OF 766.67'
- 2) N 45°38'00"W, A DISTANCE OF 240.06', TO A POINT INTERSECTING THE EASTERLY LINE OF USS 3797

-
- 1,200.00'
- 4) S 45°38'00"E, A DISTANCE OF 240.20'
 - 5) S 44°22'00"W, A DISTANCE OF 633.40'
 - 6) S 45°38'00"E, A DISTANCE OF 60.00'
 - 7) N 44°22'00"E, A DISTANCE OF 633.40'
 - 8) S 45°38'00"E, A DISTANCE OF 699.80'
 - 9) N 44°22'00"E, A DISTANCE OF 1,200.00'
 - 10) N 45°38'00"W, A DISTANCE OF 699.94'
 - 11) N 44°22'00"E, A DISTANCE OF 790.63'
 - 12) N 67°34'11"W, A DISTANCE OF 64.88', TO THE P.O.B., CONTAINING 1,284,656.54 SQUARE FEET (29.5 ACRES) MORE OR LESS.

The legal description may change to conform to a survey or surveys. The Lessee shall commission and obtain a valid plat incorporating an as-built survey, recordable in form, at its own expense, for Lessor's signature, within one year from the date hereof.

2. Purpose of Lease. The sole and exclusive purpose of the lease is the construction, operation, and maintenance of a community sanitation facility and this purpose is subject to all prior existing rights, including rights created by ANCSA in Lessor and third persons, whether or not claiming through Lessor.
3. Term of Lease. The lease term shall be thirty (30) years from the date that this lease is signed by both parties.
4. Termination Upon ANCSA Conveyance.
 - (a) When the Lessor conveys the title to the premises pursuant to Section 14(c)(3) of the ANCSA, this lease shall terminate. Neither the Lessor nor the Lessee shall be entitled to compensation of any kind whatsoever due to the termination of this lease pursuant to this paragraph.
 - (b) In the event that no such conveyance is accomplished during the term of this lease, the Lessee shall have sixty (60) days within which to exercise an option to renew this lease for an additional thirty (30) year term.

5. Rent. The Lessee agrees to pay the Lessor a rent for the premises in the sum of One Dollar (\$1.00) per year, at such office of the Lessor or its agent in the village of Tuluksak, as the Lessor may from time to time designate, on or before the 1st day of January on each and every year during said term.
6. Reservation of Rights. The Lessor reserves the right to grant to others the rights and privileges to use the premises not specifically and exclusively granted to the Lessee. The rights and privileges granted to the Lessee in this lease are the only rights and privileges granted to the Lessee by this lease. The Lessee has no easements, rights to privileges, expressed or implied, other than those specifically granted by this lease.
7. Valid Existing Rights. This lease is entered into and made subject to all valid existing rights, including easements, rights of way, reservations, or other interests in the premises, in existence on the date the lease is entered into.
8. Encumbrance of Premises. During the term of this lease, the Lessee may not assign this lease or sublet the premises, nor enter into any lease, easement, or other obligation of the Lessor's title without the prior written approval of the Lessor. Any such act, without prior written approval of the Lessor, is void as against the Lessor's title to the premises.
9. Subleases. The Lessee shall provide the Lessor with copies of all applications for subleases, assignments, proposals for development, and construction as-builts, as they become available.
10. Successors Bound. All covenants and provisions in this lease extend to and bind the legal representatives, successor, subleases, and assigns of the parties.
11. Access to Premises. The Lessor or its authorized representatives reserve the right of ingress to and egress from the premises.
12. Operation and Maintenance. At no cost to the Lessor, the Lessee will provide all utilities services, and maintenance necessary for the Lessee's use of the premises. The Lessee will take reasonable steps to protect the surface of the leased area and natural resources and improvements thereon and maintain the premises in a reasonable neat and clean condition.
13. Surface Reservation. Unless otherwise stated in this lease, the Lessee may not sell or remove for use elsewhere any of the surface resources of the premises.

subject to any legal action that the Lessor considers appropriate, including the termination of this lease. The Lessor is not liable for any expenditure made by the Lessee in the event of termination of this issue.

- (c) If this lease is terminated by the summary proceedings or in any other manner, or if the premises or any part of it is abandoned by the Lessee during the term of this lease, the Lessor, after written notice to the Lessee, may immediately, or any time afterwards, enter or re-enter and take possession of the premises, or any part of it, without liability for any expenditures made by the Lessee in the event of termination of this lease.

15. No Waiver. The failure of the Lessor to insist on any one or more instance upon the strict performance by the other party of any provision in this lease may not be considered as a waiver for the future: the provision will continue in full force.

16. Indemnity of Lessor. The Lessee shall indemnify and hold the Lessor harmless from:

- (a) All claims and demands for loss or damage, including property damage, personal injury, wrongful death, and wage or employment claims, arising out of or in connection with the use or occupancy of the premises by the Lessee or its successor, or at its invitation; and
- (b) Any accident or fire on the premises; and
- (c) Any nuisance on the premises; and
- (d) Any failure of the Lessee to keep the premises in a safe and lawful condition consistent with applicable laws, regulations, ordinances, or order; and

- 21. Integration and Modification. The lease, including all attachments may not be modified or amended except by a document signed by both parties to this lease. Any amendment or modification, which is not in writing and signed by both parties is of no legal affect.
- 22. Severability of Clauses of Lease. If any provision of this lease is adjudged to be invalid, that judgment does not affect the validity of any other provision of this lease, nor does it constitute any cause of action in favor of either party as against the other.
- 23. Headings. The heading of the numbered paragraphs in this lease shall not be considered in construing any provisions of this lease.

BY SIGNING THIS LEASE, the Lessor and Lessee, agree to be bound by its provisions as set out above.

LESSOR:

LESSEE:

TULKISARMUTE, INCORPORATED

TULUKSAK NATIVE COMMUNITY

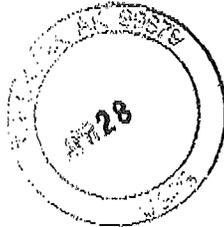
By: 
 Its: President

By: 
 Its: President

ACKNOWLEDGMENT

STATE OF ALASKA)
) ss:
THIRD JUDICIAL DISTRICT)

This is to certify that on April 28, 2014, before me appeared Joe Demantle, known to me to be the LESSOR of TULKISARMUTE, INCORPORATED, who is authorized to sign this lease and who executed this lease and acknowledged voluntarily signing on behalf of TULKISARMUTE, INCORPORATED as Lessor.



Kristy Napoka
NOTARY PUBLIC for the State of Alaska
My Commission Expires: N/A

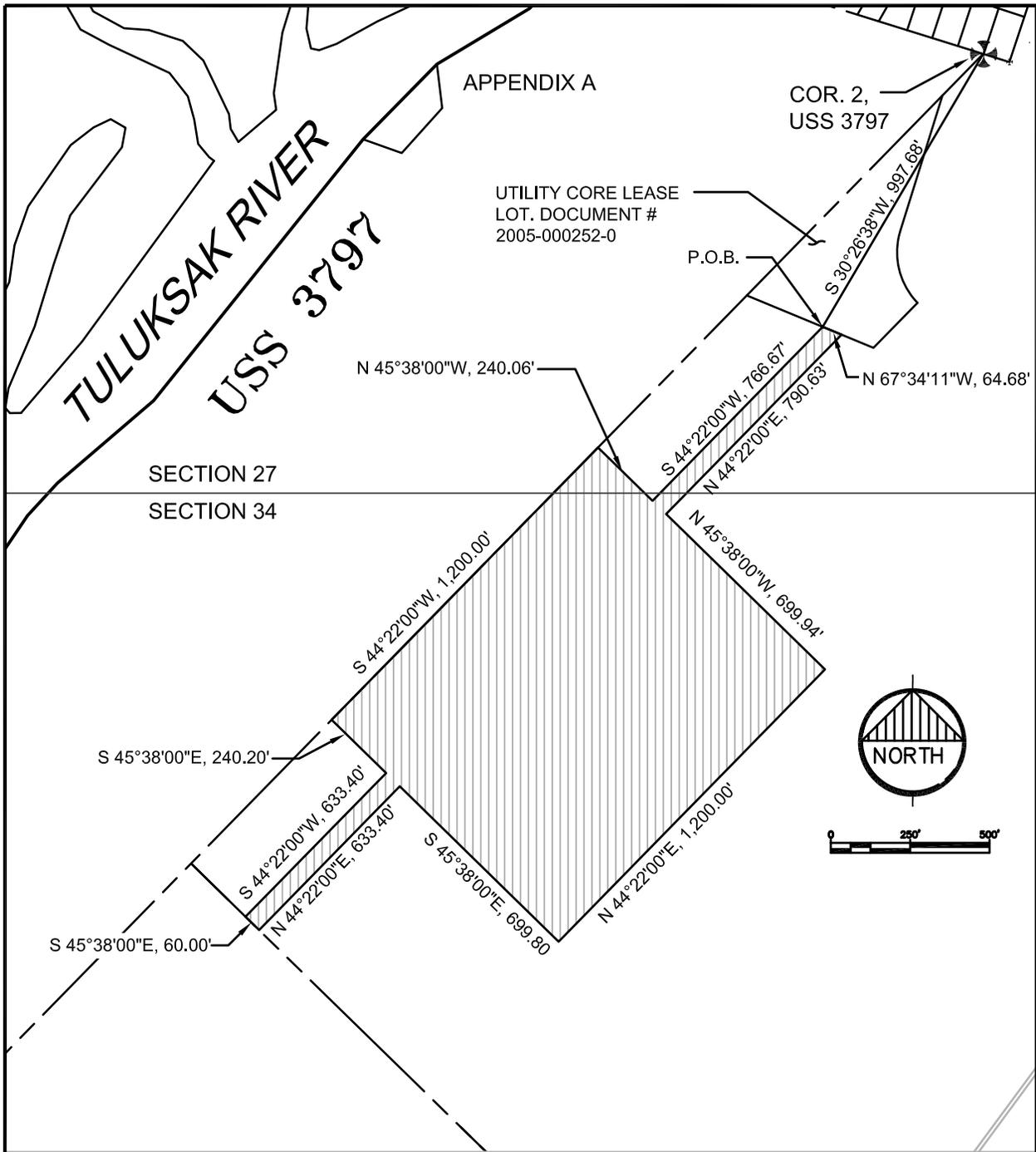
ACKNOWLEDGMENT

STATE OF ALASKA)
) ss:
THIRD JUDICIAL DISTRICT)

This is to certify that on April 28, 2014, before me appeared Peter J. Andrew, known by me to be the Lessee, of TULUKSAK NATIVE COMMUNITY, who is authorized to sign this lease and who executed this lease and acknowledged voluntarily signing it on behalf of TULUKSAK NATIVE COMMUNITY as Lessor.



Kristy Napoka
NOTARY PUBLIC for the State of Alaska
My Commission Expires: N/A



CE2
ENGINEERS,
INC.
 ANCHORAGE, ALASKA

Scale: SEE GRAPHIC SCALE
 Date: 3/31/14
 Drawn: JDJ

TULUKSAK WASTEWATER LAGOON
 APPENDIX A-SITE PLAN

FIG.1

cc

A
L
A
S
K
A

2010-001079-0

Recording Dist: 402 - Bethel

10/27/2010 10:22 AM Pages: 1 of 9



LEASE AGREEMENT

(Right of Way)

THIS LEASE made and entered into this 12 day of October, 2010 between Tulkisarmute, Inc., whose address is P.O. Box 65, Tuluksak, Alaska 99679 hereinafter called "Lessor", and Tuluksak Native Community whose address is P.O. Box 95, Tuluksak, AK 99679, hereinafter called the "Lessee".

The parties recognize that since the land encompassed by this lease will be used for community use or expansion, such land will eventually be reconveyed under the provisions of Section 14(c) (3) of the Alaska Natives Claims Settlement Act (ANSCA). The purpose of this lease is to serve as an interim measure until such reconveyance takes place.

This Lease Agreement releases the previously recorded Lease Agreement for the Right of Way on 2/18/2005 in the Bethel Recording District at 12:58 PM (Document # 2005-000251-0). This Lease Agreement contains a legal description that differs from the legal description contained in the previously recorded document.

The parties agree as follows:

1. The Premises. The Lessor hereby leases to the Lessee the surface estate of an area within un-subdivided Tulkisarmute, Incorporated land to be used as a Right of Way suitable for transportation and general utility uses, as shown on Appendix A to this document, and being further described as follows:

Being a portion of un-surveyed lands and part of Lot 3 Tuluksak School Subdivision located in Sections 27, 34 & 35, Township 12 North, Range 66 West, Seward Meridian, Tuluksak, Alaska, as shown on Exhibit A, and being more particularly described as follows:

Commencing at Corner #2, United States Survey (USS) 875, a 3-1/4 inch, Brass capped monument, and the P.O.B. (Point Of Beginning), as recorded at the U.S. Surveyor General's office in Juneau, Alaska, November 9th, 1909, along the following twenty-one (21) courses:

- a. thence along the Eastern line of said USS 875, North 18 degrees, 11 minutes 50 seconds East, a distance of 302.22 feet to a 2" diameter, aluminum capped monument marking the Southwest-most corner of Lot 3, Tuluksak School Subdivision, as recorded on Plat # 2005-27 at the Bethel recorders office, Bethel Recording District, July 25, 2005;

- b. thence along the westerly line of said Lot 3, North 18 degrees, 11 minutes 50 seconds East, a distance of 285.00 feet to a 2" diameter, aluminum capped monument marking the Northwest most corner of Lot 3, Tuluksak School Subdivision, as recorded on Plat # 2005-27 at the Bethel recorder's office, Bethel Recording District, July 25, 2005;
- c. thence along the northerly line of said Lot 3, South 71 degrees, 48 minutes 50 seconds East 40.00 feet;
- d. Thence parallel to the westerly line of said lot 3, South 18 degrees, 11 minutes 50 seconds West 285.00 feet;
- e. thence along the Southerly line of said Lot 3 of Plat 2005-27, South 71 degrees, 46 minutes 32 seconds East, a distance of 110.00 feet to a 2 inch diameter, aluminum capped monument, marking the Southeasterly corner of said Lot 3 and intersecting the Westerly line of Lot 1 of said Plat 2005-27;
- f. thence along the Westerly line of said Lot 1, South 18 degrees 13 minutes 28 seconds West, a distance of 277.82 feet, to a 2" diameter aluminum capped monument, marking the Southwestern corner of said Lot 1;
- g. thence along the Southern line of said Lot 1, South 71 degrees 44 minutes 19 seconds East, a distance of 637.30 feet to a 2 inch aluminum, capped monument, marking the Southeast corner of said Lot 1, and intersecting the Westerly line of Lot 2, USS 4435, as recorded at the Bethel recorders office, Bethel Recording District, October 20, 1992;
- h. thence along the Westerly line of said Lot 2, South 36 degrees 23 minutes 00 seconds West, a distance of 31.57 feet, to a point;
- i. thence parallel to course 4, North 71 degrees 44 minutes 19 seconds West, a distance of 627.46 feet, to a point;
- j. thence South 18 degrees 13 minutes 28 seconds West, a distance of 55.31 feet, to a point;
- k. thence North 71 degrees 44 minutes 19 seconds West, a distance of 198.69 feet, to a point;
- l. thence South 44 degrees 22 minutes 00 seconds West, a distance of 132.25 feet, to a point;
- m. thence South 17 degrees 18 minutes 09 seconds West, a distance of 431.54 feet, to a point;
- n. thence along a curve to the left, which the Radius is 170.00 feet, the Length of Curve is 216.52 feet and of which the Chord bears South 19 degrees 11 minutes 16 seconds East, a distance of 202.18 feet, to a point;
- o. thence South 55 degrees 40 minutes 31 seconds East, a distance of 678.13 feet, to a point;
- p. thence South 34 degrees 19 minutes 29 seconds West, a distance of 60.00 feet, to a point;
- q. thence North 55 degrees 40 minutes 31 seconds West, a distance of 678.13 feet to a point;



- r. thence along a curve to the right, which the Radius is 230.00 feet, the Length of Curve is 292.94 feet and of which the Chord bears North 19 degrees 11 minutes 16 seconds West, 273.54 feet, to a point on the Southeasterly line of the Utility Core Site Lease as recorded on Document # 2005-000252-0, at the Bethel recorders office, Bethel Recording District;
- s. thence continuing along the Easterly boundary of said Utility Core Site Lease, North 17 degrees 18 minutes 00 seconds East, a distance of 445.95 feet to a point intersecting the Easterly boundary of Lot 1, USS 3797, as accepted by the U.S. Department of Interior, Bureau of Land Management, Washington D.C. on October 10, 1961;
- t. thence along the Easterly boundary of said Lot 1, USS 3797, North 44 degrees 22 minutes 00 seconds East, a distance of 183.37 feet to a 3-1/2", Brass capped monument marking the Northeasterly corner, corner #2, of said USS 3797;
- u. thence along the Southerly boundary of USS 875, South 72 degrees 44 minutes 00 seconds East, a distance of 86.56 feet, to the P.O.B., containing 4.15 acres, more or less.

The legal description may change to conform to a survey or surveys. The Lessee shall commission and obtain a valid plat incorporating an as-built survey, recordable in form, at its own expense, for Lessor's signature, within one year (1) from the date hereof.

- 2. Purpose of Lease. The sole and exclusive purpose of the lease is the construction, operation, and maintenance of a right of way suitable for transportation and general utility uses for access to community sanitation facilities, and this purpose is subject to all prior existing rights, including rights created by ANSCA in Lessor and third persons, whether or not claiming through Lessor.
- 3. Term of Lease. The lease term shall be thirty (30) years from the date that this lease is signed by both parties.
- 4. Termination Upon ANCSA Conveyance.
 - (a) When the Lessor conveys the title to the premises pursuant to Section 14(c)(3) of the ANCSA, this lease shall terminate. Neither the Lessor nor the Lessee shall be entitled to compensation of any kind whatsoever due to the termination of this lease pursuant to this paragraph.
 - (b) In the event that no such conveyance is accomplished during the term of this lease, the Lessee shall have sixty (60) days within which to exercise an option to renew this lease for an additional thirty (30) year term.
- 5. Rent. The Lessee agrees to pay the Lessor a rent for the premises in the sum of One Dollar (\$1.00) per year, at such office of the Lessor or its agent in the village of



Tuluksak, as the Lessor may from time to time designate, on or before the 1st day of January on each and every year during said term.

6. Reservation of Rights. The Lessor reserves the right to grant to others the rights and privileges to use the premises not specifically and exclusively granted to the Lessee. The rights and privileges granted to the Lessee in this lease are the only rights and privileges granted to the Lessee by this lease. The Lessee has no easements, rights to privileges, expressed or implied other than those specifically granted by this lease.
7. Valid Existing Rights. This lease is entered into and made subject to all valid existing rights, including easements, rights of way, reservations, or other interests in the premises, in existence on the date the lease is entered into.
8. Encumbrance of Premises. During the term of this lease, the Lessee may not assign this lease or sublet the premises, nor enter into any lease, easement, or other obligation of the Lessor's title without the prior written approval of the Lessor. Any such act, without prior written approval of the Lessor, is void as against the Lessor's title to the premises.
9. Subleases. The Lessee shall provide the Lessor with copies of all applications for subleases, assignments, proposals for development, and construction as-builts, as they become available.
10. Successors Bound. All covenants and provisions in this lease extend to and bind the legal representatives, successor, subleases, and assigns of the parties.
11. Access to Premises. The Lessor or its authorized representatives reserve the right of ingress to and egress from the premises.
12. Operation and Maintenance. At no cost to the Lessor, the Lessee will provide all utilities services, and maintenance necessary for the Lessee's use of the premises. The Lessee will take reasonable steps to protect the surface of the leased area and natural resources and improvements thereon and maintain the premises in a reasonable neat and clean condition.
13. Surface Reservation. Unless otherwise stated in this lease, the Lessee may not sell or remove for use elsewhere any of the surface resources of the premises.
14. Breach and Remedies.
 - (a) The premises are to be used only for the purpose of a right of way suitable for transportation and general utility uses and for no other purpose without specific written authorization of the Lessor. The Lessor retains the right to



terminate this lease upon thirty (30) day's written notice if the premises are used for unauthorized purposes.

- (b) Time is of the essence in this lease. If the Lessee breaches any provision of this lease, other than a breach for improper use of the premises which is governed by subparagraph (a), and the breach is not remedied within thirty (30) days after written notice of it has been served on the Lessee, the Lessee is subject to any legal action that the Lessor considers appropriate, including the termination of this lease. The Lessor is not liable for any expenditure made by the Lessee in the event of termination of this issue.
- (c) If this lease is terminated by the summary proceedings or in any other manner, or if the premises or any part of it is abandoned by the Lessee during the term of this lease, the Lessor, after written notice to the Lessee, may immediately, or any time afterwards, enter or re-enter and take possession of the premises, or any part of it, without liability for any expenditures made by the Lessee in the event of termination of this lease.

15. No Waiver. The failure of the Lessor to insist on any one or more instance upon the strict performance by the other party of any provision in this lease may not be considered as a waiver for the future: the provision will continue in full force.

16. Indemnity of Lessor. The Lessee shall indemnify and hold the Lessor harmless from:

- (a) All claims and demands for loss or damage, including property damage, personal injury, wrongful death, and wage or employment claims, arising out of or in connection with the use or occupancy of the premises by the Lessee or its successor, or at its invitation; and
- (b) Any accident or fire on the premises; and
- (c) Any nuisance on the premises; and
- (d) Any failure of the Lessee to keep the premises in a safe and lawful condition consistent with applicable laws, regulations, ordinances, or order; and
- (e) Any assignment, sublease, or conveyance, attempted or successful, by the Lessee, which is contrary to the provisions of this lease.
- (f) The Lessee will keep all goods, materials, furniture, fixtures, equipment, machinery, and other property on the premises at its sole risk, and will hold the Lessor harmless from any claim of loss or damage to them by any cause.



17. Notice of Claim. The parties agree to immediately notify each other of any claim, demand, or lawsuit arising out of or affecting the Lessee's occupation or use of the premises. Both parties will fully cooperate in the investigation and litigation of any claim, demand, and lawsuit affecting the premises.
18. Laws and Taxes. At no expense to the Lessor, the Lessee will conduct all activities authorized by this lease in compliance with all federal, state, and local laws ordinances, rules and regulations now or hereafter in care, operation, and maintenance, including but not limited to matters of health, safety, sanitation, and pollution. The acquisition of any necessary licenses or permits and payment of any taxes and special assessments accruing against the premises during this lease term will be the responsibility of the Lessee or its sublease and not that of the Lessor.
19. Notices. All notices and other writings required or permitted by this lease must be sent by registered or certified mail, postage prepaid, to the parties at the following addresses. A party must notify the other in writing of any changes of address.

LESSOR:
TULKISARMUTE, INCORPORATED
P.O. BOX 65
TULUKSAK, AK 99679

LESSEE:
TULUKSAK NATIVE COMMUNITY
P.O. BOX 95
TULUKSAK, AK 99679

20. Denial of Warranty Concerning Title or Conditions. The Lessor make no specific warranties, expressed or implied, concerning the title or condition of the premises, including survey, access, or suitability for any use, including those uses authorized by this lease. The Lessee leases the premises subject to any and all of the covenants, terms, and conditions affecting the Lessor's title to the premises.
21. Integration and Modification. The lease, including all attachments may not be modified or amended except by a document signed by both parties to this lease. Any amendment or modification, which is not in writing and signed by both parties is of no legal affect.
22. Severability of Clauses of Lease. If any provision of this lease is adjudged to be invalid, that judgment does not affect the validity of any other provision of this lease, nor does it constitute any cause of action in favor of either party as against the other.
23. Headings. The heading of the numbered paragraphs in this lease shall not be considered in construing any provisions of this lease.



BY SIGNING THIS LEASE, the Lessor and Lessee, agree to be bound by its provisions as set out above.

LESSOR:

LESSEE:

TULKISARMUTE, INCORPORATED

TULUKSAK NATIVE COMMUNITY

By: Wasceca Fly

By: Joseph Alehe

Its: Vice-President

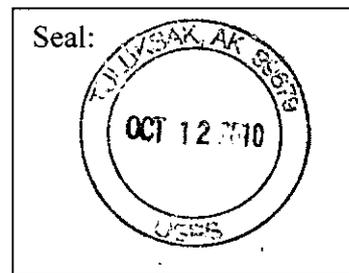
Its: President

ACKNOWLEDGMENT

STATE OF ALASKA)
) ss:
THIRD JUDICIAL DISTRICT)

This is to certify that on the 12 day of Oct, 2010, before me appeared Wasceca Fly, known to me to be the vice president, of **TULKISARMUTE, INCORPORATED**, who is authorized to sign this lease and who executed this lease and acknowledged voluntarily signing on behalf of **TULKISARMUTE, INCORPORATED** as Lessor.

Heathey Rogers
NOTARY PUBLIC for the State of Alaska
My Commission Expires: unknown

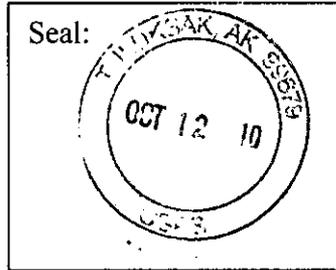


ACKNOWLEDGMENT

STATE OF ALASKA)
) ss:
THIRD JUDICIAL DISTRICT)

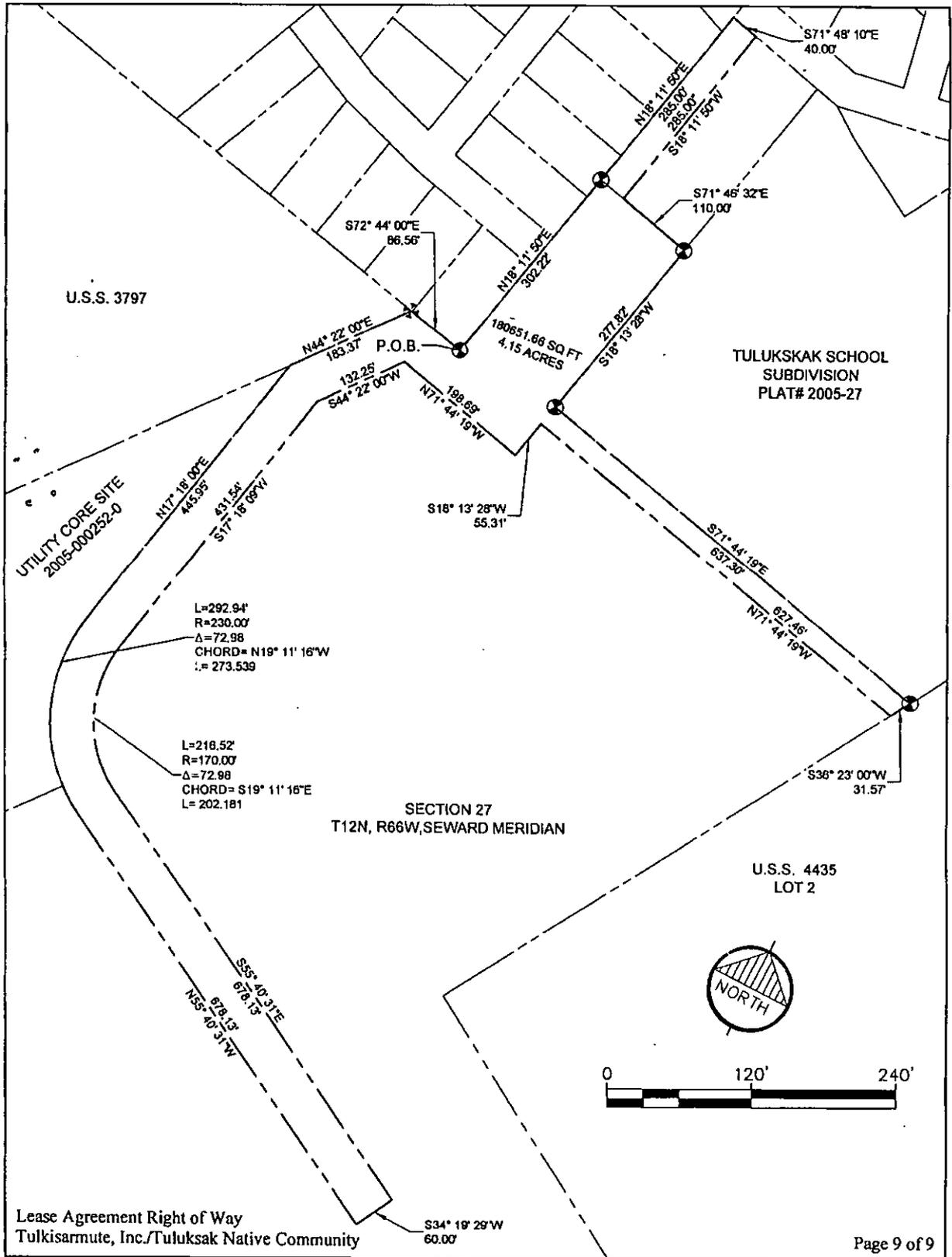
This is to certify that on the 12 day of Oct, 2010, before me appeared Joseph Alexie, known by me to be the President, of **TULUKSAK NATIVE COMMUNITY**, who is authorized to sign this lease and who executed this lease and acknowledged voluntarily signing it on behalf of **TULUKSAK NATIVE COMMUNITY** as Lessor.

Kenneth M. ...
NOTARY PUBLIC for the State of Alaska
My Commission Expires: Unknown



To be recorded at the Bethel Recording District
To be returned to:
Tuluksak Native Community
P.O. Box 95
Tuluksak, Alaska 99679





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To be recorded at the Bethel Recording Office
To be returned to:
Tuluksak Native Community
P.O. Box 95
Tuluksak, Alaska 99679

LEASE AGREEMENT

(Right of Way)

THIS LEASE, made and entered into this 18th day of February, 2005 between Tulkisarmute, Inc., whose address is P.O. Box 65, Tuluksak, Alaska 99679 hereinafter called "LESSOR", and Tuluksak Native Community whose address is P.O. Box 95, Tuluksak, AK 99679, hereinafter called the "LESSEE".

The parties recognize that since the land encompassed by this lease will be used for community use or expansion, such land will eventually be reconveyed under the provisions of Section 14(c)(3) of the Alaska Natives Claims Settlement Act (ANSCA). The purpose of this lease is to serve as an interim measure until such reconveyance takes place.

This Lease Agreement releases the previously recorded Lease Agreement for the Right of Way on 5/22/2003 in the Bethel Recording District at 9:59 AM (Document # 2003-001056-0). This Lease Agreement contains a legal description that differs from the legal description contained in the previously recorded document.

The parties agree as follows:

1. The Premises. The Lessor hereby leases to the Lessee the surface estate of an area within unsubdivided Tulkisarmute, Incorporated land to be used as a Right of Way suitable for transportation and general utility uses, as shown on Appendix A to this document, and being further described as follows:

Being a portion of unsurveyed Tulkisarmute, Inc. property located in Section 27, Township 12 North, Range 66 West, Seward Meridian, Tuluksak, Alaska, being more particularly described as follows:

Beginning at corner No. 2, Tract B, U.S. Survey No. 875, and the Point of Beginning; thence along the southerly boundary of said U.S.S. No. 875, North 72 degrees 42 minutes 00 seconds West, a distance of 86.56 feet, to corner No. 2, U.S. Survey No. 3797; thence along the easterly boundary of

said U.S.S. No. 3797, South 44 degrees 22 minutes 00 seconds West, a distance of 183.37 feet to a point; thence across unsurveyed Tulkisarmute, Inc. property South 17 degrees 18 minutes 00 seconds, a distance of 445.95 feet to a point; thence along a curve to the left, of which the Radius is 230.00 feet, the Length is 292.94 feet and the Chord bears South 19 degrees 11 minutes 15 seconds East to a point; thence South 55 degrees 40 minutes 31 seconds East, a distance of 690.77 feet to a point; thence North 35 degrees 28 minutes 18 seconds East, a distance of 60.00 feet to a point; thence North 55 degrees 40 minutes 31 seconds West a distance of 691.97 feet to a point; thence along a curve to the right, the Radius of which is 170.00 feet, the Length is 216.52 and the Chord bears North 19 degrees 11 minutes 15 seconds West, to a point; thence North 17 degrees 18 minutes 00 seconds East, a distance of 549.24 feet to a point; thence South 72 degrees 42 minutes 00 seconds East, a distance of 170.00 feet, to a point; thence North 17 degrees 18 minutes 00 seconds East, a distance of 135.00 feet, to a point; thence North 72 degrees 42 minutes 00 seconds West, a distance of 60.00 feet, to a point; thence South 17 degrees 18 minutes 00 seconds, a distance of 75.00 feet, to the Point of Beginning, containing 2.32 acres, more or less.

The legal description may change to conform to a survey or surveys. The Lessee shall commission and obtain a valid plat incorporating an as-built survey, recordable in form, at its own expense, for Lessor's signature, within one year (1) from the date hereof.

2. Purpose of Lease. The sole and exclusive purpose of the lease is the construction, operation, and maintenance of a right of way suitable for transportation and general utility uses for access to community sanitation facilities, and this purpose is subject to all prior existing rights, including rights created by ANCSA in Lessor and third persons, whether or not claiming through Lessor.
3. Term of Lease. The lease term shall be thirty (30) years from the date that this lease is signed by both parties.
4. Termination Upon ANCSA Conveyance.
 - (a) When the Lessor conveys the title to the premises pursuant to Section 14(c)(3) of the ANCSA, this lease shall terminate. Neither the Lessor nor the Lessee shall be entitled to compensation of any kind whatsoever due to the termination of this lease pursuant to this paragraph.



(b) In the event that no such conveyance is accomplished during the term of this lease, the Lessee shall have sixty (60) days within which to exercise an option to renew this lease for an additional thirty (30) year term.

5. Rent. The Lessee agrees to pay the Lessor a rent for the premises in the sum of One Dollar (\$1.00) per year, at such office of the Lessor or its agent in the village of Tuluksak, as the Lessor may from time to time designate, on or before the 1st day of January on each and every year during said term.
6. Reservation of Rights. The Lessor reserves the right to grant to others the rights and privileges to use the premises not specifically and exclusively granted to the Lessee. The rights and privileges granted to the Lessee in this lease are the only rights and privileges granted to the Lessee by this lease. The Lessee has no easements, rights to privileges, expressed or implied, other than those specifically granted by this lease.
7. Valid Existing Rights. This lease is entered into and made subject to all valid existing rights, including easements, rights of way, reservations, or other interests in the premises, in existence on the date the lease is entered into.
8. Encumbrance of Premises. During the term of this lease, the Lessee may not assign this lease or sublet the premises, nor enter into any lease, easement, or other obligation of the Lessor's title without the prior written approval of the Lessor. Any such act, without prior written approval of the Lessor, is void as against the Lessor's title to the premises.
9. Subleases. The Lessee shall provide the Lessor with copies of all applications for subleases, assignments, proposals for development, and construction as-builts, as they become available.
10. Successors Bound. All covenants and provisions in this lease extend to and bind the legal representatives, successor, subleases, and assigns of the parties.
11. Access to Premises. The Lessor or its authorized representatives reserve the right of ingress to and egress from the premises.
12. Operation and Maintenance. At no cost to the Lessor, the Lessee will provide all utilities services, and maintenance necessary for the Lessee's use of the premises. The Lessee will take reasonable steps to protect the surface of the leased area and natural resources and



improvements thereon and maintain the premises in a reasonable neat and clean condition.

13. Surface Reservation. Unless otherwise stated in this lease, the Lessee may not sell or remove for use elsewhere any of the surface resources of the premises.

14. Breach and Remedies.

(a) The premises are to be used only for the purpose of a right of way suitable for transportation and general utility uses and for no other purpose without specific written authorization of the Lessor. The Lessor retains the right to terminate this lease upon thirty (30) day's written notice if the premises are used for unauthorized purposes, or if they cease to be used for the construction and maintenance of a sanitary landfill and sewage lagoon purposes.

(b) Time is of the essence in this lease. If the Lessee breaches any provision of this lease, other than a breach for improper use of the premises which is governed by subparagraph (a), and the breach is not remedied within thirty (30) days after written notice of it has been served on the Lessee, the Lessee is subject to any legal action that the Lessor considers appropriate, including the termination of this lease. The Lessor is not liable for any expenditure made by the Lessee in the event of termination of this issue.

(c) If this lease is terminated by the summary proceedings or in any other manner, or if the premises or any part of it is abandoned by the Lessee during the term of this lease, the Lessor, after written notice to the Lessee, may immediately, or any time afterwards, enter or re-enter and take possession of the premises, or any part of it, without liability for any expenditures made by the Lessee in the event of termination of this lease.

15. No Waiver. The failure of the Lessor to insist on any one or more instance upon the strict performance by the other party of any provision in this lease may not be considered as a waiver for the future: the provision will continue in full force.

16. Indemnity of Lessor. The Lessee shall indemnify and hold the Lessor harmless from:

(a) All claims and demands for loss or damage, including property damage, personal injury, wrongful death, and wage or employment claims, arising out



of or in connection with the use or occupancy of the premises by the Lessee or its successor, or at its invitation; and

- (b) Any accident or fire on the premises; and
- (c) Any nuisance on the premises; and
- (d) Any failure of the Lessee to keep the premises in a safe and lawful condition consistent with applicable laws, regulations, ordinances, or order; and
- (e) Any assignment, sublease, or conveyance, attempted or successful, by the Lessee, which is contrary to the provisions of this lease.
- (f) The Lessee will keep all goods, materials, furniture, fixtures, equipment, machinery, and other property on the premises at its sole risk, and will hold the Lessor harmless from any claim of loss or damage to them by any cause.

17. Notice of Claim. The parties agree to immediately notify each other of any claim, demand, or lawsuit arising out of or affecting the Lessee's occupation or use of the premises. Both parties will fully cooperate in the investigation and litigation of any claim, demand, lawsuit affecting the premises.

18. Laws and Taxes. At no expense to the Lessor, the Lessee will conduct all activities authorized by this lease in compliance with all federal, state, and local laws ordinances, rules and regulations now or hereafter in care, operation, maintenance, and protection of the sanitary landfill and sewage lagoon, including but not limited to matters of health, safety, sanitation, and pollution. The acquisition of any necessary licenses or permits and payment of any taxes and special assessments accruing against the premises during this lease term will be the responsibility of the Lessee or its sublease and not that of the Lessor.

19. Notices. All notices and other writings required or permitted by this lease must be sent by registered or certified mail, postage prepaid, to the parties at the following addresses. A party must notify the other in writing of any changes of address.



LESSOR:

LESSEE:

TULKISARMUTE, INCORPORATED
P.O. BOX 65
TULUKSAK, AK 99679

TULUKSAK NATIVE COMMUNITY
P.O. BOX 95
TULUKSAK, AK 99679

- 20. Denial of Warranty Concerning Title or Conditions. The Lessor make no specific warranties, expressed or implied, concerning the title or condition of the premises, including survey, access, or suitability for any use, including those uses authorized by this lease. The Lessee leases the premises subject to any and all of the covenants, terms, and conditions affecting the Lessor's title to the premises.
- 21. Integration and Modification. The lease, including all attachments may not be modified or amended except by a document signed by both parties to this lease. Any amendment or modification, which is not in writing and signed by both parties is of no legal affect.
- 22. Severability of Clauses of Lease. If any provision of this lease is adjudged to be invalid, that judgment does not affect the validity of any other provision of this lease, nor does it constitute any cause of action in favor of either party as against the other.
- 23. Headings. The heading of the numbered paragraphs in this lease shall not be considered in construing any provisions of this lease.

BY SIGNING THIS LEASE, the Lessor and Lessee, agree to be bound by its provisions as set out above.

LESSOR:

LESSEE:

TULKISARMUTE, INCORPORATED

TULUKSAK NATIVE COMMUNITY

By: *[Signature]*

By: *Moses K. Pajon*

Its: *Tulkisarmute, Inc. Chair*

Its: *Village Council President*



ACKNOWLEDGMENT

STATE OF ALASKA)
) ss:
THIRD JUDICIAL DISTRICT)

This is to certify that on the 18th day of FEB, 2005, before me appeared Robert Peter, known to me to be the Tuluksak INC, of TULKISARMUTE, INCORPORATED, who is authorized to sign this lease and who executed this lease and acknowledged voluntarily signing on behalf of TULKISARMUTE, INCORPORATED as Lessor.

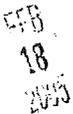


Nellie C Alexio
NOTARY PUBLIC for the State of Alaska
My Commission Expires: _____

ACKNOWLEDGMENT

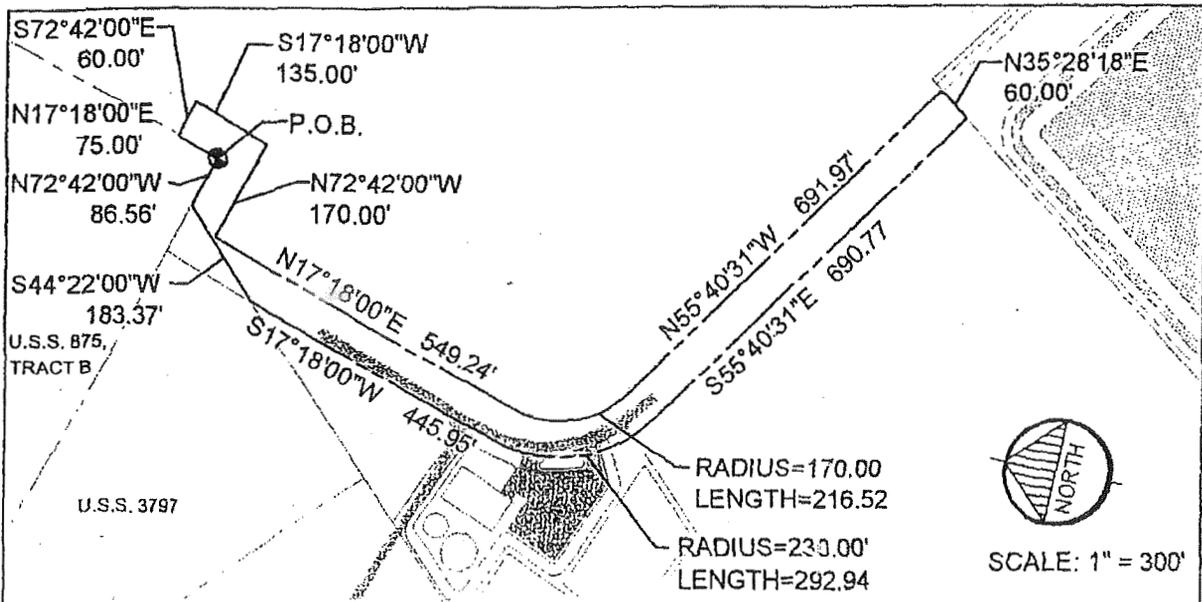
STATE OF ALASKA)
) ss:
THIRD JUDICIAL DISTRICT)

This is to certify that on the 18th day of Feb, 2005, before me appeared Moses K Peter, known by me to be the Village Council Pres. of TULUKSAK NATIVE COMMUNITY, who is authorized to sign this lease and who executed this lease and acknowledged voluntarily signing it on behalf of TULUKSAK NATIVE COMMUNITY as Lessor.



Nellie C Alexio
NOTARY PUBLIC for the State of Alaska
My Commission Expires: _____





RIGHT OF WAY DESCRIPTION

Description of an area affecting the Tulkisarmute, Inc. property, to be dedicated as a right of way, being further described as follows.

Owner: Tulkisarmute, Incorporated.

Being a portion of unsurveyed Tulkisarmute, Inc. property located in Section 27, Township 12 North, Range 66 West, Seward Meridian, Tuluksak, Alaska, being more particularly described as follows:

Beginning at corner No. 2, Tract B, U.S. Survey No. 875, and the Point of Beginning; thence along the southerly boundary of said U.S.S. No. 875, North 72 degrees 42 minutes 00 seconds West, a distance of 86.56 feet, to corner No. 2, U.S. Survey No. 3797; thence along the easterly boundary of said U.S.S. No. 3797, South 44 degrees 22 minutes 00 seconds West, a distance of 183.37 feet to a point; thence across unsurveyed Tulkisarmute, Inc. property South 17 degrees 18 minutes 00 seconds, a distance of 445.95 feet to a point; thence along a curve to the left, of which the Radius is 230.00 feet, the Length is 292.94 feet and the Chord bears South 19 degrees 11 minutes 15 seconds East to a point; thence South 55 degrees 40 minutes 31 seconds East, a distance of 690.77 feet to a point; thence North 35 degrees 28 minutes 18 seconds East, a distance of 60.00 feet to a point; thence North 55 degrees 40 minutes 31 seconds West a distance of 691.97 feet to a point; thence along a curve to the right, the Radius of which is 170.00 feet, the Length is 216.52 and the Chord bears North 19 degrees 11 minutes 15 seconds West, to a point; thence North 17 degrees 18 minutes 00 seconds East, a distance of 549.24 feet to a point; thence South 72 degrees 42 minutes 00 seconds East, a distance of 170.00 feet, to a point; thence North 17 degrees 18 minutes 00 seconds East, a distance of 135.00 feet, to a point; thence North 72 degrees 42 minutes 00 seconds West, a distance of 60.00 feet, to a point; thence South 17 degrees 18 minutes 00 seconds, a distance of 75.00 feet, to the Point of Beginning, containing 2.32 acres, more or less





To be recorded at the Bethel Recording Office
 To be returned to:
 Tuluksak Native Community
 P.O. Box 95
 Tuluksak, Alaska 99679

LEASE AGREEMENT (Right-of-Way)

THIS LEASE, made and entered into this 13th day of July, 2001, between Tulkisarmute, Inc., whose address is P.O. Box 65, Tuluksak, Alaska, 99679 hereinafter called "LESSOR", and Native Village of Tuluksak whose address is P.O. Box 95, Tuluksak, AK 99679, hereinafter called the "LESSEE".

The parties recognize that since the land encompassed by this lease will be used for community use or expansion, such land will eventually be reconveyed under the provisions of Section 14(c)(3) of the Alaska Natives Claims Settlement Act (ANSCA). The purpose of this lease is to serve as an interim measure until such reconveyance takes place.

The parties agree as follows:

1. The Premises. The Lessor hereby leases to the Lessee the surface estate of the following real property which is located within Section 27, Township 12N, Range 66W, Seward Meridian, Alaska.

A portion of unsurveyed lands located in Section 27, Township 12 North, Range 66 West, Seward Meridian, Alaska, being more particularly described as follows:

Commencing at Cor. #5 of U.S. Survey 4435; thence along the southerwesterly boundary of said U.S. Survey 4435, South 54 degrees 31 minutes 42 seconds East, a distance of 200.00 feet o a point; thence leaving said southewesterly boundary, over said unsurveyed lands, South 35 degrees 28 minutes 18 seconds West, a distance of 225.20 feet to the True Point of Beginning; thence continuing across said unsurveyed lands the following three (3) courses: South 35 degrees 28 minutes 18 seconds West, a distance of 60.00 feet to a point; thence North 54 degrees 31 minutes 42 seconds West, a distance of 706.54 feet to a point; thence along the arc of a circular curve to the right, the radius of which is 230.00 feet, with a delta of 72 degrees 25 minutes 41 seconds, a length of 290.74 feet and a tangent of 168.77 feet to a point; thence continuing over said unsurveyed lands and over a portion of U.S. Survey 3797, North 17 degrees 53 minutes 59 seconds East, a distance of 591.65 feet to a point on the common boundary between said U.S. Survey 3797 and U.S. Survey 875; thence along the southerly boundary of said U.s. Sruvey 875, South 72 degrees 06 minutes 01 seconds East, a distance of 170.02 feet (passing Cor. #2 of said U.S. Survey 3797 at 83.47 feet) to Cor. #2 of said U.S. Survey 875; thence leaving said easterly boundary over said unsurveyed lands the following six (6) courses: South 71 degrees 12 minutes 11 seconds East, a distance of 60.00 feet to a point; thence South 18 degrees 47 minutes 49 seconds West, a distance of 134.91 feet to a point; thence North 72 degrees 06 minutes 01 seconds West,

a distance of 169.09 feet to a point; thence South 17 degrees 53 minutes 59 seconds West, a distance of 531.65 feet to a point; thence along the arc of a circular curve to the left; the radius of which is 170.00 feet, with a delta of 72 degrees 25 minutes 41 seconds, a length of 214.90 feet and a tangent of 124.49 feet to a point; thence South 54 degrees 31 minutes 42 seconds East, a distance of 706.54 feet to the True Point of Beginning, containing 2.47 acres of land more or less.

The legal description may change to conform to a survey or surveys. The Lessee shall commission and obtain a valid plat incorporating an as built survey, recordable in form, at its own expense, for Lessor's signature, within one (1) year from the date hereof.

2. Purpose of Lease. The sole and exclusive purpose of this lease is the construction, operation and maintenance of a Right-of-Way over and across Lessor's lands to provide Lessee access to a utility core and sanitary landfill and sewage lagoon site, and this purpose is subject to all prior existing rights, including rights created by ANCSA in Lessor and third persons, whether or not claiming through Lessor.

3. Term of Lease. The lease term shall be thirty (30) years from the date that this lease is signed by both parties.

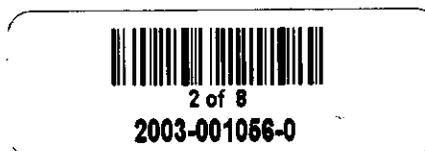
4. Termination Upon ANCSA Conveyance.

(a) When the Lessor conveys the title to the premises pursuant to Section 14(c)(3) of the ANCSA, this lease shall terminate. Neither the Lessor nor the Lessee shall be entitled to compensation of any kind whatsoever due to the termination of this lease pursuant to this paragraph.

(b) In the event that no such conveyance is accomplished during the term of this lease, the Lessee shall have sixty (60) days within which to exercise an option to renew this lease for an additional thirty (30) year term.

5. Rent. The Lessee agrees to pay the Lessor a rent for the premises in the sum of One Dollars (\$1.00) per year, at such office of the Lessor or its agent in the village of Tuluksak, as the Lessor may from time to time designate, on or before the 1st day of January on each and every year during the said term.

6. Reservation of Rights. The Lessor reserves the right to grant to others the rights and privileges to use the premises not specifically and exclusively granted to the Lessee. The rights and privileges granted to the Lessee in this lease are the only rights and privileges granted to the Lessee by this lease. The Lessee has no easements, rights to privileges,



expressed or implied, other than those specifically granted by this lease.

7. Valid Existing Rights. This lease is entered into and made subject to all valid existing rights, including easements, rights of way, reservations, or other interests in the premises, in existence on the date the lease is entered into.

8. Encumbrance of Premises. During the term of this lease, the Lessee may not assign this lease or sublet the premises, nor enter into any lease, easement, or other obligation of the Lessor's title without the prior written approval of the Lessor. Any such act, without prior written approval of the Lessor, is void as against the Lessor's title to the premises.

9. Subleases. The Lessee shall provide the Lessor with copies of all applications for subleases, assignments, proposals for development, and construction as-builts, as they become available.

10. Successors Bound. All covenants and provisions in this lease extend to and bind the legal representatives, successor, subleases, and assigns of the parties.

11. Access to Premises. The Lessor or its authorized representatives reserve the right of ingress to and egress from the premises.

12. Operation and Maintenance. At no cost to the Lessor, the Lessee will provide all utilities services, and maintenance necessary for the Lessee's use of the premises. The Lessee will take reasonable steps to protect the surface of the leased area and natural resources and improvements thereon and maintain the premises in a reasonable neat and clean condition.

13. Surface Reservation. Unless otherwise stated in this lease, the Lessee may not sell or remove for use elsewhere any of the surface resources of the premises.

14. Breach and Remedies.

- (a) The premises are to be used only for the purpose of construction, operation and maintenance of a Right-of-Way, over and across Lessor's lands to provide Lessee access to a utility core and sanitary landfill and sewage lagoon site and for no other purpose without specific written authorization of the Lessor. The Lessor retains the right to terminate this lease upon thirty (30) days' written notice if the premises are used for unauthorized purposes, or if they cease to be used for the construction, operation and maintenance of a Right-of-Way over and across Lessor's lands to provide Lessee access to a utility core and sanitary landfill and sewage lagoon site purposes.

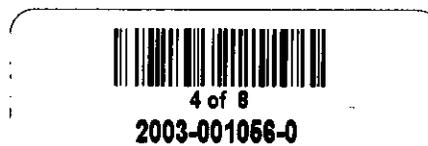


- (b) Time is of the essence in this lease. If the Lessee breaches any provision of this lease, other than a breach for improper use of the premises which is governed by subparagraph (a), and the breach is not remedied without thirty (30) days after written notice of it has been served on the Lessee, the Lessee is subject to any legal action that the Lessor considers appropriate, including the termination of this lease. The Lessor is not liable for any expenditure made by the Lessee in the event of termination of this issue.
- (c) If this lease is terminated by summary proceedings or in any other manner, or if the premises or any part of it is abandoned by the Lessee during the term of this lease, the Lessor, after written notice to the Lessee, may immediately, or any time afterwards, enter or re-enter and take possession of the premises, or any part of it, without liability for any expenditures made by the Lessee in the event of termination of this lease.

15. No Waiver. The failure of the Lessor to insist on any one or more instance upon the strict performance by the other party of any provision in this lease may not be considered as a waiver for the future; the provision will continue in full force.

16. Indemnity of Lessor. The Lessee shall indemnify and hold the Lessor harmless from:

- (a) all claims and demands for loss or damage, including property damage, personal injury, wrongful death, and wage or employment claims, arising out of or in connection with the use or occupancy of the premises by the Lessee or its successor, or at its invitation; and
- (b) any accident or fire on the premises; and
- (c) any nuisance on the premises; and
- (d) any failure of the Lessee to keep the premises in a safe and lawful condition consistent with applicable laws, regulations, ordinances, or orders; and
- (e) any assignment, sublease, or conveyance, attempted or successful, by the Lessee which is contrary to the provisions of this lease.
- (f) the Lessee will keep all goods, materials, furniture, fixtures, equipment, machinery, and other property on the premises at its sole risk, and will hold the Lessor harmless from any claim of loss or damage to them by any cause.



17. Notice of Claim. The parties agree to immediately notify each other of any claim, demand, or lawsuit arising out of or affecting the Lessee's occupation or use of the premises. Both parties will fully cooperate in the investigation and litigation of any claim, demand, or lawsuit affecting the premises.

18. Laws and Taxes. At no expense to the Lessor, the Lessee will conduct all activities authorized by this lease in compliance with all federal, state, and local laws, ordinances, rules and regulations now or hereafter in care, and protection of the construction, operation and maintenance of a Right-of-Way, over and across Lessor's lands to provide Lessee access to a utility core and sanitary landfill and sewage lagoon site, including but not limited to matters of health, safety, sanitation, and pollution. The acquisition of any necessary licenses or permits and payment of any taxes and special assessments accruing against the premises during this lease term will be the responsibility of the Lessee or its sublease and not that of the Lessor.

19. Notices. All notices and other writings required or permitted by this lease must be sent by registered or certified mail, postage prepaid, to the parties at the following addresses. A party must notify the other in writing of any change of address.

LESSOR:

TULKISARMUTE, INCORPORATED
P.O. BOX 65
TULUKSAK, AK 99679

LESSEE:

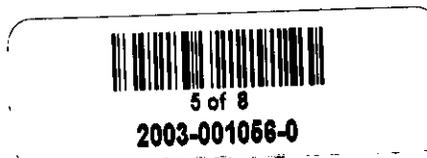
NATIVE VILLAGE OF TULUKSAK
P.O. BOX 95
TULUKSAK, AK 99679

20. Denial of Warranty Concerning Title or Conditions. The Lessor make no specific warranties, expressed or implied, concerning the title or condition of the premises, including survey, access, or suitability for any use, including those uses authorized by this lease. The Lessee leases the premises subject to any and all of the covenants, terms, and conditions affecting the Lessor's title to the premises.

21. Integration and Modification. The lease, including all attachments may not be modified or amended except by a document signed by both parties to this lease. Any amendment or modification, which is not in writing and signed by both parties is of no legal affect.

22. Severability of Clauses of Lease. If any provision of this lease is adjudged to be invalid, that judgment does not affect the validity of any other provision of this lease, nor does it constitute any cause of action in favor of either party as against the other.

23. Headings. The heading of the numbered paragraphs in this lease shall not be considered in construing any provisions of this lease.



BY SIGNING THIS LEASE, the Lessor and Lessee, agree to be bound by its provisions as set out above.

LESSOR:

LESSEE:

TULKISARMUTE, INCORPORATED

NATIVE VILLAGE OF TULUKSAK

By: Bobby Peter
Its: Sec. Treas.

By: Joseph Alarie
Its: President

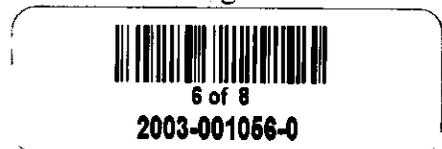
ACKNOWLEDGMENT

STATE OF ALASKA)
) ss:
Third JUDICIAL DISTRICT)

This is to certify that on 13th July, 2001, before me appeared Bobby Peter, known by me to be the Secretary, of TULKISARMUTE, INCORPORATED, who is authorized to sign this lease by the _____ as shown by the attached Resolution (Appendix A) and who executed this lease and acknowledged voluntarily signing it on behalf of TULKISARMUTE, INCORPORATED as Lessor.



Carrie Peter (Postal Clerk)
NOTARY PUBLIC for the State of Alaska
My Commission Expires: _____



ACKNOWLEDGMENT

STATE OF ALASKA)
) ss:
Third JUDICIAL DISTRICT)

This is to certify that on 13th July, 2001, before me appeared Joseph Alexie, known by me to be the President, of NATIVE VILLAGE OF TULUKSAK, who is authorized to sign this lease by the _____ as shown by the attached Resolution (Appendix A) and who executed this lease and acknowledged voluntarily signing it on behalf of NATIVE VILLAGE OF TULUKSAK as Lessor.



Carrie Peter Postal Clerk

NOTARY PUBLIC for the State of Alaska

My Commission Expires: _____



2005-000252-0

Recording Dist: 402 - Bethel
2/25/2005 12:59 PM Pages: 1 of 8

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CC

To be recorded at the Bethel Recording Office
To be returned to:
Tuluksak Native Community
P.O. Box 95
Tuluksak, Alaska 99679

LEASE AGREEMENT
(Utility Core)

THIS LEASE, made and entered into this 18th day of February, 2005, between Tulkisarmute, Inc., whose address is P.O. Box 65, Tuluksak, Alaska 99679 hereinafter called "LESSOR", and Tuluksak Native Community whose address is P.O. Box 95, Tuluksak, AK 99679, hereinafter called the "LESSEE".

The parties recognize that since the land encompassed by this lease will be used for community use or expansion, such land will eventually be reconveyed under the provisions of Section 14(c)(3) of the Alaska Natives Claims Settlement Act (ANSCA). The purpose of this lease is to serve as an interim measure until such reconveyance takes place.

This Lease Agreement releases the previously recorded Lease Agreement for the Utility Core filed on 5/22/2003 in the Bethel Recording District at 9:58 AM (Document # 2003-001055-0). This Lease Agreement contains a legal description which differs from the legal description contained in the previously recorded document.

The parties agree as follows:

1. The Premises. The Lessor hereby leases to the Lessee the surface estate of the real property located within Section 27, Township 12 N, Range 66W, Seward Meridian, Alaska, shown on Appendix A to this document, and described as follows:

Being a portion of the Tulkisarmute, Inc. property located in Section 27, Township 12 North, Range 66 West, Seward Meridian, Tuluksak, Alaska, being more particularly described as follows:

Beginning at corner No. 2, U.S. Survey No. 3797; thence along the easterly boundary of said U.S.S. No. 3797, South 44 degrees 22 minutes 00 seconds West, a distance of 183.37 feet to the Point of Beginning; thence continuing along the easterly boundary of said U.S.S. NO. 3797,

South 44 degrees 22 minutes 00 seconds West, a distance of 881.65 feet to a point; thence across unsurveyed Tulkisarmute property South 67 degrees 33 minutes 56 seconds East, a distance of 431.67 feet to a point; thence North 44 degrees 19 minutes 26 seconds East, a distance of 198.05 feet to a point; thence along a curve to the right, of which the Radius is 230.00 feet, the length is 245.18, and the chord bears North 13 degrees 13 minutes 46 seconds West, to a point; thence North 17 degrees 18 minutes 00 seconds East, a distance of 445.95 feet to the Point of Beginning, containing 4.24 acres, more or less.

The legal description may change to conform to a survey or surveys. The Lessee shall commission and obtain a valid plat incorporating an as-built survey, recordable in form, at its own expense, for Lessor's signature, within one year within one year (1) from the date hereof.

2. Purpose of Lease. The sole and exclusive purpose of the lease is the construction, operation, and maintenance of a Utility Core area incorporating community's power plant, water treatment plant, water storage tank, and future bulk fuel storage area, and this purpose is subject to all prior existing rights, including rights created by ANCSA in Lessor and third persons, whether or not claiming through Lessor.
3. Term of Lease. The lease term shall be thirty (30) years from the date that this lease is signed by both parties.
4. Termination Upon ANCSA Conveyance.
 - (a) When the Lessor conveys the title to the premises pursuant to Section 14(c)(3) of the ANCSA, this lease shall terminate. Neither the Lessor nor the Lessee shall be entitled to compensation of any kind whatsoever due to the termination of this lease pursuant to this paragraph.
 - (b) In the event that no such conveyance is accomplished during the term of this lease, the Lessee shall have sixty (60) days within which to exercise an option to renew this lease for an additional thirty (30) year term.
5. Rent. The Lessee agrees to pay the Lessor a rent for the premises in the sum of One Dollar (\$1.00) per year, at such office of the Lessor or its agent in the village of Tuluksak, as the Lessor may from time to time designate, on or before the 1st day of January on each and every year during said term.



6. Reservation of Rights. The Lessor reserves the right to grant to others the rights and privileges to use the premises not specifically and exclusively granted to the Lessee. The rights and privileges granted to the Lessee in this lease are the only rights and privileges granted to the Lessee by this lease. The Lessee has no easements, rights to privileges, expressed or implied, other than those specifically granted by this lease.
7. Valid Existing Rights. This lease is entered into and made subject to all valid existing rights, including easements, rights of way, reservations, or other interests in the premises, in existence on the date the lease is entered into.
8. Encumbrance of Premises. During the term of this lease, the Lessee may not assign this lease or sublet the premises, nor enter into any lease, easement, or other obligation of the Lessor's title without the prior written approval of the Lessor. Any such act, without prior written approval of the Lessor, is void as against the Lessor's title to the premises.
9. Subleases. The Lessee shall provide the Lessor with copies of all applications for subleases, assignments, proposals for development, and construction as-builts, as they become available.
10. Successors Bound. All covenants and provisions in this lease extend to and bind the legal representatives, successor, subleases, and assigns of the parties.
11. Access to Premises. The Lessor or its authorized representatives reserve the right of ingress to and egress from the premises.
12. Operation and Maintenance. At no cost to the Lessor, the Lessee will provide all utilities services, and maintenance necessary for the Lessee's use of the premises. The Lessee will take reasonable steps to protect the surface of the leased area and natural resources and improvements thereon and maintain the premises in a reasonable neat and clean condition.
13. Surface Reservation. Unless otherwise stated in this lease, the Lessee may not sell or remove for use elsewhere any of the surface resources of the premises.
14. Breach and Remedies.
 - (a) The premises are to be used only for the purpose of construction and maintenance of a utility core area and for no other purpose without specific



written authorization of the Lessor. The Lessor retains the right to terminate this lease upon thirty (30) day's written notice if the premises are used for unauthorized purposes, or if they cease to be used for the construction and maintenance of a utility core area.

- (b) Time is of the essence in this lease. If the Lessee breaches any provision of this lease, other than a breach for improper use of the premises which is governed by subparagraph (a), and the breach is not remedied within thirty (30) days after written notice of it has been served on the Lessee, the Lessee is subject to any legal action that the Lessor considers appropriate, including the termination of this lease. The Lessor is not liable for any expenditure made by the Lessee in the event of termination of this issue.
- (c) If this lease is terminated by the summary proceedings or in any other manner, or if the premises or any part of it is abandoned by the Lessee during the term of this lease, the Lessor, after written notice to the Lessee, may immediately, or any time afterwards, enter or re-enter and take possession of the premises, or any part of it, without liability for any expenditures made by the Lessee in the event of termination of this lease.

15. No Waiver. The failure of the Lessor to insist on any one or more instance upon the strict performance by the other party of any provision in this lease may not be considered as a waiver for the future: the provision will continue in full force.

16. Indemnity of Lessor. The Lessee shall indemnify and hold the Lessor harmless from:

- (a) All claims and demands for loss or damage, including property damage, personal injury, wrongful death, and wage or employment claims, arising out of or in connection with the use or occupancy of the premises by the Lessee or its successor, or at its invitation; and
- (b) Any accident or fire on the premises; and
- (c) Any nuisance on the premises; and
- (d) Any failure of the Lessee to keep the premises in a safe and lawful condition consistent with applicable laws, regulations, ordinances, or order; and



- (e) Any assignment, sublease, or conveyance, attempted or successful, by the Lessee, which is contrary to the provisions of this lease.
- (f) The Lessee will keep all goods, materials, furniture, fixtures, equipment, machinery, and other property on the premises at its sole risk, and will hold the Lessor harmless from any claim of loss or damage to them by any cause.

17. Notice of Claim. The parties agree to immediately notify each other of any claim, demand, or lawsuit arising out of or affecting the Lessee's occupation or use of the premises. Both parties will fully cooperate in the investigation and litigation of any claim, demand, lawsuit affecting the premises.

18. Laws and Taxes. At no expense to the Lessor, the Lessee will conduct all activities authorized by this lease in compliance with all federal, state, and local laws ordinances, rules and regulations now or hereafter in care, operation, maintenance, and protection of the utility core area, including but not limited to matters of health, safety, sanitation, and pollution. The acquisition of any necessary licenses or permits and payment of any taxes and special assessments accruing against the premises during this lease term will be the responsibility of the Lessee or its sublease and not that of the Lessor.

19. Notices. All notices and other writings required or permitted by this lease must be sent by registered or certified mail, postage prepaid, to the parties at the following addresses. A party must notify the other in writing of any changes of address.

LESSOR:

TULKISARMUTE, INCORPORATED
P.O. BOX 65
TULUKSAK, AK 99679

LESSEE:

TULUKSAK NATIVE COMMUNITY
P.O. BOX 95
TULUKSAK, AK 99679

20. Denial of Warranty Concerning Title or Conditions. The Lessor make no specific warranties, expressed or implied, concerning the title or condition of the premises, including survey, access, or suitability for any use, including those uses authorized by this lease. The Lessee leases the premises subject to any and all of the covenants, terms, and conditions affecting the Lessor's title to the premises.

21. Integration and Modification. The lease, including all attachments may not be modified or amended except by a document signed by both parties to this lease. Any amendment or modification, which is not in writing and signed by both parties is of no legal affect.



22. Severability of Clauses of Lease. If any provision of this lease is adjudged to be invalid, that judgment does not affect the validity of any other provision of this lease, nor does it constitute any cause of action in favor of either party as against the other.
23. Headings. The heading of the numbered paragraphs in this lease shall not be considered in construing any provisions of this lease.

BY SIGNING THIS LEASE, the Lessor and Lessee, agree to be bound by its provisions as set out above.

LESSOR:

LESSEE:

TULKISARMUTE, INCORPORATED

TULUKSAK NATIVE COMMUNITY

By: Bobby J. Peto
Its: Tuluksak Chair

By: Moses K. Papan
Its: Village Council President



ACKNOWLEDGMENT

STATE OF ALASKA)
) ss:
THIRD JUDICIAL DISTRICT)

This is to certify that on Feb 18, 2005, before me appeared Bobby J. [Signature], known to me to be the Tulksak Inc Chair, of TULKISARMUTE, INCORPORATED, who is authorized to sign this lease and who executed this lease and acknowledged voluntarily signing on behalf of TULKISARMUTE, INCORPORATED as Lessor.



[Signature]
NOTARY PUBLIC for the State of Alaska
My Commission Expires: Unknown

ACKNOWLEDGMENT

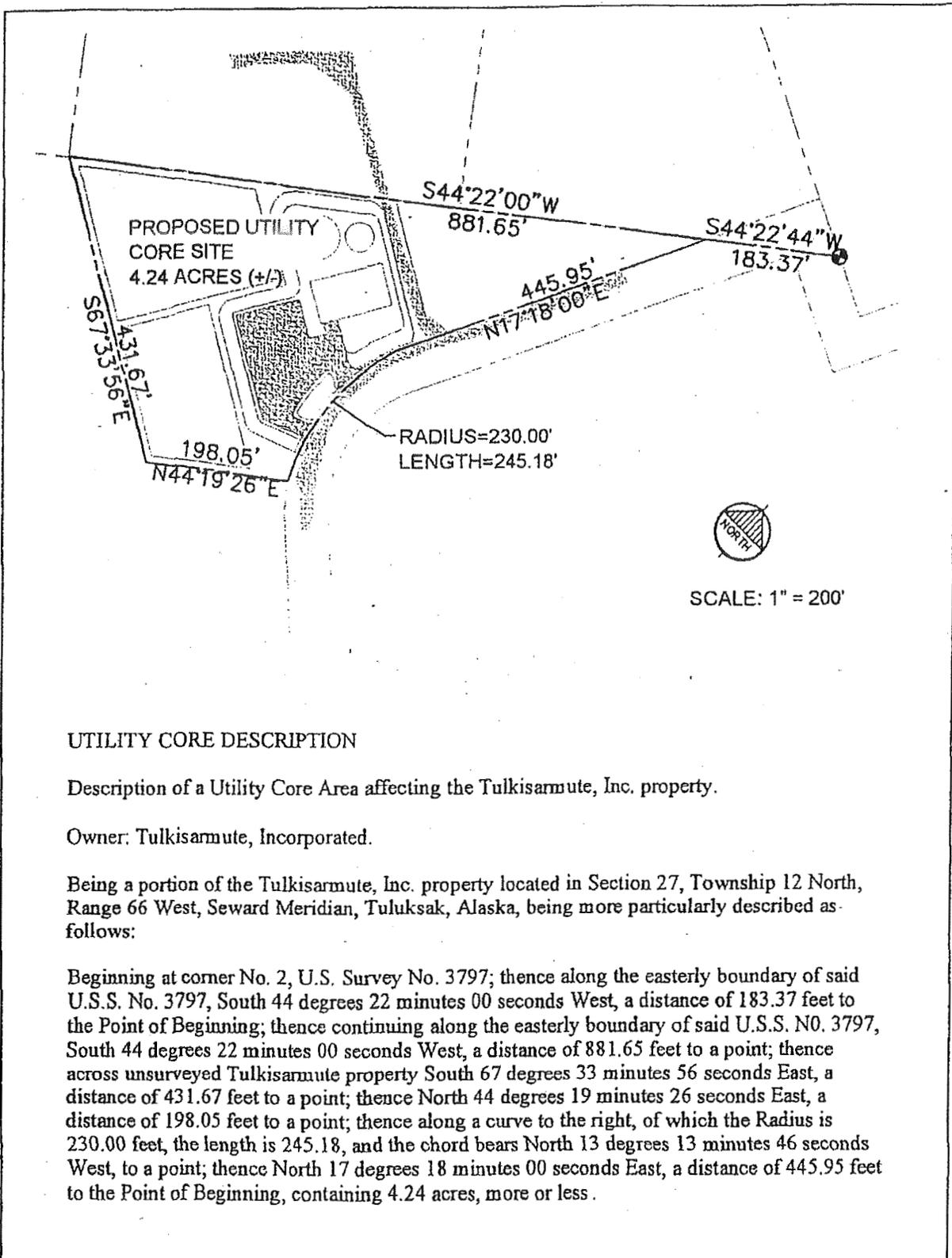
STATE OF ALASKA)
) ss:
THIRD JUDICIAL DISTRICT)

This is to certify that on Feb 18, 2005, before me appeared Moses K Peter, known by me to be the Village Council Pres, of TULUKSAK NATIVE COMMUNITY, who is authorized to sign this lease and who executed this lease and acknowledged voluntarily signing it on behalf of TULUKSAK NATIVE COMMUNITY as Lessor.



[Signature]
NOTARY PUBLIC for the State of Alaska
My Commission Expires: Unknown





UTILITY CORE DESCRIPTION

Description of a Utility Core Area affecting the Tulkisarmute, Inc. property.

Owner: Tulkisarmute, Incorporated.

Being a portion of the Tulkisarmute, Inc. property located in Section 27, Township 12 North, Range 66 West, Seward Meridian, Tuluksak, Alaska, being more particularly described as follows:

Beginning at corner No. 2, U.S. Survey No. 3797; thence along the easterly boundary of said U.S.S. No. 3797, South 44 degrees 22 minutes 00 seconds West, a distance of 183.37 feet to the Point of Beginning; thence continuing along the easterly boundary of said U.S.S. NO. 3797, South 44 degrees 22 minutes 00 seconds West, a distance of 881.65 feet to a point; thence across unsurveyed Tulkisarmute property South 67 degrees 33 minutes 56 seconds East, a distance of 431.67 feet to a point; thence North 44 degrees 19 minutes 26 seconds East, a distance of 198.05 feet to a point; thence along a curve to the right, of which the Radius is 230.00 feet, the length is 245.18, and the chord bears North 13 degrees 13 minutes 46 seconds West, to a point; thence North 17 degrees 18 minutes 00 seconds East, a distance of 445.95 feet to the Point of Beginning, containing 4.24 acres, more or less.





2003-001054-0

Recording Dist: 402 - Bethel
5/22/2003 9:57 AM Pages: 1 of 8

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To be recorded at the Bethel Recording Office
To be returned to:
Tuluksak Native Community
P.O. Box 95
Tuluksak, Alaska 99679

LEASE AGREEMENT
(Landfill and Sewage Lagoon)

THIS LEASE, made and entered into this 13th day of July, 2001, between Tulkisarmute, Inc. whose address is P.O. Box 65, Tuluksak, Alaska, 99679 hereinafter called "LESSOR", and Native Village of Tuluksak whose address is P.O. Box 95, Tuluksak, AK 99679, hereinafter called the "LESSEE".

The parties recognize that since the land encompassed by this lease will be used for community use or expansion, such land will eventually be reconveyed under the provisions of Section 14(c)(3) of the Alaska Natives Claims Settlement Act (ANSCA). The purpose of this lease is to serve as an interim measure until such reconveyance takes place.

The parties agree as follows:

1. The Premises. The Lessor hereby leases to the Lessee the surface estate of the following real property which is located within Section 27, Township 12N, Range 66W, Seward Meridian, Alaska.

A portion of unsurveyed lands located in Section 27, Township 12 North, Range 66 West, Seward Meridian, Alaska, being more particularly described as follows:

Commencing at Cor. #5 of U.S. Survey 4435; thence along the southerly boundary of said U.S. Survey 4435, South 54 degrees 31 minutes 42 seconds East, a distance of 200.00 feet to a point; thence leaving said southerly boundary, over said unsurveyed lands, South 35 degrees 28 minutes 18 seconds West, a distance of 200 feet to the True Point of Beginning; thence continuing across said unsurveyed lands the following four (4) courses: South 35 degrees 31 minutes 42 seconds East, a distance of 968.00 feet to a point; thence South 35 degrees 28 minutes 18 seconds West, a distance of 675.00 feet to a point, thence North 54 degrees 31 minutes 42 seconds West, a distance of 968.00 feet to a point; thence North 35 degrees 28 minutes 18 seconds East, a distance of 675.00 feet to the True Point of Beginning, containing 15 acres of land more or less.

The legal description may change to conform to a survey or surveys. The Lessee shall commission and obtain a valid plat incorporating an as built survey, recordable in form, at its own expense, for Lessor's signature, within one (1) year from the date hereof.

2. Purpose of Lease. The sole and exclusive purpose of this lease is the construction, operation, and maintenance of a landfill and sewage lagoon, and this purpose is subject to all

prior existing rights, including rights created by ANSCA in Lessor and third persons, whether or not claiming through Lessor.

3. Term of Lease. The lease term shall be thirty (30) years from the date that this lease is signed by both parties.

4. Termination Upon ANCSA Conveyance.

(a) When the Lessor conveys the title to the premises pursuant to Section 14(c)(3) of the ANCSA, this lease shall terminate. Neither the Lessor nor the Lessee shall be entitled to compensation of any kind whatsoever due to the termination of this lease pursuant to this paragraph.

(b) In the event that no such conveyance is accomplished during the term of this lease, the Lessee shall have sixty (60) days within which to exercise an option to renew this lease for an additional thirty (30) year term.

5. Rent. The Lessee agrees to pay the Lessor a rent for the premises in the sum of One Dollars (\$1.00) per year, at such office of the Lessor or its agent in the village of Tuluksak, as the Lessor may from time to time designate, on or before the 1st day of January on each and every year during the said term.

6. Reservation of Rights. The Lessor reserves the right to grant to others the rights and privileges to use the premises not specifically and exclusively granted to the Lessee. The rights and privileges granted to the Lessee in this lease are the only rights and privileges granted to the Lessee by this lease. The Lessee has no easements, rights to privileges, expressed or implied, other than those specifically granted by this lease.

7. Valid Existing Rights. This lease is entered into and made subject to all valid existing rights, including easements, rights of way, reservations, or other interests in the premises, in existence on the date the lease is entered into.

8. Encumbrance of Premises. During the term of this lease, the Lessee may not assign this lease or sublet the premises, nor enter into any lease, easement, or other obligation of the Lessor's title without the prior written approval of the Lessor. Any such act, without prior written approval of the Lessor, is void as against the Lessor's title to the premises.

9. Subleases. The Lessee shall provide the Lessor with copies of all applications for



subleases, assignments, proposals for development, and construction as-builts, as they become available.

10. Successors Bound. All covenants and provisions in this lease extend to and bind the legal representatives, successor, subleases, and assigns of the parties.

11. Access to Premises. The Lessor or its authorized representatives reserve the right of ingress to and egress from the premises.

12. Operation and Maintenance. At no cost to the Lessor, the Lessee will provide all utilities services, and maintenance necessary for the Lessee's use of the premises. The Lessee will take reasonable steps to protect the surface of the leased area and natural resources and improvements thereon and maintain the premises in a reasonable neat and clean condition.

13. Surface Reservation. Unless otherwise stated in this lease, the Lessee may not sell or remove for use elsewhere any of the surface resources of the premises.

14. Breach and Remedies.

- (a) The premises are to be used only for the purpose of construction and maintenance of a sanitary landfill and sewage lagoon and for no other purpose without specific written authorization of the Lessor. The Lessor retains the right to terminate this lease upon thirty (30) days' written notice if the premises are used for unauthorized purposes, or if they cease to be used for the construction and maintenance of a sanitary landfill and sewage lagoon purposes.
- (b) Time is of the essence in this lease. If the Lessee breaches any provision of this lease, other than a breach for improper use of the premises which is governed by subparagraph (a), and the breach is not remedied without thirty (30) days after written notice of it has been served on the Lessee, the Lessee is subject to any legal action that the Lessor considers appropriate, including the termination of this lease. The Lessor is not liable for any expenditure made by the Lessee in the event of termination of this issue.
- (c) If this lease is terminated by summary proceedings or in any other manner, or if the premises or any part of it is abandoned by the Lessee



during the term of this lease, the Lessor, after written notice to the Lessee, may immediately, or any time afterwards, enter or re-enter and take possession of the premises, or any part of it, without liability for any expenditures made by the Lessee in the event of termination of this lease.

15. No Waiver. The failure of the Lessor to insist on any one or more instance upon the strict performance by the other party of any provision in this lease may not be considered as a waiver for the future; the provision will continue in full force.

16. Indemnity of Lessor. The Lessee shall indemnify and hold the Lessor harmless from:

- (a) all claims and demands for loss or damage, including property damage, personal injury, wrongful death, and wage or employment claims, arising out of or in connection with the use or occupancy of the premises by the Lessee or its successor, or at its invitation; and
- (b) any accident or fire on the premises; and
- (c) any nuisance on the premises; and
- (d) any failure of the Lessee to keep the premises in a safe and lawful condition consistent with applicable laws, regulations, ordinances, or orders; and
- (e) any assignment, sublease, or conveyance, attempted or successful, by the Lessee which is contrary to the provisions of this lease.
- (f) the Lessee will keep all goods, materials, furniture, fixtures, equipment, machinery, and other property on the premises at its sole risk, and will hold the Lessor harmless from any claim of loss or damage to them by any cause.

17. Notice of Claim. The parties agree to immediately notify each other of any claim, demand, or lawsuit arising out of or affecting the Lessee's occupation or use of the premises. Both parties will fully cooperate in the investigation and litigation of any claim, demand, or lawsuit affecting the premises.



18. Laws and Taxes. At no expense to the Lessor, the Lessee will conduct all activities authorized by this lease in compliance with all federal, state, and local laws, ordinances, rules and regulations now or hereafter in care, operation, maintenance, and protection of the sanitary landfill and sewage lagoon, including but not limited to matters of health, safety, sanitation, and pollution. The acquisition of any necessary licenses or permits and payment of any taxes and special assessments accruing against the premises during this lease term will be the responsibility of the Lessee or its sublease and not that of the Lessor.

19. Notices. All notices and other writings required or permitted by this lease must be sent by registered or certified mail, postage prepaid, to the parties at the following addresses. A party must notify the other in writing of any change of address.

LESSOR:

LESSEE:

TULKISARMUTE, INCORPORATED
P.O. BOX 65
TULUKSAK, AK 99679

NATIVE VILLAGE OF TULUKSAK
P.O. BOX 95
TULUKSAK, AK 99679

20. Denial of Warranty Concerning Title or Conditions. The Lessor make no specific warranties, expressed or implied, concerning the title or condition of the premises, including survey, access, or suitability for any use, including those uses authorized by this lease. The Lessee leases the premises subject to any and all of the covenants, terms, and conditions affecting the Lessor's title to the premises.

21. Integration and Modification. The lease, including all attachments may not be modified or amended except by a document signed by both parties to this lease. Any amendment or modification, which is not in writing and signed by both parties is of no legal affect.

22. Severability of Clauses of Lease. If any provision of this lease is adjudged to be invalid, that judgment does not affect the validity of any other provision of this lease, nor does it constitute any cause of action in favor of either party as against the other.

23. Headings. The heading of the numbered paragraphs in this lease shall not be considered in construing any provisions of this lease.



ACKNOWLEDGMENT

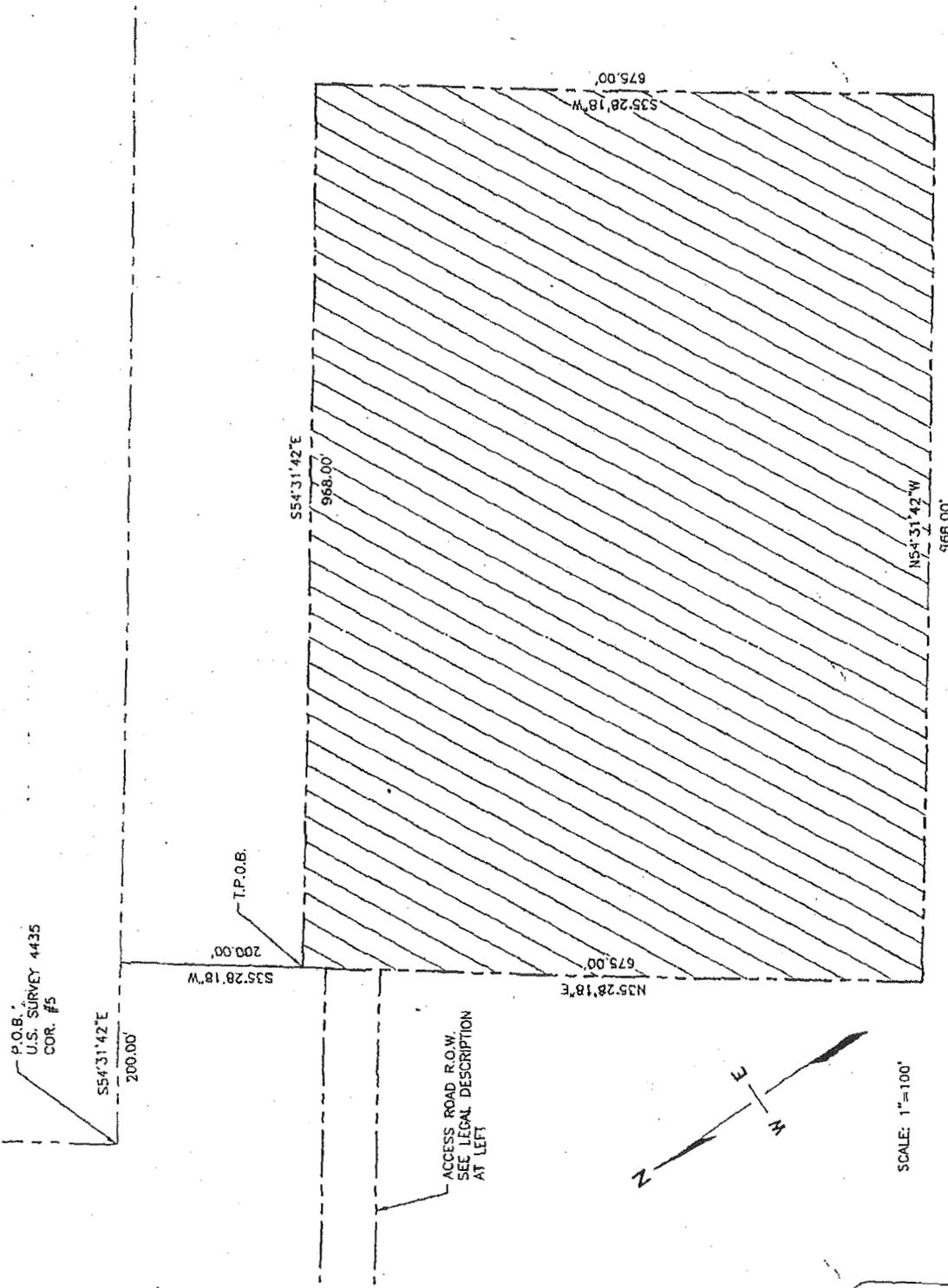
STATE OF ALASKA)
) ss:
Third JUDICIAL DISTRICT)

This is to certify that on 13th July, 2001, before me appeared Joseph Alexie, known by me to be the President, of NATIVE VILLAGE OF TULUKSAK, who is authorized to sign this lease by the _____ as shown by the attached Resolution (Appendix A) and who executed this lease and acknowledged voluntarily signing it on behalf of NATIVE VILLAGE OF TULUKSAK as Lessor.



Carrie Peter (Postal Clerk)
NOTARY PUBLIC for the State of Alaska
My Commission Expires: _____

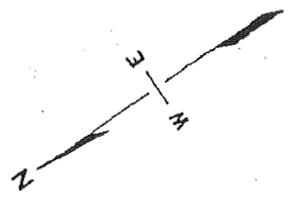




LANDFILL/LAGOON SITE DESCRIPTION

An area within the Tuluksak Native Community to be dedicated for a municipal landfill/lagoon site, being further described as follows:
 Being a portion of the unsurveyed lands located in Section 27, Township 12 North, Range 66 West, Tuluksak, Alaska, being more particularly described as follows:
 Commencing at Cor. #5 of U.S. Survey 4435; thence along the southwesterly boundary of said U.S. Survey 4435, South 54 degrees 31 minutes 42 seconds East, a distance of 200.00 feet to a point; thence leaving said southwesterly boundary, over said unsurveyed lands, South 35 degrees 28 minutes 18 seconds West, a distance of 200.00 feet to the True Point of Beginning; thence continuing across said unsurveyed lands the following four (4) courses: South 54 degrees 31 minutes 42 seconds East, a distance of 968.00 feet to a point; thence South 35 degrees 28 minutes 18 seconds West, a distance of 675.00 feet to a point; thence North 54 degrees 31 minutes 42 seconds East, a distance of 968.00 feet to a point; thence North 35 degrees 28 minutes 18 seconds East, a distance of 675.00 feet to the True Point of Beginning, containing 15 acres of land more or less.

SCALE: 1"=100'



2003-001054-0

DATE July 28, 2010

**U.S. SURVEY
No. 3797, ALASKA**
DEPENDENT RESURVEY OF
U.S. SURVEY No. 3797
AND PORTIONS OF
U.S. SURVEY No. 875 AND
U.S. SURVEY No. 10260
AND SUBDIVISION OF
U.S. SURVEY No. 3797
LOTS 1, 2, AND 3
CREATING LOTS 5, 6, 7, AND 8
SITUATED ON

THE LEFT BANK OF THE TULUKSAK RIVER
APPROXIMATELY 1 MILE SOUTHERLY OF
TULUKSAK, ALASKA
WITHIN TOWNSHIP 12 NORTH, RANGE 66 WEST
SEWARD MERIDIAN

THE GEOGRAPHIC POSITION
OF THE CORNER NO. 3, LOT 5
IDENTICAL WITH
CORNER NO. 4, LOT 2, U.S. SURVEY NO. 13848

IS:
LATITUDE: 61° 05' 08.53" NORTH
LONGITUDE: 160° 59' 05.36" WEST
NAD 27

SURVEYED BY
ANDREW B. HEIKKINEN
CADASTRAL SURVEYOR

AUGUST 7 THROUGH AUGUST 10, 2007
UNDER SUPPLEMENTAL SPECIAL INSTRUCTIONS

DATED JULY 10, 2007
APPROVED JULY 18, 2007
AREA RESURVEYED:
155.14 ACRES

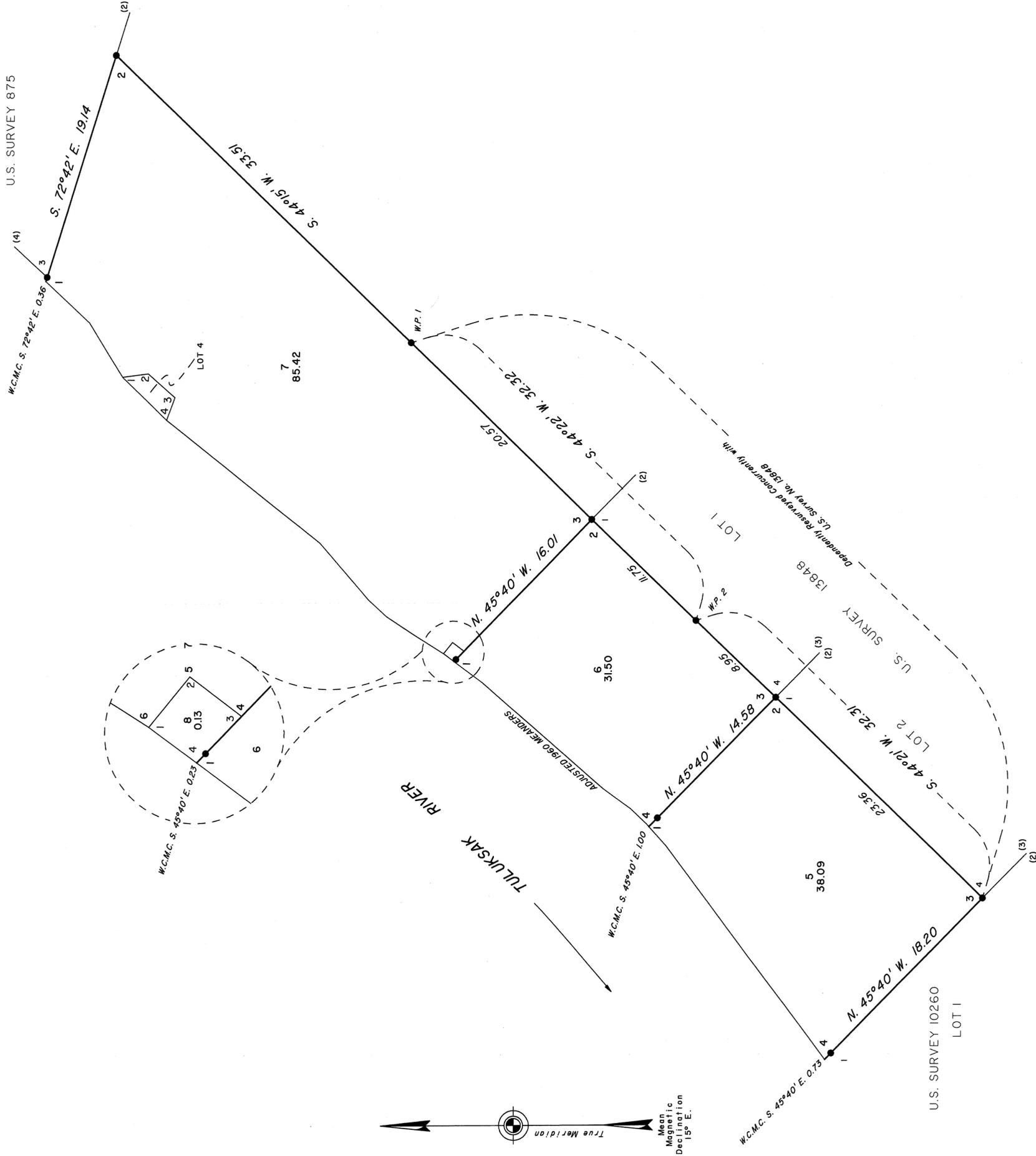
UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Anchorage, Alaska

This plat is strictly conformable to the approved field notes, and the survey, having been correctly executed in accordance with the requirements of law and the regulations of this Bureau, is hereby accepted.

For the Director

Stephen B. Hammel May 27, 2010
Date

Chief Cadastral Surveyor for Alaska



File Tuluksak Site Control

STATE OF ALASKA

DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

OFFICE OF AVIATION & AIRPORT DEVELOPMENT MANAGEMENT

FRANK H. MURKOWSKI, GOVERNOR

4111 AVIATION AVENUE
P.O. BOX 196900
ANCHORAGE, ALASKA 99519-6900
(907) 269-0740 (FAX 269-0489)
(TTY 269-0473)

March 30, 2005

RE: Tuluksak Airport
Agreements ADA-08276, 08277

Anne Herschleb
CE2 Engineers, Inc.
P O Box 232946
Anchorage AK 99523-2946

Dear Ms. Herschleb:

This letter is to confirm my phone conversation with your office that we will be unable to process the above referenced applications for use of lands at the Tuluksak Airport. Your application fees will be refunded by separate cover.

The deed that gives the State of Alaska title to the airport lands contain restrictions that prevent use of airport lands for non-aviation purposes. If we were to do so, the lands would automatically revert to the federal government. This property was transferred to the State by patent through "section 16, Federal Airport Act of 1946" which contains the restrictions stated in the patent.

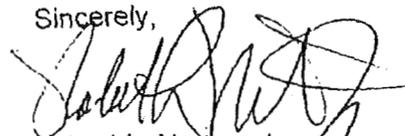
The Federal Aviation Administration (FAA) is charged with the responsibility of policing this property restriction. Informal discussions with FAA (John Lovett 271-5446) suggest that a request for a waiver for this non-aviation use is not recommended.

Upon closure of the existing airport, the State's patent will revert to the federal government. The Bureau of Land Management (BLM) on behalf of the federal government will control the property. The BLM would then go through their very lengthy procedures for disposal with other federal agencies getting first choice. The community may very well end up getting the property but the process is very time consuming.

It appears that the only viable resolution is to relocate the wellhead and any other non-aviation uses outside the airport boundary and eliminate any approvals or uncertainty for the future property issues. In addition, any plans for building the pipeline, pump house, access roads, laundromat or any similar infrastructure should not include the use of airport property because we will face the same problem with those items.

Again I apologize for the confusion on the land issues for the airport at Tuluksak. If you have any questions please call me at (907) 269-0745 or e-mail me at bob_norton @dot.state.ak.us.

Sincerely,



Robert L. Norton, Jr.
Chief, Anchorage Office

cc

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2014-001184-0

Recording District 402 Bethel

11/10/2014 01:40 PM Page 1 of 2



 <p style="text-align: center;">STATE OF ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES</p> <p style="text-align: center;">COMMISSIONER'S QUITCLAIM DEED</p>	PROJECT NAME: OLD TULUKSAK AIRPORT
	STATE PROJECT #: _____
	FEDERAL-AID PROJECT #: _____
	PARCEL #: _____ UNIT #: _____

The GRANTOR, STATE OF ALASKA, DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES, whose mailing address is 4111 Aviation Avenue, Anchorage, Alaska 99502, acting by and through its Commissioner, under the authority of AS 19.05.070, and in accordance with the terms of the grant to the State of Alaska in Patent No. 1235654 recorded April 8, 1964 in Book 14 Page 255, Bethel Recording District pursuant to the authority contained in section 16 of the Federal Airport Act (60 Stat. 179), for and in consideration of No Dollars, (\$00.00) does hereby convey and quitclaim unto the GRANTEE, The United States of America, whose mailing address is 222 West Seventh Avenue #13, Anchorage, Alaska 99513, the Grantee's successors and assigns forever, all right, title and interest, if any, in and to that real property situated in the Bethel Recording District, Fourth Judicial District, State of Alaska, more particularly described as follows:

Lots Four (4), Five (5), Six (6), Seven (7), and Eight (8) of United States Survey No. 3797, Alaska, on the left bank of the Tuluksak River, south of the Village of Tuluksak, latitude 61° 05' N, longitude 160° 58' W, Seward Meridian, Alaska, located in the Bethel Recording District, Fourth Judicial District, State of Alaska, containing approximately 155.14 acres, according to the approved plat of survey thereof on file in the Bureau of Land Management, Department of the Interior.

The Grantee takes title to the conveyed property formerly identified as the Old Tuluksak Airport. The GRANTEE'S signature on the Certificate of Acceptance below constitutes acceptance of the above-described real property.

Dated this 31 day of October, 2014

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

BY: 
Regional Director, Central Region

Filed for Record at the Request of
and Return to:
State of Alaska
Department of Transportation &
Public Facilities

State Business - No Charge

STATE ACKNOWLEDGMENT

STATE OF ALASKA)
 : ss.
3rd JUDICIAL DISTRICT)

ON THIS 31 day of October, 2014 before me, the undersigned, a notary public in and for the State of Alaska, personally appeared Robert Campbell the Regional Director of the Central Region of the Department of Transportation and Public Facilities for the State of Alaska, known to me to be the identical person who executed the foregoing instrument and who acknowledged to me that he signed the same freely and voluntarily, with full knowledge of its contents, for the uses and purposes therein mentioned.

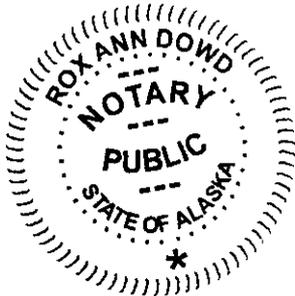
IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and year above written.

Rox Ann Dowd
Notary Public in and for the State of Alaska
My Commission Expires: with Office

CERTIFICATE OF ACCEPTANCE

THIS IS TO CERTIFY that David Li Yong, Grantee herein, hereby accepts the conveyance of real property, or interest therein, described in this instrument and consents to the recordation thereof.

IN WITNESS WHEREOF, I have hereunto set my hand this 5th day of November, 2014.



The United States of America

To all to whom these presents shall come, Greeting:

Patent

F-14949-B

This patent is issued by the UNITED STATES, Department of the Interior, Bureau of Land Management, 222 West Seventh Avenue, #13, Anchorage, Alaska 99513-7504, as GRANTOR, to Tulkisarmute Incorporated, P.O. Box 65, Tuluksak, Alaska 99679 as GRANTEE, for lands in the Bethel and Kuskokwim Recording Districts.

WHEREAS

Tulkisarmute Incorporated

is entitled to a patent pursuant to Sec. 14(a) of the Alaska Native Claims Settlement Act of December 18, 1971, 43 U.S.C. § 1613(a), of the surface estate in the following-described lands:

Lots 4, 7, and 8, U.S. Survey No. 3797, Alaska.

Containing 86.22 acres, as shown on the plat of survey accepted on October 10, 1961 and the plat of dependent resurvey officially filed on July 28, 2010.

NOW KNOW YE, that there is, therefore, granted by the UNITED STATES OF AMERICA, unto the above-named corporation the surface estate in the lands above described; TO HAVE AND TO HOLD the said estate with all the rights, privileges, immunities, and appurtenances, of whatsoever nature, thereunto belonging, unto the said corporation, its successors and assigns, forever.

EXCEPTING AND RESERVING TO THE UNITED STATES from the lands so granted:

1. The subsurface estate therein, and all rights, privileges, immunities, and appurtenances, of whatsoever nature, accruing unto said estate pursuant to

the Alaska Native Claims Settlement Act of December 18, 1971, 43 U.S.C. § 1613(f); and

2. Pursuant to Sec. 17(b) of the Alaska Native Claims Settlement Act of December 18, 1971, 43 U.S.C. § 1616(b), and the administrative record, including easement memoranda, the following public easements, referenced by Easement Identification Number (EIN) on the easement map, copies of which can be found in the Bureau of Land Management's public land records, are reserved to the United States. All easements are subject to applicable Federal, State, or Municipal corporation regulation. The following is a listing of uses allowed for each type of easement. Any uses which are not specifically listed are prohibited.

25 Foot Trail - The uses allowed on a twenty-five (25) foot wide trail easement are: travel by foot, dogsleds, animals, snowmobiles, two- and three-wheeled vehicles, and small all-terrain vehicles (ATVs) (less than 3,000 lbs. Gross Vehicle Weight (GVW)).

One Acre Site - The uses allowed on a site easement are: vehicle parking (e.g., aircraft, boats, all-terrain vehicles (ATVs), snowmobiles, cars, trucks), temporary camping, and loading or unloading. Temporary camping, loading, or unloading shall be limited to 24 hours.

- a. (EIN 200 D1) An easement twenty-five (25) feet in width for a proposed trail extension to EIN 5 C4 D1 beginning at the easterly boundary of Lot 7, USS No. 3797 and heading northwesterly adjacent to an existing road to site easement EIN 201 C4. The uses allowed are those listed above for a twenty-five (25) foot wide trail easement. This trail is winter use only
- b. (EIN 201 C4) One (1) acre site easement upland of the ordinary high water mark in the NW corner of Lot 7, USS No. 3797. The uses allowed are those listed above for a one (1) acre site easement.

THE GRANT OF THE ABOVE-DESCRIBED LANDS IS SUBJECT TO:

1. Valid existing rights therein, if any, including but not limited to those created by any lease, contract, permit, right-of-way, or easement, and the right of the lessee, contractee, permittee or grantee to the complete

50-2018-0005

Appendix D

Trip and Inspection Reports

Included in this appendix:

- 1) CRW Civil Inspection (4 pages)
- 2) Reid Middleton Structural Inspection (35 pages)
- 3) EDC, INC Mechanical Inspection (23 pages)
- 4) CRW Electrical Inspection (5 pages)

TRIP REPORT



CRW Engineering Group, LLC
3940 Arctic Blvd., Suite 300
Anchorage, AK 99503
(907) 562-3252 phone (907) 561-2273 fax
www.crweng.com

Project: Tuluksak Water & Sewer Feasibility Study, 82301.00

Purpose: Tuluksak Native Community (TNC) Council Meeting, Site Visit & Data Collection

Date of trip: Thursday, January 31, 2013

People Traveling: Beverly Short, VSW Kevin Hansen, EDC
Jon Hermon, CRW Ken Andersen, Reid Middleton
Bill McDonald, CRW Bob White, YKHC
Andrea Meeks, CRW

Location: Tuluksak, Alaska

Contacts: Wascca Fly, TNC Council President
Darlene Peter, TNC Tribal Administrator
Angela Alexie, TNC Bookkeeper
Willy Phillip, TNC Utility Manager
Carl Napoka, Sr., Water Operator
Brandon Andrew, TNC Admin
Joe Demantle, Sr., Tulkisarmute Inc.

Reporter: Andrea Meeks

Activities:

We departed Anchorage for Bethel at 6:30 a.m. We waited at Grant's charter office for the weather to clear. After a few hours, we were given the okay to fly and loaded up in a Piper. Wascca Fly met us at the runway and transported us to the TNC Office to meet with the council. Kevin, Bill, and Ken walked to the water treatment plant to begin their facility condition assessments. Bob walked there too to check in with Carl Napoka and review any operational issues.

I met with Angela, Willy and Brandon to discuss TNC's water and sewer budgets, fee collections and usage. Angela contacted Kate Nichaolai with Rural Alaska Empowered and had her talk with me about the financial information I needed. Kate said that her group was finalizing the 2013 budgets for TNC and thought they would be completed in late February. Angela and I discussed average median household incomes. She provided ranges of monthly expenses for a typical resident of Tuluksak (typical cell phone, cable and internet fees are in the hundreds of dollars per month).

The council meeting started. Jon introduced CRW and gave a brief overview of the purpose of trip. The community is very interested in getting a piped water and sewer system. We explained that the funding agencies wanted another evaluation of feasible water and sewer systems for the community and that pipes would be included in this analysis. We explained that community input was going to be crucial to generating a good feasibility study and asked for suggestions on how to increase public involvement. In other communities, a door prize or two given out during a community meeting has been a good way to boost attendance. Angela suggested we raffle off cash.

I asked the council members if any of them could recall a time when septic systems were used in the community (this is suggested in an early water and sewer study). No one could recall that any septic systems were installed.

During the meeting (around 3:00 pm), Grant Aviation called to let me know the weather was closing in and they wanted to pick us up in the next 30 minutes. I asked them to give us as much time as they could. They agreed to pick us up at 4:30 pm.

While Bev and Jon completed the council meeting, I walked to the WTP to take photos and document conditions (see trip photos). The gravity wastewater line from the building show signs of leaking at the pipe/bldg. interface. The red water is presumably backwash water from the treatment system (the raw water is very high in iron). The gravity line shows signs of bellies between pipe supports. According to Bob White, the gravity line freezes often. The WTP/Washeteria facility shows its age (30 plus years), there appear to be many sections of rotten flooring. Most of the water treatment piping appears to have been either modified, repaired or added to over the last 30 years and the resulting plant is a mishmash of pipes, valves and pumps (some clearly not operable). While we were there, Bob worked with Carl troubleshooting a problem with their well pump. Neither had information about the size and type of well pump being used. Ken pointed out the holes in the flooring where water apparently ponded and rotted the floor. These holes were apparent in the mechanical and treatment rooms.

The washeteria side of the building also shows its age. None of the toilets or showers were functioning. Only a few washers and dryers were available for use. No one was actively using the washeteria while we were there.

Bill and Kevin walked to the new TNC Powerhouse to determine how easy it could be to tap into waste heat for use in any new water and/or sewer mains. Drawings of the piped sewer system (designed by CE2) calls out for a connection to waste heat on the sewer force main. Bill and Kevin said that there appeared to be pumps and controls currently installed in the powerhouse suitable for waste heat recovery but that no electrical had been provided for these systems to be operational.

Grant called and said they were on their way. Wascca gathered us and drove us to the runway (we grabbed Bill and Kevin as they walked to the runway). The weather in Bethel was not very good (low fog still) and the pilot had to circle for about 30 minutes before we were able to land in Bethel.

We checked into our evening flight then grabbed a cab for dinner in downtown Bethel. The 9:00 pm jet took us home to Anchorage.

Attachments: Site Visit Photos (1 page)

Tuluksak Water & Sewer Feasibility Study - Jan 31, 2013 Site Visit Photos



WTP/W Bldg (SE corner, notice insulated well head & piping)



Insulated well head & piping



Leaky (glaciated) wastewater line from WTP/Washer (notice iron content in filter backwash water).



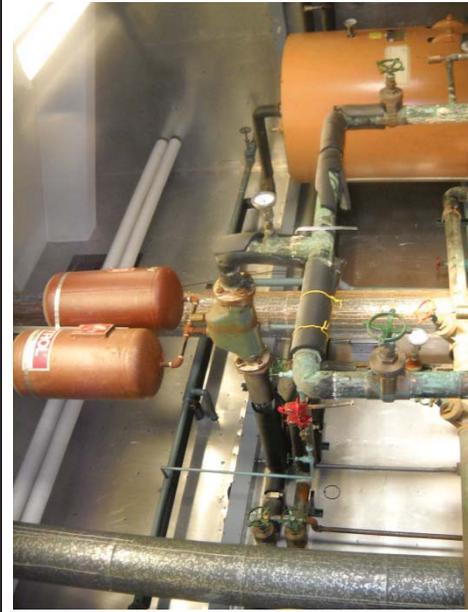
WTP/W Bldg (western end)



WTP Watering Point



Rotten floor in mechanical room



Mechanical Room Piping (HWH behind)
Treatment System Pump Manifold



Treatment System Pump Manifold



Treatment Room (cw from left, treated water tank, greensand filter, pressure tank, backwash water surge tank)



Pressure Tanks (backwash surge tank on left foreground)



Potassium Permanganate Tank



Washeteria

Tuluksak Water Treatment Plant Structural Condition Survey Report

Tuluksak, Alaska

RM Project No. 402013.007

February 2013

Prepared for:
CRW Engineering Group, LLC



Prepared by:

ReidMiddleton

Reid Middleton, Inc.
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1.0 Executive Summary

The Tulusak Water Treatment Plant has been in operation since 1982 or 1983. Reid Middleton, Inc. was retained to perform a condition survey of the water treatment facility to assess the general condition of the building's structural framing systems and provide recommendations for repair or upgrade.

In general, the water treatment plant is in reasonably good condition. The most significant issue is the presence of significant rot in the floor sheathing and joists in the northwest corner of the boiler room. The rot is caused by water penetration from the washing machines in the washeteria or by leaks from the boilers.

Recommended repairs or upgrades include the following:

Routine Maintenance

1. Repair/upgrade the railing systems at the east and west stairs.
2. Replace the stair treads at the east stairs.
3. Replace the missing corner trim at the northwest corner of the building.
4. Tighten existing cable bracing or replace the bracing with new rod bracing and turnbuckles.
5. Replace broken window on south wall of building.

Significant Repairs or Upgrades

1. Replace the flooring in the boiler room.

From an operational perspective, the Owner should prevent water accumulation on the floor. This would include ensuring that washers are not leaking and are properly draining, boiler leaks are fixed promptly, and water is not allowed to pond on the floor. Water from washeteria and treatment plant operations are the cause of rot in the floor framing of the platform.

2.0 Existing Construction

2.1 Background

The Tulusak Treatment Plant, constructed in 1982, was funded and constructed by the U.S. Department of Health, Educational & Welfare, Public Health Service, Indian Health Services, project number AN-81-220. "As Built" drawings for the facility, dated December 1982, were provided for our review. The building is therefore approximately 30 years old.

The existing building is a panelized wood framed structure supported on a heavy timber post and pad foundation. The building is 32 ft wide by 64 ft long, with a 6'-0" wide by 8'-0" entry vestibule with stairs on each end of the building. On the south side of the building, identified as the "front" of the building on the record drawings, a ramp with a landing provided access to the room containing the water storage tanks. The ramp, landing and access door to the building are no longer in use.

The roof is a simple gable roof with a 4:12 slope.

See Photos No. 1, No. 2 and No. 3 for general views of the water treatment facility. See also Figure No. 1 - Floor Plan.

2.2 Building Design

The building consists of a wood framed superstructure and a substructure consisting of a heavy timber post and pad foundation system. The as-built drawing set, provided for our review, included 30 sheets of drawings. Copies of sheet numbers 1-13, depicting the architectural and structural layout of the building, are included in Section 7 of this report.

2.2.1 Superstructure Framing

2.2.1.1 Roof Framing

Roof construction is shown on sheet 11 of the original design drawings for the building.

Roof framing consists of insulated timber panels that span from the eave of the building to the ridge. The panels are 4'-0" wide and are framed with 2x6's on all edges and ½-inch CDX plywood sheathing on both sides. There are no intermediate 2x6 members between the edge members of the panels. This results in an equivalent framing of a 2x6 every 24-inches on center.

The building has three intermediate beam lines, at the quarter points of the building width, which run the full length of the building. The panels therefore have a span length of 8'-0", spanning from the eave to the first intermediate beam line and then from this intermediate beam to the ridge.

The ridge line post and beam framing is divided into four spans of 12 ft, 14 ft, 18 ft and 20 ft. The ridge beams are 5.125x12 glued-laminated beams (GLB) supported on 5.125x7.5 glued-laminated columns.

The intermediate beams, between the eave and ridge, consist of a 4x12 at the 12 ft span, a 4x14 at the 14 ft span, a 3.125x13.5 GLB at the 18 ft span, and a 3.125x15 GLB at the 20 ft span. These beams are not supported on posts. They frame into glued-laminated beams that span 16 feet from the eave to the ridge beam. Therefore, there are only three intermediate posts within the footprint of the building – the three posts on the ridge post and beam framing. See sheet no. 7 of the original drawings.

2.2.1.2 Wall Framing

Wall framing consists of insulated timber panels with a height, at the eaves, of 10'-0". The panels are constructed with 2x6 studs spaced at 24-inches on center. The panels are sheathed with 5/8-inch T1-11 siding on the exterior face and ½-inch CDX-Interior plywood on the interior face. The panels, all 4 ft wide, are insulated with polyurethane insulation. Wall panel construction is shown on sheet 10 of the original drawings.

2.2.2 Substructure Framing

2.2.2.1 Platform Framing

Platform framing is depicted on sheets 5 and 6 of the original drawings.

The water treatment plant is supported on a wood framed platform. The platform consists of four lines or bents of heavy timber post and beam framing with wood joists spanning between the bents. Spacing between bents consists of one 12 foot span followed by two 10-foot spans.

Flooring consists of 1-1/8-inch plywood sheathing supported by timber joists spaced 12-inches on center. Three sizes of joists are used: 4x12s under the water storage tanks, 3x12s in the treatment room area that does not support the tanks, and 2x12s in the washeteria and boiler room. 3/8-inch plywood is attached to the underside of the joists creating an insulated floor assembly.

The floor joists are supported at the bearing lines by 10x10 treated beams. The 10x10 beams are supported on 10x12 treated posts spaced four feet on center.

2.2.2.2 Foundation System

The foundation system is depicted on sheets 4 and 6 of the original drawings.

The foundation system consists of 10x12 treated posts spaced four feet on center along each of the four bents. The posts extend approximately 3 feet below grade and are supported on a treated timber strip footing. Each 10x12 post bears on a 10x12 cross-beam that distributes the loads across the strip footing that consists of treated 4x12s that run the length of the building. The width of the strip footing varies. Under the interior bent supporting the water tanks, the footing is (4) 4x12 planks wide. The other strip footings are two or three 4x12s wide. See sheet 6 for a 3-D perspective of the foundation system.

2.2.2.3 Lateral Systems

Lateral loads for the water treatment plant are resisted by plywood diaphragms at the roof and floor levels and plywood shear walls on the perimeter of the building.

In the long direction of the building, lateral loads are transferred from the platform to the foundation by 3x8 diagonal braces nailed to the sides of the 10x12 posts. See sheets 12 and 13 of the original design drawings. In the narrow or transverse direction, lateral loads are transferred from the platform to the foundation with steel cable braces at the end walls. The original drawings show three sets of X-bracing at each end of the building, extending from the platform level to just above finish grade. The drawings also show intermediate 3x8 cross bracing at the 1/3 points of the building. These braces were not installed.

The cable bracing are fastened to the posts just above finish grade. At this point, lateral loads are transferred from the posts to the ground through bearing pressure of the posts against the soil.

3.0 Structural Design Load Comparison and Analysis

3.1 Design Loads – Original versus Current Code Requirements

The as-built drawings for the water treatment plant did not contain detailed general structural notes. However, some design information was provided on the drawings. The drawings also did not specify the design code under which the facility was designed. As the building was designed in 1981 and constructed in 1982, we assumed, for our building evaluation, that the water treatment plant was designed in accordance with the 1979 edition of the Uniform Building Code (UBC) - the code in affect at the time of design and construction. Live loads for new buildings are currently specified in the 2009 International

Building Code (IBC) and the American Society of Civil Engineers ASCE 7-05, *Minimum Design Loads for Buildings and Other Structures*. As part of our evaluation, we compared the design loads from the 1979 UBC to current design code requirements for a facility of this type in this location. Design loads specified on the as-built drawings included:

- Roof Loads 40 psf
- Wall Loading (wind) 25 psf
- Seismic Zone 1

3.1.1 Floor Live Loads

Neither the 1979 UBC, the 2009 IBC, nor ASCE 7-05 provide recommended design loads for water treatment plants or washeterias. The 1979 states that industrial or commercial buildings should be designed for the live load “caused by the use to which the building or part of the building is to be put” with special provision for the weight of equipment if the equipment or machine weight exceeds the live load. The 1979 UBC also has a category called “Mechanical and Electrical Equipment” and states that the area should be designed for “total loads”. ASCE 7-05 does not have a category for mechanical rooms. However, mechanical rooms are typically designed for 125 psf or 150 psf or the weight of the equipment – whichever controls. The fully loaded water storage tank or water treatment tank will have pressures in excess of 500 psf.

3.1.2 Roof Snow Loads

Current codes (IBC and ASCE 7-05) specify a ground snow load for communities throughout Alaska and provide a methodology for converting that ground snow load to a roof snow load. The 1979 UBC did not specify a ground snow load, or a recommended roof snow load, for Bethel or any other community in Alaska. Prior to 1979, the Corps of Engineers recommended a roof snow load of 30 psf for Bethel.

Under current codes, ASCE 7-05 recommends a ground snow load for Bethel of 40 psf. This translates into a roof snow load, when adjusted for the 4:12 roof slope, of 25 psf. For gable roofs, the code assumes that wind will “unload” the windward roof and “load” or blow the snow onto the leeward roof. Therefore, under ASCE 7-05, the roof must support either a uniform load of 25 psf over the entire roof or an “unbalanced” snow load consisting of no snow on one side of the ridge and a uniform snow load of 40 psf on the leeward side of the roof.

Original Design Roof Snow Load	40 psf
Current Recommended Roof Snow Load	40 psf

3.1.3 Wind Loads

ASCE 7-05 specifies a design wind speed of 117 mph for Tuluksak. This results in lateral wind pressures of 20.5 psf for the main exterior walls and corner pressures of 30.7 psf (typically the end 6 feet of the building). The design wind pressures for the building, under current codes, are less than the pressures for which the building was designed.

3.1.4 Seismic Loads

For simple buildings seismic forces are typically computed as a percentage of the weight, called the seismic mass, of the building. The force levels, expressed as a percentage of “W” or the dead load of the building, are:

- 1979 UBC: $V(eq) = 0.035 \times W$
- ASCE 7-05: $V(eq) = 0.043 \times W$

Code prescribed seismic forces for a building of this type, under current codes, are slightly higher than for which the building was designed. However, Tuluksak is located in an area of low seismic activity, such that wind pressures will control the design of lateral systems for the building.

3.2 Structural Analysis

3.2.1 Material Properties

The as-built drawings for the Tuluksak Water Treatment Plant did not specify the type or grade of timber components used in construction. To determine how the building’s design and construction compares to current code requirements, we had to make assumptions as to the type of materials used for construction. Our assumptions were based on our knowledge of the materials typically used for the construction of wood frame buildings in Alaska in the early 1980s. Our analysis is based on the following assumptions:

- Timber Joists and Wall Framing: Hem-Fir No. 2 or Better (Doug-Fir No. 2 or Better was also typically used, but we based our evaluation on the lower quality Hem-Fir No. 2 wood.)
- Glued-Laminated Beams: Doug-Fir with $F_b = 2,400$ psi
- Heavy Timber: Douglas Fir No. 1 or Better

Our analysis showed the following:

3.2.2 Roof Panels

Our analysis shows that the 2x6 framing, acting as individual joists, have adequate capacity to support a snow load of 40 psf. The framing, acting as a structural insulated panel with plywood sheathing, has even greater capacity.

3.2.3 Wall Panels

The wall panels can safely support the combined required roof snow loads and wind pressures.

3.2.4 Floor Joists

The floor capacity was evaluated assuming that Hem-Fir No. 2 lumber was used for all floor joists. The framing can support the following live loads:

- | | |
|--|---------|
| • Washeteria/Boiler Room (2x12 floor joists) | 150 psf |
| • Treatment Plant Room (3x12 floor joists) | 250 psf |
| • Treatment Plant Room – Tanks (4x12 floor joists) | 600 psf |

If the floor framing consists of Douglas-Fir wood, live load capacities can be increased by approximately 15 percent.

The recommended floor live load for mechanical type facilities is typically 125 psf or 150 psf.

The drawings for the water treatment plant indicate that the water tanks have a minimum height of 8 feet which translates to floor load, from the water alone, of 500 psf.

In summary, the platform framing, as designed, has adequate capacity to support the floor loads for water treatment plant operations.

3.2.5 Support Beams

The 10x10 support beams, if Hem-Fir material, can support an average uniform load of approximately 400 psf. If the wood is Douglas-Fir, the beams can support an average uniform load over 600 psf.

3.2.6 Foundation System

The original drawings did not provide an allowable soil bearing pressure for the building foundation. Assuming a conservative allowable bearing pressure of 2,000 psf, the foundation system can support uniform live loads of 550 to 600 psf.

4.0 Field Observations

On January 31, 2013 Ken Andersen, P.E., principal with Reid Middleton, performed a structural condition survey of the Tuluksak water treatment plant. The following observations are based on visual observations of the existing facility. As the interior of the building was covered with either gypsum wallboard or other finish materials and the underside of the floor joists sheathed with plywood, we had limited access to the structural framing members.

4.1 General Observations

The Tuluksak water treatment plant, constructed in 1982, is 30 years of age and is showing its age. Exterior siding appears weathered and entries to the building, although functional, are worn, uneven, and in need of repair.

Structurally, with the exception of rot in the plywood flooring and floor joists in the northwest corner of the boiler room, the building appears to be in reasonable condition.

4.2 Building Exterior

The exterior of the building appeared in good condition. Observations included:

1. The exterior T1-11 siding could use new paint.
2. A 3-foot section of corner trim is missing from the northwest corner of the building (Photo No. 4).
3. West Stairs: The railing system is not code compliant - too large of opening between vertical members (Photo No. 3).
4. East Stairs:

- a. The railing system is not code compliant – too large of opening between vertical members (Photo No. 5).
- b. The top rail is rotten in places and should be replaced (Photo No. 6).
- c. The stair treads are damaged and should be replaced (Photo No. 5).
5. The ramp and landing on the south side of the building, although not used, does not have a code compliant railing system and the sheathing/decking at the landing has been removed. The ramp and landing poses a potential hazard and should be repaired, removed, or chained off so that people cannot access the ramp.
6. Window on the south wall is broken.

4.3 Foundation System

The foundation system appears in good condition. We did not observe any signs of settlement, rot, or overstressed or failed members. Observations included:

1. West Elevation: The design drawings showed three sets of cross bracing, one in each of the three bays of the building in the transverse direction. Cross bracing is missing from the middle bay. The braces in the end bays are loose.
2. Mid-building braces: The original drawings showed two more rows of braces at the third points of the building. These braces were not installed.
3. East Elevation: The design drawings showed three sets of cross bracing, one in each of the three bays of the building in the transverse direction. Cross bracing is missing from the middle bay. The braces in the end bays are loose.

The original design drawings showed three sets of cross bracing at each end of the building. However, it appears that only two sets were installed. The original drawings also show the bracing as rod bracing with turnbuckles for tightening. Cable bracing without turnbuckles were installed. The bracing is not providing any lateral support for the building. However, the building appears to be performing adequately without the bracing. Lateral resistance is probably being provided by the numerous 10x12 posts resisting wind pressures through bending and lateral bearing pressure against the soil. My recommendation, however, would be to restore the bracing to a functional condition by either tightening the existing cable bracing or replacing the existing cable bracing with rod bracing and turnbuckles. This restores the bracing to the original design intent for the building.

4.4 Roof Framing

We observed no structural issues with the roof framing. Water stains were noticed on several of the roof beams (Photos 10 and 12), but no rot was observed in the roof framing members. Where glued-laminated beams framed into columns, it appears that the steel hanger connections were too short and the beams were notched to allow for installation (Photo No. 11). This is not a recommended detail as it can lead to splitting of the bottom of the beam at the notch. However, the beams are performing adequately with no splitting. No action is required.

4.5 Wall Construction

We observed no issues with the exterior wall construction.

4.6 Platform Floor

The platform appears to be performing adequately under the equipment loads and operation of the water treatment plant. Floors appear level and there are no signs of excessive deflection or member failure.

Rot was observed at several locations in the floor of the water treatment building, as noted below:

1. Base of the wall separating the washeteria from the boiler room. The keyhole saw could be pushed several inches into the sill plate of the wall (Photo 13 and 14).
2. Northwest corner of the boiler room, behind boiler no. 2 (Photo 17). The floor in this area has a soft spot that “gave” under the weight of a foot. The plywood could be easily removed by hand. The top of the 3x12 joists in this area could also easily be removed by hand – indicating extensive rot. The insulation between joists was wet, not just damp.
3. Northeast corner of the boiler room, equipment pad for hot water generator (Photo 15 and 16): The hot water tank is supported on a raised equipment pad that is wood framed, not concrete. The front edge of the pad is rotten (see Photo 16 showing knife penetration into wood platform).
4. Doorway between the boiler room and treatment room: The wood framing under the door is rotten (Photo 18).
5. Floor in front of the water treatment tank (Photo 19): An area of the floor in front of the water tank is soft. The plywood is soft and can be scraped easily with a knife. The extent of rot is not as severe as in the boiler room.

The plywood sheathing and joists in the boiler room, at least in the area adjacent to boiler no. 2, should be replaced. As the equipment pad under the water heater is also severely rotten, there is a chance that the floor under the water heater is rotten or damaged as well. Replacing the flooring and joists would not be an easy task. The best approach would be to remove existing equipment, remove all damaged flooring, and replace with new framing and sheathing, including the wall separating the washeteria from the boiler room. This approach would work well if the existing boilers and water heaters were scheduled for replacement. The flooring could be removed from below, but even this approach would probably require the temporary removal and replacement of equipment. For budgeting purposes, I would recommend that the entire boiler room floor be considered for replacement.

5.0 Recommendations

Based on our observations and evaluation of the Tulusak water treatment plant, we’d recommend the following repairs or upgrades.

a. Routine Maintenance

1. Repair/Upgrade the railing systems at the east and west Stairs.
2. Replace the stair treads at the east stairs.
3. Replace the missing corner trim at the northwest corner of the building.
4. Tighten existing cable bracing or replace the bracing with new rod bracing and turnbuckles.
5. Replace broken window on the south wall of the building.

b. Significant Repairs or Upgrades

1. Replace the flooring in the boiler room.

c. Operational Procedures

1. Prevent water accumulation on the floor. This would include ensuring that washers are not leaking and are properly draining, boiler leaks are fixed promptly, and water is not allowed to pond on the floor. Water from washeteria and treatment plant operations are the cause of rot in the floor framing of the platform.

6.0 Limitations

The professional services described in this report were performed based on limited visual observation of the structures. No destructive testing, except as noted in the report, was performed to qualify as-built conditions or to verify the quality of materials and workmanship. No other warranty is made as to the professional advice included in this report. This report has been prepared for the exclusive use of The City of Tuluksak / Village Safe Water and is not intended for use by other parties, nor may it contain sufficient information for purposes of other parties or their uses.

7.0 Photos



Photo No. 1: North Elevation



Photo No. 2: South Elevation



Photo No. 3: West Elevation
Note: Non-compliant railing at stairs



Photo No. 4: West Wall
Note: 1. Missing trim from corner of building
2. Cable bracing not tight



Photo No. 5: East Entry Stairs
Note: 1. Non-compliant railing
2. Damaged stair treads



Photo No. 6: West Entry Stairs
Note: Rotten stairrail



Photo No. 7: Ramp on South Wall
Note: Non-compliant Railing



Photo No. 8: Landing on South Wall
Note: No decking creates potential safety hazard



Photo No. 9: Post and Beam Foundation



Photo No. 10: Typical Roof Framing



Photo No. 11: Roof Framing
Note: Dapped GLB at connection



Photo No. 12: Roof Beam
Note: Water stains on beam



Photo No. 13: Washeteria – Rot at base of wall separating Washeteria and Boiler Room

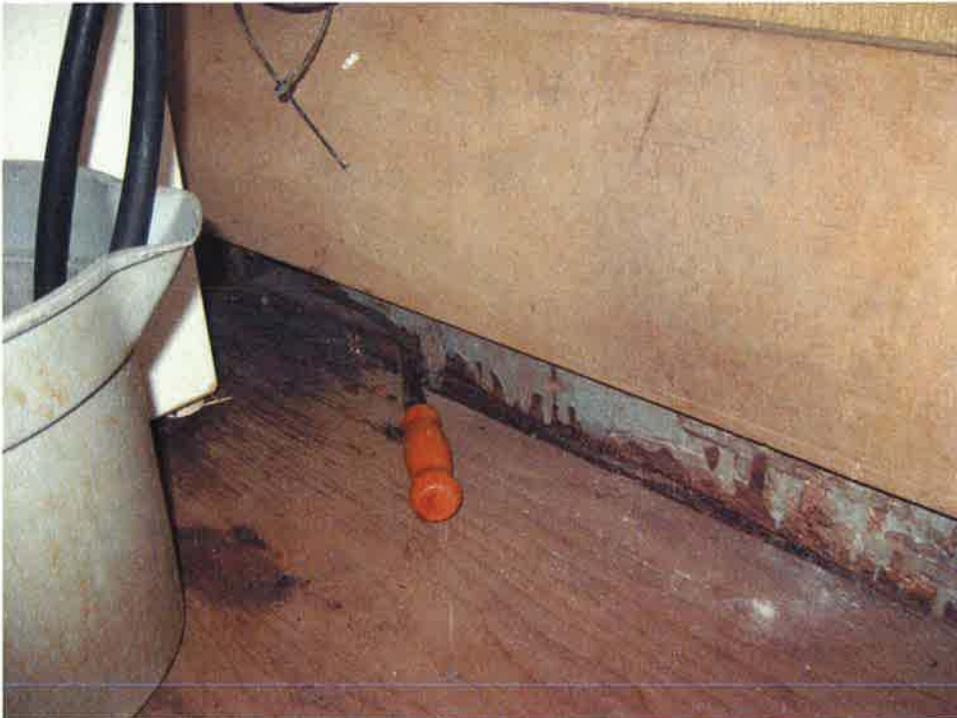


Photo No. 14: Washeteria - Rot at base of wall separating Washeteria and Boiler Room



Photo No. 15: Boiler Room – Hot Water Generator



Photo No. 16: Boiler Room – Wood platform supporting hot water tank



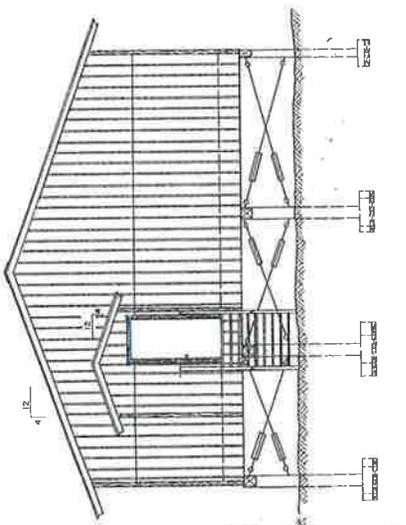
Photo No. 17: Boiler Room – Rotten plywood and joists behind Boiler No. 2



Photo No. 18: Boiler Room – Rotten sill at door between Boiler Room and Treatment Room

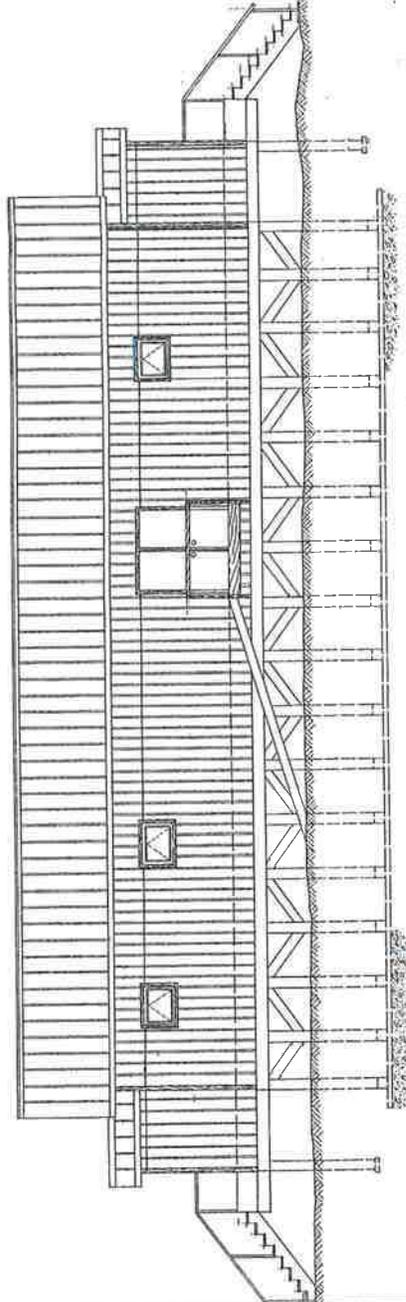


Photo No. 19: Water treatment tank – rotten plywood adjacent to tank



RIGHT END ELEVATION
SCALE: 1/4"=1'-0"

- NOTES
1. SEE PLAN SHEET OF SHEET ROCK, LATHES OF SHEET ALUMINUM.
 2. JAPANESE COURED SHEET ROCK IN SHOWER ROOMS AND SHOWER ROOMS.
 3. 2" THICKNESS OF BASEBOARD HEATER FOR FUEL OIL GREATER.



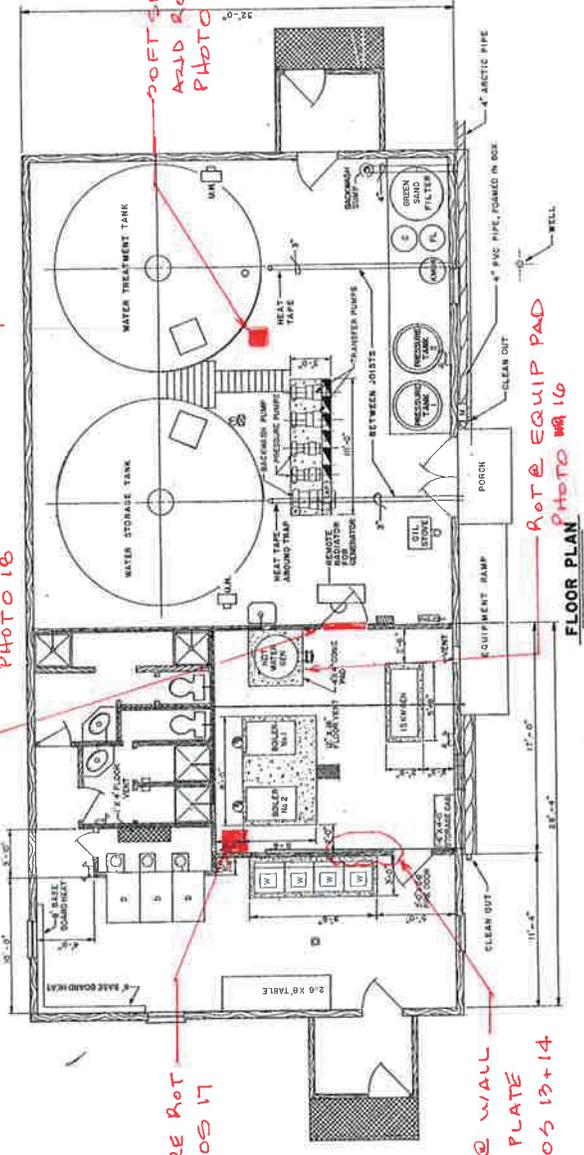
FRONT ELEVATION
SCALE: 1/4"=1'-0"

North ↑

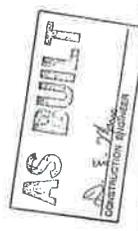
Rot @ Door Threshold
Photo 18

Severe Rot
Photos 17

Rot @ Wall
Sill Plate
Photos 13+14



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



DATE	AS-BUILT CONDITIONS	WST	INITIALS

U. S. Department of Health & Human Services
Public Health Service
Indian Health Service

TULUKSAK, ALASKA
WATER TREATMENT PLANT
FLOOR PLAN AND ELEVATIONS
PROJECT NO. 84-81-220
CHECKED BY: [Signature]
DATE: [Blank]

SHEET NO. 12
OF 12

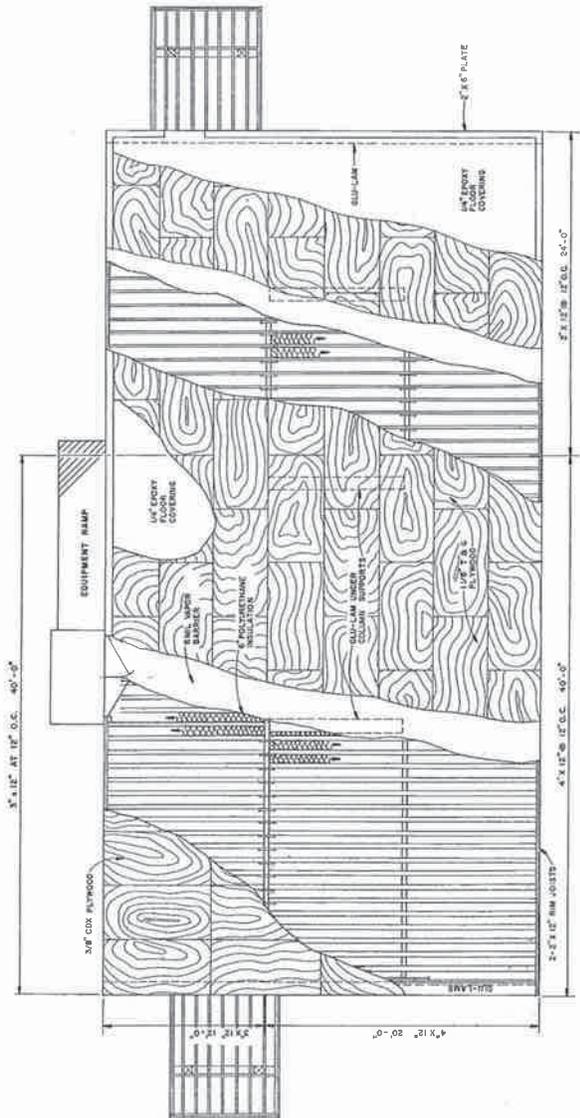
CONSTRUCTION BRANCH
ENVIRONMENTAL HEALTH SERVICE
ALASKA INDIGENOUS SERVICE



Figure 1



12/62 AS-BUILT CONDITIONS W/1
 SCALE 1" = 120'
 U.S. Department of Health, Education & Welfare
 Public Health Service
 DIVISION OF SOCIAL HEALTH
TULUKSAT, ALASKA
 AERIAL PHOTOGRAPHY
 PUBLIC LAW 86-41 PROJECT
 PROJECT NO. AH-61-220
 SHEET NO. 2 OF 30
 MADE IN U.S.A.
 PREPARED BY: [illegible]
 CHECKED BY: [illegible]
 APPROVED BY: [illegible]
 OFFICE OF ENVIRONMENTAL HEALTH
 FEDERAL BUREAU OF SURVEILLANCE
 WASHINGTON, D.C.



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

AS BUILT
CONSTRUCTION HOUSE

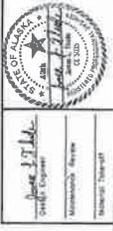
DATE	AS-BUILT CONDITIONS	REVISIONS	BY	INITIALS

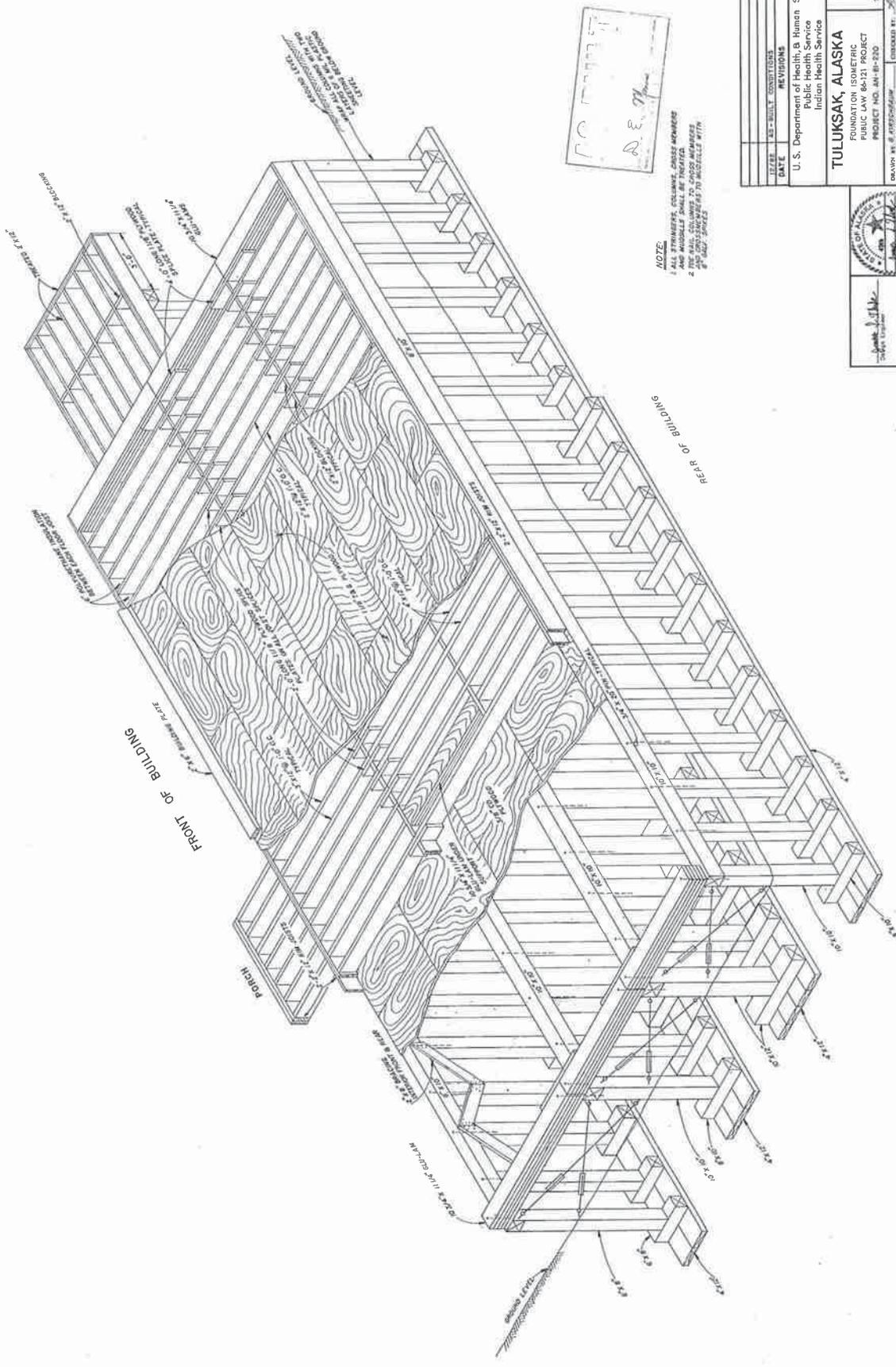
U.S. Department of Health, Education & Human Services
Public Health Service
Indian Health Service

TULUKSAK, ALASKA
FOUNDATION PLAN
PROJECT NO. AN-BI-220
DRAWN BY: J. J. JENSEN
DATE: FEBRUARY, 1979
CHECKED BY: J. J. JENSEN
DATE: 2/28/79

SHEET NO. 30
TOTAL SHEETS 30

SANITATION FACILITIES CONSTRUCTION BRANCH
ENVIRONMENTAL HEALTH DIVISION
ALASKA DEPARTMENT OF HEALTH, EDUCATION & HUMAN SERVICES
ANCHORAGE, ALASKA



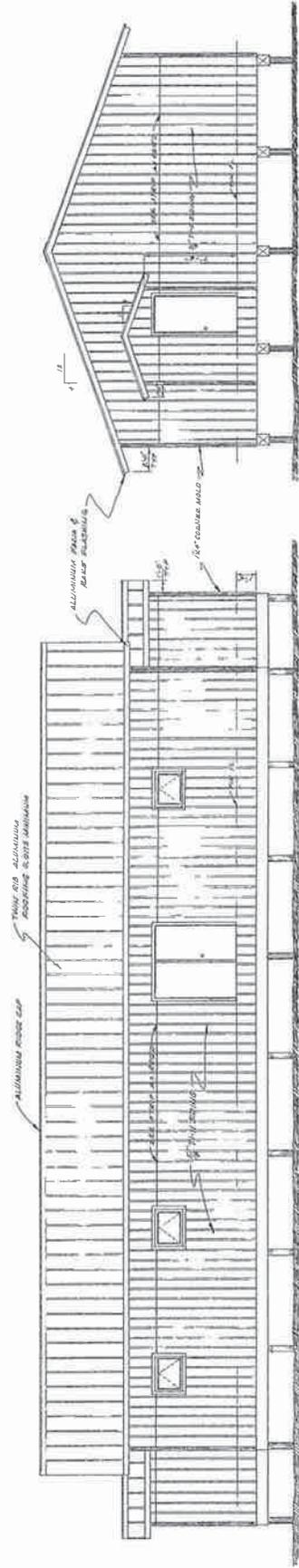


DATE: 10/1/58
 DRAWN BY: D.E. [Signature]

NOTE:
 1 ALL DIMENSIONS ARE IN FEET AND INCHES
 2 THE WALL COLUMNS TO CROSS MEMBERS
 3 SHALL BE SPACED TO INTERLOCK WITH

DATE	BY	REVISIONS	INITIALS

U.S. Department of Health, Education & Welfare
 Public Health Service
 Indian Health Service



FRONT ELEVATION
SCALE 1/4" = 1'-0"

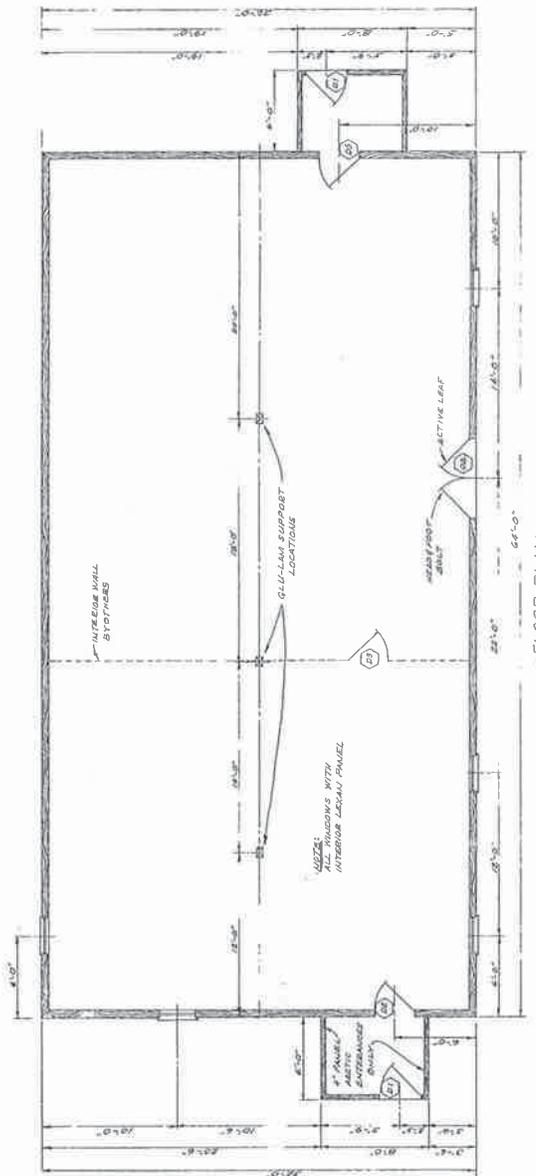
RIGHT END ELEVATION
SCALE 1/4" = 1'-0"

DOOR SCHEDULE

REQ'D	DOOR	TYPE OF DOOR	TYPE OF FRAME	TYPE OF GLASS	TYPE OF LOCK	TYPE OF HINGE	TYPE OF SWELL	TYPE OF FINISH	TYPE OF PAINT	TYPE OF GLASS	TYPE OF LOCK	TYPE OF HINGE	TYPE OF SWELL	TYPE OF FINISH	TYPE OF PAINT
2	D-1	INTERIOR	WOOD	GLASS	WOOD	WOOD	WOOD	WOOD	WOOD	GLASS	WOOD	WOOD	WOOD	WOOD	WOOD
3	D-2	INTERIOR	WOOD	GLASS	WOOD	WOOD	WOOD	WOOD	WOOD	GLASS	WOOD	WOOD	WOOD	WOOD	WOOD
4	D-3	EXTERIOR	WOOD	GLASS	WOOD	WOOD	WOOD	WOOD	WOOD	GLASS	WOOD	WOOD	WOOD	WOOD	WOOD
5	D-4	EXTERIOR	WOOD	GLASS	WOOD	WOOD	WOOD	WOOD	WOOD	GLASS	WOOD	WOOD	WOOD	WOOD	WOOD
6	D-5	EXTERIOR	WOOD	GLASS	WOOD	WOOD	WOOD	WOOD	WOOD	GLASS	WOOD	WOOD	WOOD	WOOD	WOOD

AS BUILT
CONSTRUCTION SERVICES

NOTE:
LOADING CONDITIONS TO BE USED IN DESIGN OF BUILDING SHALL BE AS INDICATED IN SPECIFICATION AND AS FOLLOWS:
ROOF LOADING: VERTICAL LIVE LOAD (INCLUDING SNOW LOAD) OF 40 POUNDS PER SQUARE FOOT

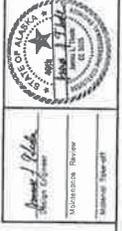


FLOOR PLAN
SCALE 1/4" = 1'-0"

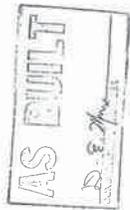
U.S. Department of Health, Education & Welfare
Public Health Service
Indian Health Service
TULUKSAK, ALASKA
WATER TREATMENT PLANT
FLOOR PLAN AND ELEVATIONS
PROJECT NO. AI-80-222

DATE: 1/11/79
DRAWN BY: J.P.
CHECKED BY: J.P.
DATE: 1/11/79

SHEET NO. 7
OF 30
TOTAL SHEETS



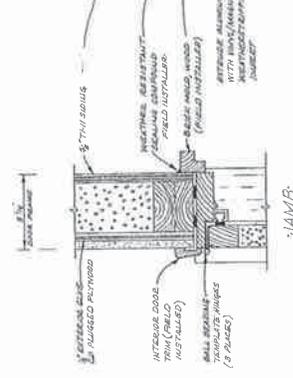
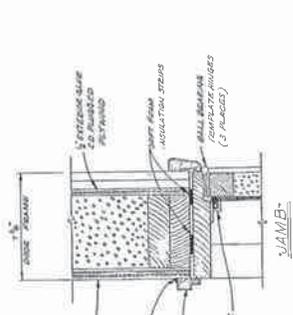
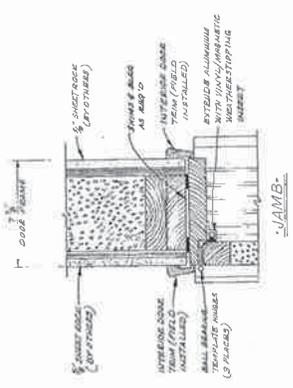
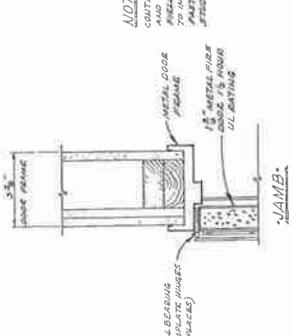
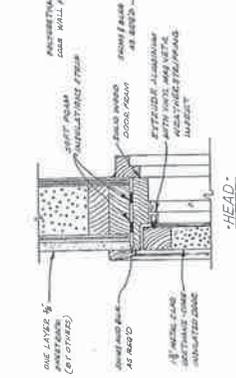
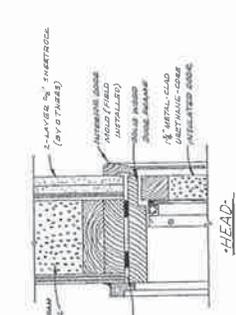
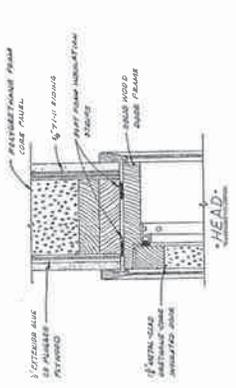
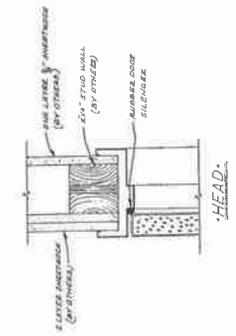
CONSTRUCTION SERVICES
1111 EAST 10TH AVE. SUITE 101
ANCHORAGE, ALASKA 99501



SCALE	AS-BUILT CONDITIONS	WKT	
DATE	REVISIONS	INITIALS	
U.S. Department of Health, Education & Welfare Public Health Service Indian Health Service			
TULLUKE, ALASKA WATER TREATMENT PLANT		SHEET NO.	9
PROJECT NO. 66-121		OF	30
DATE: JAN 79		TOTAL SHEETS	
DRAWN BY: J.S.G.		CHECKED BY: J.S.G.	
SANITATION FACILITIES CONSTRUCTION INDIAN HEALTH SERVICE ALASKA ADMINISTRATIVE HEALTH SERVICE			



J.S.G.
Professional Engineer
No. 1000
State of Alaska
Expiration Date: 12/31/80



NOTE
CONTRACTOR TO PROVIDE DOOR AND APPURTENANCES, ALL TO BE TO INCLUDE DOOR FRAME CLIP TO FASTEN METAL DOOR FRAME TO WOOD JOIST.

SECTION A

SECTION B

SECTION C

SECTION D

SECTION A

SECTION B

SECTION C

SECTION D

1/8" T & G FLOOR

SECTION A

SECTION B

SECTION C

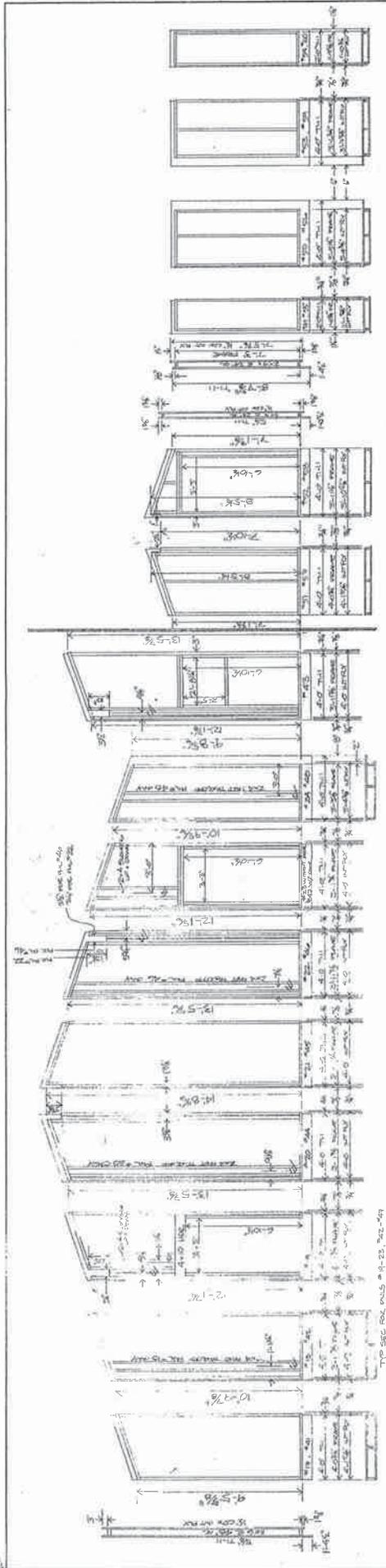
SECTION D

SECTION A

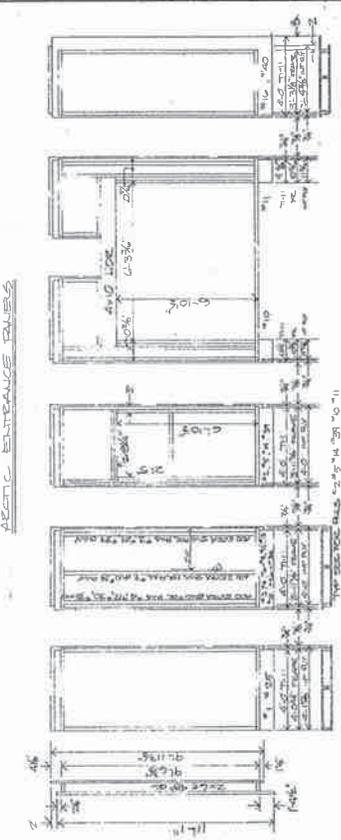
SECTION B

SECTION C

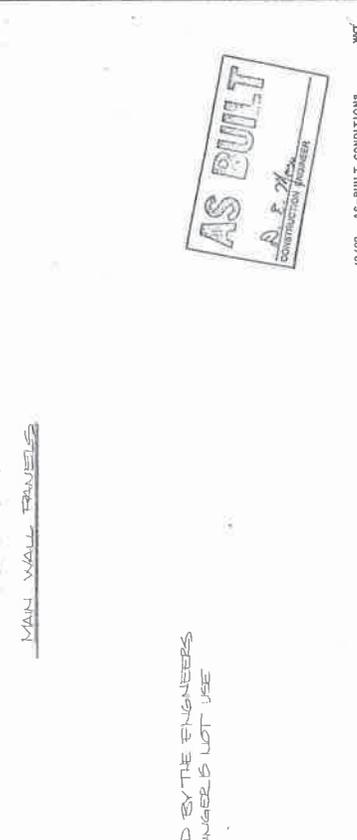
SECTION D



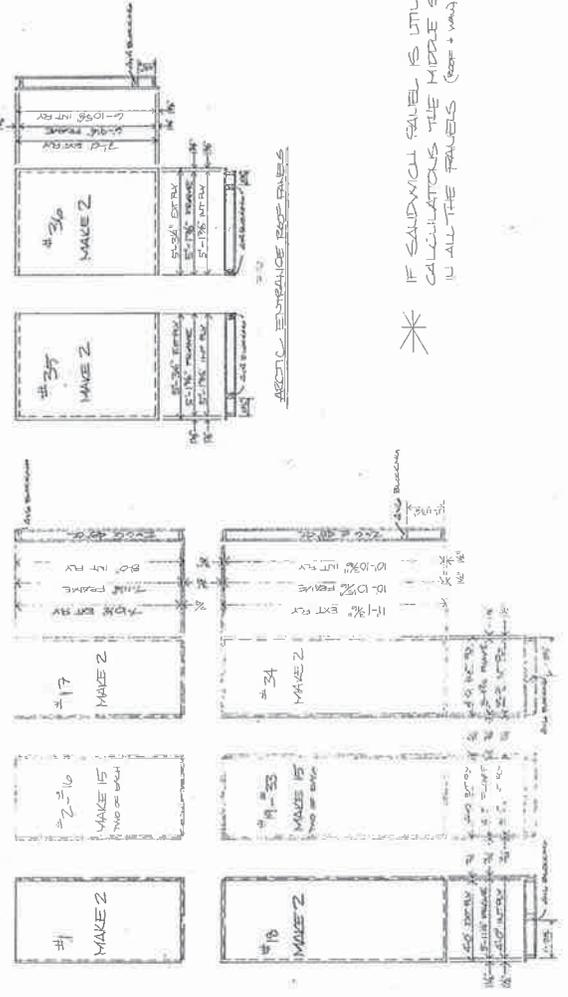
FACE END WALL PANELS



ACOUSTIC ENTRANCE PANELS



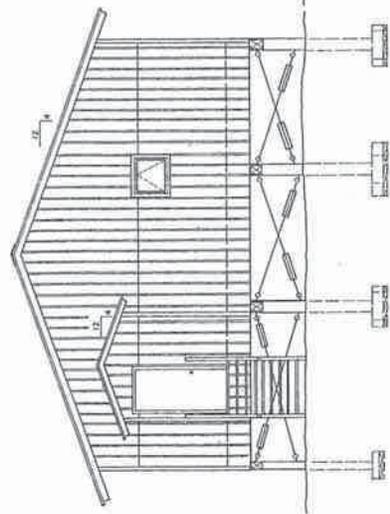
MAIN WALL PANELS



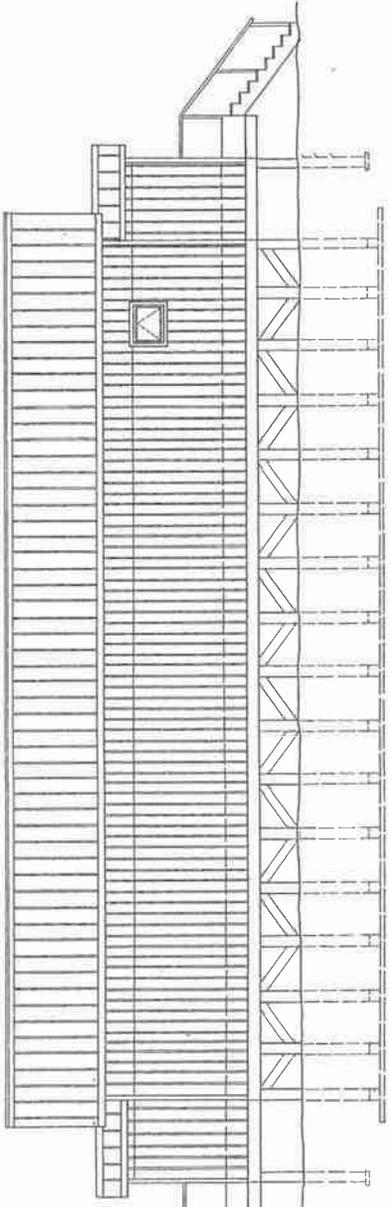
MAIN ROOF PANELS

IF SANDWICH PANEL IS UTILIZED BY THE ENGINEERS
CALCULATIONS THE HIDDEN STRINGERS NOT USE
IN ALL THE PANELS (ROOF + WALL)

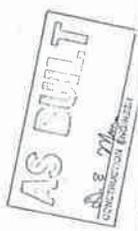




LEFT END ELEVATION
SCALE 1/8"=1'-0"



REAR ELEVATION
SCALE 1/8"=1'-0"



TYPE	AS-BUILT	CONSTRUCTION
DATE	REVISION	INITIALS
U.S. Department of Health & Human Services Indian Health Service TULUKSAK, ALASKA		
PUBLIC LAW 85-121 PROJECT PROJECT NO. AN-91-220		
DRAWN BY: A. JASCOBIAUM	CHECKED BY:	DATE:
DATE: FEBRUARY, 1981	DATE:	DATE:
SANTATION FACILITIES CONSTRUCTION BRANCH ENVIRONMENTAL HEALTH SERVICE ALASKA INDIAN HEALTH SERVICE ANCHORAGE, ALASKA		



James J. [Signature]
Professional Engineer
Registration No. 12345

PREPARED FOR: Andrea Meeks, P.E. CRW Engineering Group
PREPARED BY: Kevin L. Hansen, P.E.
COPIES: File
DATE: February 15, 2013
SUBJECT: Tuluksak Site Visit Report - Jan 31, 2013
PROJECT: CRWTLT

A site visit was made to evaluate the condition of the Tuluksak WTP/Washeteria on Jan 31, 2013.

Attendees were:

Beverly Short – Project Manager, VSW
Jon Hermon – Project Manager, CRW
Andrea Meeks – Project Engineer, CRW
Bill McDonald – CRW Electrical Engineer, CRW
Kevin Hansen – Mechanical Engineer, EDC, Inc.
Ken Anderson – Structural Engineer, Reid Middleton
Bob White – Remote Maintenance Worker, YKHC

The group arrived in Tuluksak at approximately 1 PM, and met with city personnel at the City offices. Kevin, Bill, Ken and Bob went to the WTP/Washeteria while the others met with City personnel.

WTP Washeteria Evaluation

The facility was constructed in 1981-82 and is typical of other PHS designs in the same time period. Most of the mechanical equipment is original to the construction date, with a few exceptions. Carl, the water plant operator was very helpful in pointing out areas where he had problems or had repaired things to keep the operation going.

Laundry Equipment

The facility was designed with four washers, and three hydronic dryers, but has been modified from the original design either during the original construction or sometime afterward. The toilet/shower rooms now consist of two rooms with toilet, shower and lavatory in each, although the toilets are not currently installed or operational. The original second shower room shown on the plans has been converted to three clothes washer stations, although they are not currently operational. Of the four washer locations shown on the original drawings, three washers are still installed and assumed to be operational. The three original hydronic dryers have been replaced with two (stacked) hydronic dryers and three household style electric dryers. Neither of the hydronic dryers are operational having been abandoned in place, but the three household style dryers appear to be operational. With the substitution of electric dryers for hydronic dryers, the load has shifted from fuel consumption

in the boilers to electrical consumption. Numerous clothes washers that are apparently no longer working are setting in various spots around the building.

Heating System

The heating system consists of two hydronic boilers, with two circulating pumps. The hydronic system serves baseboard heaters in the laundry and toilet areas, unit heaters in the treatment area, a domestic hot water generator. and the hydronic dryers that are still in place. At some point, a heating piping loop with circulation pump was installed to serve a heat exchanger to preheat raw water for treatment. There is also a small heat exchanger to provide freeze protection for the school and work camp service lines. None of the heat exchangers, including the domestic hot water generator tube bundle appear to be double-wall type to provide isolation between boiler water and potable water.

The two boilers are original to the facility. They are Weil McLain boilers, but the data plates have been removed. The assumption is that they are model BL-676, based on the drawings. That boiler series was discontinued in 1993, although some parts (such as intermediate sections) are still available. The boilers are significantly deteriorated, with corrosion on the supply nipples from leakage and potentially on the front cast iron sections (which cannot be replaced). They appear to be gas-tight between sections and both boilers and burners are operational. Carl reports that Boiler 1 doesn't sound right when firing, so probably needs a tune-up at a minimum. The barometric damper on Boiler 2 is incorrectly installed so cannot operate properly.

Piping near the boilers is deteriorating badly, with multiple joints starting to leak. The supply flange connections at both boilers have been replaced due to leakage, but copper sweat joints will either need to be re-soldered after disassembling and cleaning or the piping replaced. The hydronic system fill is water, and has no corrosion inhibitors as a glycol system would. The fill valve is maintaining steady pressure in the system, but the relief valve at the fill valve started leaking and was plugged by Carl to stop the leak. The relief valve is a redundant one, as the relief valves on the boilers are in place and so not appear to be leaking. However, relief valves should be tested or replaced on a regular basis (10 years maximum interval), and the service record of these is unknown.

Circulating pumps appear to be the originally installed pumps, as they match the equipment specified on the drawings. They appear to be operating properly, but are oversized since the hydronic dryers are no longer being used.

Baseboard heaters in the public area of the building have missing covers and the fins are badly damaged. The bent fins and lack of covers significantly reduces the capacity of the heaters. The unit heaters in the treatment area appear to be in reasonably good shape and are operating. They may need to be cleaned to remove dust and obstructions from the coils, but are otherwise serviceable.

The fuel supply pipeline has a leak where the piping first crossed under the building which should be fixed to reduce fire hazard and contamination of the nearby well.

Water Treatment

The water treatment system is a batch type treatment, with a well pump delivering water through the preheat exchanger to a pre-treatment tank (approximately 10,000 gallons

capacity) after preheating and injection of treatment chemicals. The water is then pumped through a 4 foot diameter greensand filter, chlorinated, and stored in a treated water tank (also approximately 10,000 gallon capacity). Pressure pumps draw water from the treated water tank and deliver it to the fixtures in the building, a public watering point, and to the school and work camp. Two hydro-pneumatic pressure tanks are used for pump protection. A backwash pump also draws water from the treated water tank to backwash the filter. The backwash waste is directed to a 1000 gallon polyethylene tank, which then drains by gravity through an arctic pipe to discharge. The tank was added after original construction to regulate flow through the discharge line and prevent surges. The tank also receives water from a 1/4 HP B&G pump draining the pre-treatment tank. The pump has an estimated capacity of 60 to 80 gallons per minute, and is manually controlled to flush treatment residue from the pre-treatment tank.

The well pump was specified as a Sta-Rite VIP III 20, 5-stage, 1/2 HP submersible pump. It is unknown whether the original pump is still in place, but it is doubtful. The capacity, make and model of the existing well pump is unknown. The raw water heat exchanger that preheats the water for treatment is a plate and frame type. It may be double wall construction for isolation of the heating fluid from the water, but not likely. This is a potential source of contamination if a leak occurs in the heat exchanger. The treatment system transfer pumps are 3/4 HP PACO end suction centrifugal pumps, rated at approximately 35-40 gpm at 1750 rpm, however only one was operable. The pumps were either original to the facility or had been replaced with the same models as originally specified. The pressure pumps were originally specified as 1-1/2 HP PACO end suction centrifugal pumps, rated at approximately 50 gpm at about 25 psi boost at 3500 rpm. They had been changed to Goulds Model 3SVBK3 multi-stage vertical centrifugal pumps. Per catalog information, the currently installed pressure pumps are 3 HP, rated at approximately 55 gpm at 60 psi boost, operating at 3500 rpm, so they may be oversized for the current application. Only one of the pressure pumps is operational. Carl indicated that seals had failed on the two non-working pumps. The motor data plates on the pumps have been removed, so motor sizes could not be physically confirmed. The backwash pump appeared to be the original 3 HP PACO end suction centrifugal pump delivering approximately 180 gpm at 45 ft head at 1750 rpm (based on catalog information).

The public watering point is not working, most likely due to a failed solenoid valve located in the attic space above the washeteria. The control box at the watering point also appeared to be damaged, as the pushbutton was missing.

Equipment Condition Recap

Boilers: Near the end of their useful life, with corrosion damage. Also oversized for the current load with hydronic dryers not operational. At a minimum burner tune-up is required.

Circulation Pumps: Operational but oversized for the current load with hydronic dryers not operational.

Baseboard Heaters: Operating at less than designed output due to damaged fins. Should be replaced.

Unit Heaters: Operational. Could probably operate for another 10 years with minimal maintenance, such as cleaning of coils and fan motor lubrication.

Domestic Water Heater: Operational, but uses a single wall heat exchanger bundle. Is original to the building, but may have another 8-10 years life remaining.

Well Pump: Operational, Condition and capacity unknown. A fuel piping leak nearby may eventually contaminate the ground water if not fixed.

Treatment Transfer pumps: Only one of the pair operating. Obsolete models and repair parts are difficult to obtain. Recommend replacement.

Pressure pumps: Only one of the pair operating. With repair of the inoperable pump, may have 10 years additional life. The piping configuration makes maintenance very difficult.

Pressure tanks: Operational. Probably have 10 years of life remaining.

Water Storage Tanks: Operational, however the treated water storage tank may have leakage. Should be tracked down and repaired if the facility is to remain in use.

Raw Water Heat Exchanger: Operational, although the controls are not operating correctly, wasting energy by running the glycol circulation pump continuously rather than only when needed to heat incoming water. Heat exchanger is single wall. Probably has at least a 10 year remaining life.

School and Camp Supply Line Heat Exchanger: Operational, although piping arrangement of the camp circulation pumps causes school water meter to turn backward. Heat exchanger is single wall.

Washeteria equipment and facilities: Limited operation capability. Equipment is used hard and maintenance is difficult. Hydronic dryers in place but non-operational. Toilet and shower facilities are not operational and significant expense would be required to restore the facility to full operation to serve the villages laundry needs.

AVEC Waste Heat

Bill McDonald and I visited the AVEC power plant to check for potential for waste heat utilization.

We discovered that Waste Heat equipment had been partially installed. The system consisted of an Ameridex plate-and-frame type heat exchanger using a pumped branch from the engine cooling lines on the hot side, and two branches with pumps on the cold (output) side of the heat exchanger. The hot side supply to the heat exchanger uses a Grundfos UP 50-75F pump, with a nominal capacity of 20-25 GPM. One output side branch (3/4-inch size) serves the power plant itself with a Grundfos Model 15-42SF pump delivering glycol to unit heaters in the plant and is in operation. The other branch is 2-inch size with duplex Goulds 2SVB, 2-stage, 3/4 HP, 480/240V 3-phase pumps. The pumps have a capacity somewhere between 10 and 40 GPM. The branch piping is valved off and stubbed out to the building exterior. The Goulds pumps are not connected, nor are controls for the 2-inch branch. Duplex PEX piping is routed under the road adjacent to the power plant, but not connected at either end. Assuming a 20 degree temperature drop on the hot side of the heat exchanger, approximately 180,000-200,000 BTUH of waste heat could be utilized.

We departed Tuluksak at approximately 4 PM.



View of Boilers with leaking piping and deteriorated piping insulation

Tuluksak Site Visit - 1/31/13 Photos



Close-ups of copper boiler piping with corroding, leaking joints



Close up of corroded boiler supply nipple.



Boiler and Circulation Pump



Baseboard heaters with missing covers and damaged fins.



Domestic Water heater with original single wall heat exchanger bundle.



Photo of leaking fuel supply piping – Well pump is in the background to the left. Leak is at union about 4 ft from elbow.

Tuluksak Site Visit - 1/31/13 Photos



Washeteria area. Two unoccupied washer connections at right. Two stacked dryers are inoperable

Tuluksak Site Visit - 1/31/13 Photos



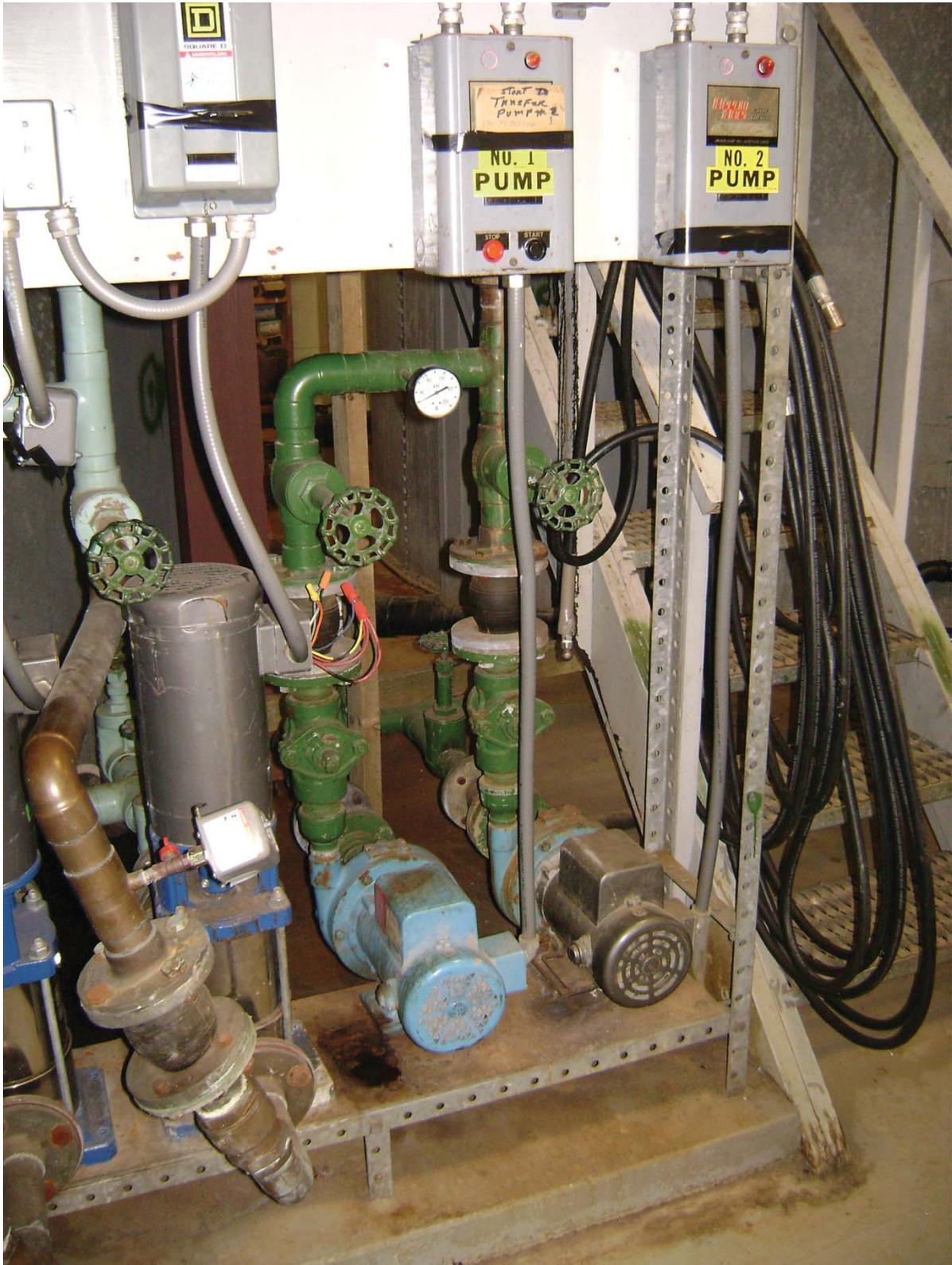
Typical Toilet/Shower room. Toilets not connected.



Backwash pump



Pressure pumps (right two). One is not working. Note piping obstructing pump maintenance.



Treatment Transfer Pumps (right two). One is not working

Tuluksak Site Visit - 1/31/13 Photos

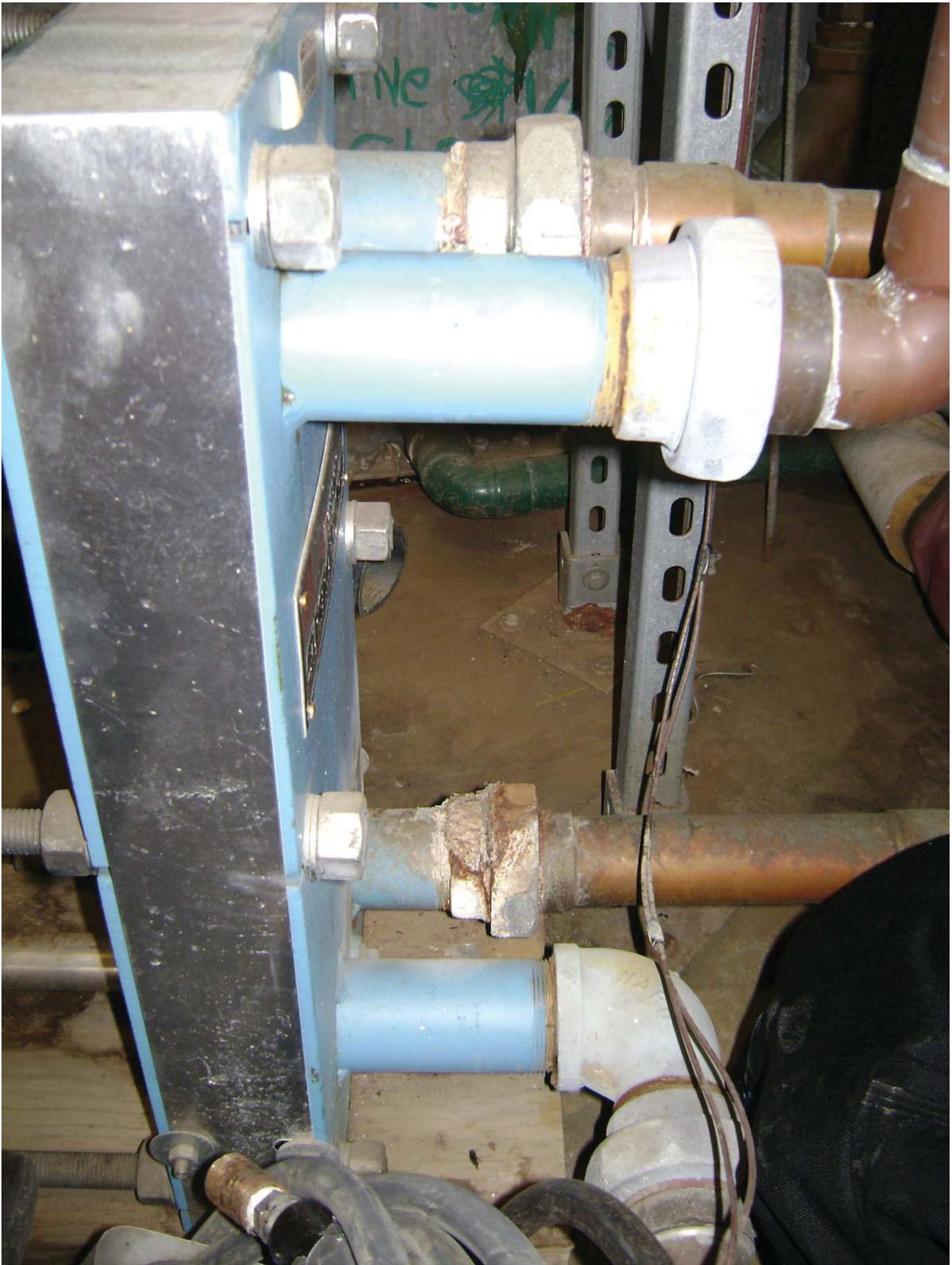


Treated water tank corrosion. Tank has been lined, but water still appears on floor underneath

Tuluksak Site Visit - 1/31/13 Photos



School and Work Camp (smaller) water lines thru floor. Raw water tank drain line pump at left.



Raw Water Heat Exchanger.

Tuluksak Site Visit - 1/31/13 Photos



Open connections at Backwash drain line. Line is broken at exterior of building wall



Leak at backwash drain piping from outside.



AVEC Waste Heat equipment



Circulation pumps for Waste Heat supply. Note pumps and control valve at upper right not connected to power. Pump in background is hot side circulator for heat exchanger.

Tuluksak Site Visit - 1/31/13 Photos



Waste Heat Piping conduit at exterior of power plant.



Waste Heat Piping conduit on opposite side of road from power plant.

TRIP REPORT



CRW Engineering Group
3900 Arctic Blvd. Suite 203
Anchorage, AK 99503
(907) 562-3252 FAX 561-2273

DATE: Jan 31,2013
PROJECT: Tuluksak Feasibility Study (CRW 20093.00)
LOCATION: Tuluksak, Alaska
REPORTER: William McDonald P.E, Electrical Engineer, CRW
PURPOSE: Site Visit – Condition Survey

CONTACTS:

Beverly Short	VSW Program Manager
Jon Hermon	CRW Project Manager
Andrea Meeks	Tribal Council Chief
Bob White	Remote Miracle Worker
Ken Anderson	Reid Middleton
Kevin Hanson	EDC

ACCOMPLISHMENTS:

The following objectives were accomplished during this trip:

- ◆ Investigate and document the electrical systems in the WTP/Washeteria
- ◆ Investigate and document the partial installation in the Power Plant.

BACKGROUND:

This trip was my first trip to Tuluksak. The information obtained during condition survey and installation documentation are intended to be used for the feasibility study and in the event the existing facility is to be upgraded (as opposed to replaced) it will be used as a basis for the design effort.

ACTIVITIES:

On Thursday Jan 31, 2013 I traveled with the above mentioned personnel from Anchorage to Tuluksak via Bethel. Weather delays in Bethel postponed the scheduled departure of the 1-day trip reduced time on site, however the site survey mission was able to be completed.

OBSERVATIONS:

WATER TREATMENT (WTP) / WASHETERIA

Electrical Service:

The facility is served via an overhead service drop. A pole mounted transformer which is shared with two other structures.

The incoming supply is 120/240V single phase. The building main consists of a 200A meter / main combination and is rated at 200A. The building main disconnect is inaccessible due to a collapsed landing.

Standby Generator:

A diesel-fired 20kW/20kVA, 120/240V generator, located in the boiler room provides standby power to the facility. It appears to be in good shape but we did not have time to operate it.

Electrical Distribution:

The generator output serves a 60A breaker located adjacent to the generator and then is routed through a 70A fused switch located in the office.

The 200A service and the 70A generator supply are terminated in a 100A rated transfer switch. Which in turn serves a 225A rated, 42 space panelboard that powers the water treatment plant..

Another 100A rated 16 space panel is connected directly to the transfer switch on the same lugs as the 200A service. This panel serves the washeteria.

Controls and Alarms

There is no central control panel. Each system is individually controlled using discreet components.

Pressure pumps – There are two pressure pumps. They are operated as MAIN /STANDBY and only one runs at a time. A single differential pressure switch is manually switched between the pump motor starters to allow automatic operation.

Chemical Injection – A flow switch controlled receptacle is provided for the operation of the chemical injection system. Other chemical injection in use at the time of the inspection (pre-

treatment) was manually operated.

Pre-Treatment – VFD controlled mixers are utilized for chemical dispersion and aeration and are manually operated.

An alarm panel in the mechanical room, intended to monitor building temperature and pressure is installed but is not operable. Based on a design no longer in use, the panel is powered from a 12VDC emergency light power supply. The panel does not meet code as it is not Listed.

General Electrical

Lighting consisted of Fluorescent fixtures. Where diffusers were damaged or missing it was noted that the newer more efficient T-8 lamps were in use, however, as was mentioned – there were several fixtures with broken or missing parts. The lighting appeared marginal in corners and at the pretreatment areas but adequate in the vicinity of the controls and major electrical components.

Wiring is installed in general in a combination of 4"x 4" wireways that run along most of the walls in WTP with EMT risers and Liquidtight Flexible Metal Conduit (LFMC) to devices and equipment.

The major motor controls are installed on a plywood rack centrally located above the pumps they control, the (2) exceptions being the VFDs that operate mixers in one of the Pre-Treatment tanks.

CONDITION SURVEY

Although not an electrical item per se, it was noted that almost all of the motor placards have been removed (and discarded ?) and a blue sticker with undecipherable letter and number designations have been provided in their place. An effort to restore the original pump information will go a long way in allowing proper replacement.

Service and Distribution

The Main disconnect is inaccessible due to a collapsed landing. This condition appears to have existed for some time as the main doors leading to the landing have been blocked off and the vestibule area used for permanent storage. This is a violation of NEC 110.16 access NEC

The 200A rated Main feeder exceeds the rating for the 100A transfer switch. This is a violation of NEC 110.3 and due to its height NEC 240.24.

Both the Fused Disconnect for the generator supply and the Manual transfer switch are located over a desk – they are not accessible per NEC 110.16. (NOTE: the 225A distribution panel located adjacent to the transfer switch does have clearance.)

The feeders from the service and the standby generator are incorrectly color coded with White insulated conductors used for HOT legs with marking tape only to identify that they are not

grounded conductors.

The Washeteria feeder is tapped at the manual transformer on the same lugs as the incoming utility service conductors. The lugs are not rated for multiple conductors. NEC 110-3 violation.

The standby generator is not UL Listed – it is listed for use in Canada only.

Controls and Alarms

The alarm panel is not listed and is in poor condition.

The pressure pump controls are only MAIN / STANDBY – originally Lead Lag was employed but the second pressure switch was inoperative.

As the rated pump motor currents could not be ascertained (see first paragraph under CONDITION) These values should be verified. NOTE : No overload trip problems were brought to our attention.

Wiring Methods

Most of the conduits in the WTP show varying degrees of corrosion – some completely corroded over 100% of the surface. The integrity of the conduit as a grounding system MAY be compromised at couplings and connectors..

The wiring methods in the washeteria utilize flush devices and surface mounted lighting is in poor condition. Receptacles accessible to the public should be GFCI type.

RECOMMENDATIONS

The following items should be addressed in order to bring the facility up to code and return it to the original operating conditions. If all of the recommended mitigation measures are employed approximately 60% of the electrical will need to be replaced/rewired. The major work will be in the replacement of the service and distribution and electrical wiring.

1. Provide new landing and access to the building Main.
2. Replace the 100A transfer switch with a 200A rated unit and re-install the conductors with proper color coding.
3. Provide overcurrent protection for the Washeteria panel feeder and tap the incoming service properly.
4. Provide a Feeder One Line diagram to permit proper operation.
5. Replace heavily corroded conduits. Provide additional protection (paint) or use PVC to

mitigate corrosion.

6. If after any system upgrades, the generator is still adequately sized, confirm with State Inspector that the generator can be used if provided with Ground Fault protection in lieu of UL listing.
7. Provide new (listed) alarm panel with outside dialer for notification.
8. Replace Lead Lag pressure pump controls.
9. Somehow figure out what the pump motor ratings are and provide pseudo placards to replace the ones removed – verify overloads are properly sized.

POWER PLANT

CURRENT INSTALLATION

There is no electrical provided for the installation of the pumps and controls currently installed (but obviously never run).

RECOMMENDATIONS

A new 480/3 panel and distribution to serve the motors should be installed with a 5 or 7.5 kVA unit substation for the 120V control and instrument supply. The existing 480 Station service could be tapped for this or if separate metering is called for a new METER/MAIN/DISTRIBUTION panel installed.

END OF REPORT

Appendix E

Cost Estimates

Included in this appendix:

- 1) Capital Cost Estimates
 - a. Alternative 1 – Site Built (21 pages)
 - b. Alternative 1 – Modular construction (16 pages)
 - c. Alternative 2 (19 pages)
 - d. Alternative 3 (22 pages)
- 2) O&M Cost Estimates
 - a. Alternative 1 (18 pages)
 - b. Alternative 2 (18 pages)
 - c. Alternative 3 (20 pages)

**Tuluksak Washeteria WTP - PER
Alternate 1 - New WTP and Washeteria**

**Construction Cost Estimate
Concept Design Submittal**

March 30, 2018



1225 E. International Airport Road, Suite 205
Anchorage, Alaska 99518
907.561.0790

Prepared for:
CRW Engineering Group, LLC
3940 Arctic Blvd. Sute 300
Anchorage, Alaska 99503
907.562.3252

Tuluksak Washeteria WTP - PER
Alternate 1 - New WTP and Washeteria

Construction Cost Estimate
Concept Design Submittal
March 30, 2018

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Documents

Document Title Tuluksak Washeteria - WTP
Design Firm
Level of Documents Concept
Date 16-Dec-16

Schedule

Project Start Spring 2019
Project Duration 12 Mths

Notes and Assumptions

Local Labor
Force Account
Equipment will be barged to and from the project site from Anchorage

Estimate Class

5

Methodology

Estimate is priced with locally priced materials and labor per the estimators experience.

Labor Rates

ANTHC Force Account Labor Rates for 2017.
Labor Rates based on 60 Hour/Week Schedule.
Lodging assumed to be from Community at \$50/MD.

Estimator

Jay Lavoie - jay@estimations.com, 907-561-0755

Exclusions

Tuluksak Washeteria WTP - PER
Alternate 1 - New WTP and Washeteria
Summary

Construction Cost Estimate
Concept Design Submittal
March 30, 2018

Description	Quantity Unit	Matl	Labor	Hours	Equipment	Total	Unit Cost
M-CB Construction Billing		NONE	\$0	\$0	-	\$0	\$0
M-CB Equipment Resources		NONE	\$0	\$0	-	\$0	\$0
M-CB Mobilization/Demob	1 LS		\$0	\$38,706	600.00	\$0	\$38,706
M-CB Shipping/Freight	1 LS	\$543,099	\$31,540	400.00	\$0	\$574,639	
M-CB Fuel	1 LS	\$30,000	\$0	-	\$0	\$30,000	
M-CB Housing	1 LS	\$111,762	\$0	-	\$0	\$111,762	
M-CB Utilities	1 LS	\$10,800	\$0	-	\$0	\$10,800	
M-CB Travel	1 LS	\$56,560	\$0	-	\$0	\$56,560	
M-CB ANTHC Project Superintendent	1 LS	\$0	\$321,892	3,117.60	\$0	\$321,892	
M-CB ANTHC Procurement Labor	1 LS	\$0	\$28,350	400.00	\$0	\$28,350	
M-CB Survey	1 LS	\$0	\$31,270	250.00	\$0	\$31,270	
M-DS Design & CA Services	1 LS	\$0	\$700,696	5,764.20	\$0	\$700,696	
M-CB Equipment Rental	14 MTH	\$12,400	\$0	-	\$427,448	\$439,848	\$31,417.71
M-EQ Equipment Repair & Maint	1 LS	\$0	\$116,203	1,039.20	\$0	\$116,203	
M-CB Consumables	1 LS	\$10,700	\$0	-	\$0	\$10,700	
M-CB Small Tools	1 LS	\$16,100	\$0	-	\$0	\$16,100	
M-CB Safety Stand Down	1 LS	\$0	\$18,869	260.00	\$0	\$18,869	
M-CO Closeout		NONE	\$0	\$0	-	\$0	\$0
M-PC Pre-Construction	1 LS	\$0	\$28,974	300.00	\$0	\$28,974	
M-PC Pre-Construction: NTP		NONE	\$0	\$0	-	\$0	\$0
M-PC Pre-Construction: Project Set-Up		NONE	\$0	\$0	-	\$0	\$0
M-PC Pre-Construction: Material Take-off		NONE	\$0	\$0	-	\$0	\$0
M-PC Pre-Construction: Meeting	1 LS	\$0	\$1,798	16.00	\$0	\$1,798	
M-PC Pre-Construction: Completed		NONE	\$0	\$0	-	\$0	\$0
M-PM Project Management	1 LS	\$0	\$126,325	1,039.20	\$0	\$126,325	
M-WR Warranty	1 LS	\$50,000	\$0	-	\$0	\$50,000	
W-WW Complete Well Connection	1 LS	\$10,030	\$8,227	96.00	\$0	\$18,257	
C-WA WTP/Washeteria - Bldg	1 LS	\$417,908	\$408,080	4,463.80	\$3,902	\$829,890	
C-WA WTP/Washeteria - Systems	1 LS	\$616,007	\$205,912	2,603.90	\$0	\$821,919	
C-WA WTP/Washeteria - Plumbing, HVAC, Process Piping	- \$0	\$102,985	\$103,026	1,330.00	\$0	\$206,011	
S-LS Wastewater Pump Station	1 EA	\$75,626	\$38,566	492.00	\$2,365	\$116,557	\$116,557.00
W-WT Insulated Storage Tank	35 KGAL	\$192,392	\$47,070	630.00	\$17,023	\$256,485	\$7,328.14
M-IF Fuel Tank	10 KGAL	\$43,600	\$7,401	100.00	\$4,065	\$55,066	\$5,506.60
W-SD Water Piping	1,700 LF	\$149,700	\$63,621	800.00	\$9,651	\$222,972	\$131.16
S-BF Force Main	175 LF	\$22,000	\$15,906	200.00	\$2,413	\$40,319	\$230.39
E-HR Upgrade Heat Recovery	1 EA	\$24,250	\$53,957	680.00	\$6,755	\$84,962	\$84,962.00
Subtotal		\$2,495,919	\$2,396,389	\$24,582	\$473,622	\$5,365,930	
Compliance with American Iron and Steel (AIS)					5.0%	\$268,297	
Estimating Contingency:					15.0%	\$845,134	
Project Administration					10.0%	\$647,936	
Total Recommended Construction Cost						\$7,127,297	

Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor Rate	Labor Cost	Equipment Costs		Unit Cost	Total Cost
				Unit	Total	Units	Hours			Unit	Total		
1													
2	M-CB Construction Billing		NONE										
3													
4													
5	Subtotal: M-CB Construction Billing	-	NONE										
6													
7													
8	M-CB Equipment Resources		NONE										
9													
10													
11	Subtotal: M-CB Equipment Resources	-	NONE										
12													
13													
14	M-CB Mobilization/Demob	1	LS										
15													
16	Crew Leader	20	DAY			10.000	200	\$104.03	\$20,806			\$1,040.30	\$20,806
17	Loc Labor	40	DAY			10.000	400	\$44.75	\$17,900			\$447.50	\$17,900
18													
19	Subtotal: M-CB Mobilization/Demob	1	LS				600.0		\$38,706				\$38,706
20													
21													
22	M-CB Shipping/Freight	1	LS										
23													
24	Equipment - In	175,000	LBS										
25	Equipment - Out	175,000	LBS										
26	Materials	365,030	LBS										
27	Miscellaneous	54,755	LBS										
28	Surface Freight To Bethel	594,785	LBS	\$0.45	\$267,653							\$0.45	\$267,653
29	Barge To Tuluksak	594,785	LBS	\$0.25	\$148,696							\$0.25	\$148,696
30	Barge Out Of Tuluksak	195,000	LBS	\$0.25	\$48,750							\$0.25	\$48,750
31	Surface Freight Bethel/Anchorage	195,000	LBS	\$0.40	\$78,000							\$0.40	\$78,000
32	Shipping Labor	400	HRS			1.000	400	\$78.85	\$31,540			\$78.85	\$31,540
33													
34													
35													
36	Subtotal: M-CB Shipping/Freight	1	LS		\$543,099		400.0		\$31,540				\$574,639
37													
38													

Tuluksak Washeteria WTP - PER
 Alternate 1 - New WTP and Washeteria

Construction Cost Estimate
 Concept Design Submittal
 March 30, 2018

Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor Rate	Labor Cost	Equipment Costs		Unit Cost	Total Cost
				Unit	Total	Units	Hours			Unit	Total		
39	M-CB Fuel	1	LS										
40													
41	Purchase Local	10,000	GAL	\$3.00	\$30,000							\$3.00	\$30,000
42	No Fuel Truck Required												
43	Local Cost = \$5.50												
44	\$2.5 \$/Gal Included In Rental												
45													
46	Subtotal: M-CB Fuel	1	LS		\$30,000								\$30,000
47													
48													
49	M-CB Housing	1	LS										
50													
51	Rental Fee From Community	2,235	MDAY	\$50.00	\$111,762							\$50.00	\$111,762
52													
53	Total Labor	24,582	HRS										
54	Local Labor	5,423	HRS										
55	Labor Hours For Hsg	19,159	HRS										
56	Housing	2,235	MDAY										
57													
58													
59													
60													
61													
62	Subtotal: M-CB Housing	1	LS		\$111,762								\$111,762
63													
64													
65	M-CB Utilities	1	LS										
66													
67	Power	12	MTH	\$500.00	\$6,000							\$500.00	\$6,000
68	Communications	12	MTH	\$400.00	\$4,800							\$400.00	\$4,800
69													
70													
71													
72													
73													
74													
75													
76	Subtotal: M-CB Utilities	1	LS		\$10,800								\$10,800
77													
78													

Tuluksak Washeteria WTP - PER
 Alternate 1 - New WTP and Washeteria

Construction Cost Estimate
 Concept Design Submittal
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Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor Rate	Labor Cost	Equipment Costs		Unit Cost	Total Cost
				Unit	Total	Units	Hours			Unit	Total		
79	M-CB Travel	1	LS										
80													
81	Travel For Anchorage												
82	Anchorage - Tuluksak	80	RTRIPS	\$572.00	\$45,760							\$572.00	\$45,760
83	Per Diem	80	EA	\$135.00	\$10,800							\$135.00	\$10,800
84													
85													
86													
87													
88	Subtotal: M-CB Travel	1	LS		\$56,560								\$56,560
89													
90													
91	M-CB ANTHC Project Superintendent	1	LS										
92													
93	Super 1	12	MTH			259.800	3,118	\$103.25	\$321,892			\$26,824.33	\$321,892
94													
95													
96													
97	Subtotal: M-CB ANTHC Project Superintendent	1	LS				3,117.6		\$321,892				\$321,892
98													
99													
100	M-CB ANTHC Procurement Labor	1	LS										
101													
102	Purchasing Officer	200	HRS			1.000	200	\$64.81	\$12,962			\$64.81	\$12,962
103	Purchasing Agent	200	HRS			1.000	200	\$76.94	\$15,388			\$76.94	\$15,388
104													
105													
106													
107	Subtotal: M-CB ANTHC Procurement Labor	1	LS				400.0		\$28,350				\$28,350
108													
109													
110	M-CB Survey	1	LS										
111													
112	Construction Staking	250	HRS			1.000	250	\$125.08	\$31,270			\$125.08	\$31,270
113													
114													
115													
116	Subtotal: M-CB Survey	1	LS				250.0		\$31,270				\$31,270
117													
118													

Tuluksak Washeteria WTP - PER
 Alternate 1 - New WTP and Washeteria

Construction Cost Estimate
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Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor Rate	Labor Cost	Equipment Costs		Unit Cost	Total Cost
				Unit	Total	Units	Hours			Unit	Total		
119	M-DS Design & CA Services	1	LS										
120													
121	Design 10%	1	LS			#####	4,414	\$121.56	\$536,590			\$536,590.00	\$536,590
122	CA Services/Design	1	LS			#####	1,350	\$121.56	\$164,106			\$164,106.00	\$164,106
123													
124													
125	Subtotal: M-DS Design & CA Services	1	LS				5,764.2		\$700,696				\$700,696
126													
127													
128	M-CB Equipment Rental	14	MTH										
129													
130	Excavator Cat 320	14	MTH							\$9,610.00	\$134,540	\$9,610.00	\$134,540
131	Loader 950H w/Forks	14	MTH							\$6,792.00	\$95,088	\$6,792.00	\$95,088
132	Dumptrucks (2)	28	MTH							\$5,050.00	\$141,400	\$5,050.00	\$141,400
133	Trailer For Tanks	14	MTH							\$1,500.00	\$21,000	\$1,500.00	\$21,000
134	ANTHC Fourwheeler (2)	28	MTH							\$600.00	\$16,800	\$600.00	\$16,800
135	Small Walk-behind Compactor	28	MTH							\$315.00	\$8,820	\$315.00	\$8,820
136	Butt Fusion	1	LS	\$3,200.00	\$3,200							\$3,200.00	\$3,200
137	Electro Fusion	1	LS	\$3,200.00	\$3,200							\$3,200.00	\$3,200
138	Jumping Jack Compactors	2	EA	\$2,200.00	\$4,400							\$2,200.00	\$4,400
139	Connexes for Storage	28	MTHS							\$350.00	\$9,800	\$350.00	\$9,800
140	JOBOX	2	EA	\$800.00	\$1,600							\$800.00	\$1,600
141													
142													
143													
144													
145	Subtotal: M-CB Equipment Rental	14	MTH		\$12,400						\$427,448		\$439,848
146													
147													
148	M-EQ Equipment Repair & Maint	1	LS										
149													
150	Mechanical	1,039	HRS			1.000	1,039	\$111.82	\$116,203			\$111.82	\$116,203
151													
152													
153													
154													
155													
156	Subtotal: M-EQ Equipment Repair & Maint	1	LS				1,039.2		\$116,203				\$116,203
157													
158													

Tuluksak Washeteria WTP - PER
 Alternate 1 - New WTP and Washeteria

Construction Cost Estimate
 Concept Design Submittal
 March 30, 2018

Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor Rate	Labor Cost	Equipment Costs		Unit Cost	Total Cost
				Unit	Total	Units	Hours			Unit	Total		
159	M-CB Consumables	1	LS										
160													
161	Consumables	1	LS	\$10,700.00	\$10,700							\$10,700.00	\$10,700
162													
163													
164	Subtotal: M-CB Consumables	1	LS		\$10,700								\$10,700
165													
166													
167	M-CB Small Tools	1	LS										
168													
169	Small Tools	1	LS	\$16,100.00	\$16,100							\$16,100.00	\$16,100
170													
171													
172													
173	Subtotal: M-CB Small Tools	1	LS		\$16,100								\$16,100
174													
175													
176	M-CB Safety Stand Down	1	LS										
177													
178	Safety Meetings	52	EA										
179	Crew Lead	104	HRS			0.500	52	\$104.03	\$5,410			\$52.02	\$5,410
180	Operator	104	HRS			0.500	52	\$124.57	\$6,478			\$62.29	\$6,478
181	Loc Labor	312	HRS			0.500	156	\$44.75	\$6,981			\$22.38	\$6,981
182													
183													
184													
185													
186	Subtotal: M-CB Safety Stand Down	1	LS				260.0		\$18,869				\$18,869
187													
188													
189	M-CO Closeout		NONE										
190													
191	Included in Engineering and Supervision Time												
192													
193													
194													
195													
196	Subtotal: M-CO Closeout	-	NONE										
197													
198													

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Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor	Labor	Equipment Costs		Unit	Total
				Unit	Total	Units	Hours	Rate	Cost	Unit	Total	Cost	Cost
199	M-PC Pre-Construction	1	LS										
200													
201	Scheduler	100	HRS			1.000	100	\$89.14	\$8,914			\$89.14	\$8,914
202	Estimating	200	HRS			1.000	200	\$100.30	\$20,060			\$100.30	\$20,060
203													
204													
205													
206	Subtotal: M-PC Pre-Construction	1	LS				300.0		\$28,974				\$28,974
207													
208													
209	M-PC Pre-Construction: NTP		NONE										
210													
211													
212													
213	Subtotal: M-PC Pre-Construction: NTP	-	NONE										
214													
215													
216	M-PC Pre-Construction: Project Set-Up		NONE										
217								\$89.14					
218													
219	Subtotal: M-PC Pre-Construction: Project Set-Up	-	NONE										
220													
221													
222	M-PC Pre-Construction: Material Take-off		NONE										
223													
224													
225	Subtotal: M-PC Pre-Construction: Material Take-off	-	NONE										
226													
227													
228	M-PC Pre-Construction: Meeting	1	LS										
229													
230	Meetings	8	EA										
231	Super	8	HRS			1.000	8	\$103.25	\$826			\$103.25	\$826
232	Eng	8	HRS			1.000	8	\$121.56	\$972			\$121.50	\$972
233													
234													
235													
236	Subtotal: M-PC Pre-Construction: Meeting	1	LS				16.0		\$1,798				\$1,798
237													
238													

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Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor Rate	Labor Cost	Equipment Costs		Unit Cost	Total Cost
				Unit	Total	Units	Hours			Unit	Total		
239	M-PC Pre-Construction: Completed		NONE										
240													
241													
242	Subtotal: M-PC Pre-Construction: Completed												
243			-	NONE									
244													
245	M-PM Project Management	1	LS										
246													
247	Construction Management	12	MTHS			86.600	1,039	\$121.56	\$126,325			\$10,527.08	\$126,325
248													
249													
250	Subtotal: M-PM Project Management												
251		1	LS				1,039.2		\$126,325				\$126,325
252													
253	M-WR Warranty	1	LS										
254													
255	Spare Parts/Warranty	1	LS	\$50,000.00	\$50,000							\$50,000.00	\$50,000
256													
257	Subtotal: M-WR Warranty												
258		1	LS		\$50,000								\$50,000
259													
260	W-WW Complete Well Connection	1	LS										
261													
262	Pumps Submersible 1.5HP	2	EA	\$1,500.00	\$2,250							\$1,500.00	\$2,250
263	Pitless Adaptor	2	EA	\$300.00	\$600							\$300.00	\$600
264	Drop Pipe and Electrical	60	LF	\$3.00	\$180							\$3.00	\$180
265	Insulated Cover	2	EA	\$1,500.00	\$3,000							\$1,500.00	\$3,000
266	Water Quality Tests	2	EA	\$2,000.00	\$4,000							\$2,000.00	\$4,000
267													
268	Labor												
269	Carpenter	16	HRS			1.000	16	\$121.37	\$1,942			\$121.38	\$1,942
270	Plumber	24	HRS			1.000	24	\$112.76	\$2,706			\$112.75	\$2,706
271	Electrical	16	HRS			1.000	16	\$111.84	\$1,789			\$111.81	\$1,789
272	Local Labor	40	HRS			1.000	40	\$44.75	\$1,790			\$44.75	\$1,790
273													
274													
275	Subtotal: W-WW Complete Well Connection												
276		1	LS		\$10,030		96.0		\$8,227				\$18,257
277													

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				Unit	Total	Units	Hours			Unit	Total		
278	C-WA WTP/Washeteria - Bldg	1	LS										
279													
280	Foundations	28	EA										
281	Treated Timbers	4,200	BF	\$1.50	\$6,300							\$1.50	\$6,300
282	Time	105	HRS										
283	Carpenter	210	HRS			1.000	210	\$121.37	\$25,488			\$121.37	\$25,488
284	Local Labor	420	HRS			1.000	420	\$44.75	\$18,795			\$44.75	\$18,795
285													
286	Gravel (104'X72'X2')	666	CY	\$100.00	\$66,560							\$100.00	\$66,560
287	Time	33	HRS										
288	Dump Truck	33	HRS							\$70.00	\$2,310	\$70.00	\$2,310
289	Backhoe Cat 320	33	HRS							\$48.25	\$1,592	\$48.24	\$1,592
290	Operator	33	HRS			1.000	33	\$124.57	\$4,111			\$124.58	\$4,111
291	Local Truck Driver	33	HRS			1.000	33	\$51.97	\$1,715			\$51.97	\$1,715
292	Lead Crew	33	HRS			1.000	33	\$104.03	\$3,433			\$104.03	\$3,433
293	Local Labor	66	HRS			1.000	66	\$44.75	\$2,954			\$44.76	\$2,954
294													
295	Utilidor												
296	Floor	320	SF										
297	Utilidor Walls	736	SF										
298	Sips 8"	1,056	SF	\$8.00	\$8,448							\$8.00	\$8,448
299	Air Barrier	1,056	SF	\$0.25	\$264							\$0.25	\$264
300	Rainscreen Wrap	1,056	SF	\$0.30	\$317							\$0.30	\$317
301	T1-11	1,056	SF	\$1.75	\$1,848							\$1.75	\$1,848
302													
303	Floor 1	2,592	SF										
304	GLB 6-3/4x24	288	LF	\$47.25	\$13,608							\$47.25	\$13,608
305	GLB 6-3/4x12	52	LF	\$23.63	\$1,229							\$23.63	\$1,229
306	Joists 16" BCKI6000	896	LF	\$5.50	\$4,928							\$5.50	\$4,928
307	Joists 3-1/2x16 LVL	1,152	LF	\$16.29	\$18,769							\$16.29	\$18,769
308	R50 Batts	2,592	SF	\$1.50	\$3,888							\$1.50	\$3,888
309	Air Barrier	2,592	SF	\$0.25	\$648							\$0.25	\$648
310	Rainscreen Wrap	2,592	SF	\$0.30	\$778							\$0.30	\$778
311	T1-11	2,592	SF	\$1.75	\$4,536							\$1.75	\$4,536
312	Stain T1-11	2,592	SF	\$0.20	\$518							\$0.20	\$518
313	Subflooring	2,592	SF	\$1.50	\$3,888							\$1.50	\$3,888
314	Elastomeric Flooring (Sub)	2,592	SF	\$30.00	\$77,760							\$30.00	\$77,760
315													

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Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor Rate	Labor Cost	Equipment Costs		Unit Cost	Total Cost
				Unit	Total	Units	Hours			Unit	Total	Cost	Cost
316	Deck & Stair												
317	Glulam Beams	308	BF	\$3.00	\$924							\$3.00	\$924
318	Decking Fiberglass	76	SF	\$18.00	\$1,368							\$18.00	\$1,368
319	Stair Treads	70	SF	\$18.00	\$1,260							\$18.00	\$1,260
320	Handrails	59	LF	\$160.00	\$9,360							\$160.00	\$9,360
321													
322	Ramp												
323	Glulam Beams	640	BF	\$3.00	\$1,920							\$3.00	\$1,920
324	Decking Fiberglass	320	SF	\$18.00	\$5,760							\$18.00	\$5,760
325	Handrails	140	LF	\$160.00	\$22,400							\$160.00	\$22,400
326													
327	Roof	3,700	SF										
328	Glulam Beams	1,833	BF	\$3.00	\$5,498							\$3.00	\$5,498
329	12" Sips Panel	3,700	SF	\$12.00	\$44,400							\$12.00	\$44,400
330	Misc Framing	780	BF	\$1.50	\$1,170							\$1.50	\$1,170
331	Metal Roofing (Sub)	3,700	SF	\$15.00	\$55,500							\$15.00	\$55,500
332	1" Z Girts	1,850	LF	\$1.20	\$2,220							\$1.20	\$2,220
333	Underlayment	3,700	SF	\$0.20	\$740							\$0.20	\$740
334	GWB	3,700	SF	\$0.55	\$2,035							\$0.55	\$2,035
335	Paint	3,700	SF	\$0.20	\$740							\$0.20	\$740
336													
337	Exterior Walls	2,080	SF										
338	Metal Siding	2,080	SF	\$6.00	\$12,480							\$6.00	\$12,480
339	2x4 Furring Treated	2,080	SF	\$0.50	\$1,040							\$0.50	\$1,040
340	1.5" Rigid Insulation	2,080	SF	\$1.13	\$2,340							\$1.13	\$2,340
341	8" Sips Panels	2,080	SF	\$8.00	\$16,640							\$8.00	\$16,640
342	GWB	2,080	SF	\$0.55	\$1,144							\$0.55	\$1,144
343	Paint	2,080	SF	\$0.20	\$416							\$0.20	\$416
344	Windows	1	EA	\$1,300.00	\$1,300							\$1,300.00	\$1,300
345	Door, Frame and Hardware	1	EA	\$1,600.00	\$1,600							\$1,600.00	\$1,600
346	Door, Frame and Hardware,	1	PR	\$2,750.00	\$2,750							\$2,750.00	\$2,750
347													
348	Partitions	3,445	SF										
349	3-5/8" Metal Studs	2,067	SF	\$0.81	\$1,680							\$0.81	\$1,680
350	6" Metal Studs	1,378	SF	\$1.28	\$1,768							\$1.28	\$1,768
351	GWB	6,890	SF	\$0.55	\$3,790							\$0.55	\$3,790
352	Paint	6,890	SF	\$0.20	\$1,378							\$0.20	\$1,378

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Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor Rate	Labor Cost	Equipment Costs		Unit Cost	Total Cost
				Unit	Total	Units	Hours			Unit	Total		
353													
354	Labor												
355	Carpenter	2,446	HRS			1.000	2,446	\$121.37	\$296,859			\$121.37	\$296,859
356	Local Labor	1,223	HRS			1.000	1,223	\$44.75	\$54,725			\$44.75	\$54,725
357													
358													
359	Subtotal: C-WA WTP/Washeteria - Bldg	1	LS		\$417,908		4,463.8		\$408,080		\$3,902		\$829,890
360													
361													
362	C-WA WTP/Washeteria - Systems	1	LS										
363													
364	WTP Equipment												
365	Detention Tank (2500 Gallon)	1	EA	\$40,000.00	\$40,000							\$40,000.00	\$40,000
366	Packaged Filtration Plant	1	EA	\$250,000.00	\$250,000							\$250,000.00	\$250,000
367	Chemical Feed Systems	3	EA	\$7,500.00	\$22,500							\$7,500.00	\$22,500
368	Process Instrumentation	1	EA	\$25,000.00	\$25,000							\$25,000.00	\$25,000
369	Laboratory Instruments	1	EA	\$15,000.00	\$15,000							\$15,000.00	\$15,000
370													
371	Labor												
372	Carpenter	117	HRS			1.000	117	\$121.37	\$14,200			\$121.37	\$14,200
373	Plumber	116	HRS			1.000	116	\$112.76	\$13,080			\$112.76	\$13,080
374	Electrical	76	HRS			1.000	76	\$111.84	\$8,500			\$111.84	\$8,500
375	Local Labor	300	HRS			1.000	300	\$44.75	\$13,425			\$44.75	\$13,425
376													
377	Mechanical Room												
378	Boilers	2	EA	\$7,500.00	\$15,000							\$7,500.00	\$15,000
379	Boiler Stack	1	EA	\$14,000.00	\$14,000							\$14,000.00	\$14,000
380	Water Heater	1	EA	\$3,500.00	\$3,500							\$3,500.00	\$3,500
381	Glycol Makeup Tank	1	EA	\$700.00	\$700							\$700.00	\$700
382	Fuel Day Tank	1	EA	\$6,500.00	\$6,500							\$6,500.00	\$6,500
383	Ductwork and Hoods	1	EA	\$6,000.00	\$6,000							\$6,000.00	\$6,000
384													
385	Labor												
386	Plumber	120	HRS			1.000	120	\$112.76	\$13,531			\$112.76	\$13,531
387	Electrical	13	HRS			1.000	13	\$111.84	\$1,454			\$111.85	\$1,454
388	Local Labor	133	HRS			1.000	133	\$44.75	\$5,952			\$44.75	\$5,952
389													
390													
391													
392													

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Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor Rate	Labor Cost	Equipment Costs		Unit Cost	Total Cost
				Unit	Total	Units	Hours			Unit	Total	Cost	Cost
393	Process Control Panels												
394	Boiler Control Panel	1	EA	\$15,000.00	\$15,000							\$15,000.00	\$15,000
395	Status and Alarm Panel	1	EA	\$35,000.00	\$35,000							\$35,000.00	\$35,000
396	Pressure Pumps	1	EA	\$10,000.00	\$10,000							\$10,000.00	\$10,000
397	Well Control Panel	1	EA	\$15,000.00	\$15,000							\$15,000.00	\$15,000
398													
399	Labor												
400	Carpenter	10	HRS			1.000	10	\$121.37	\$1,214			\$121.40	\$1,214
401	Electrical	44	HRS			1.000	44	\$111.84	\$4,921			\$111.84	\$4,921
402	Local Labor	54	HRS			1.000	54	\$44.75	\$2,417			\$44.76	\$2,417
403													
404	Washeteria Equipment												
405	20 lb Washer	3	EA	\$4,700.00	\$14,100							\$4,700.00	\$14,100
406	40 lb Washer	1	EA	\$13,500.00	\$13,500							\$13,500.00	\$13,500
407	Drain Trough For Washers	1	EA	\$2,100.00	\$2,100							\$2,100.00	\$2,100
408	30 lb Dryers	3	EA	\$5,400.00	\$16,200							\$5,400.00	\$16,200
409	50 lb Dryers	1	EA	\$6,300.00	\$6,300							\$6,300.00	\$6,300
410	Additional Steam Coils For Dryers	4	EA	\$1,500.00	\$6,000							\$1,500.00	\$6,000
411	Dryer Heat Recovery	1	EA	\$15,000.00	\$15,000							\$15,000.00	\$15,000
412	Dryer Circ Pump Control	1	EA	\$5,000.00	\$5,000							\$5,000.00	\$5,000
413	Bath / Shower Coin Boxes & Valves	3	EA	\$600.00	\$1,800							\$600.00	\$1,800
414	Watering Point Materials	1	EA	\$4,500.00	\$4,500							\$4,500.00	\$4,500
415													
416	Labor												
417	Carpenter	55	HRS			1.000	55	\$121.37	\$6,675			\$121.36	\$6,675
418	Plumber	66	HRS			1.000	66	\$112.76	\$7,442			\$112.76	\$7,442
419	Electrical	40	HRS			1.000	40	\$111.84	\$4,474			\$111.85	\$4,474
420	Local Labor	161	HRS			1.000	161	\$44.75	\$7,205			\$44.75	\$7,205
421													
422	Lighting												
423	Fixtures	45	EA	\$200.00	\$9,000							\$200.00	\$9,000
424	Exterior Fixtures	6	EA	\$600.00	\$3,600							\$600.00	\$3,600
425	Switches	15	EA	\$15.00	\$225							\$15.00	\$225
426	Conduit	2,025	LF	\$1.00	\$2,025							\$1.00	\$2,025
427	Wire #12	2,475	LF	\$0.16	\$386							\$0.16	\$386
428	Wire #10	4,208	LF	\$0.20	\$858							\$0.20	\$858
429													

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				Unit	Total	Units	Hours			Unit	Total	Cost	Cost
430	Labor												
431	Electrical	275	HRS			1.000	275	\$111.84	\$30,778			\$111.83	\$30,778
432	Local Labor	275	HRS			1.000	275	\$44.75	\$12,315			\$44.75	\$12,315
433													
434	Power												
435	Connection To Utility	1	LS	\$15,000.00	\$15,000							\$15,000.00	\$15,000
436	Panelboard 400A	1	EA	\$4,500.00	\$4,500	0.457	1					\$4,500.00	\$4,500
437	Panelboard 200A	1	EA	\$1,800.00	\$1,800	0.286	0					\$1,800.00	\$1,800
438	Feeder 400A	50	LF	\$62.99	\$3,149	0.011	1					\$62.98	\$3,149
439	Feeder 200A	100	LF	\$27.67	\$2,767	0.007	1					\$27.67	\$2,767
440	Outlets	60	EA	\$6.00	\$360	0.011	1					\$6.00	\$360
441	Outlets GFI	10	EA	\$8.49	\$85	0.007	0					\$8.50	\$85
442	Outlets GFI WP	10	EA	\$26.49	\$265	0.009	0					\$26.50	\$265
443	Allow For Motor Controls	2,500	SF	\$0.20	\$500	0.000	1					\$0.20	\$500
444	Conduit	2,400	LF	\$1.00	\$2,400							\$1.00	\$2,400
445	Wire #12	4,752	LF	\$0.16	\$741							\$0.16	\$741
446	Wire #10	3,168	LF	\$0.20	\$646							\$0.20	\$646
447													
448	Labor												
449	Electrical	372	HRS			1.000	373	\$111.84	\$41,660			\$111.85	\$41,660
450	Local Labor	372	HRS			1.000	373	\$44.75	\$16,669			\$44.75	\$16,669
451													
452	Comm and Special System	1	LS	\$10,000.00	\$10,000							\$10,000.00	\$10,000
453													
454													
455	Subtotal: C-WA WTP/Washeteria - Systems	1	LS		\$616,007		2,603.9		\$205,912				\$821,919
456													
457													
458	C-WA WTP/Washeteria - Plumbing, HVAC, Process Piping												
459													
460	Process Piping												
461	Based On Similar Project, No Details At This Time.	1	EA	\$20,000.00	\$20,000							\$20,000.00	\$20,000
462													
463	Labor												
464	Plumber	250	HRS			1.000	250	\$112.76	\$28,190			\$112.76	\$28,190
465	Local Labor	300	HRS			1.000	300	\$44.75	\$13,425			\$44.75	\$13,425
466													
467													

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				Unit	Total	Units	Hours			Unit	Total	Cost	Cost
468	Process Wiring	1	LS	\$2,000.00	\$2,000							\$2,000.00	\$2,000
469	Labor												
470	Electrical	20	HRS			1.000	20	\$111.84	\$2,237			\$111.85	\$2,237
471	Local Labor	20	HRS			1.000	20	\$44.75	\$895			\$44.75	\$895
472													
473	Washeteria - Plumbing												
474	Based On Similar Project, No Details At This Time.	1	EA	\$50,000.00	\$50,000							\$50,000.00	\$50,000
475	WC-1: Floor Mounted Toilet Elongated Bowl	3	EA	\$650.00	\$1,950							\$650.00	\$1,950
476	LAV-1: Wall Hung Lavatory, W/ Single Handle	3	EA	\$525.00	\$1,575							\$525.00	\$1,575
477	BT-1, 2: Bathtub/Shower, Non Skid Bottom Finish	1	EA	\$825.00	\$825							\$825.00	\$825
478	SH-1: Shower	2	EA	\$800.00	\$1,600							\$800.00	\$1,600
479	SK-2: Sink, Molded Plastic Laundry W/ Support Legs	1	EA	\$580.00	\$580							\$580.00	\$580
480	Emerg Shower/Eyewash	1	EA	\$575.00	\$575							\$575.00	\$575
481													
482	Labor												
483	Plumber	200	HRS			1.000	200	\$112.76	\$22,552			\$112.76	\$22,552
484	Local Labor	200	HRS			1.000	200	\$44.75	\$8,950			\$44.75	\$8,950
485													
486	Washeteria HVAC Piping, Terminal Heat Units												
487	Piping Insulation	1	LS	\$1,500.00	\$1,500							\$1,500.00	\$1,500
488	Pipe & Fittings, Copper Type	1	LS	\$7,500.00	\$7,500							\$7,500.00	\$7,500
489	Baseboard Radiation												
490	No. Of Units (Zones)	4	EA	\$200.00	\$800							\$200.00	\$800
491	Baseboard	45	LF	\$46.00	\$2,070							\$46.00	\$2,070
492	Thermostat	10	EA	\$125.00	\$1,250							\$125.00	\$1,250
493	Cabinet Unit Heaters												
494	Cabinet Unit Heaters	4	EA	\$1,200.00	\$4,800							\$1,200.00	\$4,800
495	Valves & Fittings	4	EA	\$140.00	\$560							\$140.00	\$560
496	Unit Heaters	4	EA	\$725.00	\$2,900							\$725.00	\$2,900
497													
498													
499													
500													
501													
502													

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				Unit	Total	Units	Hours	Rate	Cost	Unit	Total	Cost	Cost
503	Fans	5	EA	\$300.00	\$1,500							\$300.00	\$1,500
504	Misc Ductwork	1	LS	\$1,000.00	\$1,000							\$1,000.00	\$1,000
505													
506	Labor												
507	Plumber	170	HRS			1.000	170	\$112.76	\$19,169			\$112.76	\$19,169
508	Local Labor	170	HRS			1.000	170	\$44.75	\$7,608			\$44.75	\$7,608
509													
510													
511	Subtotal: C-WA WTP/Washeteria - Plumbing, HVAC, Process Piping			-	-	\$102,985		1,330.0		\$103,026			\$206,011
512													
513													
514	S-LS Wastewater Pump Station	1	EA										
515													
516	Well Structure	1	EA	\$35,000.00	\$35,000							\$35,000.00	\$35,000
517	Pumps and Accessories	2	EA	\$7,700.00	\$15,400							\$7,700.00	\$15,400
518	DIP 3" Discharge	2	EA	\$130.00	\$260							\$130.00	\$260
519	Ball Check Valve 3"	2	EA	\$530.00	\$1,060							\$530.00	\$1,060
520	Plug Valve Plug 3"	2	EA	\$1,275.00	\$2,550							\$1,275.00	\$2,550
521	Elbow 3" DI	1	EA	\$132.00	\$132							\$132.00	\$132
522	Reducer 2x3 DI	1	EA	\$132.00	\$132							\$132.00	\$132
523	Tee 3" DI	1	EA	\$319.00	\$319							\$319.00	\$319
524	Flanges & Fittings	4	EA	\$171.00	\$684							\$171.00	\$684
525	Control Panel	1	EA	\$15,289.00	\$15,289							\$15,289.00	\$15,289
526	Motor Starter - 4 HP	2	EA	\$400.00	\$800							\$400.00	\$800
527	Electrical	1	EA	\$4,000.00	\$4,000							\$4,000.00	\$4,000
528													
529	Pump Station Labor												
530	Carpenter	40	HRS			1.000	40	\$121.37	\$4,855			\$121.38	\$4,855
531	Plumber	100	HRS			1.000	100	\$112.76	\$11,276			\$112.76	\$11,276
532	Electrical	56	HRS			1.000	56	\$111.84	\$6,263			\$111.84	\$6,263
533	Local Labor	196	HRS			1.000	196	\$44.75	\$8,771			\$44.75	\$8,771
534													
535													
536													
537													
538													
539													
540													
541													
542													

Tuluksak Washeteria WTP - PER
 Alternate 1 - New WTP and Washeteria

Construction Cost Estimate
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Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor Rate	Labor Cost	Equipment Costs		Unit Cost	Total Cost
				Unit	Total	Units	Hours			Unit	Total	Cost	Cost
543	Earthwork												
544	Time	20	HRS										
545	Dump Truck	20	HRS							\$70.00	\$1,400	\$70.00	\$1,400
546	Backhoe Cat 320	20	HRS							\$48.25	\$965	\$48.25	\$965
547	Operator	20	HRS			1.000	20	\$124.57	\$2,491			\$124.55	\$2,491
548	Local Truck Driver	20	HRS			1.000	20	\$51.97	\$1,039			\$51.95	\$1,039
549	Lead Crew	20	HRS			1.000	20	\$104.03	\$2,081			\$104.05	\$2,081
550	Local Labor	40	HRS			1.000	40	\$44.75	\$1,790			\$44.75	\$1,790
551													
552													
553	Subtotal: S-LS Wastewater Pump Station	1	EA		\$75,626		492.0		\$38,566		\$2,365		\$116,557
554													
555													
556	W-WT Insulated Storage Tank	35	KGAL										
557													
558	Foundation - Gravel Pad 24'x24'x3'												
559	Gravel Purchase - Assumed	100	CY	\$100.00	\$10,000							\$100.00	\$10,000
560	Insulation Board 5"	3,456	BF	\$0.75	\$2,592							\$0.75	\$2,592
561													
562	Tank 35,000 Gal, Prefabricate	1	EA	\$130,000.00	\$130,000							\$130,000.00	\$130,000
563	Insulate Tank	1	EA	\$49,800.00	\$49,800							\$49,800.00	\$49,800
564													
565	Earthwork												
566	Time	130	HRS										
567	Dump Truck/Trailer	110	HRS							\$85.00	\$9,350	\$85.00	\$9,350
568	Dump Truck	20	HRS							\$70.00	\$1,400	\$70.00	\$1,400
569	Backhoe Cat 320	130	HRS							\$48.25	\$6,273	\$48.25	\$6,273
570	Operator	130	HRS			1.000	130	\$124.57	\$16,194			\$124.57	\$16,194
571	Local Truck Driver	110	HRS			1.000	110	\$51.97	\$5,717			\$51.97	\$5,717
572	Lead Crew	130	HRS			1.000	130	\$104.03	\$13,524			\$104.03	\$13,524
573	Local Labor	260	HRS			1.000	260	\$44.75	\$11,635			\$44.75	\$11,635
574													
575													
576													
577													
578													
579													
580	Subtotal: W-WT Insulated Storage Tank	35	KGAL		\$192,392		630.0		\$47,070		\$17,023		\$256,485
581													
582													

Tuluksak Washeteria WTP - PER
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Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor Rate	Labor Cost	Equipment Costs		Unit Cost	Total Cost
				Unit	Total	Units	Hours			Unit	Total	Cost	Cost
583	M-IF Fuel Tank	10	KGAL										
584													
585	Foundation - Gravel Pad 20'x24'x2'												
586	Gravel Purchase - Assumed	36	CY	\$100.00	\$3,600							\$100.00	\$3,600
587													
588	10,000 Gal Fuel Tank	1	EA	\$40,000.00	\$40,000							\$40,000.00	\$40,000
589													
590	Time	20	HRS										
591	Dump Truck/Trailer	20	HRS							\$85.00	\$1,700	\$85.00	\$1,700
592	Dump Truck	20	HRS							\$70.00	\$1,400	\$70.00	\$1,400
593	Backhoe Cat 320	20	HRS							\$48.25	\$965	\$48.25	\$965
594	Operator	20	HRS			1.000	20	\$124.57	\$2,491			\$124.55	\$2,491
595	Local Truck Driver	20	HRS			1.000	20	\$51.97	\$1,039			\$51.95	\$1,039
596	Lead Crew	20	HRS			1.000	20	\$104.03	\$2,081			\$104.05	\$2,081
597	Local Labor	40	HRS			1.000	40	\$44.75	\$1,790			\$44.75	\$1,790
598													
599													
600													
601													
602	Subtotal: M-IF Fuel Tank	10	KGAL		\$43,600		100.0		\$7,401		\$4,065		\$55,066
603													
604													
605	W-SD Water Piping	1,700	LF										
606													
607	Piping - Water												
608	16" Carrier, 4" HDPE, 2" HDPE Arctic Pipe	1,400	LF	\$65.00	\$91,000							\$65.00	\$91,000
609	Heat Trace, Electric	1,400	LF	\$16.00	\$22,400							\$16.00	\$22,400
610	Misc Materials	1	LS	\$10,000.00	\$10,000							\$10,000.00	\$10,000
611													
612	Time	140	HRS										
613	Backhoe 320	140	HRS							\$48.25	\$6,755	\$48.25	\$6,755
614	Operator	140	HRS			1.000	140	\$124.57	\$17,440			\$124.57	\$17,440
615	Lead Crew	140	HRS			1.000	140	\$104.03	\$14,564			\$104.03	\$14,564
616	Local Labor	280	HRS			1.000	280	\$44.75	\$12,530			\$44.75	\$12,530
617													
618													
619													
620													
621													

Tuluksak Washeteria WTP - PER
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Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor Rate	Labor Cost	Equipment Costs		Unit Cost	Total Cost
				Unit	Total	Units	Hours			Unit	Total	Cost	Cost
622	Piping - Raw Water												
623	16" Carrier, 3" HDPE, 2" HDPE Arctic Pipe	250	LF	\$63.00	\$15,750							\$63.00	\$15,750
624	Glycol Heat Trace Pipe PEX	500	LF	\$2.00	\$1,000							\$2.00	\$1,000
625	Misc Materials	1	LS	\$2,500.00	\$2,500							\$2,500.00	\$2,500
626													
627	Time	50	HRS										
628	Backhoe 320	50	HRS							\$48.25	\$2,413	\$48.26	\$2,413
629	Operator	50	HRS			1.000	50	\$124.57	\$6,229			\$124.58	\$6,229
630	Lead Crew	50	HRS			1.000	50	\$104.03	\$5,202			\$104.04	\$5,202
631	Local Labor	100	HRS			1.000	100	\$44.75	\$4,475			\$44.75	\$4,475
632													
633	Piping - Tank Piping												
634	10" Carrier, 3" HDPE, 2" HDPE Arctic Pipe	50	LF	\$55.00	\$2,750							\$55.00	\$2,750
635	Heat Trace, Electric	50	LF	\$16.00	\$800							\$16.00	\$800
636	Misc Materials	1	LS	\$3,500.00	\$3,500							\$3,500.00	\$3,500
637													
638	Time	10	HRS										
639	Backhoe 320	10	HRS							\$48.25	\$483	\$48.30	\$483
640	Operator	10	HRS			1.000	10	\$124.57	\$1,246			\$124.60	\$1,246
641	Lead Crew	10	HRS			1.000	10	\$104.03	\$1,040			\$104.00	\$1,040
642	Local Labor	20	HRS			1.000	20	\$44.75	\$895			\$44.75	\$895
643													
644													
645													
646													
647													
648													
649													
650	Subtotal: W-SD Water Piping	1,700	LF		\$149,700		800.0		\$63,621		\$9,651		\$222,972
651													
652													
653	S-BF Force Main	175	LF										
654													
655	Piping - Force Main												
656	16" Carrier, 3" HDPE, (2) 2" HDPE Arctic Pipe	250	LF	\$68.00	\$17,000							\$68.00	\$17,000
657	Misc Materials	1	LS	\$5,000.00	\$5,000							\$5,000.00	\$5,000
658													

Tuluksak Washeteria WTP - PER
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Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor	Labor	Equipment Costs		Unit	Total
				Unit	Total	Units	Hours	Rate	Cost	Unit	Total	Cost	Cost
659	Time	50	HRS										
660	Backhoe 320	50	HRS							\$48.25	\$2,413	\$48.26	\$2,413
661	Operator	50	HRS			1.000	50	\$124.57	\$6,229			\$124.58	\$6,229
662	Lead Crew	50	HRS			1.000	50	\$104.03	\$5,202			\$104.04	\$5,202
663	Local Labor	100	HRS			1.000	100	\$44.75	\$4,475			\$44.75	\$4,475
664													
665													
666													
667													
668													
669													
670	Subtotal: S-BF Force Main	175	LF		\$22,000		200.0		\$15,906		\$2,413		\$40,319
671													
672													
673	E-HR Upgrade Heat Recovery	1	EA										
674													
675	Install Parts at Power Plant	1	LS										
676	Plumber	30	HRS			1.000	30	\$112.76	\$3,383			\$112.77	\$3,383
677	Electrical	30	HRS			1.000	30	\$111.84	\$3,355			\$111.83	\$3,355
678	Local Labor	60	HRS			1.000	60	\$44.75	\$2,685			\$44.75	\$2,685
679													
680	WTP Work - See WTP												
681													
682	Piping												
683	8" Arctic Pipe, With 2" Aquatherm	350	LF	\$55.00	\$19,250							\$55.00	\$19,250
684	Misc Materials	1	LS	\$5,000.00	\$5,000							\$5,000.00	\$5,000
685													
686	Time	140	HRS										
687	Backhoe 320	140	HRS							\$48.25	\$6,755	\$48.25	\$6,755
688	Operator	140	HRS			1.000	140	\$124.57	\$17,440			\$124.57	\$17,440
689	Lead Crew	140	HRS			1.000	140	\$104.03	\$14,564			\$104.03	\$14,564
690	Local Labor	280	HRS			1.000	280	\$44.75	\$12,530			\$44.75	\$12,530
691													
692													
693													
694													
695													
696	Subtotal: E-HR Upgrade Heat Recovery	1	EA		\$24,250		680.0		\$53,957		\$6,755		\$84,962
697													

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907.561.0790

Prepared for:
CRW Engineering Group, LLC
3940 Arctic Blvd. Sute 300
Anchorage, Alaska 99503
907.562.3252

Tuluksak Washeteria WTP - PER
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Documents

Document Title Tuluksak Washeteria - WTP
Design Firm
Level of Document Concept
Date 16-Dec-16

Schedule

Project Start Spring 2019
Project Duration 6 Mths

Notes and Assumptions

Local Labor
Force Account
Equipment will be barged to and from the project site from Anchorage
Modular Units will be fully built out with all equipment and piping practical.

Estimate Class 5

Methodology Estimate is priced with locally priced materials and labor per the estimators experience.

Labor Rates ANTHC Force Account Labor Rates for 2017.
Labor Rates based on 60 Hour/Week Schedule.
Lodging assumed to be from Community at \$50/MD.

Estimator Jay Lavoie - jay@estimations.com, 907-561-0755

Exclusions

Tuluksak Washeteria WTP - PER
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Summary

Construction Cost Estimate
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Description	Quantit	Unit	Matl	Labor	Hours	Equipment	Total	Unit Cost
M-CB Construction Billing			NONE	\$0	\$0	-	\$0	\$0
M-CB Equipment Resources			NONE	\$0	\$0	-	\$0	\$0
M-CB Mobilization/Demob	1	LS	\$0	\$38,706	600.00	\$0	\$38,706	
M-CB Shipping/Freight	1	LS	\$585,154	\$31,540	400.00	\$0	\$616,694	
M-CB Fuel	1	LS	\$30,000	\$0	-	\$0	\$30,000	
M-CB Housing	1	LS	\$36,000	\$0	-	\$0	\$36,000	
M-CB Utilities	1	LS	\$5,400	\$0	-	\$0	\$5,400	
M-CB Travel	1	LS	\$21,210	\$0	-	\$0	\$21,210	
M-CB ANTHC Project Superintendent	1	LS	\$0	\$160,946	1,558.80	\$0	\$160,946	
M-CB ANTHC Procurement Labor	1	LS	\$0	\$14,175	200.00	\$0	\$14,175	
M-CB Survey	1	LS	\$0	\$31,270	250.00	\$0	\$31,270	
M-DS Design & CA Services	1	LS	\$0	\$717,046	5,898.70	\$0	\$717,046	
M-CB Equipment Rental	8	MTH	\$12,400	\$0	-	\$364,256	\$376,656	\$47,082.00
M-EQ Equipment Repair & Maint	1	LS	\$0	\$87,153	779.40	\$0	\$87,153	
M-CB Consumables	1	LS	\$9,200	\$0	-	\$0	\$9,200	
M-CB Small Tools	1	LS	\$13,800	\$0	-	\$0	\$13,800	
M-CB Safety Stand Down	1	LS	\$0	\$9,435	130.00	\$0	\$9,435	
M-CO Closeout			NONE	\$0	\$0	-	\$0	\$0
M-PC Pre-Construction	1	LS	\$0	\$28,974	300.00	\$0	\$28,974	
M-PC Pre-Construction: NTP			NONE	\$0	\$0	-	\$0	\$0
M-PC Pre-Construction: Project Set-Up			NONE	\$0	\$0	-	\$0	\$0
M-PC Pre-Construction: Material Take-off			NONE	\$0	\$0	-	\$0	\$0
M-PC Pre-Construction: Meeting	1	LS	\$0	\$1,798	16.00	\$0	\$1,798	
M-PC Pre-Construction: Completed			NONE	\$0	\$0	-	\$0	\$0
M-PM Project Management	1	LS	\$0	\$84,217	692.80	\$0	\$84,217	
M-WR Warranty	1	LS	\$50,000	\$0	-	\$0	\$50,000	
W-WW Complete Well Connection	1	LS	\$10,030	\$8,227	96.00	\$0	\$18,257	
C-WA WTP/Washeteria - Bldg	1	LS	\$206,710	\$133,603	1,598.50	\$3,784	\$344,097	
C-WA WTP/Washeteria - Modular	1	LS	\$1,018,000	\$102,935	1,188.00	\$15,500	\$1,136,435	
S-LS Wastewater Pump Station	1	EA	\$75,626	\$38,566	492.00	\$2,365	\$116,557	\$116,557.00
W-WT Insulated Storage Tank	35	KGAL	\$192,392	\$47,070	630.00	\$17,023	\$256,485	\$7,328.14
M-IF Fuel Tank	10	KGAL	\$43,600	\$7,401	100.00	\$4,065	\$55,066	\$5,506.60
W-SD Water Piping	1,700	LF	\$149,700	\$63,621	800.00	\$9,651	\$222,972	\$131.16
S-BF Force Main	175	LF	\$22,000	\$15,906	200.00	\$2,413	\$40,319	\$230.39
E-HR Upgrade Heat Recovery	1	EA	\$24,250	\$53,957	680.00	\$6,755	\$84,962	\$84,962.00
Subtotal			\$2,505,472	\$1,676,546	16,610.20	\$425,812	\$4,607,830	
Compliance with American Iron and Steel (AIS)						5.0%	\$230,392	
Estimating Contingency:						15.0%	\$725,733	
Project Administration						10.0%	\$556,395	
Total Recommended Construction Cost							\$6,120,350	

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Line No.	A Description	Qty	UNITS	Material Costs Unit	Material Costs Total	Labor Hours Units	Labor Hours Hours	Labor Rate	Labor Cost	Equipment Costs Unit	Equipment Costs Total	Unit Cost	Total Cost
1													
2	M-CB Construction Billing		NONE										
3													
4													
5	Subtotal: M-CB Construction Billing	-	NONE										
6													
7													
8	M-CB Equipment Resources		NONE										
9													
10													
11	Subtotal: M-CB Equipment Resources	-	NONE										
12													
13													
14	M-CB Mobilization/Demob	1	LS										
15													
16	Crew Leader	20	DAY			10.000	200	\$104.03	\$20,806			\$1,040.30	\$20,806
17	Loc Labor	40	DAY			10.000	400	\$44.75	\$17,900			\$447.50	\$17,900
18													
19	Subtotal: M-CB Mobilization/Demob	1	LS				600.0		\$38,706				\$38,706
20													
21													
22	M-CB Shipping/Freight	1	LS										
23													
24	Equipment - In	235,000	LBS										
25	Equipment - Out	235,000	LBS										
26	Materials	203,607	LBS										
27	Miscellaneous	30,541	LBS										
28	Surface Freight To Bethel	469,148	LBS	\$0.45	\$211,117							\$0.45	\$211,117
29	Barge To Tuluksak	469,148	LBS	\$0.25	\$117,287							\$0.25	\$117,287
30	Barge Out Of Tuluksak	255,000	LBS	\$0.25	\$63,750							\$0.25	\$63,750
31	Surface Freight Bethel/Anchorage	255,000	LBS	\$0.40	\$102,000							\$0.40	\$102,000
32	Shipping to Tuluksak	5	EA	\$18,200.00	\$91,000							\$18,200.00	\$91,000
33	Shipping Labor	400	HRS			1.000	400	\$78.85	\$31,540			\$78.85	\$31,540
34													
35													
36													
37	Subtotal: M-CB Shipping/Freight	1	LS		\$585,154		400.0		\$31,540				\$616,694
38													
39													

Tuluksak Washeteria WTP - PER
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Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor Rate	Labor Cost	Equipment Costs		Unit Cost	Total Cost
				Unit	Total	Units	Hours			Unit	Total	Cost	Cost
40	M-CB Fuel	1	LS										
41													
42	Purchase Local	10,000	GAL	\$3.00	\$30,000							\$3.00	\$30,000
43	No Fuel Truck Required												
44	Local Cost = \$5.50												
45	\$2.5 \$/Gal Included In Rental												
46													
47	Subtotal: M-CB Fuel	1	LS		\$30,000								\$30,000
48													
49													
50	M-CB Housing	1	LS										
51													
52	Rental Fee From Community	720	MDAY	\$50.00	\$36,000							\$50.00	\$36,000
53	4 Men 3 Months												
54													
55													
56													
57	Subtotal: M-CB Housing	1	LS		\$36,000								\$36,000
58													
59													
60	M-CB Utilities	1	LS										
61													
62	Power	6	MTH	\$500.00	\$3,000							\$500.00	\$3,000
63	Communications	6	MTH	\$400.00	\$2,400							\$400.00	\$2,400
64													
65													
66	Subtotal: M-CB Utilities	1	LS		\$5,400								\$5,400
67													
68													
69	M-CB Travel	1	LS										
70													
71	Travel For Anchorage												
72	Anchorage - Tuluksak	30	RTRIPS	\$572.00	\$17,160							\$572.00	\$17,160
73	Per Diem	30	EA	\$135.00	\$4,050							\$135.00	\$4,050
74	d												
75													
76													
77													
78	Subtotal: M-CB Travel	1	LS		\$21,210								\$21,210
79													
80													

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Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor	Labor	Equipment Costs		Unit	Total
				Unit	Total	Units	Hours	Rate	Cost	Unit	Total	Cost	Cost
81	M-CB ANTHC Project Superintendent	1	LS										
82													
83	Super 1	6	MTH			259.800	1,559	\$103.25	\$160,946			\$26,824.33	\$160,946
84													
85													
86	Subtotal: M-CB ANTHC Project Superintendent	1	LS				1,558.8		\$160,946				\$160,946
87													
88													
89	M-CB ANTHC Procurement Labor	1	LS										
90													
91	Purchasing Officer	100	HRS			1.000	100	\$64.81	\$6,481			\$64.81	\$6,481
92	Purchasing Agent	100	HRS			1.000	100	\$76.94	\$7,694			\$76.94	\$7,694
93													
94													
95	Subtotal: M-CB ANTHC Procurement Labor	1	LS				200.0		\$14,175				\$14,175
96													
97													
98	M-CB Survey	1	LS										
99													
100	Construction Staking	250	HRS			1.000	250	\$125.08	\$31,270			\$125.08	\$31,270
101													
102													
103													
104	Subtotal: M-CB Survey	1	LS				250.0		\$31,270				\$31,270
105													
106													
107	M-DS Design & CA Services	1	LS										
108													
109	Design 12%	1	LS			#####	4,549	\$121.56	\$552,940			\$552,940.00	\$552,940
110	CA Services/Design	1	LS			#####	1,350	\$121.56	\$164,106			\$164,106.00	\$164,106
111													
112													
113													
114													
115													
116													
117													
118													
119	Subtotal: M-DS Design & CA Services	1	LS				5,898.7		\$717,046				\$717,046
120													
121													

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Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor Rate	Labor Cost	Equipment Costs		Unit Cost	Total Cost
				Unit	Total	Units	Hours			Unit	Total	Cost	Cost
122	M-CB Equipment Rental	8	MTH										
123													
124	Excavator Cat 320	8	MTH							\$9,610.00	\$76,880	\$9,610.00	\$76,880
125	Loader 950H W/ Forks	8	MTH							\$6,792.00	\$54,336	\$6,792.00	\$54,336
126	Dumptrucks (2)	16	MTH							\$5,050.00	\$80,800	\$5,050.00	\$80,800
127	Lowboy Trailer For Tanks/Modulars	8	MTH							\$1,500.00	\$12,000	\$1,500.00	\$12,000
128	ANTHC Fourwheeler (2)	16	MTH							\$600.00	\$9,600	\$600.00	\$9,600
129	Small Walk-behind	16	MTH							\$315.00	\$5,040	\$315.00	\$5,040
130	Butt Fusion	1	LS	\$3,200.00	\$3,200							\$3,200.00	\$3,200
131	Electro Fusion	1	LS	\$3,200.00	\$3,200							\$3,200.00	\$3,200
132	Jumping Jack Compactors	2	EA	\$2,200.00	\$4,400							\$2,200.00	\$4,400
133	Connexes For Storage	16	MTHS							\$350.00	\$5,600	\$350.00	\$5,600
134	JOBBOX	2	EA	\$800.00	\$1,600							\$800.00	\$1,600
135	Crane Rental	8	MTHS							#####	\$120,000	\$15,000.00	\$120,000
136													
137													
138													
139	Subtotal: M-CB Equipment Rental	8	MTH		\$12,400						\$364,256		\$376,656
140													
141													
142	M-EQ Equipment Repair & Maint	1	LS										
143													
144	Mechanical	779	HRS			1.000	779	\$111.82	\$87,153			\$111.82	\$87,153
145	1 Man 3 Months (1/2 Time)												
146													
147													
148	Subtotal: M-EQ Equipment Repair & Maint	1	LS				779.4		\$87,153				\$87,153
149													
150													
151	M-CB Consumables	1	LS										
152													
153	Consumables	1	LS	\$9,200.00	\$9,200							\$9,200.00	\$9,200
154													
155													
156													
157													
158													
159	Subtotal: M-CB Consumables	1	LS		\$9,200								\$9,200
160													
161													

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Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor Rate	Labor Cost	Equipment Costs		Unit Cost	Total Cost
				Unit	Total	Units	Hours			Unit	Total	Cost	Cost
162	M-CB Small Tools	1	LS										
163													
164	Small Tools	1	LS	\$13,800.00	\$13,800							\$13,800.00	\$13,800
165													
166													
167													
168	Subtotal: M-CB Small Tools	1	LS		\$13,800								\$13,800
169													
170													
171	M-CB Safety Stand Down	1	LS										
172													
173	Safety Meetings	26	EA										
174	Crew Lead	52	HRS			0.500	26	\$104.03	\$2,705			\$52.02	\$2,705
175	Operator	52	HRS			0.500	26	\$124.57	\$3,239			\$62.29	\$3,239
176	Loc Labor	156	HRS			0.500	78	\$44.75	\$3,491			\$22.38	\$3,491
177													
178													
179													
180	Subtotal: M-CB Safety Stand Down	1	LS				130.0		\$9,435				\$9,435
181													
182													
183	M-CO Closeout		NONE										
184													
185	Included in Engineering and Supervision Time												
186													
187													
188	Subtotal: M-CO Closeout	-	NONE										
189													
190													
191	M-PC Pre-Construction	1	LS										
192													
193	Scheduler	100	HRS			1.000	100	\$89.14	\$8,914			\$89.14	\$8,914
194	Estimating	200	HRS			1.000	200	\$100.30	\$20,060			\$100.30	\$20,060
195													
196													
197													
198													
199													
200	Subtotal: M-PC Pre-Construction	1	LS				300.0		\$28,974				\$28,974
201													
202													

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Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor	Labor	Equipment Costs		Unit	Total
				Unit	Total	Units	Hours	Rate	Cost	Unit	Total	Cost	Cost
203	M-PC Pre-Construction: NTP		NONE										
204													
205													
206													
207	Subtotal: M-PC Pre-Construction: NTP - NONE												
208													
209													
210	M-PC Pre-Construction: Project Set-Up		NONE										
211								\$89.14					
212													
213	Subtotal: M-PC Pre-Construction: Project Set-Up - NONE												
214													
215													
216	M-PC Pre-Construction: Material Take-off		NONE										
217													
218													
219													
220	Subtotal: M-PC Pre-Construction: Material Take-off - NONE												
221													
222													
223	M-PC Pre-Construction: Meeting	1	LS										
224													
225	Meetings	8	EA										
226	Super	8	HRS			1.000	8	\$103.25	\$826			\$103.25	\$826
227	Eng	8	HRS			1.000	8	\$121.56	\$972			\$121.50	\$972
228													
229													
230													
231													
232	Subtotal: M-PC Pre-Construction: Meeting 1 LS 16.0 \$1,798 \$1,798												
233													
234													
235	M-PC Pre-Construction: Completed		NONE										
236													
237													
238													
239													
240													
241	Subtotal: M-PC Pre-Construction: Completed - NONE												
242													
243													

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Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor Rate	Labor Cost	Equipment Costs		Unit Cost	Total Cost
				Unit	Total	Units	Hours			Unit	Total	Cost	Cost
244	M-PM Project Management	1	LS										
245													
246	Construction Management	8	MTHS			86.600	693	\$121.56	\$84,217			\$10,527.13	\$84,217
247													
248													
249	Subtotal: M-PM Project Management	1	LS				692.8		\$84,217				\$84,217
250													
251													
252	M-WR Warranty	1	LS										
253													
254	Spare Parts/Warranty	1	LS	\$50,000.00	\$50,000							\$50,000.00	\$50,000
255													
256													
257													
258	Subtotal: M-WR Warranty	1	LS		\$50,000								\$50,000
259													
260													
261	W-WW Complete Well Connection	1	LS										
262													
263	Pumps Submersible 1.5HP	2	EA	\$1,500.00	\$2,250							\$1,500.00	\$2,250
264	Pitless Adaptor	2	EA	\$300.00	\$600							\$300.00	\$600
265	Drop Pipe and Electrical	60	LF	\$3.00	\$180							\$3.00	\$180
266	Insulated Cover	2	EA	\$1,500.00	\$3,000							\$1,500.00	\$3,000
267	Water Quality Tests	2	EA	\$2,000.00	\$4,000							\$2,000.00	\$4,000
268													
269	Labor												
270	Carpenter	16	HRS			1.000	16	\$121.37	\$1,942			\$121.38	\$1,942
271	Plumber	24	HRS			1.000	24	\$112.76	\$2,706			\$112.75	\$2,706
272	Electrical	16	HRS			1.000	16	\$111.84	\$1,789			\$111.81	\$1,789
273	Local Labor	40	HRS			1.000	40	\$44.75	\$1,790			\$44.75	\$1,790
274													
275													
276													
277													
278													
279													
280													
281													
282	Subtotal: W-WW Complete Well Connection	1	LS		\$10,030		96.0		\$8,227				\$18,257
283													
284													

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Line			Material Costs		Labor Hours		Labor	Labor	Equipment Costs		Unit	Total	
No.	A Description	Qty	UNITS	Unit	Total	Units	Hours	Rate	Cost	Unit	Total	Cost	Cost
285	C-WA WTP/Washeteria - Bldg	1	LS										
286													
287	Foundations	28	EA										
288	Treated Timbers	4,200	BF	\$1.50	\$6,300							\$1.50	\$6,300
289	Time	105	HRS										
290	Carpenter	210	HRS			1.000	210	\$121.37	\$25,488			\$121.37	\$25,488
291	Local Labor	420	HRS			1.000	420	\$44.75	\$18,795			\$44.75	\$18,795
292													
293	Gravel (104'X70'X2')	647	CY	\$100.00	\$64,711							\$100.00	\$64,711
294	Time	32	HRS										
295	Dump Truck	32	HRS							\$70.00	\$2,240	\$70.00	\$2,240
296	Backhoe Cat 320	32	HRS							\$48.25	\$1,544	\$48.25	\$1,544
297	Operator	32	HRS			1.000	32	\$124.57	\$3,986			\$124.56	\$3,986
298	Local Truck Driver	32	HRS			1.000	32	\$51.97	\$1,663			\$51.97	\$1,663
299	Lead Crew	32	HRS			1.000	32	\$104.03	\$3,329			\$104.03	\$3,329
300	Local Labor	64	HRS			1.000	64	\$44.75	\$2,864			\$44.75	\$2,864
301													
302	Utilidor												
303	Floor	320	SF										
304	Utilidor Walls	736	SF										
305	Sips 8"	1,056	SF	\$8.00	\$8,448							\$8.00	\$8,448
306	Air Barrier	1,056	SF	\$0.25	\$264							\$0.25	\$264
307	Rainscreen Wrap	1,056	SF	\$0.30	\$317							\$0.30	\$317
308	T1-11	1,056	SF	\$1.75	\$1,848							\$1.75	\$1,848
309													
310	Deck & Stair												
311	Glulam Beams	308	BF	\$3.00	\$924							\$3.00	\$924
312	Decking Fiberglass	76	SF	\$18.00	\$1,368							\$18.00	\$1,368
313	Stair Treads	70	SF	\$18.00	\$1,260							\$18.00	\$1,260
314	Handrails	59	LF	\$160.00	\$9,360							\$160.00	\$9,360
315													
316	Ramp												
317	Glulam Beams	640	BF	\$3.00	\$1,920							\$3.00	\$1,920
318	Decking Fiberglass	320	SF	\$18.00	\$5,760							\$18.00	\$5,760
319	Handrails	140	LF	\$160.00	\$22,400							\$160.00	\$22,400
320													
321													
322													
323													
324													

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				Unit	Total	Units	Hours			Unit	Total	Cost	Cost
325	Roof	3,700	SF										
326	Roof Trusses	3,700	SF	\$6.00	\$22,200							\$6.00	\$22,200
327	Misc Framing	780	BF	\$1.50	\$1,170							\$1.50	\$1,170
328	Metal Roofing (Sub)	3,700	SF	\$15.00	\$55,500							\$15.00	\$55,500
329	1" Z Girts	1,850	LF	\$1.20	\$2,220							\$1.20	\$2,220
330	Underlayment	3,700	SF	\$0.20	\$740							\$0.20	\$740
331													
332	Labor												
333	Carpenter	539	HRS			1.000	539	\$121.37	\$65,418			\$121.37	\$65,418
334	Local Labor	270	HRS			1.000	270	\$44.75	\$12,060			\$44.75	\$12,060
335													
336													
337	Subtotal: C-WA WTP/Washeteria - Bldg	1	LS		\$206,710		1,598.5		\$133,603		\$3,784		\$344,097
338													
339													
340	C-WA WTP/Washeteria - Modular	1	LS										
341													
342	Modular Construction	2,520	SF	\$400.00	\$1,008,000							\$400.00	#####
343	Modular Construction includes complete buildout of Washeteria and WTP												
344	Lowboy To Site	5	EA			18.000	90			\$700.00	\$3,500	\$700.00	\$3,500
345													
346	Setting Modules	5	EA										
347	Carpenters	250	HR			1.000	250	\$121.37	\$30,343			\$121.37	\$30,343
348	Local Labor	150	HR			1.000	150	\$44.75	\$6,713			\$44.75	\$6,713
349	Crane - Operations	6	DAY			10.000	60			\$2,000.00	\$12,000	\$2,000.00	\$12,000
350													
351	Stitching Modules at Site												
352	Carpenters	96	HR			1.000	96	\$121.37	\$11,652			\$121.38	\$11,652
353	Local Labor	100	HR			1.000	100	\$44.75	\$4,475			\$44.75	\$4,475
354	Plumber	96	HR			1.000	96	\$112.76	\$10,825			\$112.76	\$10,825
355	Electrician	96	HR			1.000	96	\$111.84	\$10,737			\$111.84	\$10,737
356	Misc Materials	1	LS	\$10,000.00	\$10,000							\$10,000.00	\$10,000
357	Test, Adjust and Balancing	100	HRS			1.000	100	\$112.76	\$11,276			\$112.76	\$11,276
358	Commissioning	150	HRS			1.000	150	\$112.76	\$16,914			\$112.76	\$16,914
359													
360													
361	Subtotal: C-WA WTP/Washeteria - Modular	1	LS		\$1,018,000		1,188.0		\$102,935		\$15,500		#####
362													
363													

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Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor Rate	Labor Cost	Equipment Costs		Unit Cost	Total Cost
				Unit	Total	Units	Hours			Unit	Total	Cost	Cost
364	S-LS Wastewater Pump Station	1	EA										
365													
366	Well Structure	1	EA	\$35,000.00	\$35,000							\$35,000.00	\$35,000
367	Pumps and Accessories	2	EA	\$7,700.00	\$15,400							\$7,700.00	\$15,400
368	DIP 3" Discharge	2	EA	\$130.00	\$260							\$130.00	\$260
369	Ball Check Valve 3"	2	EA	\$530.00	\$1,060							\$530.00	\$1,060
370	Plug Valve Plug 3"	2	EA	\$1,275.00	\$2,550							\$1,275.00	\$2,550
371	Elbow 3" DI	1	EA	\$132.00	\$132							\$132.00	\$132
372	Reducer 2x3 DI	1	EA	\$132.00	\$132							\$132.00	\$132
373	Tee 3" DI	1	EA	\$319.00	\$319							\$319.00	\$319
374	Flanges & Fittings	4	EA	\$171.00	\$684							\$171.00	\$684
375	Control Panel	1	EA	\$15,289.00	\$15,289							\$15,289.00	\$15,289
376	Motor Starter - 4 HP	2	EA	\$400.00	\$800							\$400.00	\$800
377	Electrical	1	EA	\$4,000.00	\$4,000							\$4,000.00	\$4,000
378													
379	Pump Station Labor												
380	Carpenter	40	HRS			1.000	40	\$121.37	\$4,855			\$121.38	\$4,855
381	Plumber	100	HRS			1.000	100	\$112.76	\$11,276			\$112.76	\$11,276
382	Electrical	56	HRS			1.000	56	\$111.84	\$6,263			\$111.84	\$6,263
383	Local Labor	196	HRS			1.000	196	\$44.75	\$8,771			\$44.75	\$8,771
384													
385	Earthwork												
386	Time	20	HRS										
387	Dump Truck	20	HRS							\$70.00	\$1,400	\$70.00	\$1,400
388	Backhoe Cat 320	20	HRS							\$48.25	\$965	\$48.25	\$965
389	Operator	20	HRS			1.000	20	\$124.57	\$2,491			\$124.55	\$2,491
390	Local Truck Driver	20	HRS			1.000	20	\$51.97	\$1,039			\$51.95	\$1,039
391	Lead Crew	20	HRS			1.000	20	\$104.03	\$2,081			\$104.05	\$2,081
392	Local Labor	40	HRS			1.000	40	\$44.75	\$1,790			\$44.75	\$1,790
393													
394													
395													
396													
397													
398													
399													
400													
401													
402	Subtotal: S-LS Wastewater Pump Station	1	EA		\$75,626		492.0		\$38,566		\$2,365		\$116,557
403													
404													

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Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor Rate	Labor Cost	Equipment Costs		Unit Cost	Total Cost
				Unit	Total	Units	Hours			Unit	Total	Cost	Cost
405	W-WT Insulated Storage Tank	35	KGAL										
406													
407	Foundation - Gravel Pad 24'x24'x3'												
408	Gravel Purchase - Assumed	100	CY	\$100.00	\$10,000							\$100.00	\$10,000
409	Insulation Board 5"	3,456	BF	\$0.75	\$2,592							\$0.75	\$2,592
410													
411	Tank 35,000 Gal, Prefab'd	1	EA	\$130,000.00	\$130,000							\$130,000.00	\$130,000
412	Insulate Tank	1	EA	\$49,800.00	\$49,800							\$49,800.00	\$49,800
413													
414	Earthwork												
415	Time	130	HRS										
416	Dump Truck/Trailer	110	HRS							\$85.00	\$9,350	\$85.00	\$9,350
417	Dump Truck	20	HRS							\$70.00	\$1,400	\$70.00	\$1,400
418	Backhoe Cat 320	130	HRS							\$48.25	\$6,273	\$48.25	\$6,273
419	Operator	130	HRS			1.000	130	\$124.57	\$16,194			\$124.57	\$16,194
420	Local Truck Driver	110	HRS			1.000	110	\$51.97	\$5,717			\$51.97	\$5,717
421	Lead Crew	130	HRS			1.000	130	\$104.03	\$13,524			\$104.03	\$13,524
422	Local Labor	260	HRS			1.000	260	\$44.75	\$11,635			\$44.75	\$11,635
430													
431													
432	Subtotal: W-WT Insulated Storage Tank	35	KGAL		\$192,392		630.0		\$47,070		\$17,023		\$256,485
433													
434													
435	M-IF Fuel Tank	10	KGAL										
436													
437	Foundation - Gravel Pad 20'x24'x2'												
438	Gravel Purchase - Assumed	36	CY	\$100.00	\$3,600							\$100.00	\$3,600
439													
440	10,000 Gal Fuel Tank	1	EA	\$40,000.00	\$40,000							\$40,000.00	\$40,000
442	Time	20	HRS										
443	Dump Truck/Trailer	20	HRS							\$85.00	\$1,700	\$85.00	\$1,700
444	Dump Truck	20	HRS							\$70.00	\$1,400	\$70.00	\$1,400
445	Backhoe Cat 320	20	HRS							\$48.25	\$965	\$48.25	\$965
446	Operator	20	HRS			1.000	20	\$124.57	\$2,491			\$124.55	\$2,491
447	Local Truck Driver	20	HRS			1.000	20	\$51.97	\$1,039			\$51.95	\$1,039
448	Lead Crew	20	HRS			1.000	20	\$104.03	\$2,081			\$104.05	\$2,081
449	Local Labor	40	HRS			1.000	40	\$44.75	\$1,790			\$44.75	\$1,790
452													
453	Subtotal: M-IF Fuel Tank	10	KGAL		\$43,600		100.0		\$7,401		\$4,065		\$55,066
454													
455													

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Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor Rate	Labor Cost	Equipment Costs		Unit Cost	Total Cost
				Unit	Total	Units	Hours			Unit	Total	Cost	Cost
456	W-SD Water Piping	1,700	LF										
457													
458	Piping - Water												
459	16" Carrier, 4" HDPE, 2" HDPE Arctic Pipe	1,400	LF	\$65.00	\$91,000							\$65.00	\$91,000
460	Heat Trace, Electric	1,400	LF	\$16.00	\$22,400							\$16.00	\$22,400
461	Misc Materials	1	LS	\$10,000.00	\$10,000							\$10,000.00	\$10,000
462													
463	Time	140	HRS										
464	Backhoe 320	140	HRS							\$48.25	\$6,755	\$48.25	\$6,755
465	Operator	140	HRS			1.000	140	\$124.57	\$17,440			\$124.57	\$17,440
466	Lead Crew	140	HRS			1.000	140	\$104.03	\$14,564			\$104.03	\$14,564
467	Local Labor	280	HRS			1.000	280	\$44.75	\$12,530			\$44.75	\$12,530
468													
469	Piping - Raw Water												
470	16" Carrier, 3" HDPE, 2" HDPE Arctic Pipe	250	LF	\$63.00	\$15,750							\$63.00	\$15,750
471	Glycol Heat Trace Pipe PEX	500	LF	\$2.00	\$1,000							\$2.00	\$1,000
472	Misc Materials	1	LS	\$2,500.00	\$2,500							\$2,500.00	\$2,500
473													
474	Time	50	HRS										
475	Backhoe 320	50	HRS							\$48.25	\$2,413	\$48.26	\$2,413
476	Operator	50	HRS			1.000	50	\$124.57	\$6,229			\$124.58	\$6,229
477	Lead Crew	50	HRS			1.000	50	\$104.03	\$5,202			\$104.04	\$5,202
478	Local Labor	100	HRS			1.000	100	\$44.75	\$4,475			\$44.75	\$4,475
479													
480	Piping - Tank Piping												
481	10" Carrier, 3" HDPE, 2" HDPE Arctic Pipe	50	LF	\$55.00	\$2,750							\$55.00	\$2,750
482	Heat Trace, Electric	50	LF	\$16.00	\$800							\$16.00	\$800
483	Misc Materials	1	LS	\$3,500.00	\$3,500							\$3,500.00	\$3,500
484													
485	Time	10	HRS										
486	Backhoe 320	10	HRS							\$48.25	\$483	\$48.30	\$483
487	Operator	10	HRS			1.000	10	\$124.57	\$1,246			\$124.60	\$1,246
488	Lead Crew	10	HRS			1.000	10	\$104.03	\$1,040			\$104.00	\$1,040
489	Local Labor	20	HRS			1.000	20	\$44.75	\$895			\$44.75	\$895
499													
500	Subtotal: W-SD Water Piping	1,700	LF		\$149,700		800.0		\$63,621		\$9,651		\$222,972
501													
502													

Tuluksak Washeteria WTP - PER
 Alternate 1 - New WTP and Washeteria - Modular Construction

Construction Cost Estimate
 Concept Design Submittal
 March 30, 2018

Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor Rate	Labor Cost	Equipment Costs		Unit Cost	Total Cost
				Unit	Total	Units	Hours			Unit	Total	Cost	Cost
503	S-BF Force Main	175	LF										
504													
505	Piping - Force Main												
506	16" Carrier, 3" HDPE, (2) 2" HDPE Arctic Pipe	250	LF	\$68.00	\$17,000							\$68.00	\$17,000
507	Misc Materials	1	LS	\$5,000.00	\$5,000							\$5,000.00	\$5,000
508													
509	Time	50	HRS										
510	Backhoe 320	50	HRS							\$48.25	\$2,413	\$48.26	\$2,413
511	Operator	50	HRS			1.000	50	\$124.57	\$6,229			\$124.58	\$6,229
512	Lead Crew	50	HRS			1.000	50	\$104.03	\$5,202			\$104.04	\$5,202
513	Local Labor	100	HRS			1.000	100	\$44.75	\$4,475			\$44.75	\$4,475
520													
521													
522	Subtotal: S-BF Force Main	175	LF		\$22,000		200.0		\$15,906		\$2,413		\$40,319
523													
524													
525	E-HR Upgrade Heat Recovery	1	EA										
526													
527	Install Parts at Power Plant	1	LS										
528	Plumber	30	HRS			1.000	30	\$112.76	\$3,383			\$112.77	\$3,383
529	Electrical	30	HRS			1.000	30	\$111.84	\$3,355			\$111.83	\$3,355
530	Local Labor	60	HRS			1.000	60	\$44.75	\$2,685			\$44.75	\$2,685
531													
532	WTP Work - See WTP												
533													
534	Piping												
535	8" Arctic Pipe, With 2" Aquatherm	350	LF	\$55.00	\$19,250							\$55.00	\$19,250
536	Misc Materials	1	LS	\$5,000.00	\$5,000							\$5,000.00	\$5,000
537													
538	Time	140	HRS										
539	Backhoe 320	140	HRS							\$48.25	\$6,755	\$48.25	\$6,755
540	Operator	140	HRS			1.000	140	\$124.57	\$17,440			\$124.57	\$17,440
541	Lead Crew	140	HRS			1.000	140	\$104.03	\$14,564			\$104.03	\$14,564
542	Local Labor	280	HRS			1.000	280	\$44.75	\$12,530			\$44.75	\$12,530
567													
568													
569	Subtotal: E-HR Upgrade Heat Recovery	1	EA		\$24,250		680.0		\$53,957		\$6,755		\$84,962
570													

**Tuluksak Washeteria WTP - PER
Alternate 2 - Renovation**

**Construction Cost Estimate
Concept Design Submittal**

March 30, 2018

 **ESTIMATIONS**

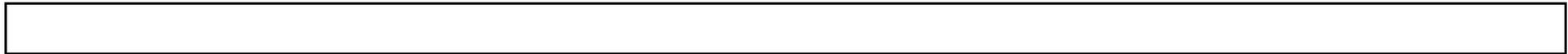
1225 E. International Airport Road, Suite 205
Anchorage, Alaska 99518
907.561.0790

Prepared for:

CRW Engineering Group, LLC
3940 Arctic Blvd. Sute 300
Anchorage, Alaska 99503
907.562.3252

Tuluksak Washeteria WTP - PER
Alternate 2 - Renovation

Construction Cost Estimate
Concept Design Submittal
March 30, 2018



Documents

Document Title Tuluksak Washeteria - WTP
Design Firm
Level of Documents Concept
Date 16-Dec-16

Schedule

Project Start Spring 2019
Project Duration 10 Mths

Notes and Assumptions

Local Labor
Force Account
Equipment will be barged to and from the project site from Anchorage

Estimate Class **5**

Methodology Estimate is priced with locally priced materials and labor per the estimators experience.

Labor Rates ANTHC Force Account Labor Rates for 2017.
Labor Rates based on 60 Hour/Week Schedule.
Lodging assumed to be from Community at \$50/MD.

Estimator Jay Lavoie - jay@estimations.com, 907-561-0755

Exclusions

Tuluksak Washeteria WTP - PER
Alternate 2 - Renovation
Summary

Construction Cost Estimate
Concept Design Submittal
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Description	Quantity	Unit	Matl	Labor	Hours	Equipment	Total	Unit Cost
M-CB Construction Billing		NONE	\$0	\$0	-	\$0	\$0	
M-CB Equipment Resources		NONE	\$0	\$0	-	\$0	\$0	
M-CB Mobilization/Demob	1	LS	\$0	\$38,706	600.00	\$0	\$38,706	
M-CB Shipping/Freight	1	LS	\$411,686	\$31,540	400.00	\$0	\$443,226	
M-CB Fuel	1	LS	\$30,000	\$0	-	\$0	\$30,000	
M-CB Housing	1	LS	\$102,756	\$0	-	\$0	\$102,756	
M-CB Utilities	1	LS	\$9,000	\$0	-	\$0	\$9,000	
M-CB Travel	1	LS	\$31,400	\$0	-	\$0	\$31,400	
M-CB ANTHC Project Superintendent	1	LS	\$0	\$268,244	2,598.00	\$0	\$268,244	
M-CB ANTHC Procurement Labor	1	LS	\$0	\$28,350	400.00	\$0	\$28,350	
M-CB Survey	1	LS	\$0	\$31,270	250.00	\$0	\$31,270	
M-DS Design & CA Services	1	LS	\$0	\$689,318	5,670.60	\$0	\$689,318	
M-CB Equipment Rental	12	MTH	\$12,400	\$0	-	\$366,384	\$378,784	\$31,565.33
M-EQ Equipment Repair & Maint	1	LS	\$0	\$116,203	1,039.20	\$0	\$116,203	
M-CB Consumables	1	LS	\$10,500	\$0	-	\$0	\$10,500	
M-CB Small Tools	1	LS	\$15,800	\$0	-	\$0	\$15,800	
M-CB Safety Stand Down	1	LS	\$0	\$12,716	150.50	\$0	\$12,716	
M-CO Closeout		NONE	\$0	\$0	-	\$0	\$0	
M-PC Pre-Construction	1	LS	\$0	\$28,974	300.00	\$0	\$28,974	
M-PC Pre-Construction: NTP		NONE	\$0	\$0	-	\$0	\$0	
M-PC Pre-Construction: Project Set-Up		NONE	\$0	\$0	-	\$0	\$0	
M-PC Pre-Construction: Material Take-off		NONE	\$0	\$0	-	\$0	\$0	
M-PC Pre-Construction: Meeting	1	LS	\$0	\$1,798	16.00	\$0	\$1,798	
M-PC Pre-Construction: Completed		NONE	\$0	\$0	-	\$0	\$0	
M-PM Project Management	1	LS	\$0	\$126,325	1,039.20	\$0	\$126,325	
M-WR Warranty	1	LS	\$50,000	\$0	-	\$0	\$50,000	
W-WW Complete Well Connection	1	LS	\$10,030	\$8,227	96.00	\$0	\$18,257	
C-WA WTP/Washeteria - Temp Facilities	1	LS	\$644,000	\$114,023	1,080.00	\$0	\$758,023	
C-WA WTP/Washeteria - Bldg	1	LS	\$143,986	\$153,882	1,605.80	\$0	\$297,868	
C-WA WTP/Washeteria - Systems	1	LS	\$616,007	\$205,912	2,603.90	\$0	\$821,919	
C-WA WTP/Washeteria - Plumbing, HVAC, Process Piping	-	\$0	\$102,985	\$100,789	1,280.00	\$0	\$203,774	
S-LS Wastewater Pump Station	1	EA	\$75,626	\$38,566	492.00	\$2,365	\$116,557	\$116,557.00
W-WT Insulated Storage Tank	35	KGAL	\$192,392	\$47,070	630.00	\$17,023	\$256,485	\$7,328.14
M-IF Fuel Tank	10	KGAL	\$43,600	\$7,401	100.00	\$4,065	\$55,066	\$5,506.60
W-SD Water Piping	1,925	LF	\$167,675	\$71,574	900.00	\$10,857	\$250,106	\$129.93
S-BF Force Main	125	LF	\$13,875	\$7,953	100.00	\$1,206	\$23,034	\$184.27
S-BC Sewer Main	150	LF	\$15,650	\$19,086	240.00	\$2,895	\$37,631	\$250.87
Subtotal			\$2,699,368	\$2,147,927	\$21,591	\$404,795	\$5,252,090	
Compliance with American Iron and Steel (AIS)						5.0%	\$262,605	
Estimating Contingency:						15.0%	\$827,204	
Project Administration						10.0%	\$634,190	
Total Recommended Construction Cost							\$6,976,089	

Tuluksak Washeteria WTP - PER
 Alternate 2 - Renovation

Construction Cost Estimate
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Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor Rate	Labor Cost	Equipment Costs		Unit Cost	Total Cost
				Unit	Total	Units	Hours			Unit	Total	Cost	Cost
1													
2	M-CB Construction Billing		NONE	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
3				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
4													
5	Subtotal: M-CB Construction Billing	-	NONE	\$0	\$0		0.0		\$0		\$0		\$0
6													
7													
8	M-CB Equipment Resources		NONE										
9				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
10													
11	Subtotal: M-CB Equipment Resources	-	NONE	\$0	\$0		0.0		\$0		\$0		\$0
12													
13													
14	M-CB Mobilization/Demob	1	LS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
15				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
16	Crew Leader	20	DAY	\$0.00	\$0	10.000	200	\$104.03	\$20,806	\$0.00	\$0	\$1,040.30	\$20,806
17	Loc Labor	40	DAY	\$0.00	\$0	10.000	400	\$44.75	\$17,900	\$0.00	\$0	\$447.50	\$17,900
18													
19	Subtotal: M-CB Mobilization/Demob	1	LS		\$0		600.0		\$38,706		\$0		\$38,706
20													
21													
22	M-CB Shipping/Freight	1	LS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
23				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
24	Equipment - In	175,000	LBS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
25	Equipment - Out	175,000	LBS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
26	Materials	201,784	LBS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
27	Miscellaneous	30,268	LBS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
28	Surface Freight To Bethel	407,052	LBS	\$0.45	\$183,173	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.45	\$183,173
29	Barge To Tuluksak	407,052	LBS	\$0.25	\$101,763	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.25	\$101,763
30	Barge Out Of Tuluksak	195,000	LBS	\$0.25	\$48,750	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.25	\$48,750
31	Surface Freight	195,000	LBS	\$0.40	\$78,000	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.40	\$78,000
32	Bethel/Anchorage Shipping Labor	400	HRS	\$0.00	\$0	1.000	400	\$78.85	\$31,540	\$0.00	\$0	\$78.85	\$31,540
33				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
34				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
35				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
36													
37	Subtotal: M-CB Shipping/Freight	1	LS		\$411,686		400.0		\$31,540		\$0		\$443,226
38													
39													

Tuluksak Washeteria WTP - PER
 Alternate 2 - Renovation

Construction Cost Estimate
 Concept Design Submittal
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Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor Rate	Labor Cost	Equipment Costs		Unit Cost	Total Cost
				Unit	Total	Units	Hours			Unit	Total		
40	M-CB Fuel	1	LS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
41				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
42	Purchase Local	10,000	GAL	\$3.00	\$30,000	0.000	0	\$0.00	\$0	\$0.00	\$0	\$3.00	\$30,000
43	No Fuel Truck Required			\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
44	Local Cost = \$5.50			\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
45	\$2.5 \$/Gal Included In Rental			\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
46													
47	Subtotal: M-CB Fuel	1	LS		\$30,000		0.0		\$0		\$0		\$30,000
48													
49													
50	M-CB Housing	1	LS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
51				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
52	Rental Fee From Community	2,055	MDAY	\$50.00	\$102,756	0.000	0	\$0.00	\$0	\$0.00	\$0	\$50.00	\$102,756
53				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
54	Total Labor	21,591	HRS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
55	Local Labor	3,976	HRS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
56	Labor Hours For Hsg	17,615	HRS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
57	Housing	2,055	MDAY	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
58				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
59													
60	Subtotal: M-CB Housing	1	LS		\$102,756		0.0		\$0		\$0		\$102,756
61													
62													
63	M-CB Utilities	1	LS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
64				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
65	Power	10	MTH	\$500.00	\$5,000	0.000	0	\$0.00	\$0	\$0.00	\$0	\$500.00	\$5,000
66	Communications	10	MTH	\$400.00	\$4,000	0.000	0	\$0.00	\$0	\$0.00	\$0	\$400.00	\$4,000
67				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
68													
69	Subtotal: M-CB Utilities	1	LS		\$9,000		0.0		\$0		\$0		\$9,000
70													
71													
72	M-CB Travel	1	LS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
73				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
74	Travel For Anchorage			\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
75	Anchorage - Tuluksak	40	RTRIPS	\$650.00	\$26,000	0.000	0	\$0.00	\$0	\$0.00	\$0	\$650.00	\$26,000
76	Per Diem	40	EA	\$135.00	\$5,400	0.000	0	\$0.00	\$0	\$0.00	\$0	\$135.00	\$5,400
77				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
78													
79	Subtotal: M-CB Travel	1	LS		\$31,400		0.0		\$0		\$0		\$31,400
80													

Tuluksak Washeteria WTP - PER
 Alternate 2 - Renovation

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Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor Rate	Labor Cost	Equipment Costs		Unit Cost	Total Cost
				Unit	Total	Units	Hours			Unit	Total	Cost	Cost
81													
82	M-CB ANTHC Project Superintendent	1	LS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
83				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
84	Super 1	10	MTH	\$0.00	\$0	259.800	2,598	\$103.25	\$268,244	\$0.00	\$0	\$26,824.40	\$268,244
85				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
86				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
87													
88	Subtotal: M-CB ANTHC Project Superintendent	1	LS		\$0		2,598.0		\$268,244		\$0		\$268,244
89													
90													
91	M-CB ANTHC Procurement Labor	1	LS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
92				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
93	Purchasing Officer	200	HRS	\$0.00	\$0	1.000	200	\$64.81	\$12,962	\$0.00	\$0	\$64.81	\$12,962
94	Purchasing Agent	200	HRS	\$0.00	\$0	1.000	200	\$76.94	\$15,388	\$0.00	\$0	\$76.94	\$15,388
95				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
96				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
97													
98	Subtotal: M-CB ANTHC Procurement Labor	1	LS		\$0		400.0		\$28,350		\$0		\$28,350
99													
100													
101	M-CB Survey	1	LS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
102				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
103	Construction Staking	250	HRS	\$0.00	\$0	1.000	250	\$125.08	\$31,270	\$0.00	\$0	\$125.08	\$31,270
104				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
105													
106	Subtotal: M-CB Survey	1	LS		\$0		250.0		\$31,270		\$0		\$31,270
107													
108													
109	M-DS Design & CA Services	1	LS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
110				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
111	Design 10%	1	LS	\$0.00	\$0	4,320.574	4,321	\$121.56	\$525,212	\$0.00	\$0	\$525,212.00	\$525,212
112	CA Services/Design	1	LS	\$0.00	\$0	1,350.000	1,350	\$121.56	\$164,106	\$0.00	\$0	\$164,106.00	\$164,106
113				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
114				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
115				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
116				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
117				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
118													
119	Subtotal: M-DS Design & CA Services	1	LS		\$0		5,670.6		\$689,318		\$0		\$689,318
120													
121													

Tuluksak Washeteria WTP - PER
 Alternate 2 - Renovation

Construction Cost Estimate
 Concept Design Submittal
 March 30, 2018

Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor Rate	Labor Cost	Equipment Costs		Unit Cost	Total Cost
				Unit	Total	Units	Hours			Unit	Total	Cost	Cost
122	M-CB Equipment Rental	12	MTH	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
123				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
124	Excavator Cat 320	12	MTH	\$0.00	\$0	0.000	0	\$0.00	\$0	#####	\$115,320	\$9,610.00	\$115,320
125	Loader 950H W/ Forks	12	MTH	\$0.00	\$0	0.000	0	\$0.00	\$0	#####	\$81,504	\$6,792.00	\$81,504
126	Dumptrucks (2)	24	MTH	\$0.00	\$0	0.000	0	\$0.00	\$0	#####	\$121,200	\$5,050.00	\$121,200
127	Trailer For Tanks	12	MTH	\$0.00	\$0	0.000	0	\$0.00	\$0	#####	\$18,000	\$1,500.00	\$18,000
128	ANTHC Fourwheeler (2)	24	MTH	\$0.00	\$0	0.000	0	\$0.00	\$0	\$600.00	\$14,400	\$600.00	\$14,400
129	Small Walk-behind	24	MTH	\$0.00	\$0	0.000	0	\$0.00	\$0	\$315.00	\$7,560	\$315.00	\$7,560
130	Butt Fusion	1	LS	\$3,200.00	\$3,200	0.000	0	\$0.00	\$0	\$0.00	\$0	\$3,200.00	\$3,200
131	Electro Fusion	1	LS	\$3,200.00	\$3,200	0.000	0	\$0.00	\$0	\$0.00	\$0	\$3,200.00	\$3,200
132	Jumping Jack Compactors	2	EA	\$2,200.00	\$4,400	0.000	0	\$0.00	\$0	\$0.00	\$0	\$2,200.00	\$4,400
133	Connexes For Storage	24	MTHS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$350.00	\$8,400	\$350.00	\$8,400
134	JOBOX	2	EA	\$800.00	\$1,600	0.000	0	\$0.00	\$0	\$0.00	\$0	\$800.00	\$1,600
135				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
136				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
137				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
138													
139	Subtotal: M-CB Equipment Rental	12	MTH		\$12,400		0.0		\$0		\$366,384		\$378,784
140													
141													
142	M-EQ Equipment Repair & Maint	1	LS										
143				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
144	Mechanical	1,039	HRS	\$0.00	\$0	1.000	1,039	\$111.82	\$116,203	\$0.00	\$0	\$111.82	\$116,203
145				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
146													
147	Subtotal: M-EQ Equipment Repair & Maint	1	LS		\$0		1,039.2		\$116,203		\$0		\$116,203
148													
149													
150	M-CB Consumables	1	LS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
151	Consumables	1	LS	#####	\$10,500	0.000	0	\$0.00	\$0	\$0.00	\$0	\$10,500.00	\$10,500
152				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
153													
154	Subtotal: M-CB Consumables	1	LS		\$10,500		0.0		\$0		\$0		\$10,500
155													
156													
157	M-CB Small Tools	1	LS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
158	Small Tools	1	LS	#####	\$15,800	0.000	0	\$0.00	\$0	\$0.00	\$0	\$15,800.00	\$15,800
159				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
160													
161	Subtotal: M-CB Small Tools	1	LS		\$15,800		0.0		\$0		\$0		\$15,800
162													

Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor Rate	Labor Cost	Equipment Costs		Unit Cost	Total Cost
				Unit	Total	Units	Hours			Unit	Total	Cost	Cost
163													
164	M-CB Safety Stand Down	1	LS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
165				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
166	Safety Meetings	43	EA	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
167	Crew Lead	86	HRS	\$0.00	\$0	0.500	43	\$104.03	\$4,473	\$0.00	\$0	\$52.01	\$4,473
168	Operator	86	HRS	\$0.00	\$0	0.500	43	\$124.57	\$5,357	\$0.00	\$0	\$62.29	\$5,357
169	Loc Labor (3)	129	HRS	\$0.00	\$0	0.500	65	\$44.75	\$2,886	\$0.00	\$0	\$22.37	\$2,886
170				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
171				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
172				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
173													
174	Subtotal: M-CB Safety Stand Down	1	LS		\$0		150.5		\$12,716		\$0		\$12,716
175													
176													
177	M-CO Closeout		NONE	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
178				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
179	Included in Engineering and Supervision Time			\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
180				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
181													
182	Subtotal: M-CO Closeout	-	NONE		\$0		0.0		\$0		\$0		\$0
183													
184													
185	M-PC Pre-Construction	1	LS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
186				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
187	Scheduler	100	HRS	\$0.00	\$0	1.000	100	\$89.14	\$8,914	\$0.00	\$0	\$89.14	\$8,914
188	Estimating	200	HRS	\$0.00	\$0	1.000	200	\$100.30	\$20,060	\$0.00	\$0	\$100.30	\$20,060
189													
190	Subtotal: M-PC Pre-Construction	1	LS		\$0		300.0		\$28,974		\$0		\$28,974
191													
192													
193	M-PC Pre-Construction: NTP		NONE	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
194				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
195													
196	Subtotal: M-PC Pre-Construction: NTP	-	NONE		\$0		0.0		\$0		\$0		\$0
197													
198													
199	M-PC Pre-Construction: Project Set-Up		NONE	\$0.00	\$0	0.000	0	\$89.14	\$0	\$0.00	\$0	\$0.00	\$0
200				\$0.00	\$0	0.000	0	\$89.14	\$0	\$0.00	\$0	\$0.00	\$0
201													
202	Subtotal: M-PC Pre-Construction: Project Set-Up	-	NONE		\$0		0.0		\$0		\$0		\$0
203													

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Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor Rate	Labor Cost	Equipment Costs		Unit Cost	Total Cost
				Unit	Total	Units	Hours			Unit	Total		
204													
205	M-PC Pre-Construction: Material Take-off		NONE										
206				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
207													
208	Subtotal: M-PC Pre-Construction: Material Take-off	-	NONE		\$0		0.0		\$0		\$0		\$0
209													
210													
211	M-PC Pre-Construction: Meeting	1	LS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
212				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
213	Meetings	8	EA	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
214	Super	8	HRS	\$0.00	\$0	1.000	8	\$103.25	\$826	\$0.00	\$0	\$103.25	\$826
215	Eng	8	HRS	\$0.00	\$0	1.000	8	\$121.56	\$972	\$0.00	\$0	\$121.50	\$972
216				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
217				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
218													
219	Subtotal: M-PC Pre-Construction: Meeting	1	LS		\$0		16.0		\$1,798		\$0		\$1,798
220													
221													
222	M-PC Pre-Construction: Completed		NONE										
223				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
224				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
225													
226	Subtotal: M-PC Pre-Construction: Completed	-	NONE		\$0		0.0		\$0		\$0		\$0
227													
228													
229	M-PM Project Management	1	LS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
230				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
231	Construction Management	12	MTHS	\$0.00	\$0	86.600	1,039	\$121.56	\$126,325	\$0.00	\$0	\$10,527.08	\$126,325
232				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
233				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
234													
235	Subtotal: M-PM Project Management	1	LS		\$0		1,039.2		\$126,325		\$0		\$126,325
236													
237													
238	M-WR Warranty	1	LS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
239				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
240	Spare Parts/Warranty	1	LS	#####	\$50,000	0.000	0	\$0.00	\$0	\$0.00	\$0	\$50,000.00	\$50,000
241				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
242													
243	Subtotal: M-WR Warranty	1	LS		\$50,000		0.0		\$0		\$0		\$50,000
244													

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Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor Rate	Labor Cost	Equipment Costs		Unit Cost	Total Cost
				Unit	Total	Units	Hours			Unit	Total	Cost	Cost
245													
246	W-WW Complete Well Connection	1	LS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
247				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
248	Pumps Submersible 1.5HP	2	EA	\$1,500.00	\$2,250	0.000	0	\$0.00	\$0	\$0.00	\$0	\$1,500.00	\$2,250
249	Pitless Adaptor	2	EA	\$300.00	\$600	0.000	0	\$0.00	\$0	\$0.00	\$0	\$300.00	\$600
250	Drop Pipe and Electrical	60	LF	\$3.00	\$180	0.000	0	\$0.00	\$0	\$0.00	\$0	\$3.00	\$180
251	Insulated Cover	2	EA	\$1,500.00	\$3,000	0.000	0	\$0.00	\$0	\$0.00	\$0	\$1,500.00	\$3,000
252	Water Quality Tests	2	EA	\$2,000.00	\$4,000	0.000	0	\$0.00	\$0	\$0.00	\$0	\$2,000.00	\$4,000
253				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
254	Labor			\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
255	Carpenter	16	HRS	\$0.00	\$0	1.000	16	\$121.37	\$1,942	\$0.00	\$0	\$121.38	\$1,942
256	Plumber	24	HRS	\$0.00	\$0	1.000	24	\$112.76	\$2,706	\$0.00	\$0	\$112.75	\$2,706
257	Electrical	16	HRS	\$0.00	\$0	1.000	16	\$111.84	\$1,789	\$0.00	\$0	\$111.81	\$1,789
258	Local Labor	40	HRS	\$0.00	\$0	1.000	40	\$44.75	\$1,790	\$0.00	\$0	\$44.75	\$1,790
259				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
260													
261	Subtotal: W-WW Complete Well Connection	1	LS		\$10,030		96.0		\$8,227		\$0		\$18,257
262													
263													
264	C-WA WTP/Washeteria - Temp Facilities	1	LS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
265				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
266	Rental Washeteria	12	MTHS	\$4,166.67	\$50,000	0.000	0	\$0.00	\$0	\$0.00	\$0	\$4,166.67	\$50,000
267	Temp WTP	1	LS	#####	\$500,000	0.000	0	\$0.00	\$0	\$0.00	\$0	\$500,000.00	\$500,000
268	Freight To Site/Return	2	EA	#####	\$64,000	0.000	0	\$0.00	\$0	\$0.00	\$0	\$32,000.00	\$64,000
269	Setup On Site - Temp	1	LS	#####	\$30,000	0.000	0	\$0.00	\$0	\$0.00	\$0	\$30,000.00	\$30,000
270				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
271	Labor (6 Men 2 Weeks Setup, 6M 1W Takedown)			\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
272	Carpenter	540	HRS	\$0.00	\$0	1.000	540	\$121.37	\$65,540	\$0.00	\$0	\$121.37	\$65,540
273	Plumber	180	HRS	\$0.00	\$0	1.000	180	\$112.76	\$20,297	\$0.00	\$0	\$112.76	\$20,297
274	Electrical	180	HRS	\$0.00	\$0	1.000	180	\$111.84	\$20,131	\$0.00	\$0	\$111.84	\$20,131
275	Local Labor	180	HRS	\$0.00	\$0	1.000	180	\$44.75	\$8,055	\$0.00	\$0	\$44.75	\$8,055
276				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
277				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
278				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
279				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
280				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
281													
282	Subtotal: C-WA WTP/Washeteria - Temp Facilities	1	LS		\$644,000		1,080.0		\$114,023		\$0		\$758,023
283													
284													

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Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor Rate	Labor Cost	Equipment Costs		Unit Cost	Total Cost
				Unit	Total	Units	Hours			Unit	Total		
285	C-WA WTP/Washeteria - Bldg	1	LS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
286				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
287	Floor 1	2,592	SF	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
288	Subflooring	2,592	SF	\$1.50	\$3,888	0.000	0	\$0.00	\$0	\$0.00	\$0	\$1.50	\$3,888
289	Elastomeric Flooring	2,592	SF	\$17.50	\$45,360	0.000	0	\$0.00	\$0	\$0.00	\$0	\$17.50	\$45,360
290				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
291	Deck & Stair			\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
292	Glulam Beams	308	BF	\$3.00	\$924	0.000	0	\$0.00	\$0	\$0.00	\$0	\$3.00	\$924
293	Decking Fiberglass	95	SF	\$18.00	\$1,710	0.000	0	\$0.00	\$0	\$0.00	\$0	\$18.00	\$1,710
294	Stair Treads	78	SF	\$18.00	\$1,404	0.000	0	\$0.00	\$0	\$0.00	\$0	\$18.00	\$1,404
295	Handrails	59	LF	\$160.00	\$9,360	0.000	0	\$0.00	\$0	\$0.00	\$0	\$160.00	\$9,360
296				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
297	Ramp			\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
298	Glulam Beams	640	BF	\$3.00	\$1,920	0.000	0	\$0.00	\$0	\$0.00	\$0	\$3.00	\$1,920
299	Decking Fiberglass	320	SF	\$18.00	\$5,760	0.000	0	\$0.00	\$0	\$0.00	\$0	\$18.00	\$5,760
300	Handrails	146	LF	\$160.00	\$23,360	0.000	0	\$0.00	\$0	\$0.00	\$0	\$160.00	\$23,360
301				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
302	Roof	2,600	SF	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
303	Metal Roofing (Sub)	2,600	SF	\$15.00	\$39,000	0.000	0	\$0.00	\$0	\$0.00	\$0	\$15.00	\$39,000
304	1" Z Girts	1,300	LF	\$1.20	\$1,560	0.000	0	\$0.00	\$0	\$0.00	\$0	\$1.20	\$1,560
305	Underlayment	2,600	SF	\$0.20	\$520	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.20	\$520
306	Paint	2,600	SF	\$0.20	\$520	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.20	\$520
307				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
308	Exterior Walls	2,080	SF	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
309	Paint	4,160	SF	\$0.20	\$832	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.20	\$832
310				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
311	Partitions	3,146	SF	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
312	3-5/8" Metal Studs	1,888	SF	\$0.81	\$1,534	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.81	\$1,534
313	6" Metal Studs	1,258	SF	\$1.28	\$1,615	0.000	0	\$0.00	\$0	\$0.00	\$0	\$1.28	\$1,615
314	GWB	6,292	SF	\$0.55	\$3,461	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.55	\$3,461
315	Paint	6,292	SF	\$0.20	\$1,258	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.20	\$1,258
316				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
317	Labor			\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
318	Carpenter	1,071	HRS	\$0.00	\$0	1.000	1,071	\$121.37	\$129,927	\$0.00	\$0	\$121.37	\$129,927
319	Local Labor	535	HRS	\$0.00	\$0	1.000	535	\$44.75	\$23,955	\$0.00	\$0	\$44.75	\$23,955
320													
321	Subtotal: C-WA WTP/Washeteria - Bldg	1	LS		\$143,986		1,605.8		\$153,882		\$0		\$297,868
322													
323													

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Line			Material Costs		Labor Hours		Labor	Labor	Equipment Costs		Unit	Total	
No.	A Description	Qty	UNITS	Unit	Total	Units	Hours	Rate	Cost	Unit	Total	Cost	Cost
324	C-WA WTP/Washeteria - Systems	1	LS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
325				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
326	WTP Equipment			\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
327	Detention Tank (2500 Gallon)	1	EA	#####	\$40,000	0.000	0	\$0.00	\$0	\$0.00	\$0	\$40,000.00	\$40,000
328	Packaged Filtration Plant	1	EA	#####	\$250,000	0.000	0	\$0.00	\$0	\$0.00	\$0	\$250,000.00	\$250,000
329	Chemical Feed Systems	3	EA	\$7,500.00	\$22,500	0.000	0	\$0.00	\$0	\$0.00	\$0	\$7,500.00	\$22,500
330	Process Instrumentation	1	EA	#####	\$25,000	0.000	0	\$0.00	\$0	\$0.00	\$0	\$25,000.00	\$25,000
331	Laboratory Instruments	1	EA	#####	\$15,000	0.000	0	\$0.00	\$0	\$0.00	\$0	\$15,000.00	\$15,000
332				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
333	Labor			\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
334	Carpenter	117	HRS	\$0.00	\$0	1.000	117	\$121.37	\$14,200	\$0.00	\$0	\$121.37	\$14,200
335	Plumber	116	HRS	\$0.00	\$0	1.000	116	\$112.76	\$13,080	\$0.00	\$0	\$112.76	\$13,080
336	Electrical	76	HRS	\$0.00	\$0	1.000	76	\$111.84	\$8,500	\$0.00	\$0	\$111.84	\$8,500
337	Local Labor	300	HRS	\$0.00	\$0	1.000	300	\$44.75	\$13,425	\$0.00	\$0	\$44.75	\$13,425
338				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
339	Mechanical Room			\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
340	Boilers	2	EA	\$7,500.00	\$15,000	0.000	0	\$0.00	\$0	\$0.00	\$0	\$7,500.00	\$15,000
341	Boiler Stack	1	EA	#####	\$14,000	0.000	0	\$0.00	\$0	\$0.00	\$0	\$14,000.00	\$14,000
342	Water Heater	1	EA	\$3,500.00	\$3,500	0.000	0	\$0.00	\$0	\$0.00	\$0	\$3,500.00	\$3,500
343	Glycol Makeup Tank	1	EA	\$700.00	\$700	0.000	0	\$0.00	\$0	\$0.00	\$0	\$700.00	\$700
344	Fuel Day Tank	1	EA	\$6,500.00	\$6,500	0.000	0	\$0.00	\$0	\$0.00	\$0	\$6,500.00	\$6,500
345	Ductwork and Hoods	1	EA	\$6,000.00	\$6,000	0.000	0	\$0.00	\$0	\$0.00	\$0	\$6,000.00	\$6,000
346				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
347	Labor			\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
348	Plumber	120	HRS	\$0.00	\$0	1.000	120	\$112.76	\$13,531	\$0.00	\$0	\$112.76	\$13,531
349	Electrical	13	HRS	\$0.00	\$0	1.000	13	\$111.84	\$1,454	\$0.00	\$0	\$111.85	\$1,454
350	Local Labor	133	HRS	\$0.00	\$0	1.000	133	\$44.75	\$5,952	\$0.00	\$0	\$44.75	\$5,952
351				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
352	Process Control Panels			\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
353	Boiler Control Panel	1	EA	#####	\$15,000	0.000	0	\$0.00	\$0	\$0.00	\$0	\$15,000.00	\$15,000
354	Status and Alarm Panel	1	EA	#####	\$35,000	0.000	0	\$0.00	\$0	\$0.00	\$0	\$35,000.00	\$35,000
355	Pressure Pumps	1	EA	#####	\$10,000	0.000	0	\$0.00	\$0	\$0.00	\$0	\$10,000.00	\$10,000
356	Well Control Panel	1	EA	#####	\$15,000	0.000	0	\$0.00	\$0	\$0.00	\$0	\$15,000.00	\$15,000
357				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
358	Labor			\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
359	Carpenter	10	HRS	\$0.00	\$0	1.000	10	\$121.37	\$1,214	\$0.00	\$0	\$121.40	\$1,214
360	Electrical	44	HRS	\$0.00	\$0	1.000	44	\$111.84	\$4,921	\$0.00	\$0	\$111.84	\$4,921
361	Local Labor	54	HRS	\$0.00	\$0	1.000	54	\$44.75	\$2,417	\$0.00	\$0	\$44.76	\$2,417
362				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
363				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
364				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0

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Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor Rate	Labor Cost	Equipment Costs		Unit Cost	Total Cost
				Unit	Total	Units	Hours			Unit	Total	Cost	Cost
365	Washeteria Equipment			\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
366	20 lb Washer	3	EA	\$4,700.00	\$14,100	0.000	0	\$0.00	\$0	\$0.00	\$0	\$4,700.00	\$14,100
367	40 lb Washer	1	EA	#####	\$13,500	0.000	0	\$0.00	\$0	\$0.00	\$0	\$13,500.00	\$13,500
368	Drain Trough For Washers	1	EA	\$2,100.00	\$2,100	0.000	0	\$0.00	\$0	\$0.00	\$0	\$2,100.00	\$2,100
369	30 lb Dryers	3	EA	\$5,400.00	\$16,200	0.000	0	\$0.00	\$0	\$0.00	\$0	\$5,400.00	\$16,200
370	50 lb Dryers	1	EA	\$6,300.00	\$6,300	0.000	0	\$0.00	\$0	\$0.00	\$0	\$6,300.00	\$6,300
371	Additional Steam Coils For Dryers	4	EA	\$1,500.00	\$6,000	0.000	0	\$0.00	\$0	\$0.00	\$0	\$1,500.00	\$6,000
372	Dryer Heat Recovery	1	EA	#####	\$15,000	0.000	0	\$0.00	\$0	\$0.00	\$0	\$15,000.00	\$15,000
373	Dryer Circ Pump Control	1	EA	\$5,000.00	\$5,000	0.000	0	\$0.00	\$0	\$0.00	\$0	\$5,000.00	\$5,000
374	Bath / Shower Coin Boxes & Valves	3	EA	\$600.00	\$1,800	0.000	0	\$0.00	\$0	\$0.00	\$0	\$600.00	\$1,800
375	Watering Point Materials	1	EA	\$4,500.00	\$4,500	0.000	0	\$0.00	\$0	\$0.00	\$0	\$4,500.00	\$4,500
376				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
377	Labor			\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
378	Carpenter	55	HRS	\$0.00	\$0	1.000	55	\$121.37	\$6,675	\$0.00	\$0	\$121.36	\$6,675
379	Plumber	66	HRS	\$0.00	\$0	1.000	66	\$112.76	\$7,442	\$0.00	\$0	\$112.76	\$7,442
380	Electrical	40	HRS	\$0.00	\$0	1.000	40	\$111.84	\$4,474	\$0.00	\$0	\$111.85	\$4,474
381	Local Labor	161	HRS	\$0.00	\$0	1.000	161	\$44.75	\$7,205	\$0.00	\$0	\$44.75	\$7,205
382				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
383	Lighting			\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
384	Fixtures	45	EA	\$200.00	\$9,000	0.000	0	\$0.00	\$0	\$0.00	\$0	\$200.00	\$9,000
385	Exterior Fixtures	6	EA	\$600.00	\$3,600	0.000	0	\$0.00	\$0	\$0.00	\$0	\$600.00	\$3,600
386	Switches	15	EA	\$15.00	\$225	0.000	0	\$0.00	\$0	\$0.00	\$0	\$15.00	\$225
387	Conduit	2,025	LF	\$1.00	\$2,025	0.000	0	\$0.00	\$0	\$0.00	\$0	\$1.00	\$2,025
388	Wire #12	2,475	LF	\$0.16	\$386	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.16	\$386
389	Wire #10	4,208	LF	\$0.20	\$858	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.20	\$858
390				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
391	Labor			\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
392	Electrical	275	HRS	\$0.00	\$0	1.000	275	\$111.84	\$30,778	\$0.00	\$0	\$111.83	\$30,778
393	Local Labor	275	HRS	\$0.00	\$0	1.000	275	\$44.75	\$12,315	\$0.00	\$0	\$44.75	\$12,315
394				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
395				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
396				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
397				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
398				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
399				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
400				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
401				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
402				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
403				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0

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Line No.	A Description	Qty	UNITS	Material Costs Unit	Material Costs Total	Labor Hours Units	Labor Hours Hours	Labor Rate	Labor Cost	Equipment Costs Unit	Equipment Costs Total	Unit Cost	Total Cost
404	Power			\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
405	Connection To Utility	1	LS	#####	\$15,000	0.000	0	\$0.00	\$0	\$0.00	\$0	\$15,000.00	\$15,000
406	Panelboard 400A	1	EA	\$4,500.00	\$4,500	0.457	1	\$0.00	\$0	\$0.00	\$0	\$4,500.00	\$4,500
407	Panelboard 200A	1	EA	\$1,800.00	\$1,800	0.286	0	\$0.00	\$0	\$0.00	\$0	\$1,800.00	\$1,800
408	Feeder 400A	50	LF	\$62.99	\$3,149	0.011	1	\$0.00	\$0	\$0.00	\$0	\$62.98	\$3,149
409	Feeder 200A	100	LF	\$27.67	\$2,767	0.007	1	\$0.00	\$0	\$0.00	\$0	\$27.67	\$2,767
410	Outlets	60	EA	\$6.00	\$360	0.011	1	\$0.00	\$0	\$0.00	\$0	\$6.00	\$360
411	Outlets GFI	10	EA	\$8.49	\$85	0.007	0	\$0.00	\$0	\$0.00	\$0	\$8.50	\$85
412	Outlets GFI WP	10	EA	\$26.49	\$265	0.009	0	\$0.00	\$0	\$0.00	\$0	\$26.50	\$265
413	Allow For Motor Controls	2,500	SF	\$0.20	\$500	0.000	1	\$0.00	\$0	\$0.00	\$0	\$0.20	\$500
414	Conduit	2,400	LF	\$1.00	\$2,400	0.000	0	\$0.00	\$0	\$0.00	\$0	\$1.00	\$2,400
415	Wire #12	4,752	LF	\$0.16	\$741	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.16	\$741
416	Wire #10	3,168	LF	\$0.20	\$646	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.20	\$646
417				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
418	Labor			\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
419	Electrical	372	HRS	\$0.00	\$0	1.000	373	\$111.84	\$41,660	\$0.00	\$0	\$111.85	\$41,660
420	Local Labor	372	HRS	\$0.00	\$0	1.000	373	\$44.75	\$16,669	\$0.00	\$0	\$44.75	\$16,669
421				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
422	Comm and Special System	1	LS	#####	\$10,000	0.000	0	\$0.00	\$0	\$0.00	\$0	\$10,000.00	\$10,000
431				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
432													
433	Subtotal: C-WA WTP/Washeteria - Systems	1	LS		\$616,007		2,603.9		\$205,912		\$0		\$821,919
434													
435													
436	C-WA WTP/Washeteria - Plumbing, HVAC, Process Piping			\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
437				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
438	Process Piping			\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
439	Based On Similar Project, No Details At This Time.	1	EA	#####	\$20,000	0.000	0	\$0.00	\$0	\$0.00	\$0	\$20,000.00	\$20,000
440				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
441	Labor			\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
442	Plumber	250	HRS	\$0.00	\$0	1.000	250	\$112.76	\$28,190	\$0.00	\$0	\$112.76	\$28,190
443	Local Labor	250	HRS	\$0.00	\$0	1.000	250	\$44.75	\$11,188	\$0.00	\$0	\$44.75	\$11,188
444				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
445	Process Wiring	1	LS	\$2,000.00	\$2,000	0.000	0	\$0.00	\$0	\$0.00	\$0	\$2,000.00	\$2,000
446	Labor			\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
447	Electrical	20	HRS	\$0.00	\$0	1.000	20	\$111.84	\$2,237	\$0.00	\$0	\$111.85	\$2,237
448	Local Labor	20	HRS	\$0.00	\$0	1.000	20	\$44.75	\$895	\$0.00	\$0	\$44.75	\$895
449				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0

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Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor Rate	Labor Cost	Equipment Costs		Unit Cost	Total Cost
				Unit	Total	Units	Hours			Unit	Total	Cost	Cost
450	Washeteria - Plumbing			\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
451	Based On Similar Project, No Details At This Time.	1	EA	#####	\$50,000	0.000	0	\$0.00	\$0	\$0.00	\$0	\$50,000.00	\$50,000
452	WC-1: Floor Mounted Toilet Elongated Bowl	3	EA	\$650.00	\$1,950	0.000	0	\$0.00	\$0	\$0.00	\$0	\$650.00	\$1,950
453	LAV-1: Wall Hung Lavatory, W/ Single Handle	3	EA	\$525.00	\$1,575	0.000	0	\$0.00	\$0	\$0.00	\$0	\$525.00	\$1,575
454	BT-1, 2: Bathtub/Shower, Non Skid Bottom Finish	1	EA	\$825.00	\$825	0.000	0	\$0.00	\$0	\$0.00	\$0	\$825.00	\$825
455	SH-1: Shower	2	EA	\$800.00	\$1,600	0.000	0	\$0.00	\$0	\$0.00	\$0	\$800.00	\$1,600
456	SK-2: Sink, Molded Plastic Laundry W/ Support Legs	1	EA	\$580.00	\$580	0.000	0	\$0.00	\$0	\$0.00	\$0	\$580.00	\$580
457	Emerg Shower/Eyewash	1	EA	\$575.00	\$575	0.000	0	\$0.00	\$0	\$0.00	\$0	\$575.00	\$575
458				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
459	Labor			\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
460	Plumber	200	HRS	\$0.00	\$0	1.000	200	\$112.76	\$22,552	\$0.00	\$0	\$112.76	\$22,552
461	Local Labor	200	HRS	\$0.00	\$0	1.000	200	\$44.75	\$8,950	\$0.00	\$0	\$44.75	\$8,950
462				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
463	Washeteria HVAC Piping, Terminal Heat Units			\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
464	Piping Insulation	1	LS	\$1,500.00	\$1,500	0.000	0	\$0.00	\$0	\$0.00	\$0	\$1,500.00	\$1,500
465	Pipe & Fittings, Copper Type	1	LS	\$7,500.00	\$7,500	0.000	0	\$0.00	\$0	\$0.00	\$0	\$7,500.00	\$7,500
466	Baseboard Radiation			\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
467	No. Of Units (Zones)	4	EA	\$200.00	\$800	0.000	0	\$0.00	\$0	\$0.00	\$0	\$200.00	\$800
468	Baseboard	45	LF	\$46.00	\$2,070	0.000	0	\$0.00	\$0	\$0.00	\$0	\$46.00	\$2,070
469	Thermostat	10	EA	\$125.00	\$1,250	0.000	0	\$0.00	\$0	\$0.00	\$0	\$125.00	\$1,250
470	Cabinet Unit Heaters			\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
471	Cabinet Unit Heaters	4	EA	\$1,200.00	\$4,800	0.000	0	\$0.00	\$0	\$0.00	\$0	\$1,200.00	\$4,800
472	Valves & Fittings	4	EA	\$140.00	\$560	0.000	0	\$0.00	\$0	\$0.00	\$0	\$140.00	\$560
473	Unit Heaters	4	EA	\$725.00	\$2,900	0.000	0	\$0.00	\$0	\$0.00	\$0	\$725.00	\$2,900
474				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
475	Fans	5	EA	\$300.00	\$1,500	0.000	0	\$0.00	\$0	\$0.00	\$0	\$300.00	\$1,500
476	Misc Ductwork	1	LS	\$1,000.00	\$1,000	0.000	0	\$0.00	\$0	\$0.00	\$0	\$1,000.00	\$1,000
477				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
478	Labor			\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
479	Plumber	170	HRS	\$0.00	\$0	1.000	170	\$112.76	\$19,169	\$0.00	\$0	\$112.76	\$19,169
480	Local Labor	170	HRS	\$0.00	\$0	1.000	170	\$44.75	\$7,608	\$0.00	\$0	\$44.75	\$7,608
486				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
487													
488	Subtotal: C-WA WTP/Washeteria - Plumbing, HVAC, Process Piping	-	-		\$102,985		1,280.0		\$100,789		\$0		\$203,774
489													
490													

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Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor Rate	Labor Cost	Equipment Costs		Unit Cost	Total Cost
				Unit	Total	Units	Hours			Unit	Total	Cost	Cost
491	S-LS Wastewater Pump Station	1	EA	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
492				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
493	Well Structure	1	EA	#####	\$35,000	0.000	0	\$0.00	\$0	\$0.00	\$0	\$35,000.00	\$35,000
494	Pumps and Accessories	2	EA	\$7,700.00	\$15,400	0.000	0	\$0.00	\$0	\$0.00	\$0	\$7,700.00	\$15,400
495	DIP 3" Discharge	2	EA	\$130.00	\$260	0.000	0	\$0.00	\$0	\$0.00	\$0	\$130.00	\$260
496	Ball Check Valve 3"	2	EA	\$530.00	\$1,060	0.000	0	\$0.00	\$0	\$0.00	\$0	\$530.00	\$1,060
497	Plug Valve Plug 3"	2	EA	\$1,275.00	\$2,550	0.000	0	\$0.00	\$0	\$0.00	\$0	\$1,275.00	\$2,550
498	Elbow 3" DI	1	EA	\$132.00	\$132	0.000	0	\$0.00	\$0	\$0.00	\$0	\$132.00	\$132
499	Reducer 2x3 DI	1	EA	\$132.00	\$132	0.000	0	\$0.00	\$0	\$0.00	\$0	\$132.00	\$132
500	Tee 3" DI	1	EA	\$319.00	\$319	0.000	0	\$0.00	\$0	\$0.00	\$0	\$319.00	\$319
501	Flanges & Fittings	4	EA	\$171.00	\$684	0.000	0	\$0.00	\$0	\$0.00	\$0	\$171.00	\$684
502	Control Panel	1	EA	#####	\$15,289	0.000	0	\$0.00	\$0	\$0.00	\$0	\$15,289.00	\$15,289
503	Motor Starter - 4 HP	2	EA	\$400.00	\$800	0.000	0	\$0.00	\$0	\$0.00	\$0	\$400.00	\$800
504	Electrical	1	EA	\$4,000.00	\$4,000	0.000	0	\$0.00	\$0	\$0.00	\$0	\$4,000.00	\$4,000
505				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
506	Pump Station Labor			\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
507	Carpenter	40	HRS	\$0.00	\$0	1.000	40	\$121.37	\$4,855	\$0.00	\$0	\$121.38	\$4,855
508	Plumber	100	HRS	\$0.00	\$0	1.000	100	\$112.76	\$11,276	\$0.00	\$0	\$112.76	\$11,276
509	Electrical	56	HRS	\$0.00	\$0	1.000	56	\$111.84	\$6,263	\$0.00	\$0	\$111.84	\$6,263
510	Local Labor	196	HRS	\$0.00	\$0	1.000	196	\$44.75	\$8,771	\$0.00	\$0	\$44.75	\$8,771
511				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
512	Earthwork			\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
513	Time	20	HRS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
514	Dump Truck	20	HRS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$70.00	\$1,400	\$70.00	\$1,400
515	Backhoe Cat 320	20	HRS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$48.25	\$965	\$48.25	\$965
516	Operator	20	HRS	\$0.00	\$0	1.000	20	\$124.57	\$2,491	\$0.00	\$0	\$124.55	\$2,491
517	Local Truck Driver	20	HRS	\$0.00	\$0	1.000	20	\$51.97	\$1,039	\$0.00	\$0	\$51.95	\$1,039
518	Lead Crew	20	HRS	\$0.00	\$0	1.000	20	\$104.03	\$2,081	\$0.00	\$0	\$104.05	\$2,081
519	Local Labor	40	HRS	\$0.00	\$0	1.000	40	\$44.75	\$1,790	\$0.00	\$0	\$44.75	\$1,790
520				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
521				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
522				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
523				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
524				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
531				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
532				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
533				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
534													
535	Subtotal: S-LS Wastewater Pump Station	1	EA		\$75,626		492.0		\$38,566		\$2,365		\$116,557
536													
537													

Tuluksak Washeteria WTP - PER
 Alternate 2 - Renovation

Construction Cost Estimate
 Concept Design Submittal
 March 30, 2018

Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor Rate	Labor Cost	Equipment Costs		Unit Cost	Total Cost
				Unit	Total	Units	Hours			Unit	Total	Cost	Cost
538	W-WT Insulated Storage Tank	35	KGAL	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
539				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
540	Foundation - Gravel Pad 24'x24'x3'			\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
541	Gravel Purchase - Assumed	100	CY	\$100.00	\$10,000	0.000	0	\$0.00	\$0	\$0.00	\$0	\$100.00	\$10,000
542	Insulation Board 5"	3,456	BF	\$0.75	\$2,592	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.75	\$2,592
543				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
544	Tank 35,000 Gal,	1	EA	#####	\$130,000	0.000	0	\$0.00	\$0	\$0.00	\$0	\$130,000.00	\$130,000
545	Insulate Tank	1	EA	#####	\$49,800	0.000	0	\$0.00	\$0	\$0.00	\$0	\$49,800.00	\$49,800
546				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
547	Earthwork			\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
548	Time	130	HRS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
549	Dump Truck/Trailer	110	HRS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$85.00	\$9,350	\$85.00	\$9,350
550	Dump Truck	20	HRS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$70.00	\$1,400	\$70.00	\$1,400
551	Backhoe Cat 320	130	HRS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$48.25	\$6,273	\$48.25	\$6,273
552	Operator	130	HRS	\$0.00	\$0	1.000	130	\$124.57	\$16,194	\$0.00	\$0	\$124.57	\$16,194
553	Local Truck Driver	110	HRS	\$0.00	\$0	1.000	110	\$51.97	\$5,717	\$0.00	\$0	\$51.97	\$5,717
554	Lead Crew	130	HRS	\$0.00	\$0	1.000	130	\$104.03	\$13,524	\$0.00	\$0	\$104.03	\$13,524
555	Local Labor	260	HRS	\$0.00	\$0	1.000	260	\$44.75	\$11,635	\$0.00	\$0	\$44.75	\$11,635
559													
560	Subtotal: W-WT Insulated Storage Tank	35	KGAL		\$192,392		630.0		\$47,070		\$17,023		\$256,485
561													
562													
563	M-IF Fuel Tank	10	KGAL	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
564				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
565	Foundation - Gravel Pad 20'x24'x2'			\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
566	Gravel Purchase - Assumed	36	CY	\$100.00	\$3,600	0.000	0	\$0.00	\$0	\$0.00	\$0	\$100.00	\$3,600
567				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
568	10,000 Gal Fuel Tank	1	EA	#####	\$40,000	0.000	0	\$0.00	\$0	\$0.00	\$0	\$40,000.00	\$40,000
569				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
570	Time	20	HRS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
571	Dump Truck/Trailer	20	HRS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$85.00	\$1,700	\$85.00	\$1,700
572	Dump Truck	20	HRS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$70.00	\$1,400	\$70.00	\$1,400
573	Backhoe Cat 320	20	HRS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$48.25	\$965	\$48.25	\$965
574	Operator	20	HRS	\$0.00	\$0	1.000	20	\$124.57	\$2,491	\$0.00	\$0	\$124.55	\$2,491
575	Local Truck Driver	20	HRS	\$0.00	\$0	1.000	20	\$51.97	\$1,039	\$0.00	\$0	\$51.95	\$1,039
576	Lead Crew	20	HRS	\$0.00	\$0	1.000	20	\$104.03	\$2,081	\$0.00	\$0	\$104.05	\$2,081
577	Local Labor	40	HRS	\$0.00	\$0	1.000	40	\$44.75	\$1,790	\$0.00	\$0	\$44.75	\$1,790
580				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
581													
582	Subtotal: M-IF Fuel Tank	10	KGAL		\$43,600		100.0		\$7,401		\$4,065		\$55,066
583													

Tuluksak Washeteria WTP - PER
 Alternate 2 - Renovation

Construction Cost Estimate
 Concept Design Submittal
 March 30, 2018

Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor Rate	Labor Cost	Equipment Costs		Unit Cost	Total Cost
				Unit	Total	Units	Hours			Unit	Total		
584													
585	W-SD Water Piping	1,925	LF	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
586				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
587	Piping - Water			\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
588	16" Carrier, 4" HDPE, 2" HDPE Arctic Pipe	1,600	LF	\$65.00	\$104,000	0.000	0	\$0.00	\$0	\$0.00	\$0	\$65.00	\$104,000
589	Heat Trace, Electric	1,600	LF	\$16.00	\$25,600	0.000	0	\$0.00	\$0	\$0.00	\$0	\$16.00	\$25,600
590	Misc Materials	1	LS	#####	\$10,000	0.000	0	\$0.00	\$0	\$0.00	\$0	\$10,000.00	\$10,000
591				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
592	Time	160	HRS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
593	Backhoe 320	160	HRS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$48.25	\$7,720	\$48.25	\$7,720
594	Operator	160	HRS	\$0.00	\$0	1.000	160	\$124.57	\$19,931	\$0.00	\$0	\$124.57	\$19,931
595	Lead Crew	160	HRS	\$0.00	\$0	1.000	160	\$104.03	\$16,645	\$0.00	\$0	\$104.03	\$16,645
596	Local Labor	320	HRS	\$0.00	\$0	1.000	320	\$44.75	\$14,320	\$0.00	\$0	\$44.75	\$14,320
597				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
598	Piping - Raw Water			\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
599	16" Carrier, 3" HDPE, 2" HDPE Arctic Pipe	250	LF	\$63.00	\$15,750	0.000	0	\$0.00	\$0	\$0.00	\$0	\$63.00	\$15,750
600	Glycol Heat Trace Pipe PEX	500	LF	\$2.00	\$1,000	0.000	0	\$0.00	\$0	\$0.00	\$0	\$2.00	\$1,000
601	Misc Materials	1	LS	\$2,500.00	\$2,500	0.000	0	\$0.00	\$0	\$0.00	\$0	\$2,500.00	\$2,500
602				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
603	Time	50	HRS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
604	Backhoe 320	50	HRS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$48.25	\$2,413	\$48.26	\$2,413
605	Operator	50	HRS	\$0.00	\$0	1.000	50	\$124.57	\$6,229	\$0.00	\$0	\$124.58	\$6,229
606	Lead Crew	50	HRS	\$0.00	\$0	1.000	50	\$104.03	\$5,202	\$0.00	\$0	\$104.04	\$5,202
607	Local Labor	100	HRS	\$0.00	\$0	1.000	100	\$44.75	\$4,475	\$0.00	\$0	\$44.75	\$4,475
608				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
609	Piping - Tank Piping			\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
610	10" Carrier, 3" HDPE, 2" HDPE Arctic Pipe	75	LF	\$55.00	\$4,125	0.000	0	\$0.00	\$0	\$0.00	\$0	\$55.00	\$4,125
611	Heat Trace, Electric	75	LF	\$16.00	\$1,200	0.000	0	\$0.00	\$0	\$0.00	\$0	\$16.00	\$1,200
612	Misc Materials	1	LS	\$3,500.00	\$3,500	0.000	0	\$0.00	\$0	\$0.00	\$0	\$3,500.00	\$3,500
613				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
614	Time	15	HRS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
615	Backhoe 320	15	HRS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$48.25	\$724	\$48.27	\$724
616	Operator	15	HRS	\$0.00	\$0	1.000	15	\$124.57	\$1,869	\$0.00	\$0	\$124.60	\$1,869
617	Lead Crew	15	HRS	\$0.00	\$0	1.000	15	\$104.03	\$1,560	\$0.00	\$0	\$104.00	\$1,560
618	Local Labor	30	HRS	\$0.00	\$0	1.000	30	\$44.75	\$1,343	\$0.00	\$0	\$44.77	\$1,343
625													
626	Subtotal: W-SD Water Piping	1,925	LF		\$167,675		900.0		\$71,574		\$10,857		\$250,106
627													

Tuluksak Washeteria WTP - PER
 Alternate 2 - Renovation

Construction Cost Estimate
 Concept Design Submittal
 March 30, 2018

Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor Rate	Labor Cost	Equipment Costs		Unit Cost	Total Cost
				Unit	Total	Units	Hours			Unit	Total	Cost	Cost
628													
629	S-BF Force Main	125	LF	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
630				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
631	Piping - Force Main			\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
632	12" Carrier, 4" HDPE Arctic	125	LF	\$55.00	\$6,875	0.000	0	\$0.00	\$0	\$0.00	\$0	\$55.00	\$6,875
633	Heat Trace, Electric	125	LF	\$16.00	\$2,000	0.000	0	\$0.00	\$0	\$0.00	\$0	\$16.00	\$2,000
634	Misc Materials	1	LS	\$5,000.00	\$5,000	0.000	0	\$0.00	\$0	\$0.00	\$0	\$5,000.00	\$5,000
635				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
636	Time	25	HRS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
637	Backhoe 320	25	HRS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$48.25	\$1,206	\$48.24	\$1,206
638	Operator	25	HRS	\$0.00	\$0	1.000	25	\$124.57	\$3,114	\$0.00	\$0	\$124.56	\$3,114
639	Lead Crew	25	HRS	\$0.00	\$0	1.000	25	\$104.03	\$2,601	\$0.00	\$0	\$104.04	\$2,601
640	Local Labor	50	HRS	\$0.00	\$0	1.000	50	\$44.75	\$2,238	\$0.00	\$0	\$44.76	\$2,238
647				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
648													
649	Subtotal: S-BF Force Main	125	LF		\$13,875		100.0		\$7,953		\$1,206		\$23,034
650													
651													
652	S-BC Sewer Main	150	LF	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
653				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
654	Piping - Sewer Main			\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
655	12" Carrier, 4" HDPE Arctic	150	LF	\$55.00	\$8,250	0.000	0	\$0.00	\$0	\$0.00	\$0	\$55.00	\$8,250
656	Heat Trace, Electric	150	LF	\$16.00	\$2,400	0.000	0	\$0.00	\$0	\$0.00	\$0	\$16.00	\$2,400
657	Misc Materials	1	LS	\$5,000.00	\$5,000	0.000	0	\$0.00	\$0	\$0.00	\$0	\$5,000.00	\$5,000
658				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
659	Time	60	HRS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
660	Backhoe 320	60	HRS	\$0.00	\$0	0.000	0	\$0.00	\$0	\$48.25	\$2,895	\$48.25	\$2,895
661	Operator	60	HRS	\$0.00	\$0	1.000	60	\$124.57	\$7,474	\$0.00	\$0	\$124.57	\$7,474
662	Lead Crew	60	HRS	\$0.00	\$0	1.000	60	\$104.03	\$6,242	\$0.00	\$0	\$104.03	\$6,242
663	Local Labor	120	HRS	\$0.00	\$0	1.000	120	\$44.75	\$5,370	\$0.00	\$0	\$44.75	\$5,370
664				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
669				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
670				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
671				\$0.00	\$0	0.000	0	\$0.00	\$0	\$0.00	\$0	\$0.00	\$0
672													
673	Subtotal: S-BC Sewer Main	150	LF		\$15,650		240.0		\$19,086		\$2,895		\$37,631
674													

**Tuluksak Washeteria WTP - PER
Alternate 3 - Renovation Washeteria, New WTP**

**Construction Cost Estimate
Concept Design Submittal**

March 30, 2018

 **ESTIMATIONS**

1225 E. International Airport Road, Suite 205
Anchorage, Alaska 99518
907.561.0790

Prepared for:

CRW Engineering Group, LLC
3940 Arctic Blvd. Sute 300
Anchorage, Alaska 99503
907.562.3252

Tuluksak Washeteria WTP - PER
Alternate 3 - Renovation Washeteria. New WTP

Construction Cost Estimate
Concept Design Submittal
March 30, 2018

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Documents

Document Title Tuluksak Washeteria - WTP
Design Firm
Level of Documents Concept
Date 16-Dec-16

Schedule

Project Start Spring 2019
Project Duration 12 Mths

Notes and Assumptions

Local Labor
Force Account
Equipment will be barged to and from the project site from
Anchorage

Estimate Class

5

Methodology

Estimate is priced with locally priced materials and labor
per the estimators experience.

Labor Rates

ANTHC Force Account Labor Rates for 2017.
Labor Rates based on 60 Hour/Week Schedule.
Lodging assumed to be from Community at \$50/MD.

Estimator

Jay Lavoie - jay@estimations.com, 907-561-0755

Exclusions

Tuluksak Washeteria WTP - PER
Alternate 3 - Renovation Washeteria, New WTP
Summary

Construction Cost Estimate
Concept Design Submittal
March 30, 2018

Description	Quantity	Unit	Matl	Labor	Hours	Equipment	Total	Unit Cost
M-CB Construction Billing			NONE			-		
M-CB Equipment Resources			NONE			-		
M-CB Mobilization/Demob	1	LS		\$38,706	600.00		\$38,706	
M-CB Shipping/Freight	1	LS	\$509,439	\$31,540	400.00		\$540,979	
M-CB Fuel	1	LS	\$30,000			-	\$30,000	
M-CB Housing	1	LS	\$123,076			-	\$123,076	
M-CB Utilities	1	LS	\$10,800			-	\$10,800	
M-CB Travel	1	LS	\$31,400			-	\$31,400	
M-CB ANTHC Project Superintendent	1	LS		\$321,892	3,117.60		\$321,892	
M-CB ANTHC Procurement Labor	1	LS		\$28,350	400.00		\$28,350	
M-CB Survey	1	LS		\$31,270	250.00		\$31,270	
M-DS Design & CA Services	1	LS		\$767,457	6,313.40		\$767,457	
M-CB Equipment Rental	6	MTH	\$12,400			\$183,192	\$195,592	\$32,598.67
M-EQ Equipment Repair & Maint	1	LS		\$116,203	1,039.20		\$116,203	
M-CB Consumables	1	LS	\$12,100			-	\$12,100	
M-CB Small Tools	1	LS	\$18,100			-	\$18,100	
M-CB Safety Stand Down	1	LS		\$18,869	260.00		\$18,869	
M-CO Closeout			NONE			-		
M-PC Pre-Construction	1	LS		\$28,974	300.00		\$28,974	
M-PC Pre-Construction: NTP			NONE			-		
M-PC Pre-Construction: Project Set-Up			NONE			-		
M-PC Pre-Construction: Material Take-off			NONE			-		
M-PC Pre-Construction: Meeting	1	LS		\$1,798	16.00		\$1,798	
M-PC Pre-Construction: Completed			NONE			-		
M-PM Project Management	1	LS		\$126,325	1,039.20		\$126,325	
M-WR Warranty	1	LS	\$50,000			-	\$50,000	
W-WW Complete Well Connection	1	LS	\$10,030	\$8,227	96.00		\$18,257	
C-WA WTP/Washeteria - Temp Facilities	1	LS	\$644,000	\$114,023	1,080.00		\$758,023	
C-WA Demolition	1	LS		\$21,156	260.00		\$21,156	
C-WA WTP - Bldg	1	LS	\$234,823	\$348,570	4,259.40	\$3,115	\$586,508	
C-WA Washeteria - Bldg	1	LS	\$166,181	\$176,552	2,125.60		\$342,733	
C-WA WTP/Washeteria - Systems	1	LS	\$616,007	\$186,551	2,357.90		\$802,558	
C-WA WTP/Washeteria - Plumbing, HVAC, Process	1	LS	\$102,985	\$103,026	1,330.00		\$206,011	
Piping								
S-LS Wastewater Pump Station	1	EA	\$75,626	\$38,566	492.00	\$2,365	\$116,557	\$116,557.00
W-WT Insulated Storage Tank	35	KGAL	\$192,392	\$47,070	630.00	\$17,023	\$256,485	\$7,328.14
M-IF Fuel Tank	10	KGAL	\$43,600	\$7,401	100.00	\$4,065	\$55,066	\$5,506.60
W-SD Water Piping	1,700	LF	\$149,700	\$63,621	800.00	\$9,651	\$222,972	\$131.16
S-BF Force Main	300	LF	\$20,775	\$19,882	250.00	\$3,016	\$43,673	\$145.58
S-BC Sewer Main	150	LF	\$15,650	\$9,543	120.00	\$1,448	\$26,641	\$177.61
E-HR Upgrade Heat Recovery	1	EA	\$24,250	\$53,957	680.00	\$6,755	\$84,962	\$84,962.00
Subtotal			\$3,093,334	\$2,709,529	\$28,316	\$230,630	\$6,033,493	
Compliance with American Iron and Steel (AIS)						5.0%	\$301,675	
Estimating Contingency:						15.0%	\$950,275	
Project Administration						10.0%	\$728,544	
Total Recommended Construction Cost								\$8,013,987

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Line No.	A Description	Qty	UNITS	Material Costs Unit	Material Costs Total	Labor Hours Units	Labor Hours Hours	Labor Rate	Labor Cost	Equipment Costs Unit	Equipment Costs Total	Unit Cost	Total Cost
1													
2	M-CB Construction Billing		NONE										
3													
4													
5	Subtotal: M-CB Construction Billing	-	NONE										
6													
7													
8	M-CB Equipment Resources		NONE										
9													
10													
11	Subtotal: M-CB Equipment Resources	-	NONE										
12													
13													
14	M-CB Mobilization/Demob	1	LS										
15													
16	Crew Leader	20	DAY			10.000	200	\$104.03	\$20,806			\$1,040.30	\$20,806
17	Loc Labor	40	DAY			10.000	400	\$44.75	\$17,900			\$447.50	\$17,900
18													
19	Subtotal: M-CB Mobilization/Demob	1	LS				600.0		\$38,706				\$38,706
20													
21													
22	M-CB Shipping/Freight	1	LS										
23													
24	Equipment - In	175,000	LBS										
25	Equipment - Out	175,000	LBS										
26	Materials	323,216	LBS										
27	Miscellaneous	48,482	LBS										
28	Surface Freight To Bethel	546,698	LBS	\$0.45	\$246,014							\$0.45	\$246,014
29	Barge To Tuluksak	546,698	LBS	\$0.25	\$136,675							\$0.25	\$136,675
30	Barge Out Of Tuluksak	195,000	LBS	\$0.25	\$48,750							\$0.25	\$48,750
31	Surface Freight	195,000	LBS	\$0.40	\$78,000							\$0.40	\$78,000
32	Bethel/Anchorage Shipping Labor	400	HRS			1.000	400	\$78.85	\$31,540			\$78.85	\$31,540
33													
34													
35													
36													
37	Subtotal: M-CB Shipping/Freight	1	LS		\$509,439		400.0		\$31,540				\$540,979
38													
39													

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Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor Rate	Labor Cost	Equipment Costs		Unit Cost	Total Cost
				Unit	Total	Units	Hours			Unit	Total		
40	M-CB Fuel	1	LS										
41													
42	Purchase Local	10,000	GAL	\$3.00	\$30,000							\$3.00	\$30,000
43	No Fuel Truck Required												
44	Local Cost = \$5.50												
45	\$2.5 \$/Gal Included In Rental												
46													
47	Subtotal: M-CB Fuel	1	LS		\$30,000								\$30,000
48													
49													
50	M-CB Housing	1	LS										
51													
52	Rental Fee From Community	2,462	MDAY	\$50.00	\$123,076							\$50.00	\$123,076
53													
54	Total Labor	28,316	HRS										
55	Local Labor	7,217	HRS										
56	Labor Hours For Hsg	21,099	HRS										
57	Housing	2,462	MDAY										
58													
59	Subtotal: M-CB Housing	1	LS		\$123,076								\$123,076
60													
61													
62	M-CB Utilities	1	LS										
63													
64	Power	12	MTH	\$500.00	\$6,000							\$500.00	\$6,000
65	Communications	12	MTH	\$400.00	\$4,800							\$400.00	\$4,800
66													
67													
68													
69	Subtotal: M-CB Utilities	1	LS		\$10,800								\$10,800
70													
71													
72	M-CB Travel	1	LS										
73													
74	Travel For Anchorage												
75	Anchorage - Tuluksak	40	RTRIPS	\$650.00	\$26,000							\$650.00	\$26,000
76	Per Diem	40	EA	\$135.00	\$5,400							\$135.00	\$5,400
77													
78													
79	Subtotal: M-CB Travel	1	LS		\$31,400								\$31,400
80													

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Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor Rate	Labor Cost	Equipment Costs		Unit Cost	Total Cost
				Unit	Total	Units	Hours			Unit	Total		
81													
82	M-CB ANTHC Project Superintendent	1	LS										
83													
84	Super 1	12	MTH			259.800	3,118	\$103.25	\$321,892			\$26,824.33	\$321,892
85													
86													
87	Subtotal: M-CB ANTHC Project Superintendent	1	LS				3,117.6		\$321,892				\$321,892
88													
89													
90	M-CB ANTHC Procurement Labor	1	LS										
91													
92	Purchasing Officer	200	HRS			1.000	200	\$64.81	\$12,962			\$64.81	\$12,962
93	Purchasing Agent	200	HRS			1.000	200	\$76.94	\$15,388			\$76.94	\$15,388
94													
95													
96													
97	Subtotal: M-CB ANTHC Procurement Labor	1	LS				400.0		\$28,350				\$28,350
98													
99													
100	M-CB Survey	1	LS										
101													
102	Construction Staking	250	HRS			1.000	250	\$125.08	\$31,270			\$125.08	\$31,270
103													
104													
105	Subtotal: M-CB Survey	1	LS				250.0		\$31,270				\$31,270
106													
107													
108	M-DS Design & CA Services	1	LS										
109													
110	Design 10%	1	LS			#####	4,963	\$121.56	\$603,351			\$603,351.00	\$603,351
111	CA Services/Design	1	LS			#####	1,350	\$121.56	\$164,106			\$164,106.00	\$164,106
112													
113													
114													
115													
116													
117													
118													
119	Subtotal: M-DS Design & CA Services	1	LS				6,313.4		\$767,457				\$767,457
120													
121													

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Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor Rate	Labor Cost	Equipment Costs		Unit Cost	Total Cost
				Unit	Total	Units	Hours			Unit	Total		
122	M-CB Equipment Rental	6	MTH										
123													
124	Excavator Cat 320	6	MTH							\$9,610.00	\$57,660	\$9,610.00	\$57,660
125	Loader 950H W/ Forks	6	MTH							\$6,792.00	\$40,752	\$6,792.00	\$40,752
126	Dumptrucks (2)	12	MTH							\$5,050.00	\$60,600	\$5,050.00	\$60,600
127	Trailer for Tanks	6	MTH							\$1,500.00	\$9,000	\$1,500.00	\$9,000
128	ANTHC Fourwheeler (2)	12	MTH							\$600.00	\$7,200	\$600.00	\$7,200
129	Small Walk-behind	12	MTH							\$315.00	\$3,780	\$315.00	\$3,780
130	Butt Fusion	1	LS	\$3,200.00	\$3,200							\$3,200.00	\$3,200
131	Electro Fusion	1	LS	\$3,200.00	\$3,200							\$3,200.00	\$3,200
132	Jumping Jack Compactors	2	EA	\$2,200.00	\$4,400							\$2,200.00	\$4,400
133	Connexes For Storage (2)	12	MTHS							\$350.00	\$4,200	\$350.00	\$4,200
134	JOBOX	2	EA	\$800.00	\$1,600							\$800.00	\$1,600
135													
136													
137													
138													
139	Subtotal: M-CB Equipment Rental	6	MTH		\$12,400						\$183,192		\$195,592
140													
141													
142	M-EQ Equipment Repair & Maint	1	LS										
143	Mechanical	1,039	HRS			1.000	1,039	\$111.82	\$116,203			\$111.82	\$116,203
144													
145													
146	Subtotal: M-EQ Equipment Repair & Maint	1	LS				1,039.2		\$116,203				\$116,203
147													
148													
149	M-CB Consumables	1	LS										
150	Consumables	1	LS	\$12,100.00	\$12,100							\$12,100.00	\$12,100
151													
152													
153	Subtotal: M-CB Consumables	1	LS		\$12,100								\$12,100
154													
155													
156	M-CB Small Tools	1	LS										
157	Small Tools	1	LS	\$18,100.00	\$18,100							\$18,100.00	\$18,100
158													
159													
160													
161	Subtotal: M-CB Small Tools	1	LS		\$18,100								\$18,100
162													

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Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor Rate	Labor Cost	Equipment Costs		Unit Cost	Total Cost
				Unit	Total	Units	Hours			Unit	Total		
163													
164	M-CB Safety Stand Down	1	LS										
165													
166	Safety Meetings	52	EA										
167	Crew Lead	104	HRS			0.500	52	\$104.03	\$5,410			\$52.02	\$5,410
168	Operator	104	HRS			0.500	52	\$124.57	\$6,478			\$62.29	\$6,478
169													
170	Loc Labor	312	HRS			0.500	156	\$44.75	\$6,981			\$22.38	\$6,981
171													
172													
173													
174	Subtotal: M-CB Safety Stand Down	1	LS				260.0		\$18,869				\$18,869
175													
176													
177	M-CO Closeout		NONE										
178	Included in Engineering and Supervision Time												
179													
180													
181	Subtotal: M-CO Closeout	-	NONE										
182													
183													
184	M-PC Pre-Construction	1	LS										
185													
186	Scheduler	100	HRS			1.000	100	\$89.14	\$8,914			\$89.14	\$8,914
187	Estimating	200	HRS			1.000	200	\$100.30	\$20,060			\$100.30	\$20,060
188													
189	Subtotal: M-PC Pre-Construction	1	LS				300.0		\$28,974				\$28,974
190													
191													
192	M-PC Pre-Construction: NTP		NONE										
193													
194													
195	Subtotal: M-PC Pre-Construction: NTP	-	NONE										
196													
197													
198	M-PC Pre-Construction: Project Set-Up		NONE										
199									\$89.14				
200													
201	Subtotal: M-PC Pre-Construction: Project Set-Up	-	NONE										
202													
203													

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Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor Rate	Labor Cost	Equipment Costs		Unit Cost	Total Cost
				Unit	Total	Units	Hours			Unit	Total		
204	M-PC Pre-Construction: Material Take-off		NONE										
205													
206													
207	Subtotal: M-PC Pre-Construction: Material Take-off												
208			-	NONE									
209													
210	M-PC Pre-Construction: Meeting	1	LS										
211													
212	Meetings	8	EA										
213	Super	8	HRS			1.000	8	\$103.25	\$826			\$103.25	\$826
214	Eng	8	HRS			1.000	8	\$121.56	\$972			\$121.50	\$972
215													
216													
217													
218	Subtotal: M-PC Pre-Construction: Meeting												
219			1	LS			16.0		\$1,798				\$1,798
220													
221	M-PC Pre-Construction: Completed		NONE										
222													
223													
224													
225	Subtotal: M-PC Pre-Construction: Completed												
226			-	NONE									
227													
228	M-PM Project Management	1	LS										
229													
230	Construction Management	12	MTHS			86.600	1,039	\$121.56	\$126,325			\$10,527.08	\$126,325
231													
232													
233	Subtotal: M-PM Project Management												
234			1	LS			1,039.2		\$126,325				\$126,325
235													
236	M-WR Warranty	1	LS										
237													
238	Spare Parts/Warranty	1	LS	\$50,000.00	\$50,000							\$50,000.00	\$50,000
239													
240													
241													
242	Subtotal: M-WR Warranty												
243			1	LS	\$50,000	\$50,000							\$50,000
244													

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Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor Rate	Labor Cost	Equipment Costs		Unit Cost	Total Cost
				Unit	Total	Units	Hours			Unit	Total	Cost	Cost
245	W-WW Complete Well Connection	1	LS										
246													
247	Pumps Submersible 1.5HP	2	EA	\$1,500.00	\$2,250							\$1,500.00	\$2,250
248	Pitless Adaptor	2	EA	\$300.00	\$600							\$300.00	\$600
249	Drop Pipe and Electrical	60	LF	\$3.00	\$180							\$3.00	\$180
250	Insulated Cover	2	EA	\$1,500.00	\$3,000							\$1,500.00	\$3,000
251	Water Quality Tests	2	EA	\$2,000.00	\$4,000							\$2,000.00	\$4,000
252													
253	Labor												
254	Carpenter	16	HRS			1.000	16	\$121.37	\$1,942			\$121.38	\$1,942
255	Plumber	24	HRS			1.000	24	\$112.76	\$2,706			\$112.75	\$2,706
256	Electrical	16	HRS			1.000	16	\$111.84	\$1,789			\$111.81	\$1,789
257	Local Labor	40	HRS			1.000	40	\$44.75	\$1,790			\$44.75	\$1,790
258													
259													
260	Subtotal: W-WW Complete Well Connection	1	LS		\$10,030		96.0		\$8,227				\$18,257
261													
262													
263	C-WA WTP/Washeteria - Temp Facilities	1	LS										
264													
265	Rental Washeteria	12	MTHS	\$4,166.67	\$50,000							\$4,166.67	\$50,000
266	Temp WTP	1	LS	\$500,000.00	\$500,000							\$500,000.00	\$500,000
267	Freight To Site/Return	2	EA	\$32,000.00	\$64,000							\$32,000.00	\$64,000
268	Setup On Site - Temp	1	LS	\$30,000.00	\$30,000							\$30,000.00	\$30,000
269													
270	Labor (6 Men 2 Weeks Setup, 6M 1W Takedown)												
271	Carpenter	540	HRS			1.000	540	\$121.37	\$65,540			\$121.37	\$65,540
272	Plumber	180	HRS			1.000	180	\$112.76	\$20,297			\$112.76	\$20,297
273	Electrical	180	HRS			1.000	180	\$111.84	\$20,131			\$111.84	\$20,131
274	Local Labor	180	HRS			1.000	180	\$44.75	\$8,055			\$44.75	\$8,055
275													
276													
277													
278													
279													
280													
281													
282	Subtotal: C-WA WTP/Washeteria - Temp Facilities	1	LS		\$644,000		1,080.0		\$114,023				\$758,023
283													
284													

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Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor Rate	Labor Cost	Equipment Costs		Unit Cost	Total Cost
				Unit	Total	Units	Hours			Unit	Total		
285	C-WA Demolition	1	LS										
286													
287	Gut Washeteria WTP												
288	Carpenter	80	HRS			1.000	80	\$121.37	\$9,710			\$121.38	\$9,710
289	Plumber	40	HRS			1.000	40	\$112.76	\$4,510			\$112.75	\$4,510
290	Electrical	10	HRS			1.000	10	\$111.84	\$1,118			\$111.80	\$1,118
291	Local Labor	130	HRS			1.000	130	\$44.75	\$5,818			\$44.75	\$5,818
292													
293													
294	Subtotal: C-WA Demolition	1	LS				260.0		\$21,156				\$21,156
295													
296													
297	C-WA WTP - Bldg	1	LS										
298													
299	Foundations	14	EA										
300	Treated Timbers	2,100	BF	\$1.50	\$3,150							\$1.50	\$3,150
301	Time	53	HRS										
302	Carpenter	105	HRS			1.000	105	\$121.37	\$12,744			\$121.37	\$12,744
303	Local Labor	210	HRS			1.000	210	\$44.75	\$9,398			\$44.75	\$9,398
304													
305	Gravel Pad (76'x78'x2')	527	CY	\$100.00	\$52,693							\$100.00	\$52,693
306	Time	26	HRS										
307	Dump Truck	26	HRS							\$70.00	\$1,844	\$69.99	\$1,844
308	Backhoe Cat 320	26	HRS							\$48.25	\$1,271	\$48.24	\$1,271
309	Operator	26	HRS			1.000	26	\$124.57	\$3,276			\$124.34	\$3,276
310	Local Truck Driver	26	HRS			1.000	26	\$51.97	\$1,367			\$51.89	\$1,367
311	Lead Crew	26	HRS			1.000	26	\$104.03	\$2,736			\$103.85	\$2,736
312	Local Labor	53	HRS			1.000	53	\$44.75	\$2,358			\$44.75	\$2,358
313													
314	Utilidor												
315	Floor	150	SF										
316	Utilidor Walls	336	SF										
317	Sips 8"	486	SF	\$8.00	\$3,888							\$8.00	\$3,888
318	Air Barrier	486	SF	\$0.25	\$122							\$0.25	\$122
319	Rainscreen Wrap	486	SF	\$0.30	\$146							\$0.30	\$146
320	T1-11	486	SF	\$1.75	\$851							\$1.75	\$851
321													
322													
323													
324													

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Line			Material Costs		Labor Hours		Labor	Labor	Equipment Costs		Unit	Total	
No.	A Description	Qty	UNITS	Unit	Total	Units	Hours	Rate	Cost	Unit	Total	Cost	Cost
325													
326	Floor 1	1,368	SF										
327	GLB 6-3/4x24	148	LF	\$47.25	\$6,993						\$47.25	\$6,993	
328	GLB 6-3/4x12	38	LF	\$23.63	\$898						\$23.63	\$898	
329	Joists 3-1/2x16 LVL	1,406	LF	\$16.29	\$22,907						\$16.29	\$22,907	
330	R50 Batts	1,368	SF	\$1.50	\$2,052						\$1.50	\$2,052	
331	Air Barrier	1,368	SF	\$0.25	\$342						\$0.25	\$342	
332	Rainscreen Wrap	1,368	SF	\$0.30	\$410						\$0.30	\$410	
333	T1-11	1,368	SF	\$1.75	\$2,394						\$1.75	\$2,394	
334	Stain T1-11	1,368	SF	\$0.20	\$274						\$0.20	\$274	
335	Subflooring	1,368	SF	\$1.50	\$2,052						\$1.50	\$2,052	
336	Elastomeric Flooring (Sub)	1,368	SF	\$30.00	\$41,040						\$30.00	\$41,040	
337													
338	Deck & Stair												
339	Glulam Beams	84	BF	\$3.00	\$252						\$3.00	\$252	
340	Decking Fiberglass	38	SF	\$18.00	\$684						\$18.00	\$684	
341	Stair Treads	35	SF	\$18.00	\$630						\$18.00	\$630	
342	Handrails	30	LF	\$220.00	\$6,600						\$220.00	\$6,600	
343													
344	Roof	1,548	SF										
345	Glulam Beams	608	BF	\$3.00	\$1,823						\$3.00	\$1,823	
346	12" Sips Panel	1,548	SF	\$12.00	\$18,576						\$12.00	\$18,576	
347	Misc Framing	243	BF	\$1.50	\$365						\$1.50	\$365	
348	Metal Roofing (Sub)	1,548	SF	\$15.00	\$23,220						\$15.00	\$23,220	
349	1" Z Girts	774	LF	\$1.20	\$929						\$1.20	\$929	
350	Underlayment	1,548	SF	\$0.20	\$310						\$0.20	\$310	
351	GWB	1,548	SF	\$0.55	\$851						\$0.55	\$851	
352	Paint	1,548	SF	\$0.20	\$310						\$0.20	\$310	
353													
354	Exterior Walls	2,080	SF										
355	Metal Siding	2,080	SF	\$6.00	\$12,480						\$6.00	\$12,480	
356	2x4 Furring Treated	2,080	SF	\$0.50	\$1,040						\$0.50	\$1,040	
357	1.5" Rigid Insulation	2,080	SF	\$1.13	\$2,340						\$1.13	\$2,340	
358	8" Sips Panels	2,080	SF	\$8.00	\$16,640						\$8.00	\$16,640	
359	GWB	2,080	SF	\$0.55	\$1,144						\$0.55	\$1,144	
360	Paint	2,080	SF	\$0.20	\$416						\$0.20	\$416	
361	Doors, Double	1	PR	\$2,750.00	\$2,750						\$2,750.00	\$2,750	
362													
363													

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Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor Rate	Labor Cost	Equipment Costs		Unit Cost	Total Cost
				Unit	Total	Units	Hours			Unit	Total	Cost	Cost
364	Partitions	1,300	SF										
365	3-5/8" Metal Studs	780	SF	\$0.81	\$634							\$0.81	\$634
366	6" Metal Studs	520	SF	\$1.28	\$667							\$1.28	\$667
367	GWB	2,600	SF	\$0.55	\$1,430							\$0.55	\$1,430
368	Paint	2,600	SF	\$0.20	\$520							\$0.20	\$520
369													
370	Labor												
371	Carpenter	1,906	HRS			1.000	1,906	\$121.37	\$231,380			\$121.37	\$231,380
372	Local Labor	1,906	HRS			1.000	1,906	\$44.75	\$85,311			\$44.75	\$85,311
373													
374													
375	Subtotal: C-WA WTP - Bldg	1	LS		\$234,823		4,259.4		\$348,570		\$3,115		\$586,508
376													
377													
378	C-WA Washeteria - Bldg	1	LS										
379													
380	Floor 1	2,592	SF										
381	Subflooring	2,592	SF	\$1.50	\$3,888							\$1.50	\$3,888
382	Elastomeric Flooring	2,592	SF	\$17.50	\$45,360							\$17.50	\$45,360
383													
384	Deck & Stair												
385	Glulam Beams	308	BF	\$3.00	\$924							\$3.00	\$924
386	Decking Fiberglass	95	SF	\$18.00	\$1,710							\$18.00	\$1,710
387	Stair Treads	78	SF	\$18.00	\$1,404							\$18.00	\$1,404
388	Handrails	59	LF	\$220.00	\$12,870							\$220.00	\$12,870
389													
390	Ramp												
391	Glulam Beams	640	BF	\$3.00	\$1,920							\$3.00	\$1,920
392	Decking Fiberglass	320	SF	\$18.00	\$5,760							\$18.00	\$5,760
393	Handrails	146	LF	\$220.00	\$32,120							\$220.00	\$32,120
394													
395	Roof	2,600	SF										
396	Metal Roofing (Sub)	2,600	SF	\$15.00	\$39,000							\$15.00	\$39,000
397	1" Z Girts	1,300	LF	\$1.20	\$1,560							\$1.20	\$1,560
398	Underlayment	2,600	SF	\$0.20	\$520							\$0.20	\$520
399	Paint	2,600	SF	\$0.20	\$520							\$0.20	\$520
400													
401	Exterior Walls	2,496	SF										
402	Paint	4,992	SF	\$0.20	\$998							\$0.20	\$998

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Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor Rate	Labor Cost	Equipment Costs		Unit Cost	Total Cost
				Unit	Total	Units	Hours			Unit	Total	Cost	Cost
403													
404	Partitions	2,730	SF										
405	3-5/8" Metal Studs	1,638	SF	\$0.81	\$1,331							\$0.81	\$1,331
406	6" Metal Studs	1,092	SF	\$1.28	\$1,401							\$1.28	\$1,401
407	GWB	5,460	SF	\$0.55	\$3,003							\$0.55	\$3,003
408	Paint	5,460	SF	\$0.20	\$1,092							\$0.20	\$1,092
409	Doors, Frames and Hardware	8	EA	\$1,350.00	\$10,800							\$1,350.00	\$10,800
410													
411	Labor												
412	Carpenter	1,063	HRS			1.000	1,063	\$121.37	\$128,992			\$121.38	\$128,992
413	Local Labor	1,063	HRS			1.000	1,063	\$44.75	\$47,560			\$44.75	\$47,560
414													
415													
416	Subtotal: C-WA Washeteria - Bldg	1	LS		\$166,181		2,125.6		\$176,552				\$342,733
417													
418													
419	C-WA WTP/Washeteria - Systems	1	LS										
420													
421	WTP Equipment												
422	Detention Tank (2500 Gallon)	1	EA	\$40,000.00	\$40,000							\$40,000.00	\$40,000
423	Packaged Filtration Plant	1	EA	\$250,000.00	\$250,000							\$250,000.00	\$250,000
424	Chemical Feed Systems	3	EA	\$7,500.00	\$22,500							\$7,500.00	\$22,500
425	Process Instrumentation	1	EA	\$25,000.00	\$25,000							\$25,000.00	\$25,000
426	Laboratory Instruments	1	EA	\$15,000.00	\$15,000							\$15,000.00	\$15,000
427													
428	Labor												
429	Carpenter	117	HRS			1.000	117	\$121.37	\$14,200			\$121.37	\$14,200
430	Plumber	116	HRS			1.000	116	\$112.76	\$13,080			\$112.76	\$13,080
431	Electrical	76	HRS			1.000	76	\$111.84	\$8,500			\$111.84	\$8,500
432	Local Labor	300	HRS			1.000	300	\$44.75	\$13,425			\$44.75	\$13,425
433													
434	Mechanical Room												
435	Boilers	2	EA	\$7,500.00	\$15,000							\$7,500.00	\$15,000
436	Boiler Stack	1	EA	\$14,000.00	\$14,000							\$14,000.00	\$14,000
437	Water Heater	1	EA	\$3,500.00	\$3,500							\$3,500.00	\$3,500
438	Glycol Makeup Tank	1	EA	\$700.00	\$700							\$700.00	\$700
439	Fuel Day Tank	1	EA	\$6,500.00	\$6,500							\$6,500.00	\$6,500
440	Ductwork and Hoods	1	EA	\$6,000.00	\$6,000							\$6,000.00	\$6,000
441													
442													
443													

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				Unit	Total	Units	Hours			Unit	Total	Cost	Cost
444	Labor												
445	Plumber	10	HRS			1.000	10	\$112.76	\$1,128			\$112.80	\$1,128
446	Local Labor	10	HRS			1.000	10	\$44.75	\$448			\$44.80	\$448
447													
448	Process Control Panels												
449	Boiler Control Panel	1	EA	\$15,000.00	\$15,000							\$15,000.00	\$15,000
450	Status and Alarm Panel	1	EA	\$35,000.00	\$35,000							\$35,000.00	\$35,000
451	Pressure Pumps	1	EA	\$10,000.00	\$10,000							\$10,000.00	\$10,000
452	Well Control Panel	1	EA	\$15,000.00	\$15,000							\$15,000.00	\$15,000
453													
454	Labor												
455	Carpenter	10	HRS			1.000	10	\$121.37	\$1,214			\$121.40	\$1,214
456	Electrical	44	HRS			1.000	44	\$111.84	\$4,921			\$111.84	\$4,921
457	Local Labor	54	HRS			1.000	54	\$44.75	\$2,417			\$44.76	\$2,417
458													
459	Washeteria Equipment												
460	20 lb Washer	3	EA	\$4,700.00	\$14,100							\$4,700.00	\$14,100
461	40 lb Washer	1	EA	\$13,500.00	\$13,500							\$13,500.00	\$13,500
462	Drain Trough For Washers	1	EA	\$2,100.00	\$2,100							\$2,100.00	\$2,100
463	30 lb Dryers	3	EA	\$5,400.00	\$16,200							\$5,400.00	\$16,200
464	50 lb Dryers	1	EA	\$6,300.00	\$6,300							\$6,300.00	\$6,300
465	Additional Steam Coils For Dryers	4	EA	\$1,500.00	\$6,000							\$1,500.00	\$6,000
466	Dryer Heat Recovery	1	EA	\$15,000.00	\$15,000							\$15,000.00	\$15,000
467	Dryer Circ Pump Control	1	EA	\$5,000.00	\$5,000							\$5,000.00	\$5,000
468	Bath / Shower Coin Boxes & Valves	3	EA	\$600.00	\$1,800							\$600.00	\$1,800
469	Watering Point Materials	1	EA	\$4,500.00	\$4,500							\$4,500.00	\$4,500
470													
471	Labor												
472	Carpenter	55	HRS			1.000	55	\$121.37	\$6,675			\$121.36	\$6,675
473	Plumber	66	HRS			1.000	66	\$112.76	\$7,442			\$112.76	\$7,442
474	Electrical	40	HRS			1.000	40	\$111.84	\$4,474			\$111.85	\$4,474
475	Local Labor	161	HRS			1.000	161	\$44.75	\$7,205			\$44.75	\$7,205
476													
477													
478													
479													
480													
481													
482													

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				Unit	Total	Units	Hours			Unit	Total	Cost	Cost
483													
484	Lighting												
485	Fixtures	45	EA	\$200.00	\$9,000							\$200.00	\$9,000
486	Exterior Fixtures	6	EA	\$600.00	\$3,600							\$600.00	\$3,600
487	Switches	15	EA	\$15.00	\$225							\$15.00	\$225
488	Conduit	2,025	LF	\$1.00	\$2,025							\$1.00	\$2,025
489	Wire #12	2,475	LF	\$0.16	\$386							\$0.16	\$386
490	Wire #10	4,208	LF	\$0.20	\$858							\$0.20	\$858
491													
492	Labor												
493	Electrical	275	HRS			1.000	275	\$111.84	\$30,778			\$111.83	\$30,778
494	Local Labor	275	HRS			1.000	275	\$44.75	\$12,315			\$44.75	\$12,315
495													
496	Power												
497	Connection To Utility	1	LS	\$15,000.00	\$15,000							\$15,000.00	\$15,000
498	Panelboard 400A	1	EA	\$4,500.00	\$4,500	0.457	1					\$4,500.00	\$4,500
499	Panelboard 200A	1	EA	\$1,800.00	\$1,800	0.286	0					\$1,800.00	\$1,800
500	Feeder 400A	50	LF	\$62.99	\$3,149	0.011	1					\$62.98	\$3,149
501	Feeder 200A	100	LF	\$27.67	\$2,767	0.007	1					\$27.67	\$2,767
502	Outlets	60	EA	\$6.00	\$360	0.011	1					\$6.00	\$360
503	Outlets GFI	10	EA	\$8.49	\$85	0.007	0					\$8.50	\$85
504	Outlets GFI WP	10	EA	\$26.49	\$265	0.009	0					\$26.50	\$265
505	Allow For Motor Controls	2,500	SF	\$0.20	\$500	0.000	1					\$0.20	\$500
506	Conduit	2,400	LF	\$1.00	\$2,400							\$1.00	\$2,400
507	Wire #12	4,752	LF	\$0.16	\$741							\$0.16	\$741
508	Wire #10	3,168	LF	\$0.20	\$646							\$0.20	\$646
509													
510	Labor												
511	Electrical	372	HRS			1.000	373	\$111.84	\$41,660			\$111.85	\$41,660
512	Local Labor	372	HRS			1.000	373	\$44.75	\$16,669			\$44.75	\$16,669
513													
514	Comm and Special System	1	LS	\$10,000.00	\$10,000							\$10,000.00	\$10,000
515													
516													
517													
518													
519													
520	Subtotal: C-WA WTP/Washeteria - Systems	1	LS		\$616,007		2,357.9		\$186,551				\$802,558
521													
522													

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Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor Rate	Labor Cost	Equipment Costs	Unit Cost	Total Cost
				Unit	Total	Units	Hours			Unit	Total	
523	C-WA WTP/Washeteria - Plumbing, HVAC, Process Piping	1	LS									
524												
525	Process Piping											
526	Based On Similar Project, No Details At This Time.	1	EA	\$20,000.00	\$20,000						\$20,000.00	\$20,000
527												
528	Labor											
529	Plumber	250	HRS			1.000	250	\$112.76	\$28,190		\$112.76	\$28,190
530	Local Labor	300	HRS			1.000	300	\$44.75	\$13,425		\$44.75	\$13,425
531												
532	Process Wiring	1	LS	\$2,000.00	\$2,000						\$2,000.00	\$2,000
533	Labor											
534	Electrical	20	HRS			1.000	20	\$111.84	\$2,237		\$111.85	\$2,237
535	Local Labor	20	HRS			1.000	20	\$44.75	\$895		\$44.75	\$895
536												
537	Washeteria - Plumbing											
538	Based On Similar Project, No Details At This Time.	1	EA	\$50,000.00	\$50,000						\$50,000.00	\$50,000
539	WC-1: Floor Mounted Toilet Elongated Bowl	3	EA	\$650.00	\$1,950						\$650.00	\$1,950
540	LAV-1: Wall Hung Lavatory, W/ Single Handle	3	EA	\$525.00	\$1,575						\$525.00	\$1,575
541	BT-1, 2: Bathtub/Shower, Non Skid Bottom Finish	1	EA	\$825.00	\$825						\$825.00	\$825
542	SH-1: Shower	2	EA	\$800.00	\$1,600						\$800.00	\$1,600
543	SK-2: Sink, Molded Plastic Laundry W/ Support Legs	1	EA	\$580.00	\$580						\$580.00	\$580
544	Emerg Shower/Eyewash	1	EA	\$575.00	\$575						\$575.00	\$575
545												
546	Labor											
547	Plumber	200	HRS			1.000	200	\$112.76	\$22,552		\$112.76	\$22,552
548	Local Labor	200	HRS			1.000	200	\$44.75	\$8,950		\$44.75	\$8,950
549												
550												
551												
552												
553												
554												
555												
556												

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				Unit	Total	Units	Hours			Unit	Total	Cost	Cost
557	Washeteria HVAC Piping, Terminal Heat Units												
558													
559	Piping Insulation	1	LS	\$1,500.00	\$1,500							\$1,500.00	\$1,500
560	Pipe & Fittings, Copper Type	1	LS	\$7,500.00	\$7,500							\$7,500.00	\$7,500
561	Baseboard Radiation												
562	No. Of Units (Zones)	4	EA	\$200.00	\$800							\$200.00	\$800
563	Baseboard	45	LF	\$46.00	\$2,070							\$46.00	\$2,070
564	Thermostat	10	EA	\$125.00	\$1,250							\$125.00	\$1,250
565	Cabinet Unit Heaters												
566	Cabinet Unit Heaters	4	EA	\$1,200.00	\$4,800							\$1,200.00	\$4,800
567	Valves & Fittings	4	EA	\$140.00	\$560							\$140.00	\$560
568	Unit Heaters	4	EA	\$725.00	\$2,900							\$725.00	\$2,900
569													
570	Fans	5	EA	\$300.00	\$1,500							\$300.00	\$1,500
571	Misc Ductwork	1	LS	\$1,000.00	\$1,000							\$1,000.00	\$1,000
572													
573	Labor												
574	Plumber	170	HRS			1.000	170	\$112.76	\$19,169			\$112.76	\$19,169
575	Local Labor	170	HRS			1.000	170	\$44.75	\$7,608			\$44.75	\$7,608
576													
577													
578													
579	Subtotal: C-WA WTP/Washeteria - Plumbing, HVAC, Process Piping	1	LS		\$102,985		1,330.0		\$103,026				\$206,011
580													
581													
582	S-LS Wastewater Pump Station	1	EA										
583													
584	Well Structure	1	EA	\$35,000.00	\$35,000							\$35,000.00	\$35,000
585	Pumps and Accessories	2	EA	\$7,700.00	\$15,400							\$7,700.00	\$15,400
586	DIP 3" Discharge	2	EA	\$130.00	\$260							\$130.00	\$260
587	Ball Check Valve 3"	2	EA	\$530.00	\$1,060							\$530.00	\$1,060
588	Plug Valve Plug 3"	2	EA	\$1,275.00	\$2,550							\$1,275.00	\$2,550
589	Elbow 3" DI	1	EA	\$132.00	\$132							\$132.00	\$132
590	Reducer 2x3 DI	1	EA	\$132.00	\$132							\$132.00	\$132
591	Tee 3" DI	1	EA	\$319.00	\$319							\$319.00	\$319
592	Flanges & Fittings	4	EA	\$171.00	\$684							\$171.00	\$684
593	Control Panel	1	EA	\$15,289.00	\$15,289							\$15,289.00	\$15,289
594	Motor Starter - 4 HP	2	EA	\$400.00	\$800							\$400.00	\$800
595	Electrical	1	EA	\$4,000.00	\$4,000							\$4,000.00	\$4,000
596													

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Line No.	A Description	Qty	UNITS	Material Costs Unit	Material Costs Total	Labor Hours Units	Labor Hours Hours	Labor Rate	Labor Cost	Equipment Costs Unit	Equipment Costs Total	Unit Cost	Total Cost
597	Pump Station Labor												
598	Carpenter	40	HRS			1.000	40	\$121.37	\$4,855			\$121.38	\$4,855
599	Plumber	100	HRS			1.000	100	\$112.76	\$11,276			\$112.76	\$11,276
600	Electrical	56	HRS			1.000	56	\$111.84	\$6,263			\$111.84	\$6,263
601	Local Labor	196	HRS			1.000	196	\$44.75	\$8,771			\$44.75	\$8,771
602													
603	Earthwork												
604	Time	20	HRS										
605	Dump Truck	20	HRS							\$70.00	\$1,400	\$70.00	\$1,400
606	Backhoe Cat 320	20	HRS							\$48.25	\$965	\$48.25	\$965
607	Operator	20	HRS			1.000	20	\$124.57	\$2,491			\$124.55	\$2,491
608	Local Truck Driver	20	HRS			1.000	20	\$51.97	\$1,039			\$51.95	\$1,039
609	Lead Crew	20	HRS			1.000	20	\$104.03	\$2,081			\$104.05	\$2,081
610	Local Labor	40	HRS			1.000	40	\$44.75	\$1,790			\$44.75	\$1,790
611													
612													
613	Subtotal: S-LS Wastewater Pump Station	1	EA		\$75,626		492.0		\$38,566		\$2,365		\$116,557
614													
615													
616	W-WT Insulated Storage Tank	35	KGAL										
617													
618	Foundation - Gravel Pad 24'x24'x3'												
619	Gravel Purchase - Assumed	100	CY	\$100.00	\$10,000							\$100.00	\$10,000
620	Insulation Board 5"	3,456	BF	\$0.75	\$2,592							\$0.75	\$2,592
621													
622	Tank 35,000 Gal, Prefabricated	1	EA	\$130,000.00	\$130,000							\$130,000.00	\$130,000
623	Insulate Tank	1	EA	\$49,800.00	\$49,800							\$49,800.00	\$49,800
624													
625	Earthwork												
626	Time	130	HRS										
627	Dump Truck/Trailer	110	HRS							\$85.00	\$9,350	\$85.00	\$9,350
628	Dump Truck	20	HRS							\$70.00	\$1,400	\$70.00	\$1,400
629	Backhoe Cat 320	130	HRS							\$48.25	\$6,273	\$48.25	\$6,273
630	Operator	130	HRS			1.000	130	\$124.57	\$16,194			\$124.57	\$16,194
631	Local Truck Driver	110	HRS			1.000	110	\$51.97	\$5,717			\$51.97	\$5,717
632	Lead Crew	130	HRS			1.000	130	\$104.03	\$13,524			\$104.03	\$13,524
633	Local Labor	260	HRS			1.000	260	\$44.75	\$11,635			\$44.75	\$11,635
634													
635	Subtotal: W-WT Insulated Storage Tank	35	KGAL		\$192,392		630.0		\$47,070		\$17,023		\$256,485
636													

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				Unit	Total	Units	Hours			Unit	Total	Cost	Cost
637													
638	M-IF Fuel Tank	10	KGAL										
639													
640	Foundation - Gravel Pad 20'x24'x2'												
641	Gravel Purchase - Assumed	36	CY	\$100.00	\$3,600							\$100.00	\$3,600
642													
643	10,000 Gal Fuel Tank	1	EA	\$40,000.00	\$40,000							\$40,000.00	\$40,000
644													
645	Time	20	HRS										
646	Dump Truck/Trailer	20	HRS							\$85.00	\$1,700	\$85.00	\$1,700
647	Dump Truck	20	HRS							\$70.00	\$1,400	\$70.00	\$1,400
648	Backhoe Cat 320	20	HRS							\$48.25	\$965	\$48.25	\$965
649	Operator	20	HRS			1.000	20	\$124.57	\$2,491			\$124.55	\$2,491
650	Local Truck Driver	20	HRS			1.000	20	\$51.97	\$1,039			\$51.95	\$1,039
651	Lead Crew	20	HRS			1.000	20	\$104.03	\$2,081			\$104.05	\$2,081
652	Local Labor	40	HRS			1.000	40	\$44.75	\$1,790			\$44.75	\$1,790
653													
654													
655	Subtotal: M-IF Fuel Tank	10	KGAL		\$43,600		100.0		\$7,401		\$4,065		\$55,066
656													
657													
658	W-SD Water Piping	1,700	LF										
659													
660	Piping - Water												
661	16" Carrier, 4" HDPE, 2" HDPE Arctic Pipe	1,400	LF	\$65.00	\$91,000							\$65.00	\$91,000
662	Heat Trace, Electric	1,400	LF	\$16.00	\$22,400							\$16.00	\$22,400
663	Misc Materials	1	LS	\$10,000.00	\$10,000							\$10,000.00	\$10,000
664													
665	Time	140	HRS										
666	Backhoe 320	140	HRS							\$48.25	\$6,755	\$48.25	\$6,755
667	Operator	140	HRS			1.000	140	\$124.57	\$17,440			\$124.57	\$17,440
668	Lead Crew	140	HRS			1.000	140	\$104.03	\$14,564			\$104.03	\$14,564
669	Local Labor	280	HRS			1.000	280	\$44.75	\$12,530			\$44.75	\$12,530
670													
671	Piping - Raw Water												
672	16" Carrier, 3" HDPE, 2" HDPE Arctic Pipe	250	LF	\$63.00	\$15,750							\$63.00	\$15,750
673	Glycol Heat Trace Pipe PEX	500	LF	\$2.00	\$1,000							\$2.00	\$1,000
674	Misc Materials	1	LS	\$2,500.00	\$2,500							\$2,500.00	\$2,500
675													

Tuluksak Washeteria WTP - PER
 Alternate 3 - Renovation Washeteria, New WTP

Construction Cost Estimate
 Concept Design Submittal
 March 30, 2018

Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor Rate	Labor Cost	Equipment Costs		Unit Cost	Total Cost
				Unit	Total	Units	Hours			Unit	Total	Cost	Cost
676	Time	50	HRS										
677	Backhoe 320	50	HRS							\$48.25	\$2,413	\$48.26	\$2,413
678	Operator	50	HRS			1.000	50	\$124.57	\$6,229			\$124.58	\$6,229
679	Lead Crew	50	HRS			1.000	50	\$104.03	\$5,202			\$104.04	\$5,202
680	Local Labor	100	HRS			1.000	100	\$44.75	\$4,475			\$44.75	\$4,475
681													
682	Piping - Tank Piping												
683	10" Carrier, 3" HDPE, 2" HDPE Arctic Pipe	50	LF	\$55.00	\$2,750							\$55.00	\$2,750
684	Heat Trace, Electric	50	LF	\$16.00	\$800							\$16.00	\$800
685	Misc Materials	1	LS	\$3,500.00	\$3,500							\$3,500.00	\$3,500
686													
687	Time	10	HRS										
688	Backhoe 320	10	HRS							\$48.25	\$483	\$48.30	\$483
689	Operator	10	HRS			1.000	10	\$124.57	\$1,246			\$124.60	\$1,246
690	Lead Crew	10	HRS			1.000	10	\$104.03	\$1,040			\$104.00	\$1,040
691	Local Labor	20	HRS			1.000	20	\$44.75	\$895			\$44.75	\$895
692													
693													
694	Subtotal: W-SD Water Piping	1,700	LF		\$149,700		800.0		\$63,621		\$9,651		\$222,972
695													
696													
697	S-BF Force Main	300	LF										
698													
699	Piping - Force Main												
700	12" Carrier, 4" HDPE Arctic	125	LF	\$55.00	\$6,875							\$55.00	\$6,875
701	Heat Trace, Electric	125	LF	\$16.00	\$2,000							\$16.00	\$2,000
702													
703	16" Carrier, 3" HDPE, (2) 2" HDPE, Arctic Pipe	175	LF	\$68.00	\$11,900							\$68.00	\$11,900
704													
705	Time	63	HRS										
706	Backhoe 320	63	HRS							\$48.25	\$3,016	\$48.26	\$3,016
707	Operator	63	HRS			1.000	63	\$124.57	\$7,786			\$124.58	\$7,786
708	Lead Crew	63	HRS			1.000	63	\$104.03	\$6,502			\$104.03	\$6,502
709	Local Labor	125	HRS			1.000	125	\$44.75	\$5,594			\$44.75	\$5,594
710													
711													
712	Subtotal: S-BF Force Main	300	LF		\$20,775		250.0		\$19,882		\$3,016		\$43,673
713													
714													

Tuluksak Washeteria WTP - PER
 Alternate 3 - Renovation Washeteria, New WTP

Construction Cost Estimate
 Concept Design Submittal
 March 30, 2018

Line No.	A Description	Qty	UNITS	Material Costs		Labor Hours		Labor	Labor	Equipment Costs		Unit	Total
				Unit	Total	Units	Hours	Rate	Cost	Unit	Total	Cost	Cost
715	S-BC Sewer Main	150	LF										
716													
717	Piping - Sewer Main												
718	12" Carrier, 4" HDPE Arctic	150	LF	\$55.00	\$8,250							\$55.00	\$8,250
719	Heat Trace, Electric	150	LF	\$16.00	\$2,400							\$16.00	\$2,400
720	Misc Materials	1	LS	\$5,000.00	\$5,000							\$5,000.00	\$5,000
721													
722	Time	30	HRS										
723	Backhoe 320	30	HRS							\$48.25	\$1,448	\$48.27	\$1,448
724	Operator	30	HRS			1.000	30	\$124.57	\$3,737			\$124.57	\$3,737
725	Lead Crew	30	HRS			1.000	30	\$104.03	\$3,121			\$104.03	\$3,121
726	Local Labor	60	HRS			1.000	60	\$44.75	\$2,685			\$44.75	\$2,685
727													
728													
729	Subtotal: S-BC Sewer Main	150	LF		\$15,650		120.0		\$9,543		\$1,448		\$26,641
730													
731													
732	E-HR Upgrade Heat Recovery	1	EA										
733													
734	Install Parts at Power Plant	1	LS										
735	Plumber	30	HRS			1.000	30	\$112.76	\$3,383			\$112.77	\$3,383
736	Electrical	30	HRS			1.000	30	\$111.84	\$3,355			\$111.83	\$3,355
737	Local Labor	60	HRS			1.000	60	\$44.75	\$2,685			\$44.75	\$2,685
738													
739	WTP Work - See WTP												
740													
741	Piping												
742	8" Arctic Pipe, With 2" Aquatherm	350	LF	\$55.00	\$19,250							\$55.00	\$19,250
743	Misc Materials	1	LS	\$5,000.00	\$5,000							\$5,000.00	\$5,000
744													
745	Time	140	HRS										
746	Backhoe 320	140	HRS							\$48.25	\$6,755	\$48.25	\$6,755
747	Operator	140	HRS			1.000	140	\$124.57	\$17,440			\$124.57	\$17,440
748	Lead Crew	140	HRS			1.000	140	\$104.03	\$14,564			\$104.03	\$14,564
749	Local Labor	280	HRS			1.000	280	\$44.75	\$12,530			\$44.75	\$12,530
750													
751													
752	Subtotal: E-HR Upgrade Heat Recovery	1	EA		\$24,250		680.0		\$53,957		\$6,755		\$84,962
753													

Estimated Annual Costs

Alternative 1 - New Washeteria/WTP Bldg at Utility Core Site	
Item	Cost
Administration	\$ 17,500
Labor	\$ 49,000
Materials	\$ 4,000
Electricity	\$ 14,100
Heating oil	\$ 9,300
Miscellaneous	\$ 5,900
R&R (Short Lived Assets)	\$ 14,000
Total Estimated Annual Cost	\$ 114,000

ADMINISTRATIONSystem Data:

Washeteria / WTP bldg
 Water storage tank
 Water line to the school
 Community watering point
 Two wells
 Sewage lagoon - single cell percolating

Operational Assumptions:

Avg burdened labor rate for admin staff	\$16 /hr
Administrative labor	6 hr/wk
Average Daily Water Demand	4,350 gpd

Other Assumptions

Misc supplies	\$500 /yr
Postage / freight	\$1,000 /yr
Insurance (for the W / WTP bldg)	\$7,500 /yr
Travel and training	\$3,500 /yr

Total Estimated Annual Costs for Utility Administration

Labor	\$4,992
Materials	\$500
Electricity	\$0
Heating Oil	\$0
Miscellaneous	\$12,000
R&R Cost (Short Lived Assets)	\$0
Total	\$17,492

\$ 0.0110 \$/gallon

UTILITY CORE SITE 2005 WELLSSystem Data:

Average Daily Demand	4,350 gpd
Number of wells	2
Well pump size	1 hp
Well pump flow rate	20 gpm
Length of raw water transmission line	250 feet

Operational Assumptions:

Burdened labor rate for WTP operator	\$18 /hr
Labor to operate and maintain the wells	1 hr/week
Electricity	\$0.54 /kwh with PCE credit
Heating oil	\$4.00 gallon
Operation of the well pump(s)	On-demand
Operation of raw water circ pump	9 months/yr @ 24 hrs/day
Available energy of heating fuel	110,000 BTU/gallon
Heat loss for buried arctic pipe	3 BTU/ft/hr
Cost to clean and redevelop a well	\$2,500
Frequency of well cleaning/redevelopment	10 years
Misc materials and supplies	\$100 /yr

Estimated Annual Costs

<u>Electrical Demand:</u>	<u>Power</u>	<u>Average Usage (hrs/year)</u>	<u>Annual Demand (kwh)</u>	<u>Annual Cost</u>
Submersible Pump	1.0 hp	1323	987	\$533
Circ Pump	0.25 hp	6570	1,225	\$661
			Total	\$1,194
<u>Heating Demand:</u>	<u>Hourly Demand BTU/hr</u>	<u>Annual Demand (MBTU)</u>	<u>Annual Demand (gal of fuel)</u>	<u>Annual Cost</u>
Raw water transmission line	750	4,925	45	\$179
			Total	\$179
<u>Miscellaneous</u>	<u>Quantity</u>	<u>Cost</u>	<u>Frequency (years)</u>	<u>Annual Cost</u>
Well Maintenance	2	\$2,500	10	\$500
			Total	\$500
<u>R&R Costs (Short Lived Assets):</u>	<u>Cost</u>	<u>Expected Equipment Life</u>	<u>Annual Cost</u>	
Submersible pumps (2)	\$2,500	5 yr	\$552	
Raw water circ pump (2)	\$1,000	5 yr	\$221	
Raw water heat exchanger	\$3,500	15 yr	\$314	
Inflation rate	2 %		Total	\$1,087

Total Estimated Annual Costs for the Wells

Labor	\$936
Materials	\$100
Electricity	\$1,194
Heating Oil	\$179
Miscellaneous	\$500
R&R Cost (Short Lived Assets)	\$1,087
Total	<u>\$3,996</u>

\$ 0.0025 /gallon of water

WTP / WASHETERIA BUILDINGSystem Data:

Average Daily Demand	4,350 gpd
WTP / Washeteria Building Area	2,592 sf
Number of unit heaters	8

Operational Costs:

Burdened labor rate for the Operator	\$18 /hr
Labor - Operation and maintenance of building	4 hr/wk
Electricity	\$0.54 /kwh with PCE credit
Heating oil	\$4.00 /gallon
Available energy of heating fuel	110,000 BTU/gal
Misc Materials and Supplies	\$500 /yr

Estimated Annual Costs

<u>Electrical Demand:</u>	<u>Power</u>	<u>Average Usage (hr/day)</u>	<u>Annual Demand (kwh)</u>	<u>Annual Cost</u>
Building unit heaters	50 watts	8	1,168	\$631
Building lights	0.4 watts/ft2	8	3,027	\$1,635
Boilers	0.33 hp	6	539	\$291
Boiler circ pump	0.17 hp	24	1,110	\$600
Process circ pump	0.25 hp	24	1,633	\$882
			Total	\$4,038

<u>Heating Demand:</u>	<u>Hourly Demand BTU/hr</u>	<u>Annual Demand (MBTU)</u>	<u>Annual Demand (gal of fuel)</u>	<u>Annual Cost</u>
WTP/W Bldg (maintained @ 68 F)	33,648	220,944	2,009	\$8,034
			Total	\$8,034

<u>Miscellaneous</u>	<u>Quantity</u>	<u>Cost</u>	<u>Annual Cost</u>	
None	0	\$0	\$0	
			Total	\$0

<u>R&R Costs (Short Lived Assets):</u>	<u>Cost</u>	<u>Expected Equipment Life</u>	<u>Annual Cost</u>	
Unit Heaters (8 total)	\$6,000	15 yr	\$538	
Boiler circ pumps (2)	\$1,000	10 yr	\$122	
Process circ pumps (2)	\$1,500	10 yr	\$183	
Inflation rate	2 %		Total	\$843

Total Estimated Annual Costs for the WTP/Washeteria Bldg	
Labor	\$3,744
Materials	\$500
Electricity	\$4,038
Heating Oil	\$8,034
Miscellaneous	\$0
R&R Cost (Short Lived Assets)	\$843
Total	<u>\$17,160</u>

\$0.0108 /gallon of water

WATER TREATMENT SYSTEM

System Data:

Type of system: Oxidation with Conventional Filtration	
Design flow rate	20 gpm
Average Daily Demand	4,350 gpd

Operational Costs:

Burdened labor rate for an Operator	\$18 /hr
Labor to treat the water	20 hr/week
Electricity	\$0.54 /kwh with PCE credit
Heating oil	\$4.00 /gallon
Available energy of heating fuel	110,000 BTU/gal
Raw water heat addition (10 ⁰ F)	83 BTU/gallon

Estimated Annual Costs

<u>Electrical Demand</u>		Average Usage (hrs/year)	Annual Demand (kwh)	Annual Cost
Oxidizer Pump	45 watts	1,323	60	\$32
Polymer Pump	0.33 hp	1,323	326	\$176
Chlorine Pump	45 watts	1,323	60	\$32
Mixers(2)	0.33 hp	104	26	\$14
Floc Drive	0.33 hp	1,323	326	\$176
Filter Effluent Pump	0.75 hp	1,323	740	\$400
Backwash Pump	3 hp	26	58	\$31
Air Blower	2 hp	26	39	\$21
			Total	\$882

<u>Heating Demand:</u>	Hourly Demand BTU/hr	Annual Demand (MBTU)	Annual Demand (gal of fuel)	Annual Cost
Raw water heat addition	99,600	131,783	1,198	\$4,792
			Total	\$4,792

Miscellaneous

<u>Chemicals</u>	Unit Cost w/ Freight	Annual Use (lbs/gallons)	Annual Cost
Potassium permanganate	\$15.00 /lb	69	\$1,029
Coagulants	\$90.00 /gallon	13	\$1,153
Calcium hypochlorite	\$6.50 /lb	77	\$498
		Total	\$2,679

<u>Water Quality Analysis:</u>	<u>Cost</u>	<u>Frequency</u>	<u>Annual Cost</u>
Total Coliform	\$50.00 /ea	1 /month	\$600
Arsenic	\$45.00 /ea	1 /yr	\$45
TTHM/HAA5	\$350.00 /ea	4 /yr	\$1,400
Lead and Copper	\$80.00 /ea	1 /yr	\$80
Sample shipment	\$50.00 /ea cooler	1 /month	\$600
		Total	<u>\$2,725</u>

<u>R&R Costs (Short Lived Assets):</u>	<u>Cost</u>	<u>Expected Equipment Life</u>	<u>Annual Cost</u>
Chemical Pumps (3)	\$6,000	5 yr	\$1,325
Mixers (2)	\$3,000	10 yr	\$366
Filter Effluent Pump	\$3,500	10 yr	\$427
Backwash Pump	\$4,500	10 yr	\$549
Air Blower	\$4,000	10 yr	\$488
Inflation rate	2 %		
		Total	<u>\$3,153</u>

Total Estimated Annual Costs for Water Treatment

Labor	\$18,720
Materials	\$2,679
Electricity	\$882
Heating Oil	\$4,792
Miscellaneous	\$2,725
R&R Cost (Short Lived Assets)	\$3,153
Total	<u>\$32,952</u>

\$0.0208 /gallon of water

WATER STORAGE TANK

System Data:

Average Daily Demand	4,350 gallons
Water Storage Tank Diameter	20 ft
Water Storage Tank Height	16 ft
Storage Volume	35,000 gallons
Length of WST piping	50 feet

Operational Assumptions:

Burdened labor rate for an Operator	\$18 /hr
Operation and maintenance of WST	1 hr/wk
Misc materials and supplies	\$100 /yr
Electricity	\$0.54 /kwh with PCE credit
Heating oil	\$4.00 /gallon
Available energy of heating fuel	110,000 BTU
Operation of raw water circ pump	9 months/yr @ 24 hrs/day
Heat loss for above grade arctic pipe	5 BTU/ft/hr
WST interior temperature	45 F
WST cleaning (interior)	\$1,000 / 2 years
WST coating inspection and repairs	\$5,000 / 5 years

Estimated Annual Costs

<u>Electrical Demand:</u>	<u>Power</u>	<u>Average Usage (hrs/year)</u>	<u>Annual Demand (kwh)</u>	<u>Annual Cost</u>
Water Circulation Pumps	0.15 hp	6566	734	\$397
			Total	\$397

<u>Heating Demand:</u>	<u>Hourly Demand BTU/hr</u>	<u>Annual Demand (MBTU)</u>	<u>Annual Demand (gal of fuel)</u>	<u>Annual Cost</u>
WST piping	250	2,190	20	\$80
Water storage tank	472	4,136	38	\$150
			Total	\$230

<u>Miscellaneous</u>	<u>Cost</u>	<u>Frequency</u>	<u>Annual Cost</u>
WST cleaning (interior)	\$1,000	Every 2 yrs	\$500
WST coating inspection and repairs	\$3,000	Every 5 yrs	\$600
		Total	\$1,100

<u>R&R Costs (Short Lived Assets):</u>	<u>Cost</u>	<u>Expected Equipment Life</u>	<u>Annual Cost</u>
Water Circulation Pumps (2)	\$1,000	10 yr	\$122
Heat Exchanger	\$2,500	15 yr	\$224
Inflation rate	2 %	Total	\$346

Total Estimated Annual O & M Costs for Water Storage	
Labor	\$936
Materials	\$100
Electricity	\$397
Heating Oil	\$230
Miscellaneous	\$1,100
R&R Cost (Short Lived Assets)	\$346
Total	<u>\$3,109</u>

\$ 0.0020 /gallon of water

WATER DISTRIBUTION SYSTEM

System Data:

Average Daily Demand	4,350 gallons
Pressure pump size	2 hp
Pressure pump flow rate	35 gpm
Operation of the pressure pumps	On-demand
Water main circ pump size	0.25
Water main circ pump flow rate	20 gpm
Operation of the water main circ pump	9 months/yr @ 24 hrs/day
Length of the water line to the school	1,400 feet

Operational Assumptions:

Burdened labor rate for an Operator	\$18 /hr
Labor - Water distribution system	1 hr/wk
Misc materials and supplies	\$100 /yr
Electricity	\$0.54 /kwh with PCE credit
Heating oil	\$4.00 /gallon
Available energy of heating fuel	110,000 BTU
Heat loss for buried arctic pipe	3 BTU/ft/hr

Estimated Annual Costs

<u>Electrical Demand:</u>	<u>Power</u>	<u>Average Usage (hr/day)</u>	<u>Annual Demand (kwh)</u>	<u>Annual Cost</u>
Pressure pumps	2 hp	2.1	1,128	\$609
Water line circ pumps	0.25 hp	24	1,224	\$661
Watering point heat trace	100 watts	24	657	\$355
			Total	\$1,625

<u>Heating Demand:</u>	<u>Quantity BTU/hr</u>	<u>Annual Demand (MBTU)</u>	<u>Annual Demand (gal of fuel)</u>	<u>Annual Cost</u>
Water line to the school	4,200	27,579	251	\$1,003
			Total	\$1,003

<u>Miscellaneous</u>	<u>Cost</u>	<u>Frequency</u>	<u>Annual Cost</u>	
None	0	\$0	\$0	
			Total	\$0

<u>R&R Costs (Short Lived Assets):</u>	<u>Cost</u>	<u>Expected Equipment Life</u>	<u>Annual Cost</u>	
Pressure pumps (2)	\$4,500	10 yr	\$549	
Circulation pumps (2)	\$1,500	10 yr	\$183	
Heat Exchanger	\$3,500	15 yr	\$314	
Inflation rate		2 %	Total	\$1,045

Estimated Annual Costs for Water Distribution	
Labor	\$936
Materials	\$100
Electricity	\$1,625
Heating Oil	\$1,003
Miscellaneous	\$0
R&R Cost (Short Lived Assets)	\$1,045
Total	<u>\$4,709</u>

\$ 0.0030 /gallon of water

LAUNDRY EQUIPMENT AND SHOWERS

System Data:

Number of washers	4 each
Number of dryers	4 each
Average number of washer loads each day	14
Average number of dryer loads each day	12
Washer load duration	0.5 hr
Dryer load duration	0.5 hr
Washer water use	28 gallons/load
Washer water temperature	65 F
Average number of showers taken each day	1.5
Shower flow rate	2 gpm
Shower water temperature	105 F
Shower duration	10 minutes

Operational Assumptions:

Burdened rate for washeteria attendant/custodian	\$14 /hr
Washeteria operation	8 hr/day
	7 days/week
Labor for washeteria attendant (~4hrs/day)	30 hr/wk
Electricity	\$0.54 /kwh with PCE credit
Heating oil	\$4.00 /gallon
Water	\$0.0526 /gallon
Misc materials and supplies	\$300 /yr
Washer and dryer maintenance	\$1,000 /yr
Available energy of heating fuel	110,000 BTU
Dryer heating	134,700 BTU/hr
Makeup air per dryer	500 cfm

Estimated Annual Costs

<u>Electrical Demand:</u>	<u>Load Amps</u>	<u>kwh/load</u>	<u>Average Usage (kwh/day)</u>	<u>Annual Usage (kwh/yr)</u>	<u>Annual Cost</u>
20 lb Washers	3.6	0.37	5.2416	1,635	\$883
30 lb Dryers	3.2	0.33	3.9936	1,246	\$673
				Total	\$1,556

<u>Heating Demand:</u>	<u>Heating Demand (BTU/load)</u>	<u>Daily Demand (BTU/day)</u>	<u>Annual Demand (MBTU)</u>	<u>Annual Demand (gal of fuel)</u>	<u>Annual Cost</u>
Dryer heating	67,350	808,200	252,158	2,292	\$9,169
Dryer makeup air	21,060	252,720	78,849	717	\$2,867
Water heater - washers	4,670	65,386	20,400	185	\$742
Water heater - showers	10,008	15,012	4,684	43	\$170
				Total	\$12,949

<u>Miscellaneous</u>	<u>Quantity</u>	<u>Cost</u>	<u>Frequency</u>	<u>Annual Cost</u>
Washer and dryer maintenance	1	\$1,000	Each year	\$1,000
			Total	\$1,000

<u>R&R Costs (Short Lived Assets):</u>	<u>Cost</u>	<u>Expected Equipment Life</u>	<u>Annual Cost</u>
Washers (4)	\$18,800	10 yr	\$2,292
Dryers (4)	\$21,600	10 yr	\$2,633
Water Heater (1)	\$3,500	10 yr	\$427
Inflation rate	2 %		
		Total	<u>\$5,351</u>

Estimated Annual Costs for Laundry Equipment and Showers

Labor	\$21,840
Materials	\$300
Electricity	\$1,556
Heating Oil	\$12,949
Miscellaneous	\$1,000
R&R Cost (Short Lived Assets)	<u>\$5,351</u>
Total	\$42,996

Approximate Unit Costs for Laundry and Showers

Washer Load	\$4.15
Dryer Load	\$5.66
Shower	\$9.52

WASTEWATER COLLECTION AND DISPOSAL

System Data:

Average Daily Demand	4,350 gallons
Washeteria wastewater flow	400 gallons/day
Backwash wastewater flow	6,790 gallons/week
Lift station pump size	5 hp
Lift station pump flow rate	100 gpm
Operation of the lift station pumps	On-demand
Force main glycol circ pump size	0.25
Force main glycol circ pump flow rate	10 gpm
Operation of the force main glycol circ pump	9 months/yr @ 24 hrs/day
Length of force main to the old lagoon	600 feet

Operational Assumptions:

Burdened labor rate for an Operator	\$18 /hr
Labor - Wastewater collection system	1 hr/wk
Misc materials and supplies	\$100 /yr
Electricity	\$0.54 /kwh with PCE credit
Heating oil	\$4.00 /gallon
Available energy of heating fuel	110,000 BTU
Heat loss for buried arctic pipe	3 BTU/ft/hr
Lagoon maintenance	\$500 /yr

Estimated Annual Costs

<u>Electrical Demand:</u>	<u>Power</u>	<u>Average Usage (hr/day)</u>	<u>Annual Demand (kwh)</u>	<u>Annual Cost</u>
Lift station pumps	5 hp	0.2	311	\$168
FM glycol circ pumps	0.25 hp	24	1,224	\$661
			Total	\$829

<u>Heating Demand:</u>	<u>Quantity BTU/hr</u>	<u>Annual Demand (MBTU)</u>	<u>Annual Demand (gal of fuel)</u>	<u>Annual Cost</u>
Lift station wet well	500	3,283	30	\$119
Force main to the lagoon	1,800	11,820	107	\$430
			Total	\$549

<u>Miscellaneous</u>	<u>Quantity</u>	<u>Cost</u>	<u>Frequency</u>	<u>Annual Cost</u>
Lagoon maintenance	1	\$500	Each year	\$500
			Total	\$500

<u>Capital Equipment Replacement:</u>	<u>Cost</u>	<u>Expected Equipment Life</u>	<u>Annual Cost</u>	
Lift station pumps (2)	\$7,500	10 yr	\$914	
Circulation pumps (2)	\$1,000	10 yr	\$122	
Heat Exchanger	\$2,500	15 yr	\$224	
Inflation rate		2 %	Total	\$1,260

Estimated Annual Costs for Wastewater Collection and Disposal

Labor	\$936
Materials	\$100
Electricity	\$829
Heating Oil	\$549
Miscellaneous	\$500
R&R Cost (Short Lived Assets)	\$1,260
Total	<u>\$4,174</u>

\$ 0.0026 /gallon of water

POWER PLANT HEAT RECOVERY SYSTEM

System Data:

Estimated available heat	200,000 BTU/hr
<u>Heating demands</u>	
Raw water transmission line	750 BTU/hr
Water treatment plant building	33,648 BTU/hr
Raw water heat addition	99,600 BTU/hr
WST piping	250 BTU/hr
Water storage tank	472 BTU/hr
Water line to the school	4,200 BTU/hr
Dryer heating	101,025 BTU/hr
Dryer Makeup Air	31,590 BTU/hr
Water Heater - Washers	8,173 BTU/hr
Water Heater - Showers	1,877 BTU/hr
Lift station wet well	500 BTU/hr
Force main to the lagoon	1,800 BTU/hr
	283,884 BTU/hr
Peak heat demand	283,884 BTU/hr
Continous heat demand	41,620 BTU/hr
HR circ pump size	1.0 hp
Circ pump flow rate	25 gpm
Length of heat recovery lines	350 feet

Operational Assumptions:

Burdened labor rate for WTP operator	\$18 /hr
Labor to operate and maintain HR system	1 hr/week
Electricity	\$0.54 /kwh with PCE credit
Heating oil	\$4.00 gallon
Operation of HR circ pump	12 months/yr @ 24 hrs/day
Available energy of heating fuel	110,000 BTU/gallon
Heat loss for buried arctic pipe	BTU/ft/hr
Misc materials and supplies	\$100 /yr

Estimated Annual Costs

<u>Electrical Demand:</u>	<u>Power</u>	<u>Average Usage (hrs/year)</u>	<u>Annual Demand (kwh)</u>	<u>Annual Cost</u>
HR circ pump	1.0 hp	8760	6,532	\$3,527
			Total	\$3,527

<u>Heating Supply from HR:</u>	<u>Quantity BTU/hr</u>	<u>Annual Demand (MBTU)</u>	<u>Annual Demand (gal of fuel)</u>	<u>Annual Savings</u>
Continuous heat demand	41,620	273,292	2,484	-\$9,938
Raw water heat addition	99,600	131,783	1,198	-\$4,792
Dryer makeup air	31,590	78,849	717	-\$2,867
Washers	8,173	20,400	185	-\$742
Showers	1,877	4,684	43	-\$170
			Total	-\$18,509

<u>Miscellaneous</u>	<u>Quantity</u>	<u>Cost</u>	<u>Frequency (years)</u>	<u>Annual Cost</u>
None	0	\$0		\$0
			Total	\$0

<u>R&R Costs (Short Lived Assets):</u>	<u>Cost</u>	<u>Expected Equipment Life</u>	<u>Annual Cost</u>
HR circ pumps (2)	\$1,500	10 yr	\$183
HR system heat exchanger (2)	\$8,000	15 yr	\$718
Inflation rate	2 %		
		Total	\$901

Total Estimated Annual Costs for the HR System

Labor	\$936
Materials	\$100
Electricity	\$3,527
Heating Oil	-\$18,509
Miscellaneous	\$0
R&R Cost (Short Lived Assets)	\$901
Total	<u>-\$13,045</u>

Estimated Annual Costs

Alternative 2 - Rehabilitate Existing WTP/Washeteria	
Item	Cost
Administration	\$ 17,500
Labor	\$ 49,000
Materials	\$ 4,000
Electricity	\$ 15,600
Heating oil	\$ 21,400
Miscellaneous	\$ 5,900
R&R (Short Lived Assets)	\$ 14,300
Total Estimated Annual Cost	\$ 128,000

ADMINISTRATION

System Data:

Washeteria / WTP bldg
 Water storage tank
 Water line to the school
 Community watering point
 Two wells
 Sewage lagoon - single cell percolating

Operational Assumptions:

Avg burdened labor rate for admin staff	\$16 /hr
Administrative labor	6 hr/wk
Average Daily Water Demand	4,350 gpd

Other Assumptions

Misc supplies	\$500 /yr
Postage / freight	\$1,000 /yr
Insurance (for the W / WTP bldg)	\$7,500 /yr
Travel and training	\$3,500 /yr

Total Estimated Annual Costs for Utility Administration

Labor	\$4,992
Materials	\$500
Electricity	\$0
Heating Oil	\$0
Miscellaneous	\$12,000
R&R Cost (Short Lived Assets)	\$0
Total	\$17,492

\$ 0.0110 \$/gallon

UTILITY CORE SITE 2005 WELLSSystem Data:

Average Daily Demand	4,350 gpd
Number of wells	2
Well pump size	1.5 hp
Well pump flow rate	20 gpm
Length of raw water transmission line	1750 feet

Operational Assumptions:

Burdened labor rate for WTP operator	\$18 /hr
Labor to operate and maintain the wells	1 hr/week
Electricity	\$0.54 /kwh with PCE credit
Heating oil	\$4.00 gallon
Operation of the well pump(s)	On-demand
Operation of raw water circ pump	9 months/yr @ 24 hrs/day
Available energy of heating fuel	110,000 BTU/gallon
Heat loss for buried arctic pipe	3 BTU/ft/hr
Cost to clean and redevelop a well	\$2,500
Frequency of well cleaning/redevelopment	10 years
Misc materials and supplies	\$100 /yr

Estimated Annual Costs

<u>Electrical Demand:</u>	<u>Power</u>	<u>Average Usage (hrs/year)</u>	<u>Annual Demand (kwh)</u>	<u>Annual Cost</u>
Submersible Pump	1.5 hp	1323	1,480	\$799
Circ Pump	0.25 hp	6570	1,225	\$661
			Total	\$1,461
<u>Heating Demand:</u>	<u>Hourly Demand BTU/hr</u>	<u>Annual Demand (MBTU)</u>	<u>Annual Demand (gal of fuel)</u>	<u>Annual Cost</u>
Raw water transmission line	5,250	34,474	313	\$1,254
			Total	\$1,254
<u>Miscellaneous</u>	<u>Quantity</u>	<u>Cost</u>	<u>Frequency (years)</u>	<u>Annual Cost</u>
Well Maintenance	2	\$2,500	10	\$500
			Total	\$500
<u>R&R Costs (Short Lived Assets):</u>	<u>Cost</u>	<u>Expected Equipment Life</u>	<u>Annual Cost</u>	
Submersible pumps (2)	\$3,000	5 yr	\$662	
Raw water circ pump (2)	\$1,500	5 yr	\$331	
Raw water heat exchanger	\$3,500	15 yr	\$314	
Inflation rate	2 %		Total	\$1,308

Total Estimated Annual Costs for the Wells

Labor	\$936
Materials	\$100
Electricity	\$1,461
Heating Oil	\$1,254
Miscellaneous	\$500
R&R Cost (Short Lived Assets)	\$1,308
Total	<u>\$5,558</u>

\$ 0.0035 /gallon of water

WTP / WASHETERIA BUILDINGSystem Data:

Average Daily Demand	4,350 gpd
WTP / Washeteria Building Area	2,048 sf
Number of unit heaters	8

Operational Costs:

Burdened labor rate for the Operator	\$18 /hr
Labor - Operation and maintenance of building	4 hr/wk
Electricity	\$0.54 /kwh with PCE credit
Heating oil	\$4.00 /gallon
Available energy of heating fuel	110,000 BTU/gal
Misc Materials and Supplies	\$500 /yr

Estimated Annual Costs

<u>Electrical Demand:</u>	<u>Power</u>	<u>Average Usage (hr/day)</u>	<u>Annual Demand (kwh)</u>	<u>Annual Cost</u>
Building unit heaters	50 watts	6	876	\$473
Building lights	0.4 watts/ft2	8	2,392	\$1,292
Boilers	0.33 hp	6	539	\$291
Boiler circ pump	0.17 hp	24	1,110	\$600
Process circ pump	0.25 hp	24	1,633	\$882
			Total	\$3,537
<u>Heating Demand:</u>	<u>Hourly Demand BTU/hr</u>	<u>Annual Demand (MBTU)</u>	<u>Annual Demand (gal of fuel)</u>	<u>Annual Cost</u>
WTP Building (maintained @ 68 F)	33,181	217,882	1,981	\$7,923
			Total	\$7,923
<u>Miscellaneous</u>	<u>Quantity</u>	<u>Cost</u>		<u>Annual Cost</u>
None	0	\$0		\$0
			Total	\$0
<u>R&R Costs (Short Lived Assets):</u>	<u>Cost</u>	<u>Expected Equipment Life</u>		<u>Annual Cost</u>
Unit Heaters (8 total)	\$6,000	15 yr		\$538
Boiler circ pumps (2)	\$1,000	10 yr		\$122
Process circ pumps (2)	\$1,500	10 yr		\$183
Inflation rate		2 %	Total	\$843

Total Estimated Annual Costs for the WTP/Washeteria Bldg

Labor	\$3,744
Materials	\$500
Electricity	\$3,537
Heating Oil	\$7,923
Miscellaneous	\$0
R&R Cost (Short Lived Assets)	\$843
Total	<u>\$16,547</u>

\$0.0104 /gallon of water

WATER TREATMENT SYSTEMSystem Data:

Type of system: Oxidation with Conventional Filtration	
Design flow rate	20 gpm
Average Daily Demand	4,350 gpd

Operational Costs:

Burdened labor rate for an Operator	\$18 /hr
Labor to treat the water	20 hr/week
Electricity	\$0.54 /kwh with PCE credit
Heating oil	\$4.00 /gallon
Available energy of heating fuel	110,000 BTU/gal
Raw water heat addition (10°F)	83 BTU/gallon

Estimated Annual Costs

<u>Electrical Demand</u>		Average Usage (hrs/year)	Annual Demand (kwh)	Annual Cost
Oxidizer Pump	45 watts	1,323	60	\$32
Polymer Pump	0.33 hp	1,323	326	\$176
Chlorine Pump	45 watts	1,323	60	\$32
Mixers(2)	0.33 hp	104	26	\$14
Floc Drive	0.33 hp	1,323	326	\$176
Filter Effluent Pump	0.75 hp	1,323	740	\$400
Backwash Pump	3 hp	26	58	\$31
Air Blower	2 hp	26	39	\$21
			Total	\$882

<u>Heating Demand:</u>	Hourly Demand BTU/hr	Annual Demand (MBTU)	Annual Demand (gal of fuel)	Annual Cost
Raw water heat addition	99,600	131,783	1,198	\$4,792
			Total	\$4,792

Miscellaneous

<u>Chemicals</u>	Unit Cost w/ Freight	Annual Use (lbs/gallons)	Annual Cost
Potassium permanganate	\$15.00 /lb	69	\$1,029
Coagulants	\$90.00 /gallon	13	\$1,153
Calcium hypochlorite	\$6.50 /lb	77	\$498
		Total	\$2,679

<u>Water Quality Analysis:</u>	<u>Cost</u>	<u>Frequency</u>	<u>Annual Cost</u>
Total Coliform	\$50.00 /ea	1 /month	\$600
Arsenic	\$45.00 /ea	1 /yr	\$45
TTHM/HAA5	\$350.00 /ea	4 /yr	\$1,400
Lead and Copper	\$80.00 /ea	1 /yr	\$80
Sample shipment	\$50.00 /ea cooler	1 /month	\$600
		Total	<u>\$2,725</u>

<u>R&R Costs (Short Lived Assets):</u>	<u>Cost</u>	<u>Expected Equipment Life</u>	<u>Annual Cost</u>
Chemical Pumps (3)	\$6,000	5 yr	\$1,325
Mixers (2)	\$3,000	10 yr	\$366
Filter Effluent Pump	\$3,500	10 yr	\$427
Backwash Pump	\$4,500	10 yr	\$549
Air Blower	\$4,000	10 yr	\$488
Inflation rate	2 %		
		Total	<u>\$3,153</u>

Total Estimated Annual Costs for Water Treatment

Labor	\$18,720
Materials	\$2,679
Electricity	\$882
Heating Oil	\$4,792
Miscellaneous	\$2,725
R&R Cost (Short Lived Assets)	\$3,153
Total	<u>\$32,952</u>

\$0.0208 /gallon of water

WATER STORAGE TANK

System Data:

Average Daily Demand	4,350 gallons
Water Storage Tank Diameter	16 ft
Water Storage Tank Height	24 ft
Storage Volume	35,000 gallons
Length of WST piping	100 feet

Operational Assumptions:

Burdened labor rate for an Operator	\$18 /hr
Operation and maintenance of WST	1 hr/wk
Misc materials and supplies	\$100 /yr
Electricity	\$0.54 /kwh with PCE credit
Heating oil	\$4.00 /gallon
Available energy of heating fuel	110,000 BTU
Operation of raw water circ pump	9 months/yr @ 24 hrs/day
Heat loss for above grade arctic pipe	5 BTU/ft/hr
WST interior temperature	45 F
WST cleaning (interior)	\$1,000 / 2 years
WST coating inspection and repairs	\$5,000 / 5 years

Estimated Annual Costs

<u>Electrical Demand:</u>	<u>Power</u>	<u>Average Usage (hrs/year)</u>	<u>Annual Demand (kwh)</u>	<u>Annual Cost</u>
Water Circulation Pumps	0.15 hp	6566	734	\$397
			Total	\$397

<u>Heating Demand:</u>	<u>Hourly Demand BTU/hr</u>	<u>Annual Demand (MBTU)</u>	<u>Annual Demand (gal of fuel)</u>	<u>Annual Cost</u>
WST piping	500	4,380	40	\$159
Water storage tank	472	4,136	38	\$150
			Total	\$310

<u>Miscellaneous</u>	<u>Cost</u>	<u>Frequency</u>	<u>Annual Cost</u>
WST cleaning (interior)	\$1,000	Every 2 yrs	\$500
WST coating inspection and repairs	\$3,000	Every 5 yrs	\$600
		Total	\$1,100

<u>R&R Costs (Short Lived Assets):</u>	<u>Cost</u>	<u>Expected Equipment Life</u>	<u>Annual Cost</u>
Water Circulation Pumps (2)	\$1,000	10 yr	\$122
Heat Exchanger	\$2,500	15 yr	\$224
Inflation rate	2 %	Total	\$346

Total Estimated Annual O & M Costs for Water Storage	
Labor	\$936
Materials	\$100
Electricity	\$397
Heating Oil	\$310
Miscellaneous	\$1,100
R&R Cost (Short Lived Assets)	\$346
Total	<u>\$3,188</u>

\$ 0.0020 /gallon of water

WATER DISTRIBUTION SYSTEM

System Data:

Average Daily Demand	4,350 gallons
Pressure pump size	2 hp
Pressure pump flow rate	35 gpm
Operation of the pressure pumps	On-demand
Water main circ pump size	0.16
Water main circ pump flow rate	10 gpm
Operation of the water main circ pump	9 months/yr @ 24 hrs/day
Length of the water line to the school	100 feet

Operational Assumptions:

Burdened labor rate for an Operator	\$18 /hr
Labor - Water distribution system	1 hr/wk
Misc materials and supplies	\$100 /yr
Electricity	\$0.54 /kwh with PCE credit
Heating oil	\$4.00 /gallon
Available energy of heating fuel	110,000 BTU
Heat loss for buried arctic pipe	3 BTU/ft/hr

Estimated Annual Costs

Electrical Demand:	<u>Power</u>	<u>Average Usage (hr/day)</u>	<u>Annual Demand (kwh)</u>	<u>Annual Cost</u>
Pressure pumps	2 hp	2.1	1,128	\$609
Water line circ pumps	0.16 hp	24	783	\$423
Watering point heat trace	100 watts	24	657	\$355
			Total	\$1,387

Heating Demand:	<u>Quantity BTU/hr</u>	<u>Annual Demand (MBTU)</u>	<u>Annual Demand (gal of fuel)</u>	<u>Annual Cost</u>
Water line to the school	300	1,970	18	\$72
			Total	\$72

Miscellaneous	<u>Cost</u>	<u>Frequency</u>	<u>Annual Cost</u>	
None	0	\$0	\$0	
			Total	\$0

R&R Costs (Short Lived Assets):	<u>Cost</u>	<u>Expected Equipment Life</u>	<u>Annual Cost</u>	
Pressure pumps (2)	\$4,500	10 yr	\$549	
Circulation pumps (2)	\$1,500	10 yr	\$183	
Heat Exchanger	\$3,500	15 yr	\$314	
Inflation rate		2 %	Total	\$1,045

Estimated Annual Costs for Water Distribution	
Labor	\$936
Materials	\$100
Electricity	\$1,387
Heating Oil	\$72
Miscellaneous	\$0
R&R Cost (Short Lived Assets)	\$1,045
Total	<u>\$3,540</u>

\$ 0.0022 /gallon of water

LAUNDRY EQUIPMENT AND SHOWERS

System Data:

Number of washers	4 each
Number of dryers	4 each
Average number of washer loads each day	14
Average number of dryer loads each day	12
Washer load duration	0.5 hr
Dryer load duration	0.5 hr
Washer water use	28 gallons/load
Washer water temperature	65 F
Average number of showers taken each day	1.5
Shower flow rate	2 gpm
Shower water temperature	105 F
Shower duration	10 minutes

Operational Assumptions:

Burdened rate for washeteria operator	\$14 /hr
Washeteria operation	8 hr/day
	7 days/week
Labor for washeteria attendant (~4hrs/day)	30 hr/wk
Electricity	\$0.54 /kwh with PCE credit
Heating oil	\$4.00 /gallon
Water	\$0.0535 /gallon
Misc materials and supplies	\$300 /yr
Washer and dryer maintenance	\$1,000 /yr
Available energy of heating fuel	110,000 BTU
Dryer heating	134,700 BTU/hr
Makeup air per dryer	500 cfm

Estimated Annual Costs

Electrical Demand:	Load Amps	kwh/load	Average Usage (kwh/day)	Annual Usage (kwh/yr)	Annual Cost
20 lb Washers	3.6	0.37	5.2416	1,635	\$883
30 lb Dryers	3.2	0.33	3.9936	1,246	\$673
				Total	\$1,556

Heating Demand:	Heating Demand (BTU/load)	Daily Demand (BTU/day)	Annual Demand (MBTU)	Annual Demand (gal of fuel)	Annual Cost
Dryer heating	67,350	808,200	252,158	2,292	\$9,169
Dryer makeup air	21,060	252,720	78,849	717	\$2,867
Water heater - washers	4,670	65,386	20,400	185	\$742
Water heater - showers	10,008	15,012	4,684	43	\$170
				Total	\$12,949

Miscellaneous	Quantity	Cost	Frequency	Annual Cost
Washer and dryer maintenance	1	\$1,000	Each year	\$1,000
			Total	\$1,000

<u>R&R Costs (Short Lived Assets):</u>	<u>Cost</u>	<u>Expected Equipment Life</u>	<u>Annual Cost</u>
Washers (4)	\$18,800	10 yr	\$2,292
Dryers (4)	\$21,600	10 yr	\$2,633
Water Heater (1)	\$3,500	10 yr	\$427
Inflation rate	2 %		
		Total	<u>\$5,351</u>

Estimated Annual Costs for Laundry Equipment and Showers

Labor	\$21,840
Materials	\$300
Electricity	\$1,556
Heating Oil	\$12,949
Miscellaneous	\$1,000
R&R Cost (Short Lived Assets)	<u>\$5,351</u>
Total	\$42,996

Approximate Unit Costs for Laundry and Showers

Washer Load	\$4.18
Dryer Load	\$5.66
Shower	\$9.54

WASTEWATER COLLECTION AND DISPOSAL

System Data:

Average Daily Demand	4,350 gallons
Washeteria wastewater flow	400 gallons/day
Backwash wastewater flow	6,790 gallons/week
Lift station pump size	5 hp
Lift station pump flow rate	100 gpm
Operation of the lift station pumps	On-demand
Electric heat trace for the force main	5 watts/ft
Length of electric heat trace for force main	150 ft
Operation of electric heat trace for the force main	9 months/yr @ 24 hrs/day
Length of force main to the old lagoon	150 feet

Operational Assumptions:

Burdened labor rate for an Operator	\$18 /hr
Labor - Wastewater collection system	1 hr/wk
Misc materials and supplies	\$100 /yr
Electricity	\$0.54 /kwh with PCE credit
Heating oil	\$4.00 /gallon
Available energy of heating fuel	110,000 BTU
Heat loss for buried arctic pipe	3 BTU/ft/hr
Lagoon maintenance	\$500 /yr

Estimated Annual Costs

<u>Electrical Demand:</u>	<u>Power</u>	<u>Average Usage (hr/day)</u>	<u>Annual Demand (kwh)</u>	<u>Annual Cost</u>
Lift station pumps	5 hp	0.2	311	\$168
Force main heat trace	750 watts	24	4,925	\$2,659
			Total	\$2,827

<u>Heating Demand:</u>	<u>Quantity BTU/hr</u>	<u>Annual Demand (MBTU)</u>	<u>Annual Demand (gal of fuel)</u>	<u>Annual Cost</u>
Lift station wet well	500	3,283	30	\$119
			Total	\$119

<u>Miscellaneous</u>	<u>Quantity</u>	<u>Cost</u>	<u>Frequency</u>	<u>Annual Cost</u>
Lagoon maintenance	1	\$500	Each year	\$500
			Total	\$500

<u>Capital Equipment Replacement:</u>	<u>Cost</u>	<u>Expected Equipment Life</u>	<u>Annual Cost</u>	
Lift station pumps (2)	\$7,500	10 yr	\$914	
Circulation pumps (2)	\$1,000	10 yr	\$122	
Heat Exchanger	\$2,500	15 yr	\$224	
Inflation rate	2 %		Total	\$1,260

Estimated Annual Costs for Wastewater Collection and Disposal

Labor	\$936
Materials	\$100
Electricity	\$2,827
Heating Oil	\$119
Miscellaneous	\$500
R&R Cost (Short Lived Assets)	\$1,260
Total	<u>\$5,743</u>

\$ 0.0036 /gallon of water

POWER PLANT HEAT RECOVERY SYSTEM

System Data:

Estimated available heat	200,000 BTU/hr
<u>Heating demands</u>	
Raw water transmission line	5,250 BTU/hr
Water treatment plant building	33,181 BTU/hr
Raw water heat addition	99,600 BTU/hr
WST piping	500 BTU/hr
Water storage tank	472 BTU/hr
Water line to the school	300 BTU/hr
Dryer heating	101,025 BTU/hr
Dryer Makeup Air	31,590 BTU/hr
Water Heater - Washers	8,173 BTU/hr
Water Heater - Showers	1,877 BTU/hr
Lift station wet well	500 BTU/hr
Peak heat demand	282,468 BTU/hr
Continuous heat demand	40,203 BTU/hr

HR circ pump size	1.0 hp
Circ pump flow rate	25 gpm
Length of heat recovery lines	350 feet

Operational Assumptions:

Burdened labor rate for WTP operator	\$18 /hr
Labor to operate and maintain HR system	1 hr/week
Electricity	\$0.54 /kwh with PCE credit
Heating oil	\$4.00 gallon
Operation of HR circ pump	12 months/yr @ 24 hrs/day
Available energy of heating fuel	110,000 BTU/gallon
Heat loss for buried arctic pipe	BTU/ft/hr
Misc materials and supplies	\$100 /yr

Estimated Annual Costs

<u>Electrical Demand:</u>	<u>Power</u>	<u>Average Usage (hrs/year)</u>	<u>Annual Demand (kwh)</u>	<u>Annual Cost</u>
HR circ pump	1.0 hp	8760	6,532	\$3,527
			Total	\$3,527

<u>Heating Supply from HR:</u>	<u>Quantity BTU/hr</u>	<u>Annual Demand (MBTU)</u>	<u>Annual Demand (gal of fuel)</u>	<u>Annual Savings</u>
Raw water transmission line	5,250	34,474	313	-\$1,254
Raw water heat addition	99,600	131,783	1,198	-\$4,792
			Total	-\$6,046

<u>Miscellaneous</u>	<u>Quantity</u>	<u>Cost</u>	<u>Frequency (years)</u>	<u>Annual Cost</u>
None	0	\$0		\$0
			Total	\$0

<u>R&R Costs (Short Lived Assets):</u>	<u>Cost</u>	<u>Expected Equipment Life</u>	<u>Annual Cost</u>
HR circ pump (2)	\$1,500	10 yr	\$183
HR system heat exchanger (2)	\$8,000	15 yr	\$718
Inflation rate	2 %		
		Total	\$901

Total Estimated Annual Costs for the HR System

Labor	\$936
Materials	\$100
Electricity	\$3,527
Heating Oil	-\$6,046
Miscellaneous	\$0
R&R Cost (Short Lived Assets)	\$901
Total	-\$582

Estimated Annual Costs

Alternative 3 - New WTP at Utility Core Site and Rehab Washeteria Bldg	
Item	Cost
Administration	\$ 22,000
Labor	\$ 53,700
Materials	\$ 4,600
Electricity	\$ 18,700
Heating oil	\$ 21,000
Miscellaneous	\$ 5,900
R&R (Short Lived Assets)	\$ 15,500
Total Estimated Annual Cost	\$ 142,000

ADMINISTRATION

System Data:

Washeteria bldg and WTP bldg
 Water storage tank
 Water line to the school
 Community watering point
 Two wells
 Sewage lagoon - single cell percolating

Operational Assumptions:

Avg burdened labor rate for admin staff	\$16 /hr
Administrative labor	6 hr/wk
Average Daily Water Demand	4,350 gpd

Other Assumptions

Misc supplies	\$500 /yr
Postage / freight	\$1,000 /yr
Insurance (for the W and WTP bldgs)	\$12,000 /yr
Travel and training	\$3,500 /yr

Total Estimated Annual Costs for Utility Administration

Labor	\$4,992
Materials	\$500
Electricity	\$0
Heating Oil	\$0
Miscellaneous	\$16,500
R&R Cost (Short Lived Assets)	\$0
Total	\$21,992

\$ 0.0139 \$/gallon

UTILITY CORE SITE 2005 WELLSSystem Data:

Average Daily Demand	4,350 gpd
Number of wells	2
Well pump size	1 hp
Well pump flow rate	20 gpm
Length of raw water transmission line	250 feet

Operational Assumptions:

Burdened labor rate for WTP operator	\$18 /hr
Labor to operate and maintain the wells	1 hr/week
Electricity	\$0.54 /kwh with PCE credit
Heating oil	\$4.00 gallon
Operation of the well pump(s)	On-demand
Operation of raw water circ pump	9 months/yr @ 24 hrs/day
Available energy of heating fuel	110,000 BTU/gallon
Heat loss for buried arctic pipe	3 BTU/ft/hr
Cost to clean and redevelop a well	\$2,500
Frequency of well cleaning/redevelopment	10 years
Misc materials and supplies	\$100 /yr

Estimated Annual Costs

<u>Electrical Demand:</u>	<u>Power</u>	<u>Average Usage (hrs/year)</u>	<u>Annual Demand (kwh)</u>	<u>Annual Cost</u>
Submersible Pump	1.0 hp	1323	987	\$533
Circ Pump	0.25 hp	6570	1,225	\$661
			Total	\$1,194

<u>Heating Demand:</u>	<u>Hourly Demand BTU/hr</u>	<u>Annual Demand (MBTU)</u>	<u>Annual Demand (gal of fuel)</u>	<u>Annual Cost</u>
Raw water transmission line	750	4,925	45	\$179
			Total	\$179

<u>Miscellaneous</u>	<u>Quantity</u>	<u>Cost</u>	<u>Frequency (years)</u>	<u>Annual Cost</u>
Well Maintenance	2	\$2,500	10	\$500
			Total	\$500

<u>R&R Costs (Short Lived Assets):</u>	<u>Cost</u>	<u>Expected Equipment Life</u>	<u>Annual Cost</u>	
Submersible pumps (2)	\$2,500	5 yr	\$552	
Raw water circ pump (2)	\$1,000	5 yr	\$221	
Raw water heat exchanger	\$3,500	15 yr	\$314	
Inflation rate	2 %		Total	\$1,087

Total Estimated Annual Costs for the Wells

Labor	\$936
Materials	\$100
Electricity	\$1,194
Heating Oil	\$179
Miscellaneous	\$500
R&R Cost (Short Lived Assets)	\$1,087
Total	<u>\$3,996</u>

\$ 0.0025 /gallon of water

WTP BUILDINGSystem Data:

Average Daily Demand	4,350 gpd
WTP building area	1,440 sf
Number of unit heaters	6

Operational Costs:

Burdened labor rate for the Operator	\$18 /hr
Labor - Operation and maintenance of building	4 hr/wk
Electricity	\$0.54 /kwh with PCE credit
Heating oil	\$4.00 /gallon
Available energy of heating fuel	110,000 BTU/gal
Misc materials and supplies	\$500 /yr

Estimated Annual Costs

<u>Electrical Demand:</u>	<u>Power</u>	<u>Average Usage (hr/day)</u>	<u>Annual Demand (kwh)</u>	<u>Annual Cost</u>
Building unit heaters	50 watts	6	657	\$355
Building lights	0.4 watts/ft ²	8	1,682	\$908
Boilers	0.33 hp	6	539	\$291
Boiler circ pump	0.17 hp	24	1,110	\$600
Process circ pump	0.25 hp	24	1,633	\$882
			Total	\$3,036

<u>Heating Demand:</u>	<u>Hourly Demand BTU/hr</u>	<u>Annual Demand (MBTU)</u>	<u>Annual Demand (gal of fuel)</u>	<u>Annual Cost</u>
WTP Building (maintained @ 68 F)	19,363	127,145	1,156	\$4,623
			Total	\$4,623

<u>Miscellaneous</u>	<u>Quantity</u>	<u>Cost</u>	<u>Annual Cost</u>	
None	0	\$0	\$0	
			Total	\$0

<u>R&R Costs (Short Lived Assets):</u>	<u>Cost</u>	<u>Expected Equipment Life</u>	<u>Annual Cost</u>	
Unit heaters (6 total)	\$4,500	15 yr	\$404	
Boiler circ pumps (2)	\$1,000	10 yr	\$122	
Process circ pumps (2)	\$1,500	10 yr	\$183	
Inflation rate	2 %		Total	\$709

Total Estimated Annual Costs for the WTP Bldg	
Labor	\$3,744
Materials	\$500
Electricity	\$3,036
Heating Oil	\$4,623
Miscellaneous	\$0
R&R Cost (Short Lived Assets)	\$709
Total	<u>\$12,612</u>

\$0.0079 /gallon of water

WASHETERIA BUILDINGSystem Data:

Average Daily Demand	4,350 gpd
Washeteria building area	1,344 sf
Number of unit heaters	6

Operational Costs:

Burdened labor rate for the operator	\$18 /hr
Labor - Operation and maintenance of building	4 hr/wk
Electricity	\$0.54 /kwh with PCE credit
Heating oil	\$4.00 /gallon
Available energy of heating fuel	110,000 BTU/gal
Misc materials and supplies	\$500 /yr

Estimated Annual Costs

<u>Electrical Demand:</u>	<u>Power</u>	<u>Average Usage (hr/day)</u>	<u>Annual Demand (kwh)</u>	<u>Annual Cost</u>
Building unit heaters	50 watts	6	657	\$355
Building lights	0.4 watts/ft2	8	1,570	\$848
Boilers	0.33 hp	6	539	\$291
Boiler circ pump	0.17 hp	24	1,110	\$600
Process circ pump	0.25 hp	24	1,633	\$882
			Total	\$2,975

<u>Heating Demand:</u>	<u>Hourly Demand BTU/hr</u>	<u>Annual Demand (MBTU)</u>	<u>Annual Demand (gal of fuel)</u>	<u>Annual Cost</u>
Washeteria bldg (maintained @ 68 F)	32,613	214,150	1,947	\$7,787
			Total	\$7,787

<u>Miscellaneous</u>	<u>Quantity</u>	<u>Cost</u>	<u>Annual Cost</u>	
None	0	\$0	\$0	
			Total	\$0

<u>R&R Costs (Short Lived Assets):</u>	<u>Cost</u>	<u>Expected Equipment Life</u>	<u>Annual Cost</u>	
Unit Heaters (6 total)	\$4,500	15 yr	\$404	
Boiler circ pumps (2)	\$1,000	10 yr	\$122	
Process circ pumps (2)	\$1,500	10 yr	\$183	
Inflation rate	2 %		Total	\$709

Total Estimated Annual Costs for the Washeteria Bldg	
Labor	\$3,744
Materials	\$500
Electricity	\$2,975
Heating Oil	\$7,787
Miscellaneous	\$0
R&R Cost (Short Lived Assets)	\$709
Total	<u>\$15,715</u>

\$0.0099 /gallon of water

WATER TREATMENT SYSTEM

System Data:

Type of system: Oxidation with Conventional Filtration	
Design flow rate	20 gpm
Average Daily Demand	4,350 gpd

Operational Costs:

Burdened labor rate for an Operator	\$18 /hr
Labor to treat the water	20 hr/week
Electricity	\$0.54 /kwh with PCE credit
Heating oil	\$4.00 /gallon
Available energy of heating fuel	110,000 BTU/gal
Raw water heat addition (10°F)	83 BTU/gallon

Estimated Annual Costs

<u>Electrical Demand</u>		<u>Average Usage (hrs/year)</u>	<u>Annual Demand (kwh)</u>	<u>Annual Cost</u>
Oxidizer Pump	45 watts	1,323	60	\$32
Polymer Pump	0.33 hp	1,323	326	\$176
Chlorine Pump	45 watts	1,323	60	\$32
Mixers(2)	0.33 hp	104	26	\$14
Floc Drive	0.33 hp	1,323	326	\$176
Filter Effluent Pump	0.75 hp	1,323	740	\$400
Backwash Pump	3 hp	26	58	\$31
Air Blower	2 hp	26	39	\$21
			Total	\$882

<u>Heating Demand:</u>	<u>Hourly Demand BTU/hr</u>	<u>Annual Demand (MBTU)</u>	<u>Annual Demand (gal of fuel)</u>	<u>Annual Cost</u>
Raw water heat addition	99,600	131,783	1,198	\$4,792
			Total	\$4,792

Miscellaneous

<u>Chemicals</u>	<u>Unit Cost w/ Freight</u>	<u>Annual Use (lbs/gallons)</u>	<u>Annual Cost</u>
Potassium permanganate	\$15.00 /lb	69	\$1,029
Coagulants	\$90.00 /gallon	13	\$1,153
Calcium hypochlorite	\$6.50 /lb	77	\$498
		Total	\$2,679

<u>Water Quality Analysis:</u>	<u>Cost</u>	<u>Frequency</u>	<u>Annual Cost</u>
Total Coliform	\$50.00 /ea	1 /month	\$600
Arsenic	\$45.00 /ea	1 /yr	\$45
TTHM/HAA5	\$350.00 /ea	4 /yr	\$1,400
Lead and Copper	\$80.00 /ea	1 /yr	\$80
Sample shipment	\$50.00 /ea cooler	1 /month	\$600
		Total	<u>\$2,725</u>

<u>R&R Costs (Short Lived Assets):</u>	<u>Cost</u>	<u>Expected Equipment Life</u>	<u>Annual Cost</u>
Chemical Pumps (3)	\$6,000	5 yr	\$1,325
Mixers (2)	\$3,000	10 yr	\$366
Filter Effluent Pump	\$3,500	10 yr	\$427
Backwash Pump	\$4,500	10 yr	\$549
Air Blower	\$4,000	10 yr	\$488
Inflation rate	2 %		
		Total	<u>\$3,153</u>

Total Estimated Annual Costs for Water Treatment

Labor	\$18,720
Materials	\$2,679
Electricity	\$882
Heating Oil	\$4,792
Miscellaneous	\$2,725
R&R Cost (Short Lived Assets)	\$3,153
Total	<u>\$32,952</u>

\$0.0208 /gallon of water

WATER STORAGE TANK

System Data:

Average Daily Demand	4,350 gallons
Water Storage Tank Diameter	20 ft
Water Storage Tank Height	16 ft
Storage Volume	35,000 gallons
Length of WST piping	50 feet

Operational Assumptions:

Burdened labor rate for an Operator	\$18 /hr
Operation and maintenance of WST	1 hr/wk
Misc materials and supplies	\$100 /yr
Electricity	\$0.54 /kwh with PCE credit
Heating oil	\$4.00 /gallon
Available energy of heating fuel	110,000 BTU
Operation of raw water circ pump	9 months/yr @ 24 hrs/day
Heat loss for above grade arctic pipe	5 BTU/ft/hr
WST interior temperature	45 F
WST cleaning (interior)	\$1,000 / 2 years
WST coating inspection and repairs	\$5,000 / 5 years

Estimated Annual Costs

<u>Electrical Demand:</u>	<u>Power</u>	<u>Average Usage (hrs/year)</u>	<u>Annual Demand (kwh)</u>	<u>Annual Cost</u>
Water Circulation Pumps	0.15 hp	6566	734	\$397
			Total	\$397

<u>Heating Demand:</u>	<u>Hourly Demand BTU/hr</u>	<u>Annual Demand (MBTU)</u>	<u>Annual Demand (gal of fuel)</u>	<u>Annual Cost</u>
WST piping	250	2,190	20	\$80
Water storage tank	472	4,136	38	\$150
			Total	\$230

<u>Miscellaneous</u>	<u>Cost</u>	<u>Frequency</u>	<u>Annual Cost</u>
WST cleaning (interior)	\$1,000	Every 2 yrs	\$500
WST coating inspection and repairs	\$3,000	Every 5 yrs	\$600
		Total	\$1,100

<u>R&R Costs (Short Lived Assets):</u>	<u>Cost</u>	<u>Expected Equipment Life</u>	<u>Annual Cost</u>
Water Circulation Pumps (2)	\$1,000	10 yr	\$122
Heat Exchanger	\$2,500	15 yr	\$224
Inflation rate	2 %	Total	\$346

Total Estimated Annual O & M Costs for Water Storage	
Labor	\$936
Materials	\$100
Electricity	\$397
Heating Oil	\$230
Miscellaneous	\$1,100
R&R Cost (Short Lived Assets)	\$346
Total	<u>\$3,109</u>

\$ 0.0020 /gallon of water

WATER DISTRIBUTION SYSTEM

System Data:

Average Daily Demand	4,350 gallons
Pressure pump size	2 hp
Pressure pump flow rate	35 gpm
Operation of the pressure pumps	On-demand
Water main circ pump size	0.25
Water main circ pump flow rate	20 gpm
Operation of the water main circ pump	9 months/yr @ 24 hrs/day
Length of the water line to the school	1,400 feet

Operational Assumptions:

Burdened labor rate for an Operator	18 /hr
Labor - Water distribution system	1 hr/wk
Misc materials and supplies	\$100 /yr
Electricity	\$0.54 /kwh with PCE credit
Heating oil	\$4.00 /gallon
Available energy of heating fuel	110,000 BTU
Heat loss for buried arctic pipe	3 BTU/ft/hr

Estimated Annual Costs

<u>Electrical Demand:</u>	<u>Power</u>	<u>Average Usage (hr/day)</u>	<u>Annual Demand (kwh)</u>	<u>Annual Cost</u>
Pressure pumps	2 hp	2.1	1,128	\$609
Water line circ pumps	0.25 hp	24	1,224	\$661
Watering point heat trace	100 watts	24	657	\$355
			Total	\$1,625

<u>Heating Demand:</u>	<u>Quantity BTU/hr</u>	<u>Annual Demand (MBTU)</u>	<u>Annual Demand (gal of fuel)</u>	<u>Annual Cost</u>
Water line to the washeteria	4,200	27,579	251	\$1,003
			Total	\$1,003

<u>Miscellaneous</u>	<u>Cost</u>	<u>Frequency</u>	<u>Annual Cost</u>	
None	0	\$0	\$0	
			Total	\$0

<u>R&R Costs (Short Lived Assets):</u>	<u>Cost</u>	<u>Expected Equipment Life</u>	<u>Annual Cost</u>	
Pressure pumps (2)	\$4,500	10 yr	\$549	
Circulation pumps (2)	\$1,500	10 yr	\$183	
Heat Exchanger	\$3,500	15 yr	\$314	
Inflation rate		2 %	Total	\$1,045

Estimated Annual Costs for Water Distribution	
Labor	\$936
Materials	\$100
Electricity	\$1,625
Heating Oil	\$1,003
Miscellaneous	\$0
R&R Cost (Short Lived Assets)	\$1,045
Total	<u>\$4,709</u>

\$ 0.0030 /gallon of water

LAUNDRY EQUIPMENT AND SHOWERS

System Data:

Number of washers	4 each
Number of dryers	4 each
Average number of washer loads each day	14
Average number of dryer loads each day	12
Washer load duration	0.5 hr
Dryer load duration	0.5 hr
Washer water use	28 gallons/load
Washer water temperature	65 F
Average number of showers taken each day	1.5
Shower flow rate	2 gpm
Shower water temperature	105 F
Shower duration	10 minutes

Operational Assumptions:

Burdened rate for washeteria operator	\$14 /hr
Washeteria operation	8 hr/day
	7 days/week
Labor for washeteria attendant (~4hrs/day)	30 hr/wk
Electricity	\$0.54 /kwh with PCE credit
Heating oil	\$4.00 /gallon
Water	\$0.0655 /gallon
Misc materials and supplies	\$300 /yr
Washer and dryer maintenance	\$1,000 /yr
Available energy of heating fuel	110,000 BTU
Dryer heating	134,700 BTU/hr
Makeup air per dryer	500 cfm

Estimated Annual Costs

Electrical Demand:	Load	Amps	kwh/load	Average Usage (kwh/day)	Annual Usage (kwh/yr)	Annual Cost
20 lb Washers	3.6		0.37	5	1,635	\$883
30 lb Dryers	3.2		0.33	4	1,246	\$673
					Total	\$1,556

Heating Demand:	Heating Demand (BTU/load)	Daily Demand (BTU/day)	Annual Demand (MBTU)	Annual Demand (gal of fuel)	Annual Cost
Dryer heating	67,350	808,200	252,158	2,292	\$9,169
Dryer makeup air	21,060	252,720	78,849	717	\$2,867
Water heater - washers	4,670	65,386	20,400	185	\$742
Water heater - showers	10,008	15,012	4,684	43	\$170
				Total	\$12,949

Miscellaneous	Quantity	Cost	Frequency	Annual Cost
Washer and dryer maintenance	1	\$1,000	Each year	\$1,000
			Total	\$1,000

<u>R&R Costs (Short Lived Assets):</u>	<u>Cost</u>	<u>Expected Equipment Life</u>	<u>Annual Cost</u>
Washers (4)	\$18,800	10 yr	\$2,292
Dryers (4)	\$21,600	10 yr	\$2,633
Water Heater (1)	\$3,500	10 yr	\$427
Inflation rate	2 %		
		Total	<u>\$5,351</u>

Estimated Annual Costs for Laundry Equipment and Showers

Labor	\$21,840
Materials	\$300
Electricity	\$1,556
Heating Oil	\$12,949
Miscellaneous	\$1,000
R&R Cost (Short Lived Assets)	<u>\$5,351</u>
Total	\$42,996

Approximate Unit Costs for Laundry and Showers

Washer Load	\$4.51
Dryer Load	\$5.66
Shower	\$9.78

WASTEWATER COLLECTION AND DISPOSAL

System Data:

Average Daily Demand	4,350 gallons
Washeteria wastewater flow	400 gallons/day
Backwash wastewater flow	6,790 gallons/week
WTP lift station pump size	5 hp
WTP lift station pump flow rate	100 gpm
Operation of the lift station pumps	On-demand
WTP force main glycol circ pump size	0.25
WTP force main glycol circ pump flow rate	10 gpm
Operation of the WTP force main glycol circ pump	9 months/yr @ 24 hrs/day
Length of force main to the old lagoon	600 feet
Washeteria lift station pump size	2 hp
Washeteria lift station pump flow rate	35 gpm
Operation of the lift station pumps	On-demand
Electric heat trace for the force main	5 watts/ft
Length of electric heat trace for force main	150 ft
Operation of electric heat trace for the force main	9 months/yr @ 24 hrs/day
Length of force main to the old lagoon	150 feet

Operational Assumptions:

Burdened labor rate for an Operator	18 /hr
Labor - Wastewater collection system	2 hr/wk
Misc materials and supplies	\$200 /yr
Electricity	\$0.54 /kwh with PCE credit
Heating oil	\$4.00 /gallon
Available energy of heating fuel	110,000 BTU
Heat loss for buried arctic pipe	3 BTU/ft/hr
Lagoon maintenance	\$500 /yr

Estimated Annual Costs

<u>Electrical Demand:</u>	<u>Power</u>	<u>Average Usage (hr/day)</u>	<u>Annual Demand (kwh)</u>	<u>Annual Cost</u>
WTP lift station pumps	5 hp	0.2	220	\$119
WTP FM glycol circ pumps	0.25 hp	24	1,224	\$661
Washeteria lift station pumps	2 hp	0.2	104	\$56
Force main heat trace	750 watts	24	4,925	\$2,659
			Total	\$3,495

<u>Heating Demand:</u>	<u>Quantity BTU/hr</u>	<u>Annual Demand (MBTU)</u>	<u>Annual Demand (gal of fuel)</u>	<u>Annual Cost</u>
WTP lift station wet well	500	3,283	30	\$119
WTP force main to the lagoon	1,800	11,820	107	\$430
Washeteria lift station wet well	500	3,283	30	\$119

Total \$669

Miscellaneous

	<u>Quantity</u>	<u>Cost</u>	<u>Frequency</u>	<u>Annual Cost</u>
Lagoon maintenance	1	\$500	Each year	\$500
			Total	<u>\$500</u>

Capital Equipment Replacement:

	<u>Cost</u>	<u>Expected Equipment Life</u>	<u>Annual Cost</u>
Lift station pumps (4)	\$15,000	10 yr	\$1,828
Circulation pumps (2)	\$1,000	10 yr	\$122
Heat Exchanger	\$2,500	15 yr	\$224
Inflation rate	2 %		
		Total	<u>\$2,175</u>

Estimated Annual Costs for Wastewater Collection and Disposal

Labor	\$1,872
Materials	\$200
Electricity	\$3,495
Heating Oil	\$669
Miscellaneous	\$500
R&R Cost (Short Lived Assets)	\$2,175
Total	<u>\$8,911</u>

\$ 0.0056 /gallon of water

POWER PLANT HEAT RECOVERY SYSTEM

System Data:

Estimated available heat	200,000 BTU/hr
<u>Heating demands</u>	
Raw water transmission line	750 BTU/hr
Water treatment plant building	19,363 BTU/hr
Raw water heat addition	99,600 BTU/hr
WST piping	250 BTU/hr
Water storage tank	472 BTU/hr
Water line to the washeteria	4,200 BTU/hr
Lift station wet well	500 BTU/hr
Force main to the lagoon	1,800 BTU/hr
Peak heat demand	126,935 BTU/hr
Continous heat demand	27,335 BTU/hr
HR circ pump size	1.0 hp
Circ pump flow rate	25 gpm
Length of heat recovery lines	350 feet

Operational Assumptions:

Burdened labor rate for WTP operator	\$18 /hr
Labor to operate and maintain HR system	1 hr/week
Electricity	\$0.54 /kwh with PCE credit
Heating oil	\$4.00 gallon
Operation of HR circ pump	12 months/yr @ 24 hrs/day
Available energy of heating fuel	110,000 BTU/gallon
Heat loss for buried arctic pipe	BTU/ft/hr
Misc materials and supplies	\$100 /yr

Estimated Annual Costs

<u>Electrical Demand:</u>	<u>Power</u>	<u>Average Usage (hrs/year)</u>	<u>Annual Demand (kwh)</u>	<u>Annual Cost</u>
HR circ pump	1.0 hp	8760	6,532	\$3,527
			Total	\$3,527
<u>Heating Supply from HR:</u>	<u>Quantity BTU/hr</u>	<u>Annual Demand (MBTU)</u>	<u>Annual Demand (gal of fuel)</u>	<u>Annual Savings</u>
Continuous heat demand	27,335	179,493	1,632	-\$6,527
Raw water heat addition	99,600	131,783	1,198	-\$4,792
			Total	-\$11,319
<u>Miscellaneous</u>	<u>Quantity</u>	<u>Cost</u>	<u>Frequency (years)</u>	<u>Annual Cost</u>
None	0	\$0		\$0
			Total	\$0

<u>R&R Costs (Short Lived Assets):</u>	<u>Cost</u>	<u>Expected Equipment Life</u>	<u>Annual Cost</u>
HR circ pump	\$1,500	10 yr	\$183
HR system heat exchanger (2)	\$8,000	15 yr	\$718
Inflation rate	2 %		
		Total	<u>\$901</u>

Total Estimated Annual Costs for the HR System

Labor	\$936
Materials	\$100
Electricity	\$3,527
Heating Oil	-\$11,319
Miscellaneous	\$0
R&R Cost (Short Lived Assets)	\$901
Total	<u>-\$5,855</u>