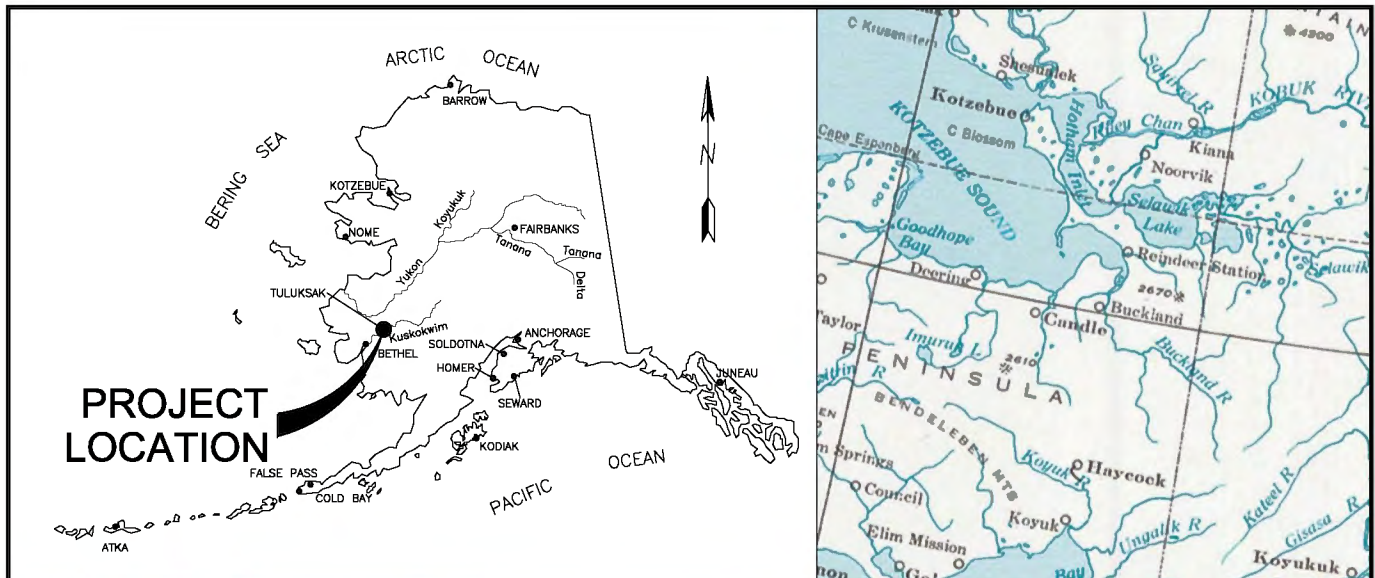


Appendix A – Figures



FILE NAME: J:\Jobsdata\82301.00 Tuluksak W&S Feasibility Study\00 CADD\02 Figures\FIGURE 1-Location And Vicinity Map.dwg



VILLAGE SAFE WATER



TULUKSAK NATIVE COMMUNITY PRELIMINARY ENGINEERING REPORT

LOCATION AND VICINITY MAP

Project No: 82301.00

Drawn By: AJG

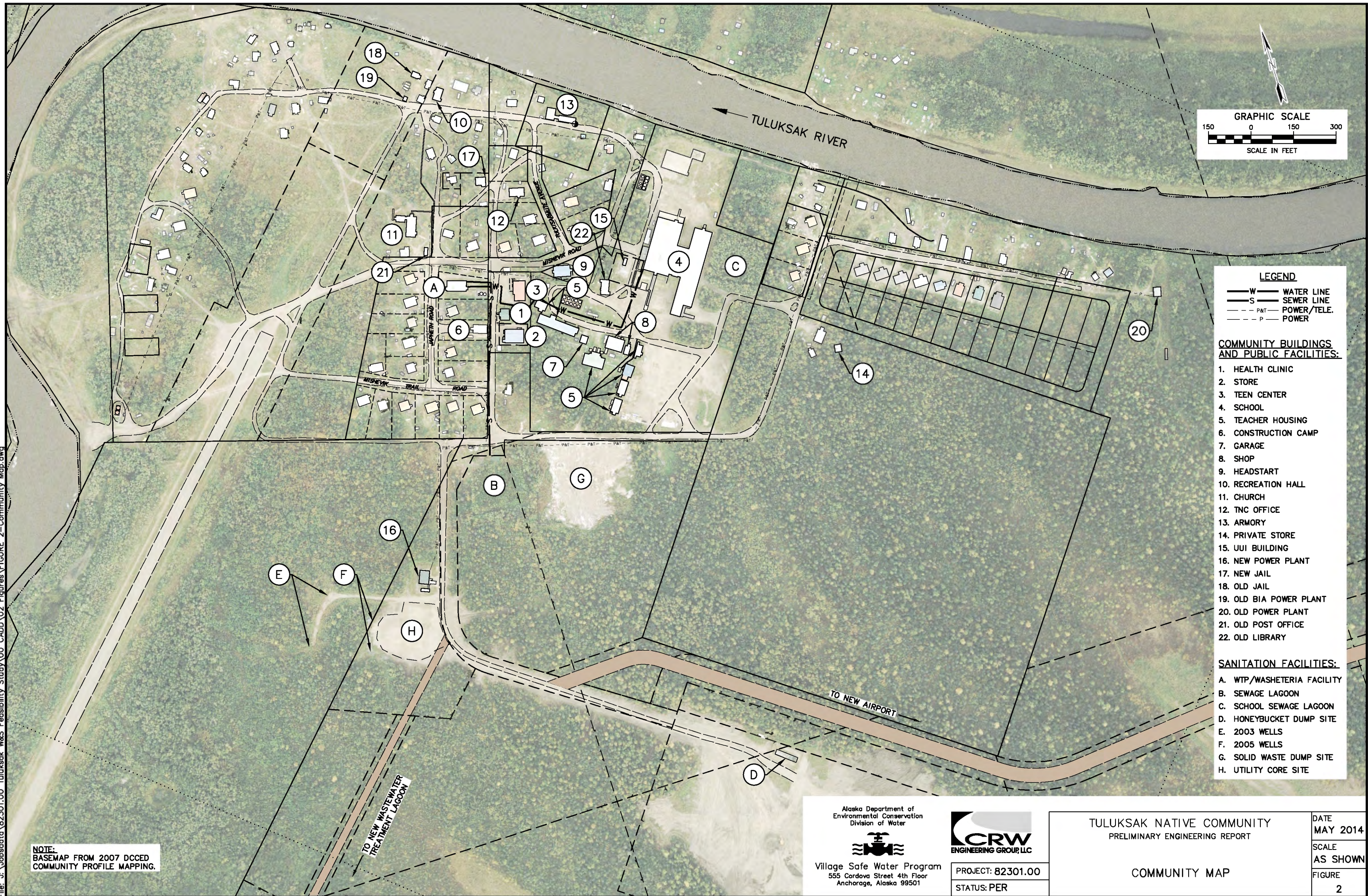
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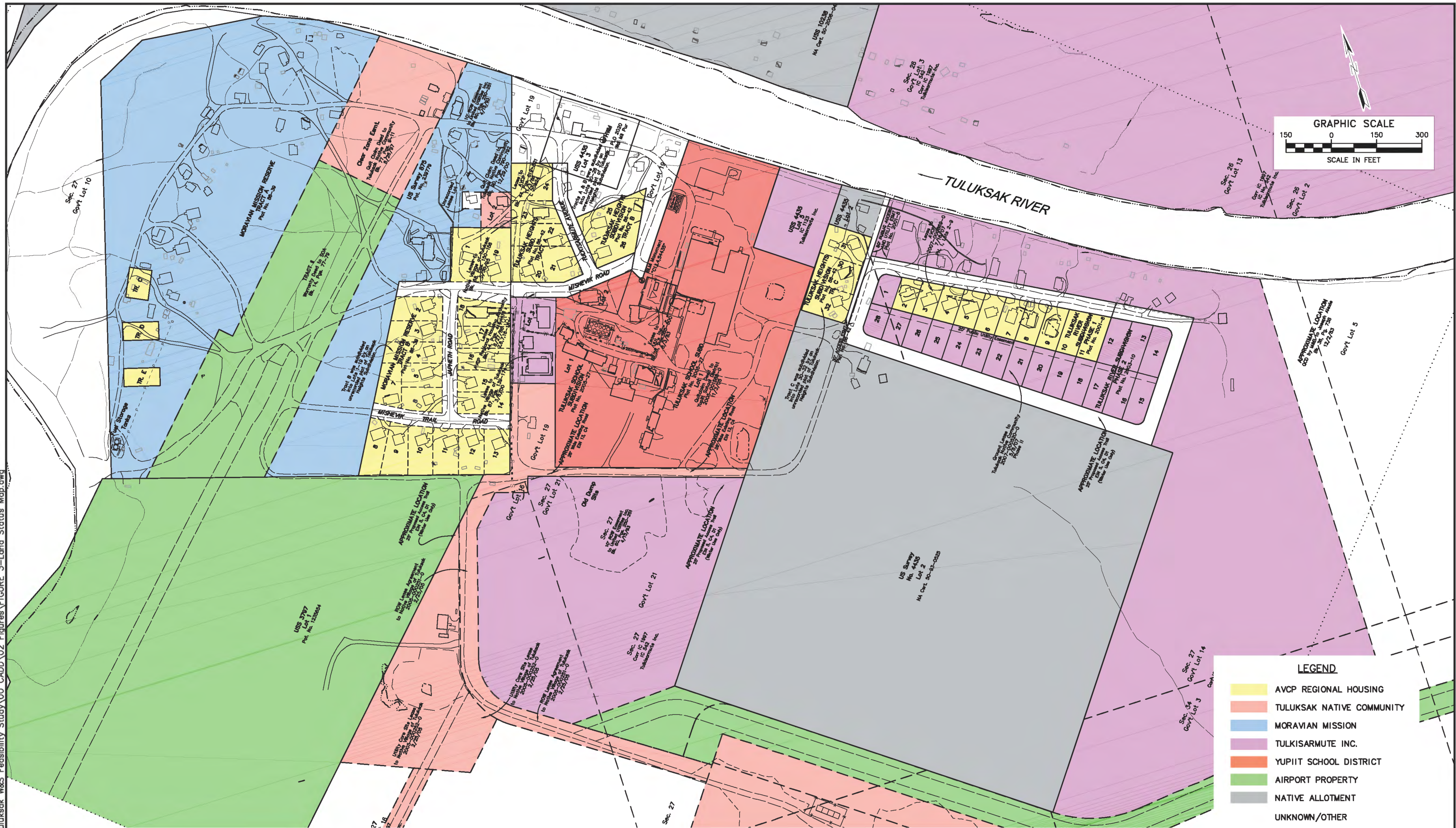
Date: MAY 2014

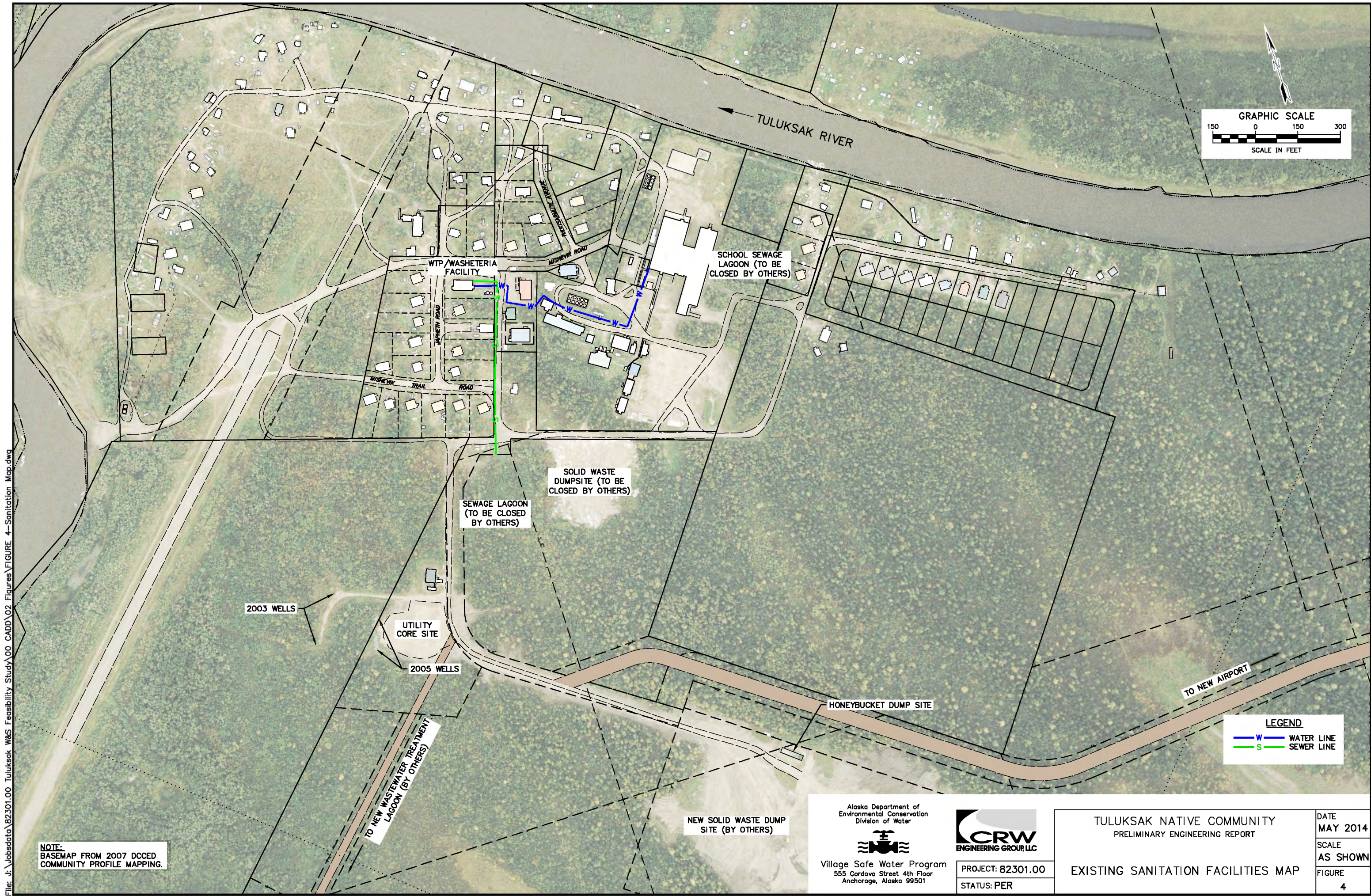
Figure: 1

Project: PER

File: J:\Jobsdata\82301.00 Tuluksak W&S Feasibility Study\00 CADD\02 Figures\FIGURE 2-Community Map.dwg









File: J:\Jobsdata\82301.00 Tuluksak W&S Feasibility Study\00 CADD\02 Figures\FIGURE 4--Sanitation Map.dwg

NOTE:
BASEMAP FROM 2007 DCCD
COMMUNITY PROFILE MAPPING.

Alaska Department of
Environmental Conservation
Division of Water

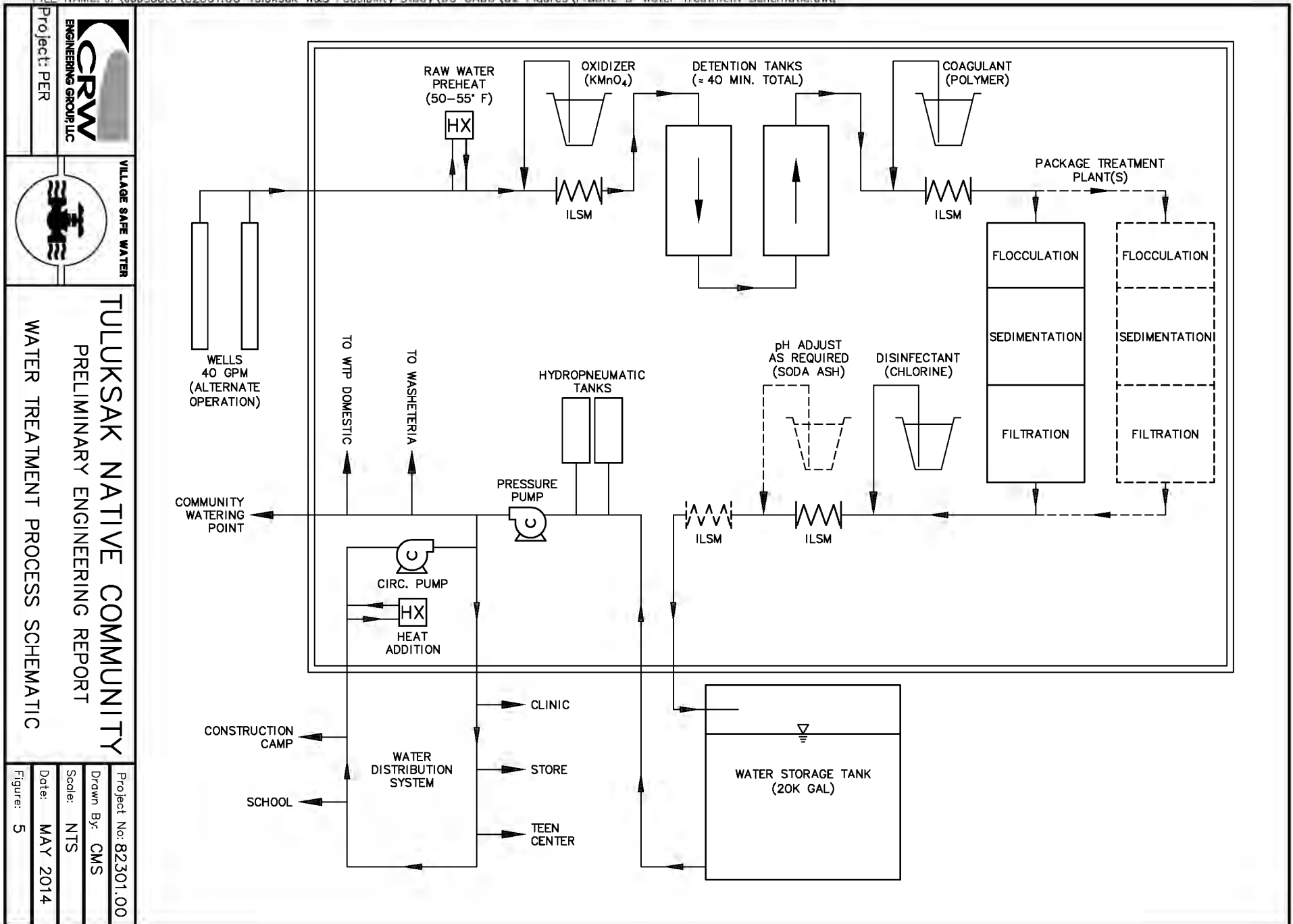


Village Safe Water Program
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Anchorage, Alaska 99501

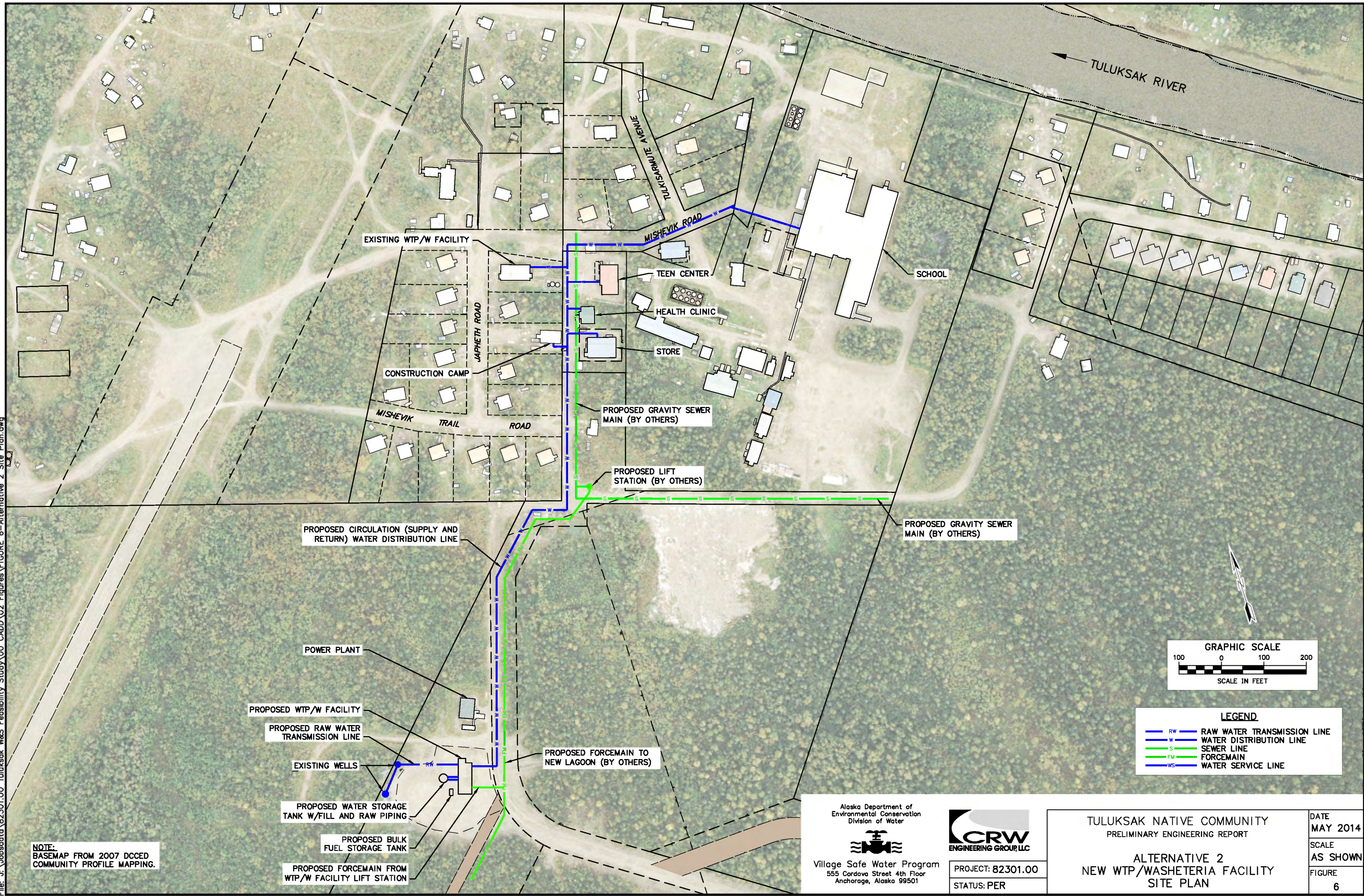


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STATUS: PER

TULUKSAK NATIVE COMMUNITY PRELIMINARY ENGINEERING REPORT		DATE MAY 2014
EXISTING SANITATION FACILITIES MAP		SCALE AS SHOWN
		FIGURE 4



File: J:\jobdata\82301.00 Tuluksak W&S Feasibility Study\00 CADD\02 Figures\FIGURE 6-Alternative 2 Site Plan.dwg



NOTE:
BASEMAP FROM 2007 DCCD
COMMUNITY PROFILE MAPPING.

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PRELIMINARY ENGINEERING REPORT

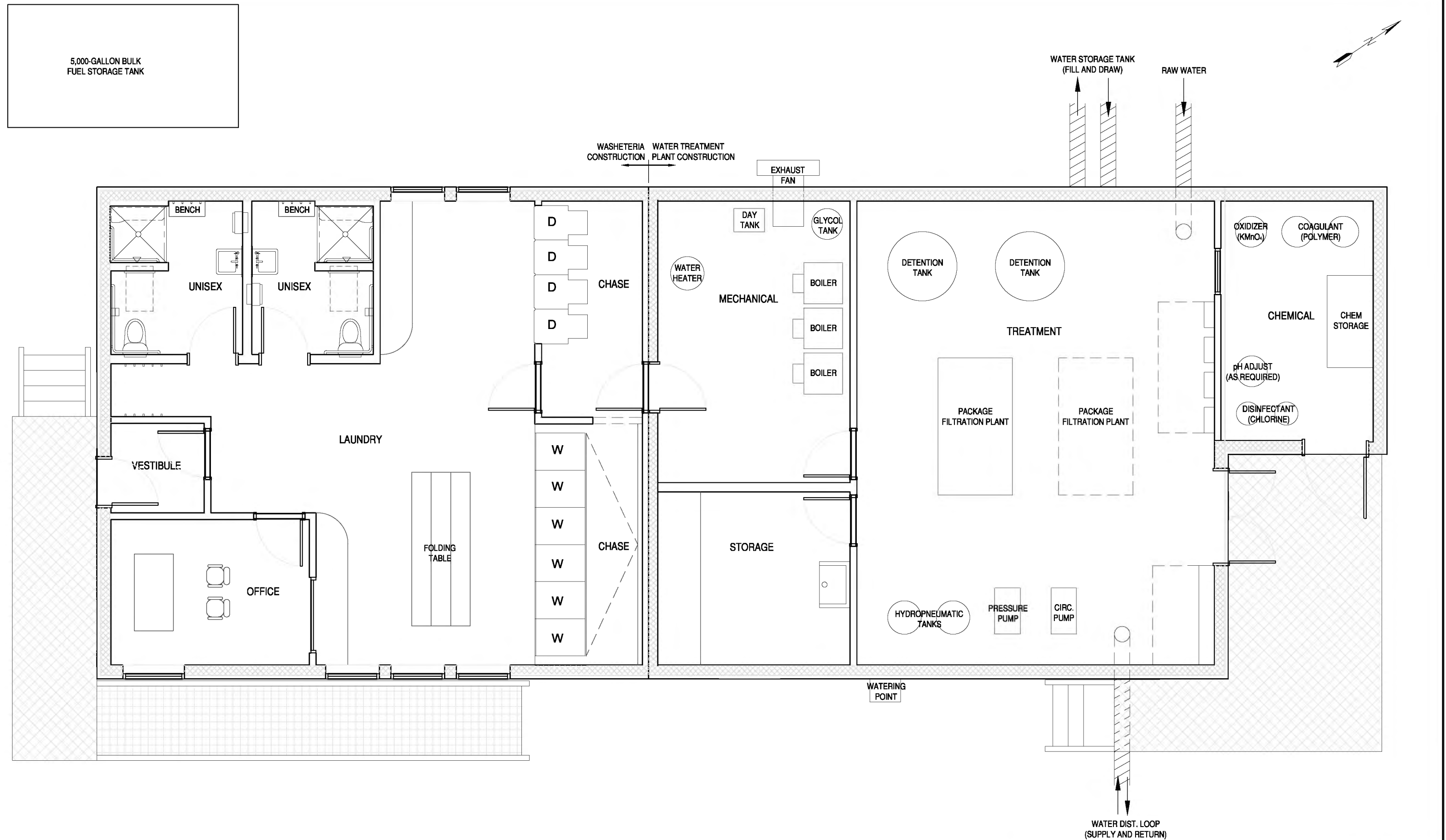
ALTERNATIVE 2
NEW WTP/WASHETERIA FACILITY
SITE PLAN

DATE
MAY 2014

SCALE
AS SHOWN

FIGURE
6

File: J:\jobdata\82301.00 Tuluksak W&S Feasibility Study\00 CADD\02 Figures\FIGURE 7-Alternative 2 Floor Plan.dwg



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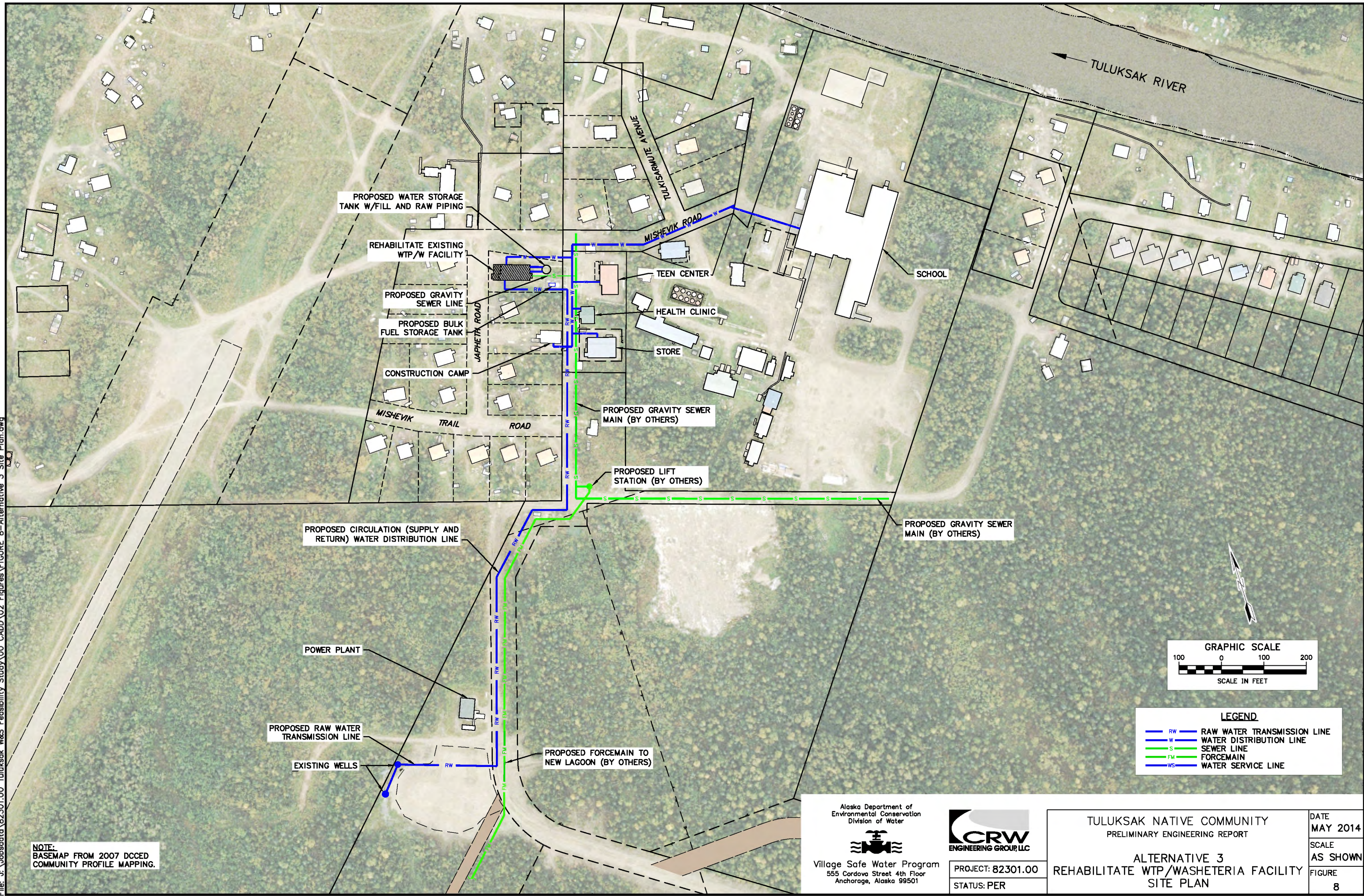
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TULUKSAK NATIVE COMMUNITY
PRELIMINARY ENGINEERING REPORT

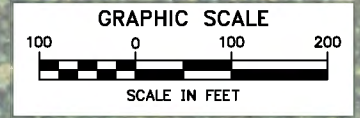
ALTERNATIVE 2
NEW WTP/WASHETERIA FACILITY
FLOOR PLAN

DATE
MAY 2014
SCALE
NTS
FIGURE
7

File: J:\jobdata\82301.00 Tuluksak W&S Feasibility Study\00 CADD\02 Figures\FIGURE 8-Alternative 3 Site Plan.dwg



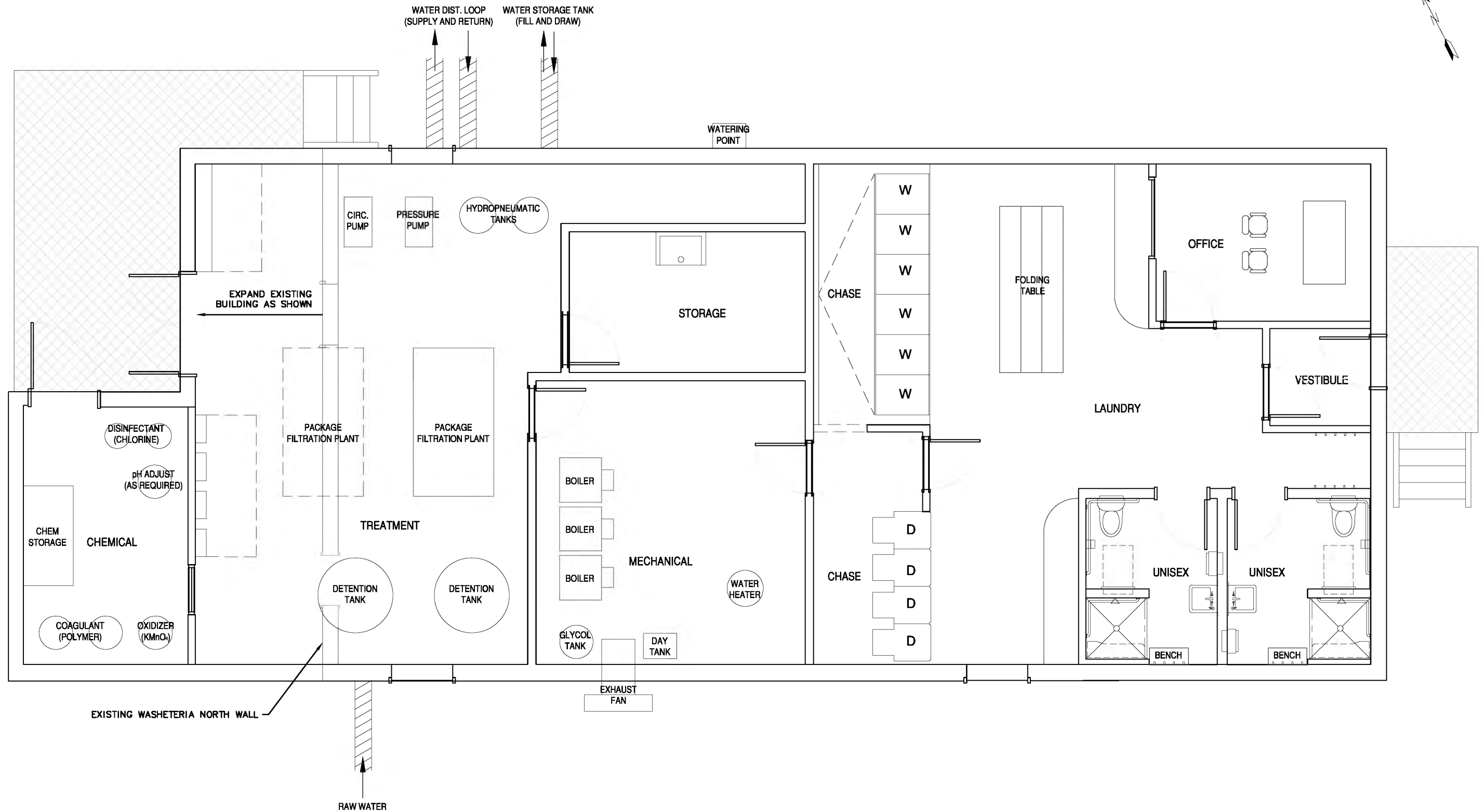
NOTE:
BASEMAP FROM 2007 DCCD
COMMUNITY PROFILE MAPPING.



LEGEND	
	RAW WATER TRANSMISSION LINE
	WATER DISTRIBUTION LINE
	SEWER LINE
	FORCEMAIN
	WATER SERVICE LINE

<div>Alaska Department of Environmental Conservation Division of Water</div> <div></div> <div>Village Safe Water Program 555 Cordova Street 4th Floor Anchorage, Alaska 99501</div>	<div></div> <div>PROJECT: 82301.00</div> <div>STATUS: PER</div>	<div>TULUKSAK NATIVE COMMUNITY PRELIMINARY ENGINEERING REPORT</div> <div>ALTERNATIVE 3 REHABILITATE WTP/WASHETERIA FACILITY SITE PLAN</div>	DATE MAY 2014
			SCALE AS SHOWN
			FIGURE 8

File: J:\jobdata\82301.00 Tuluksak W&S Feasibility Study\00 CADD\02 Figures\FIGURE 9-Alternative 3 Floor Plan.dwg



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Environmental Conservation
Division of Water



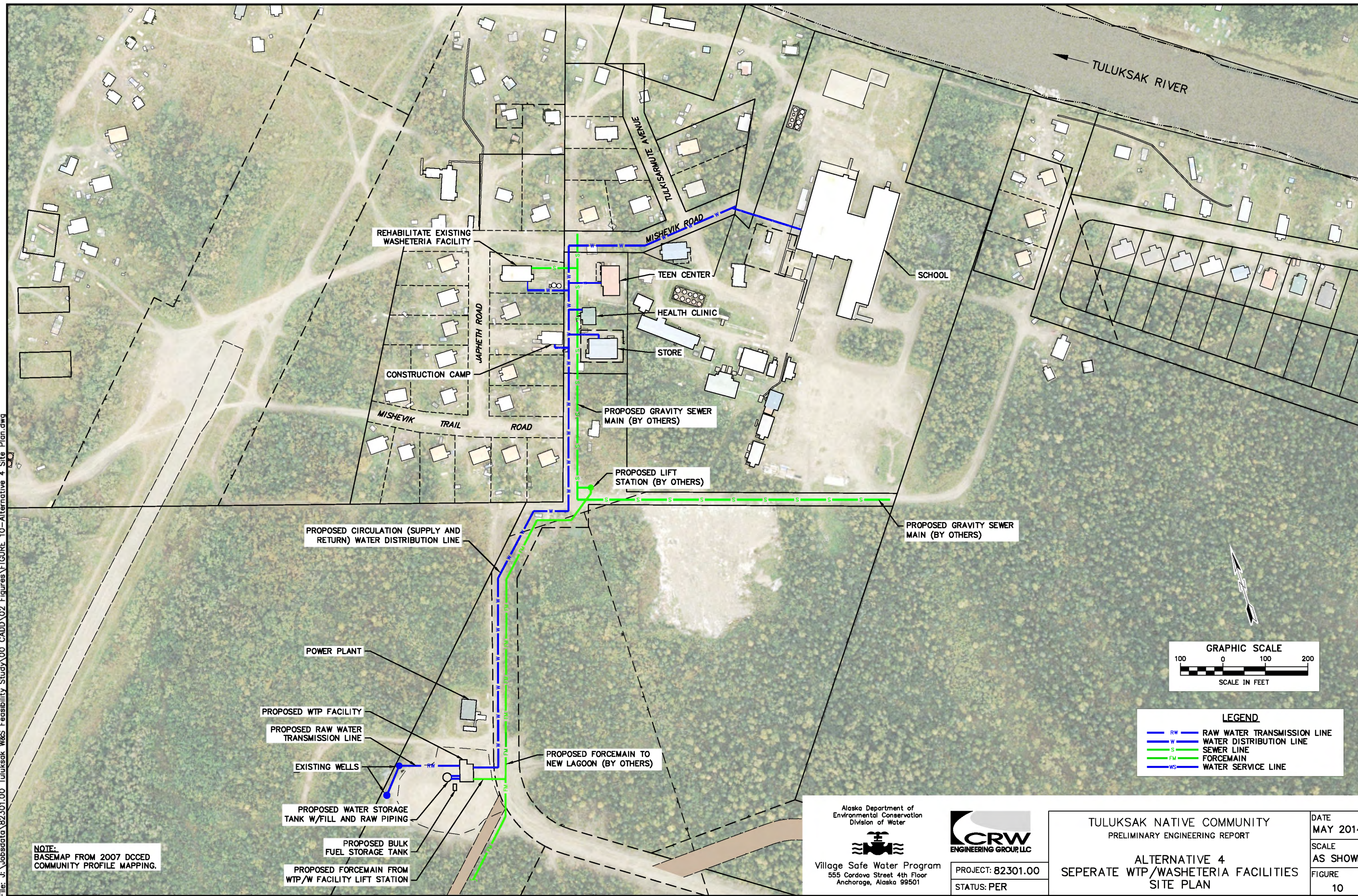
Village Safe Water Program
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Anchorage, Alaska 99501



PROJECT: 82301.00
STATUS: PER

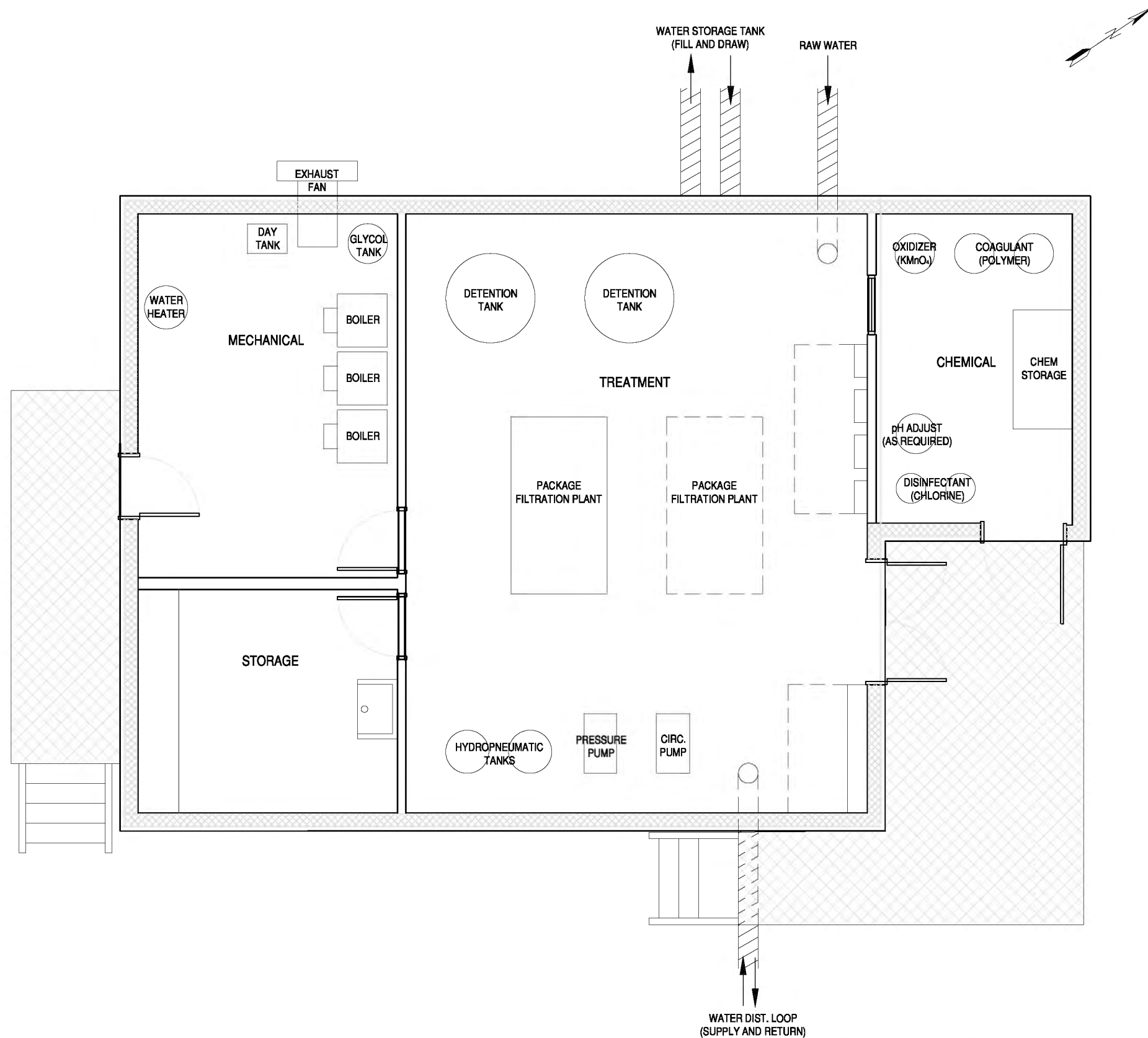
TULUKSAK NATIVE COMMUNITY PRELIMINARY ENGINEERING REPORT ALTERNATIVE 3 REHABILITATE WTP/WASHETERIA FACILITY FLOOR PLAN	DATE MAY 2014
	SCALE NTS
	FIGURE 9

File: J:\jobdata\82301.00 Tuluksak W&S Feasibility Study\00 CADD\02 Figures\FIGURE 10-Alternative 4 Site Plan.dwg



File: J:\jobdata\82301.00 Tuluksak W&S Feasibility Study\00 CADD\02 Figures\FIGURE 11&12-Alternative 4 Floor Plan.dwg

5,000-GALLON BULK
FUEL STORAGE TANK



Alaska Department of
Environmental Conservation
Division of Water



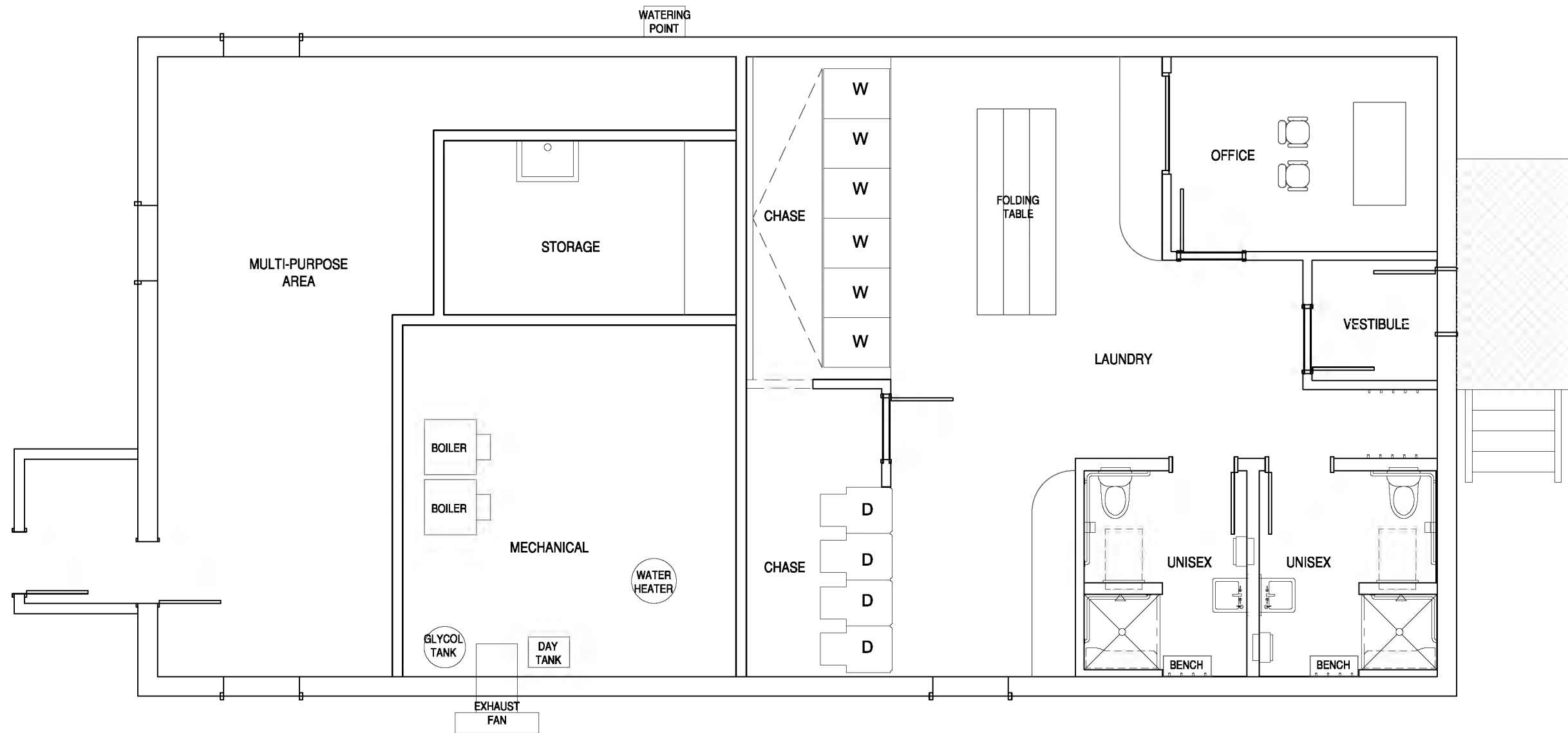
Village Safe Water Program
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Anchorage, Alaska 99501



PROJECT: 82301.00
STATUS: PER

TULUKSAK NATIVE COMMUNITY PRELIMINARY ENGINEERING REPORT		DATE MAY 2014
ALTERNATIVE 4 SEPARATE WTP/WASHETERIA FACILITIES WTP FLOOR PLAN		SCALE NTS
		FIGURE 11

File: J:\Jobsdata\82301.00 Tuluksak W&S Feasibility Study\00 CADD\02 Figures\FIGURE 11&12-Alternative 4 Floor Plan.dwg



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Village Safe Water Program
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PROJECT: 82301.00
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TULUKSAK NATIVE COMMUNITY
PRELIMINARY ENGINEERING REPORT

ALTERNATIVE 4
SEPARATE WTP/WASHETERIA FACILITIES
WASHETERIA FLOOR PLAN

DATE
MAY 2014
SCALE
NTS
FIGURE
12

Appendix B – Correspondence and Reference Data

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;

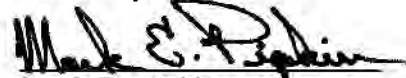
As per your request I have conducted an archaeological survey of the Tuluksak Water and Sewer Project area. This was a pedestrian survey that consisted of a walkover of all the proposed utility easements that will contain the water and sewer mains, and the proposed location of the new wells, sewage lagoon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

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Washington D.C.

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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

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.

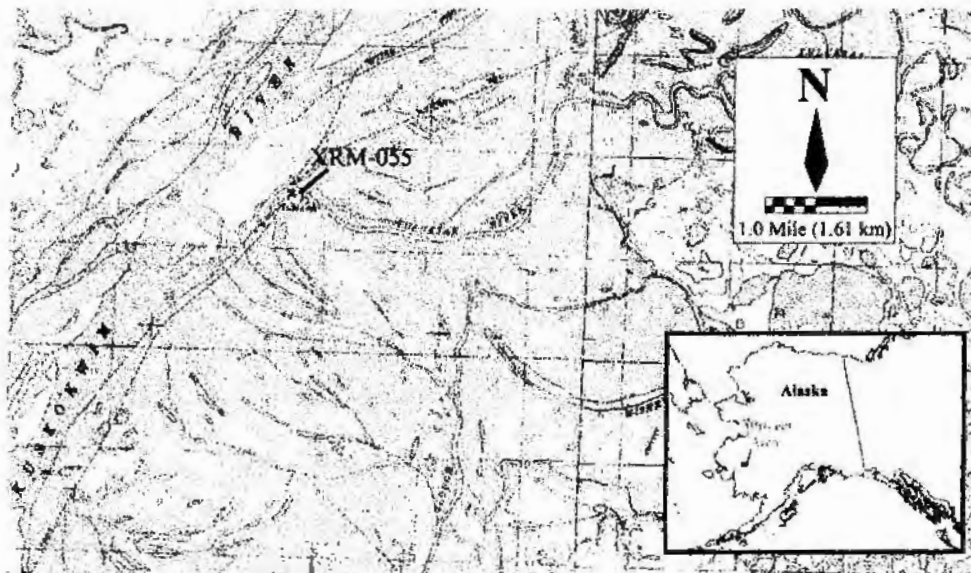


Figure 1. Tuluksak project area (modified from U.S.G.S. Quadrangles Russian Mission A-5 and A-6).

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 (Fortune 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 Jespersen 1984).

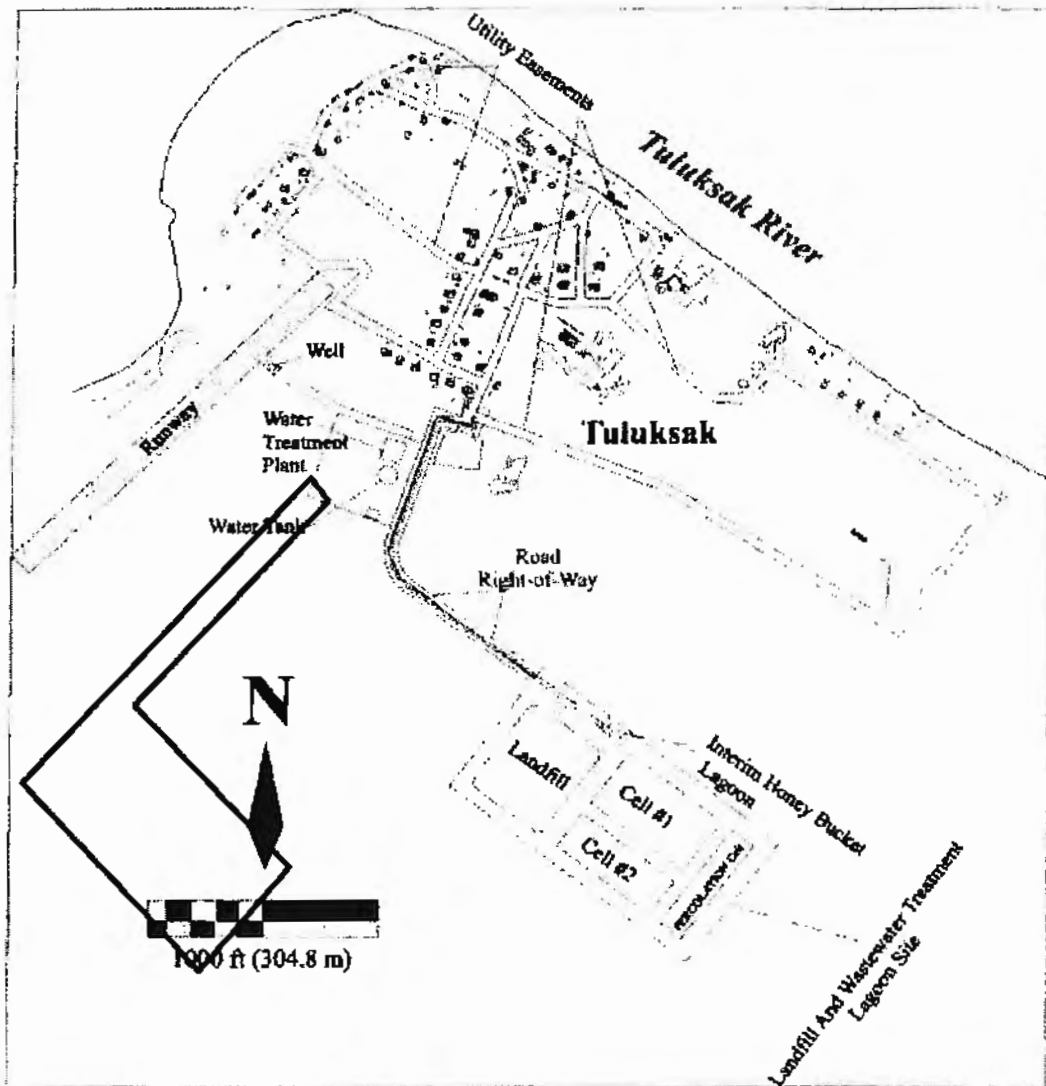


Figure 2. Tuluksak project area - detail.

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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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



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:

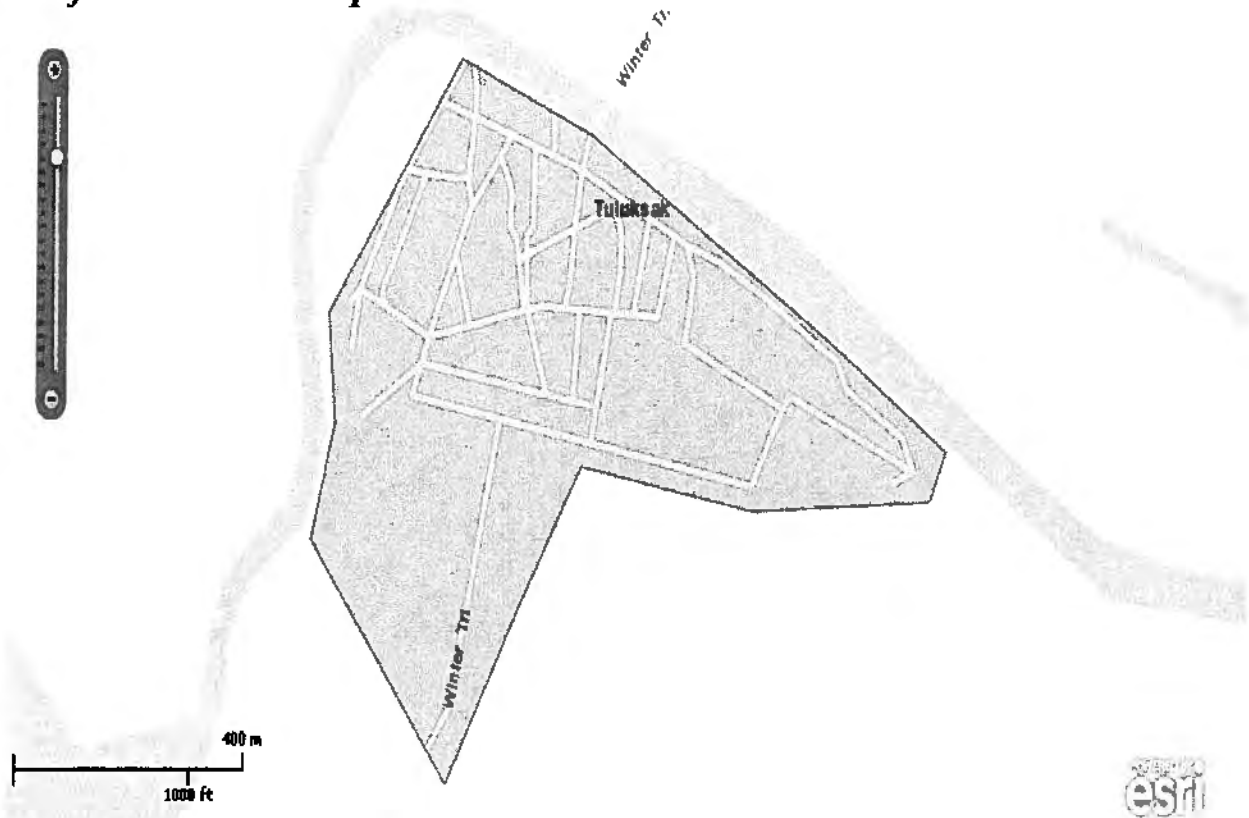
82301.00 Tuluksak WTP&W PER



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, AK 99559	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	R2UBH	5108.038178
Freshwater Forested/Shrub Wetland	PSS1C	8.164574
Freshwater Forested/Shrub Wetland	PSS1C	8171.651746
Freshwater Pond	PAB3U	14.014931
Freshwater Forested/Shrub Wetland	PSS1C	3749.468122

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

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Operator Information

Operator Name: Robert H. Allain

Certificates Currently Held

Certificate #	Certificate	Exam Date	Exp. Date	Drinking Water Core CEUs	Renewal Req. Met?
16818	Small Water System Treated	11/8/2013	12/31/2015	2.35	Yes

[Apply for an Online 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

410 W. Loughery Ave. Ste. 303, P.O. Box 11800, Juneau, AK 99811-1800
Phone: (907) 465-5180, Fax: (907) 465-5177, TDD: Alaska Relay, (800) 770-6973[Commissioner](#) [Public Notices](#) [Regulations](#) [Statutes](#) [Press Releases](#) [Divisions/Contacts](#) [Employee Email](#)[State of Alaska](#) [myAlaska](#) [My Government](#) [Resident](#) [Business in Alaska](#) [Visiting Alaska](#) [State Employees](#)State of Alaska || 2011 || [Webmaster](#)

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Operator Information

Operator Name: Jack M. Kinagak

Certificates Currently Held

Certificate #	Certificate	Exam Date	Exp. Date	Core CEUs	Noncore CEUs	Total CEUs	Renewal Req. Met?
9165	Water Distribution 1	4/11/2003	12/31/2014	0.00	0.00	0.00	No
11410	Water Treatment 1	4/21/2006	12/31/2014	0.00	0.00	0.00	No

[Apply for an Online Exam](#)

Current Employer

(If blank, no employment information is on file)

System Name	System Type/Class
Operator - Nonregulated System	X X

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) 485-5190 | Fax: (907) 485-5177 | TDD: Alaska Relay: 1 (800) 770-8973

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[Operator Information](#)**Operator Name:** Peter S. Gregory**Certificates Currently Held**[Apply for an Online Exam](#)**Expired Certificates**

Must be renewed by June 30th. Certificates for which CEU requirements have not been met cannot be renewed online. QIT certificates cannot be renewed.

Certificate #	Certificate Classification	Expiration Date	CEU Req. Met
12791	Water Distribution Provisional	12/31/2013	No

[Renew 2013 Certificates Online](#)**Current Employer**

(If blank, no employment information is on file)

[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) 465-5150 Fax (907) 495-5177 TDD Alaska Relay 1 (800) 770-2973

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David Beiswenger

From: Jon Hermon
Sent: Thursday, April 24, 2014 1:00 PM
To: David Beiswenger
Cc: Andrea Meeks
Subject: FW: Tuluksak Population Growth/Decline
Attachments: Population Change Tuluksak.xls

David:

FYI, below and attached.

Jon Hermon, PE
CRW Engineering Group, LLC

www.crweng.com

From: Randlett, Susan A (DEC) [mailto:susan.randlett@alaska.gov]
Sent: Wednesday, April 23, 2014 2:09 PM
To: Jon Hermon
Subject: FW: Tuluksak Population Growth/Decline

Jon,
The spreadsheets on population are mine based on DOL, as is the highlighting in the state demographers email.

Being optimistic and assuming the Tuluksak will grow in the same proportion as the Bethel census area, the population in 2025 will be 426. In fact, Tuluksak is growing less than the Bethel census, suggesting that 426 is too high.

However for a washeteria/wtp it seems ok. Please let me know if you disagree.

Susan

From: Hunsinger, Eddie V (DOL)
Sent: Wednesday, April 23, 2014 1:18 PM
To: Randlett, Susan A (DEC)
Subject: RE: Tuluksak Population Growth/Decline

Hi Susan,

As we may have discussed, it's not possible to predict small-area populations very far out with a very useful degree of certainty, so we don't currently publish projections below the borough/census area geographic-level, but here are some thoughts that are hopefully helpful:

-If feasible, assessing local factors (such as local resources and amenities, and even thoughts about the future including the potential construction you mentioned) and requesting local feedback/review can be very useful (particularly for

cases where a clear event is on the horizon), but in general there remains a great deal of uncertainty for the future population of small communities.

-In addition to a straight-line method, **one very simple option would be to review how Tuluksak's share of "Bethel Census Area" has changed over time, and possibly extrapolate based on that along with the population projections for Bethel Census Area.** Though still somewhat crude, and not clearly better than simple linear-extrapolation, more detailed models haven't been shown to be clearly better at predicting the population of small areas (various literature). Use of particular years as a basis for the extrapolation (for either population or share of population) can have a substantial impact on the projection, but there is no rule for selecting the best years (and uncertainty would be greater than variation from this) – for projecting 10 years forward, **I feel that using data back to 2000, or using 10 years of data, would both be reasonable in the general case, and the more described the better.**

-Please note that Tuluksak has a youthful population, and that would generally point to a good chance for population growth (at least over the next several years), but, especially for a small community, migration could still outpace growth from births, and individual economic events could change the picture at any time. Unfortunately we don't have time series of birth, death and migration data at the place level.

I know you have some, and maybe all, of these, but in case, here are links to existing data:

Population projections: <http://laborstats.alaska.gov/pop/popproj.htm>

All population estimates: <http://labor.alaska.gov/research/pop/popest.htm>

2010 to 2013 population estimates (direct link to table):

<http://laborstats.alaska.gov/pop/estimates/data/TotalPopulationPlace.xls>

2000 to 2010 population estimates (direct link to table):

http://laborstats.alaska.gov/pop/estimates/data/TotalPopulationPlace_2000to2010.xls

1990 to 1999 population estimates (direct link to table):

http://laborstats.alaska.gov/pop/estimates/data/TotalPopulationPlace_1990to1999.xls

I hope this is helpful. Please let me know if you have any further questions, or if we can be of further assistance.

Best regards,

Eddie

907-269-4960

From: Randlett, Susan A (DEC)

Sent: Wednesday, April 23, 2014 12:52 PM

To: Hunsinger, Eddie V (DOL)

Subject: Tuluksak Population Growth/Decline

Eddie,

Some construction for Tuluksak is under consideration. When I look at the population, I see a general downward trend. The population is near the population back in 1994-1995 20 years ago.

How far back to you go when projecting population using the straight line method?

You said that for 10 years a straight line is as valid as other methods. Do you have information on in/out migration or birth/death rates that would help project a 20 year growth? For Chefnak we used a 0.5% annual increase for 20 years.

Susan

269-7614

2013	380
2012	383
2011	374
2010	373
2009	365
2008	397
2007	397
2006	411
2005	404
2004	419
2003	421
2002	435
2001	423
2000	428
1999	443
1998	419
1997	389
1996	404
1995	387
1994	374
1993	374
1992	375
1991	372
1990	358
1980	235
1970	195
1950	116
1940	88

Susan Randlett

Village Safe Water . Department of Environmental Conservation . 555 Cordova Street . Anchorage, AK 99501

1-907-269-7614 Phone

1-800-510-2332 ext. 7614 Toll Free

Department of Commerce, Community, and Economic Development
 Division of Community and Regional Affairs

State of Alaska > Commerce > Community & Regional Affairs > CDO > RUBA > Browse/Search > Preview Reports

QUARTERLY REPORT: 2014, JANUARY - MARCH (Q3), TULUKSAK

Community:	Tuluksak	Entity:	Tuluksak Native Community
Staff:	<u>Eli Jacobson</u>	Population:	380 2013 Department of Labor Estimate
DCRA Regional Office:	Bethel regional office	Assessment Status:	Assessment Completed
Gov't Type:	Federally Recognized Tribe	Assessment Date:	6/14/2013
Borough:		Exp Date:	6/14/2015
Agreement?	No	Last Updated:	4/3/2014
Agreement Date:			

Community Sanitation Overview:

The traditional council operates the washeteria, water treatment plant, container haul system, and electrical services for the community. Only one watering point, with storage capacity of 7,000 gallons, serves the entire community, washeteria, clinic, and the school. Residents haul honey-buckets to 21 bins located sparingly throughout the community.

RUBA Status & Activities This Qtr:

On March 19, 2014, November 11, 2013, and September 9, 2013 request for RUBA quarterly information were sent to Tuluksak Native Community. Up to this writing the tribe has not provided the requested information. The tribe has not responded to offers of assistance for meeting essential indicators in order to gain RUBA compliance this quarter. The administrator stepped down this quarter.

RUBA Activities for the Coming Qtr:

RUBA staff will continue to offer assistance to Tuluksak Native Community.

Scores:

Essential Indicators: 11 of 27

Sustainable Indicators: 12 of 27

Total Score: 23 of 54

FINANCES

Essential Indicators

Answer Question

- | | |
|-----|--|
| No | All revenues and expenses for the utility are listed in the utility budget. |
| No | The utility has adopted a balanced realistic budget. |
| No | Monthly financial reports are prepared and submitted to the policy making board. |
| No | The utility is current in paying all water/wastewater electric bills. |
| Yes | The utility has on hand a year's adequate fuel supply or it has a financial plan to purchase an adequate supply. |

No The utility is receiving revenues (user fees or other sources) sufficient to cover operating expenses.

Sustainable Indicators

Answer Question

No The utility is receiving revenues (user fees or other sources) sufficient to cover operating expenses and Repair & Replacement (R) costs.

No YTD revenues are at a level equal to or above those budgeted.

No YTD expenditures are at a level equal to or below those budgeted.

No A monthly manager's report is prepared.

No Budget amendments are completed and adopted as necessary.

Finances Comments

Tuluksak has not provided a copy of its FY14 budget, its adoption, or meeting minutes showing its adoption. Monthly financial reports are not prepared. Tuluksak generates its own electricity but does not record power usage of the utility. The tribal administrator said the school supplies and bills the tribe for heating fuel. The school has over a year's supply of heating fuel. The tribe does not have a repair and replacement fund established. Year-to-date revenues and expenditures cannot be determined. Monthly manager's reports are given verbally, but are not recorded in the meeting minutes. The council meets on the second Monday of each month and amendments are adopted as necessary.

ACCOUNTING SYSTEMS

Essential Indicators

Answer Question

No The utility has adopted a collection policy and actively follows it.

Yes The utility bills customers on a regular basis.

Yes An accounts receivable system is in place which tracks customers and reports past due accounts and amounts.

Yes An accounts payable system is in place.

Yes The payroll system correctly calculates payroll and keeps records.

Yes A cash receipt system is in place that records incoming money and how it was spent.

Yes The utility has a cash disbursement system that records how money was spent.

Sustainable Indicators

Answer Question

Yes A chart of accounts is used that identifies categories in a reasonable, usable manner.

Yes Monthly bank reconciliations have been completed for all utility accounts.

Yes The utility has a purchasing system that requires approval prior to purchase, and the approval process compares proposed purchases to budgeted amounts.

Accounting Systems Comments

All incoming and outgoing money for Tuluksak Native Community is recorded in manual ledgers. The tribe has an adopted collection policy, but it does not refer to the current utility it operates. The tribe sends out bills monthly for the wastewater removal service. It bills the school for treated water; however, treated water is not billed at the washeteria fill point. An accounts receivable system tracks customers' current monthly charge, previous balance, payments received, and total due. The tribe has a file cabinet that contains folders for all vendors. QuickBooks is used for payroll. All cash is deposited into the bank. The tribe's chart of accounts is in QuickBooks. The tribal bookkeeper reconciles the bank accounts monthly. The tribal administrator approves purchases under five-hundred dollars. Purchases of five-hundred or more have to be approved by the council president.

TAX PROBLEMS

Essential Indicators

Answer Question

- | | |
|----|--|
| No | The utility has a system to accurately calculate, track, and report payroll tax liabilities. |
| No | The utility is current on filing tax reports. |
| No | The utility is current on making tax deposits. |
| No | If there are any past due tax liabilities or recorded tax liens, a lien release has been issued or a repayment agreement has been signed and repayments are current. |

Tax Problems Comments

Request for information needed for verification of federal taxes were sent to Tuluksak Native Community on March 19, 2014, November 11, 2013, and September 9, 2013. At the time of this writing the tribe has not provided the requested information. Previously on September 30, 2013, the IRS deemed Tuluksak Native Community as not compliant with federal tax filing and deposit requirements. On March 21, 2014 the State Department of Labor communicated that the tribe is current on their Employment Security Contributions account. Tuluksak Native Community is not in the Lien Watch dated January-February 2014.

PERSONNEL SYSTEM

Essential Indicators

Answer Question

- | | |
|----|---|
| No | The utility has a posted workers compensation insurance policy in effect. |
|----|---|

Sustainable Indicators

Answer Question

- | | |
|-----|---|
| Yes | The utility has adopted and uses a Personnel Policy, which has been reviewed by an attorney, AML or Commerce for topics and language. |
| Yes | The utility has adequate written job descriptions for all positions. |
| Yes | The utility has adopted and follows a written personnel evaluation process that ties the job description to the evaluation. |
| No | The utility has an adequate written hiring process. |
| No | |

Monday of each month, which is open to the public. The tribal administrator posts meeting notices in seven public places five days in advance.

OPERATION OF UTILITY

Essential Indicators

Answer Question

- No The utility operator(s) are actively working towards necessary certification.
- No The utility has a preventative maintenance plan developed for the existing sanitation facilities.

Sustainable Indicators

Answer Question

- No The manager receives a monthly O&M report from the utility operator and routinely "spot checks" the facilities to see that the maintenance items are being completed.
- No The utility has a safety manual and holds safety meetings.
- Yes Utility facilities have not suffered any major problems/outages due to management issues that are unresolved.
- Yes The utility is operating at the level of service that was proposed.
- No The operator provides status reports to the manager on a routine basis.
- No The utility has completed and distributed its "Consumer Confidence Report".
- No The utility is not on the "Significant Non-Complier" (SNC) list.
- No The utility maintains an inventory control list.
- No The utility maintains a critical spare parts list.

Operation of Utility Comments

The utility operator is not working towards necessary certification. The utility does not have a written preventative maintenance plan. The tribal administrator infrequently contacts the operator and does not spot check the facility. The utility does not have a safety manual or hold regular safety meetings. The utility is functioning as intended and no major outages have occurred. The operator does not provide reports to the tribal administrator. A CCR has not been posted. The tribe is on the SNC list dated January 2014. The utility does not have an inventory control, or critical spare parts list.

[Contact Us / Staff Directory](#)

Appendix C – Design Calculations

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 (KMnO ₄)	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

Population Served	Projected Number of Customers	Daily Use (GPCD)	Total Daily Use (Gallons)
General Public	456	13	5,928
School	18	20	360
Estimated Daily Use			6,288
Estimated Three Day Use			18,864
Recommended Tank Volume			20,000

NOTE: Tank sized for three days of use

Tuluksak Washeteria Water Demand

Current Population (2013 DCED)	380 people	92 occupied homes
Future Design Population (year 2034)	456 people	111 occupied homes

Days/Week Washeteria Open	6 days
---------------------------	--------

Current Showers	2 showers
Future Showers	2 showers

Showers per day

Existing	1.5333
Future	1.8500

Current Washers	4 washers
Future Washers	6 washers

Washes per day

Existing	38
Future	46

Estimated Water Use

Showers	20 gallons/shower
Washers	28 gallons/load

Estimated Facility Use*

Showers	0.1 showers/household/week
Washers	2.5 loads/household/week

Weekly Washeteria Water Demand

(Based on assumed use)

Current Showers	184 gallons
Current Washers	6,440 gallons
Total	6,624 gallons

Existing Daily Demand 1,104 gpd
--

Future Showers	222 gallons
Future Washers	7,770 gallons
Total	7,992 gallons

Future Daily Demand 1,332 gpd
--

Tuluksak WTP/Washeteria Preliminary Engineering Report

Existing Water Demand Calculations w/Housing

Population in 2013	380 people
WP&SH	830 gpd
	3 gpcd
Current WP&SH Users	
WP & SH Users for 365 days/year	202 customers
WP & SH Users for 165 days/year	163 customers
(Students and Staff use school rate for 200 days)	
School Demand	1,650 gpd
School Demand determined in 1993 LKSD Lagoon Design.	599,120 gallons per year
Student and staff population extrapolated to account for future growth. Teachers Housing now online.	
Teachers	15 people
Staff	18 Assumed people
Students	145 people
Teacher Usage	20 gpcd
Student and Staff Usage	15 gpcd
School Year	200 days
Teacher Housing Year	270 days
Basketball at School	70 People/week
	8 gal/shower
	52 week/year
Clinic Demand	0 gpd
Clinic demand determined by contacting Bob White at YKHC. Bob suggested monthly usage of 1300-1600gal based on	0 gallons/month
Store Demand	0 gpd
Teen Center Demand	0 gpd
Backwashing Demand (Existing)	600 gpd
Assumes 15 min per day at 40 gpm	
Washeteria Demand	1,110 gpd
From Washeteria Demand Spreadsheet	0.8 gpm
Average Daily Demand Rate (ADD)	4,190 gpd
Sum of Residential, Backwashing, Washeteria and School daily demand	2.9 gpm
Peak Hour Demand	14,665 gpd
175% of Maximum Day Demand	10.2 gpm
Maximum Day Demand	8,380 gpd
Assumed to be 2.0 the ADD to account for fire flows and times of high demand.	5.8 gpm
Average Water Use	11 gpcd

Tuluksak WTP/Washeteria Preliminary Engineering Report

Proposed Water Demand Calculations

Population in 2034	456 people
WP & SH	1,660 gpd
	5 gpcd
Future WP&SH Users	
WP & SH Users for 365 days/year	242 customers
WP & SH Users for 165 days/year	196 customers
(Students and Staff use school rate for 200 days)	
School Demand	2,120 gpd
School Demand determined in 1993 LKSD Lagoon Design. Student and staff population extrapolated to account for future growth.	772,560 gallons per year
Future Teachers plus family	18 people
Future Staff	22 Assumed future Staff
Future Students	174 Assumed future students
Teacher Usage	20 gpcd
Student and Staff Usage	15 gpcd
School Year	200 days
Teacher Housing Year	270 days
Basketball Showers	84 People/week
	20 gal/shower
	52 week/year
Clinic Demand	50 gpd
Clinic demand determined by contacting Bob White at YKHC. Bob suggested monthly usage of 1300-1600gal based on Eek Demand	1500 gallons/month
Store Demand	50 gpd
Teen Center Demand	25 gpd
Backwashing Demand (Future)	240 gpd
Assumes 3 min per day at 40 gpm (twice daily: once for contact clarifier, once for greensand filter)	
Washeteria Demand	1,340 gpd
From Washeteria Demand Spreadsheet	0.9 gpm
Average Daily Demand Rate (ADD)	5,485 gpd
Sum of Residential, Backwashing, Washeteria and School daily demand	3.8 gpm
Peak Hour Demand	19,200 gpd
175% of Maximum Day Demand	13.3 gpm
Maximum Day Demand	10,970 gpd
Assumed to be 2.0 the ADD to account for fire flows and times of high demand.	7.6 gpm
Average Water Use	12 gpcd

Appendix D – Site Control Documents

SANITATION UTILITY CORRIDOR DESCRIPTION,
A PORTION OF TULKISARMUTE, INC. PROPERTY, TULUKSAK, ALASKA

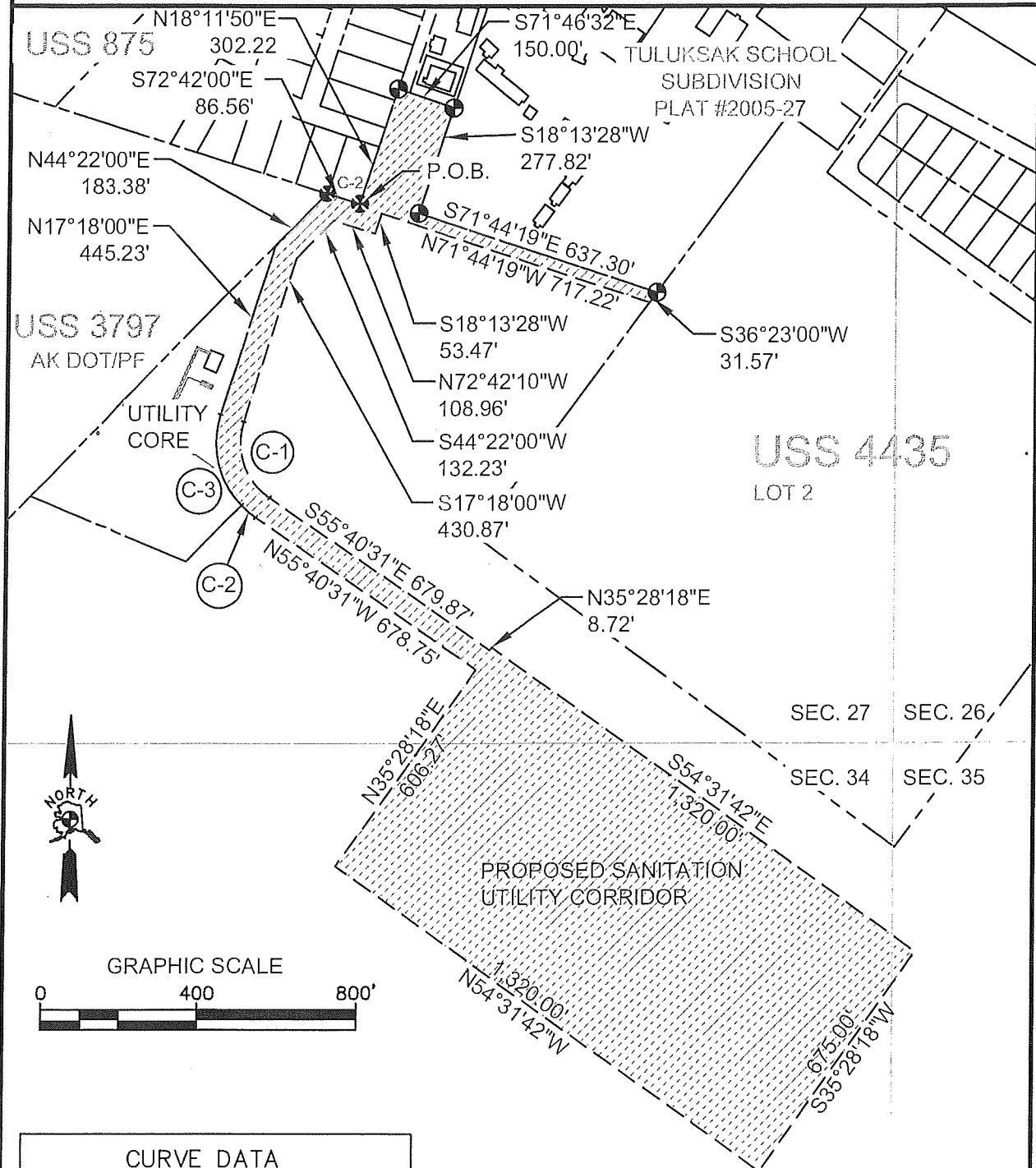
Being a portion of un-surveyed lands located in Sections 27, 34 & 35, Township 12 North, Range 66 West, Seward Meridian, Tuluksak, Alaska, as shown on Exhibit A, and being more particularly described as follows:

Commencing from 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-three (23) courses:

1. 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;
2. thence along the Southern line of said Lot 3 of Plat 2005-27, South 71 degrees, 46 minutes 32 seconds East, a distance of 150.00 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;
3. 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;
4. 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;
5. 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;
6. thence parallel to course 4, North 71 degrees 44 minutes 19 seconds West, a distance of 717.22 feet, to a point;
7. thence South 18 degrees 13 minutes 28 seconds West, a distance of 53.47 feet, to a point;
8. thence North 72 degrees 42 minutes 10 seconds West, a distance of 108.96 feet, to a point;
9. thence South 44 degrees 22 minutes 00 seconds West, a distance of 132.23 feet, to a point;

10. thence South 17 degrees 18 minutes 00 seconds West, a distance of 430.87 feet, to a point;
11. 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 01 minutes 04 seconds, a distance of 202.18 feet, to a point;
12. thence South 55 degrees 40 minutes 31 seconds East, a distance of 679.87 feet, to a point;
13. thence North 35 degrees 28 minutes 18 seconds East, a distance of 8.72 feet, to a point;
14. thence South 54 degrees 31 minutes 42 seconds East, a distance of 1,320 feet, to a point;
15. thence South 35 degrees 28 minutes 18 seconds West, a distance of 675.00 feet, to a point;
16. thence North 54 degrees 31 minutes 42 seconds West, a distance of 1,320.00 feet, to a point;
17. thence North 35 degrees 28 minutes 18 seconds East, a distance of 606.27 feet, to a point;
18. thence North 55 degrees 40 minutes 31 seconds West, a distance of 678.75 feet to a point;
19. thence along a curve to the right, which the Radius is 230.00 feet, the Length of Curve is 47.07 feet and of which the Chord bears North 49 degrees 48 minutes 20 seconds West, a distance of 47.00 feet, to an un-monumented point representing the Southeasterly corner of the Utility Core Site Lease as recorded on Document # 2005-000252-0, at the Bethel recorders office, Bethel Recording District;
20. thence continuing along the Easterly boundary of said Utility Core Site Lease, along a curve to the right, which the Radius is 230.00 feet, the Length of Curve is 245.87 feet, of which the Chord bears North 13 degrees 17 minutes 35 seconds West, a distance of 233.36 feet to an un-monumented point on the Easterly boundary of said Utility Core Site Lease;
21. thence continuing along the Easterly boundary of said Utility Core Site Lease, North 17 degrees 18 minutes 00 seconds East, a distance of 445.23 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;
22. thence along the Easterly boundary of said Lot 1, USS 3797, North 44 degrees 22 minutes 00 seconds East, a distance of 183.38 feet to a 3-1/2", Brass capped monument marking the Northeasterly corner, corner #2, of said USS 3797;
23. thence along the Southerly boundary of USS 875, South 72 degrees 42 minutes 00 seconds East, a distance of 86.56 feet, to the P.O.B., containing 22.2 acres, more or less.

EXHIBIT A



CURVE DATA

NO.	RADIUS	LENGTH
C1	170.00'	216.52'
C2	230.00'	47.07'
C3	230.00'	245.87'

- PROPOSED SANITATION UTILITY CORRIDOR
 = 2"Ø ALUM. CAPPED MONUMENT
 = 3-1/4"Ø BRASS CAPPED MONUMENT

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: 

By: 

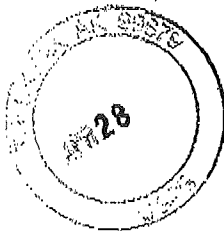
Its: 

Its: 

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

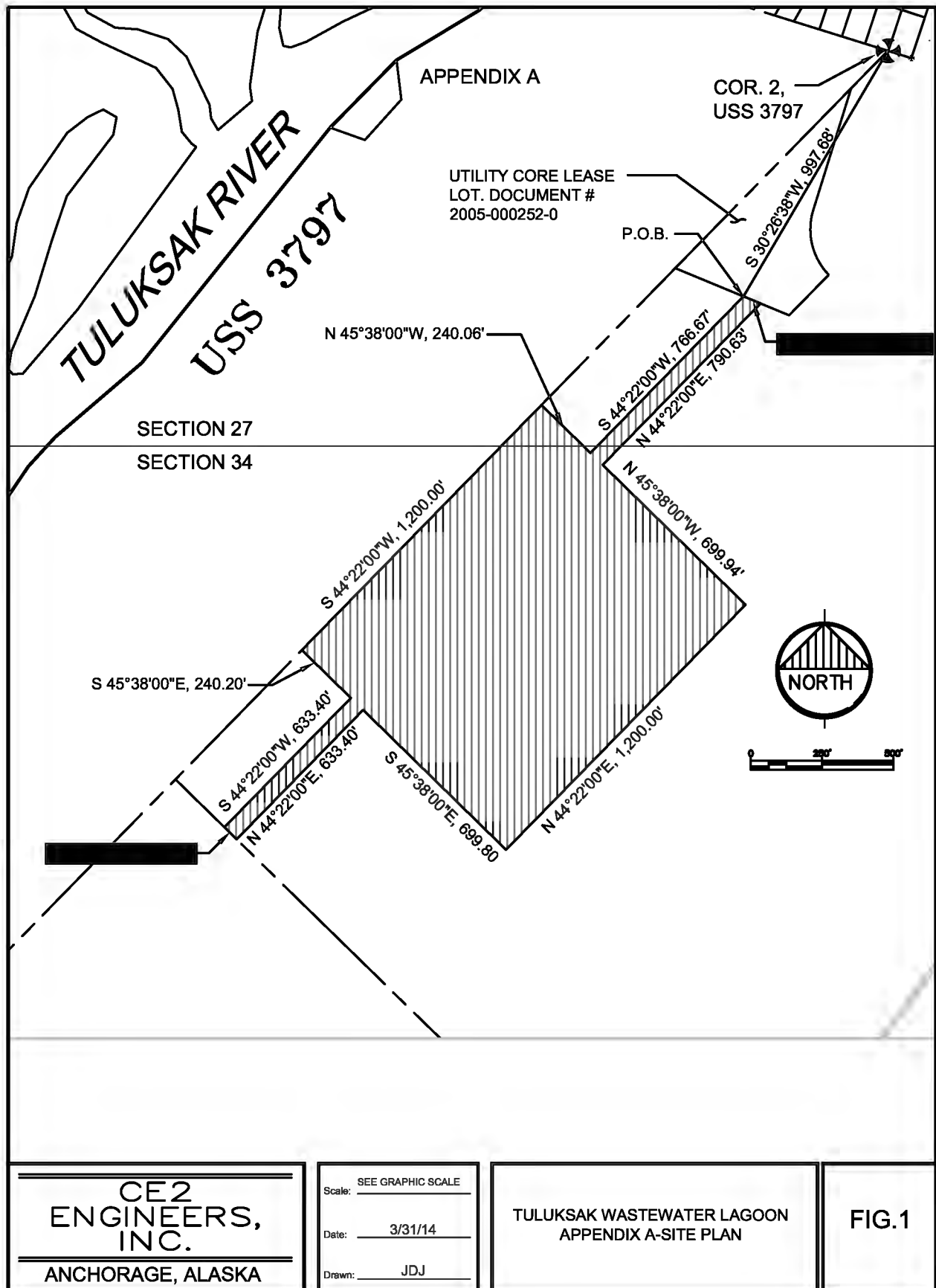
ACKNOWLEDGMENT

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





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 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 southwesterly 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 leas 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:

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: Secy, 1998

By: James O'Leary
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:

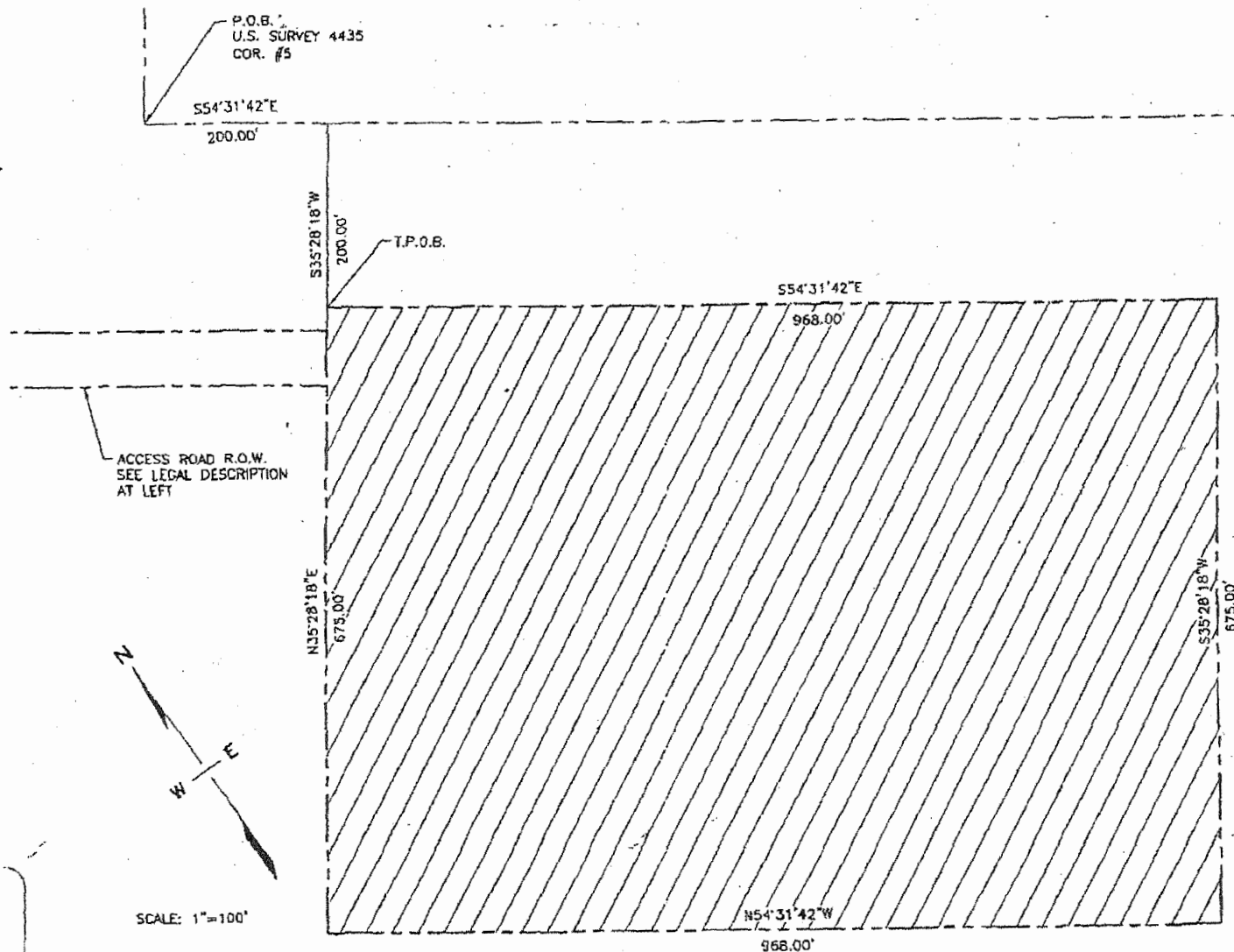
Third JUDICIAL DISTRICT)

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: _____





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 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.

2003-001064-0



8 of 8



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.

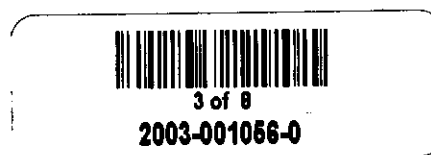
11. Access to Premises. The Lessor or its authorized representatives reserve the right of ingress to and egress from the premises.

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.

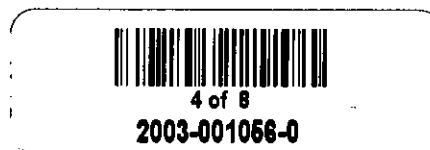


- (b) Time is of the essence in this lease. If the Lessee breaches any provision of this lease, other than a breach for improper use of the premises which is governed by subparagraph (a), and the breach is not remedied without thirty (30) days after written notice of it has been served on the Lessee, 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 (Notal 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.

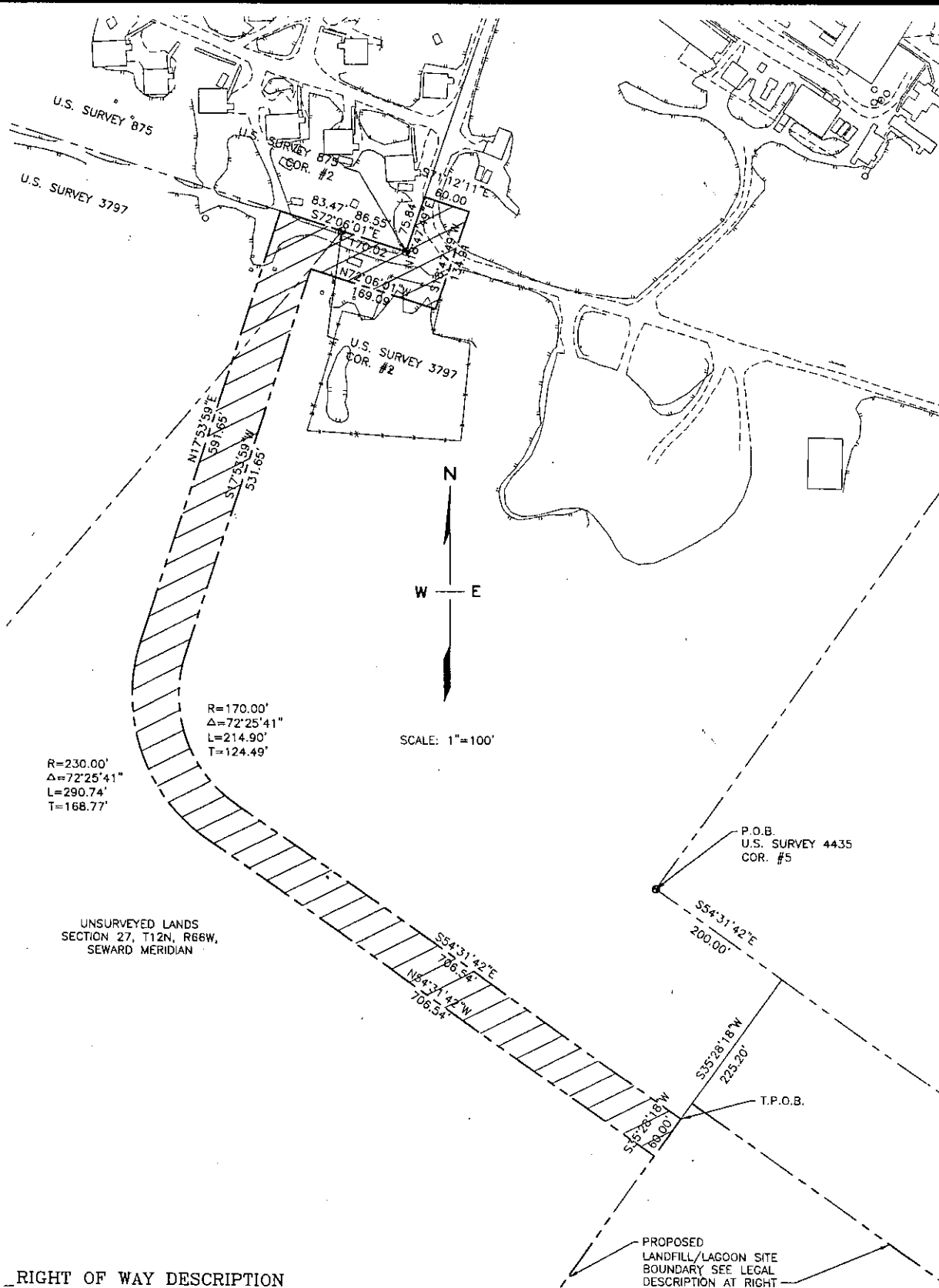


Carrie Peter Postal Clerk

NOTARY PUBLIC for the State of Alaska

My Commission Expires: _____





RIGHT OF WAY DESCRIPTION

An area within the Tuluksok Native Community to be dedicated as a right of way, being further described as follows:

Being a portion of the unsurveyed lands located in Section 27, Township 12 North, Range 66 West, Seward Meridian, Tuluksok, 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 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



8 of 8

2003-001066-0



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

CC

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:

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:

TULKISARMUTE, INCORPORATED

LESSEE:

TULUKSAK NATIVE COMMUNITY

By: [Signature]

By: Moses K. P. [Signature]

Its: Tulak [Signature]

Its: Village Council President



ACKNOWLEDGMENT

[illegible]

This is to certify that on the 18th day of Feb, 2005, before me appeared Robert J. Pate, known to me to be the Tulok Sak 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.

FEB 18 2005

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

ACKNOWLEDGMENT

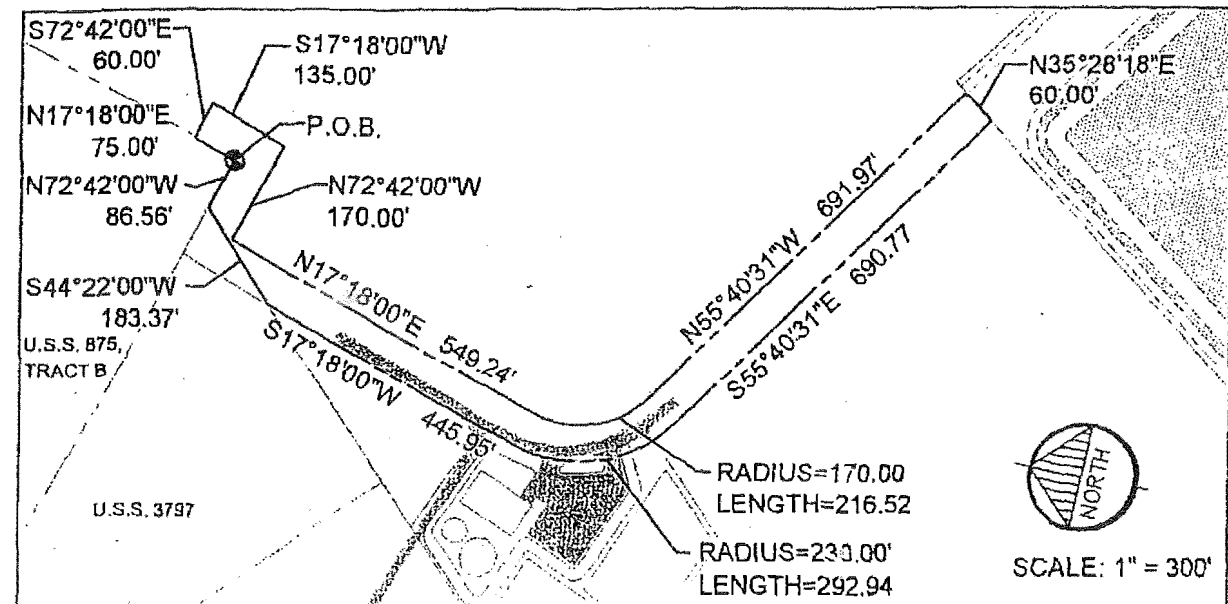
STATE OF ALASKA)
) ss:
THIRD JUDICIAL DISTRICT)

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.

55B
18
2005

Nella C. Alexi
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



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:

TULKISARMUTE, INCORPORATED

By: Bobby J. Peto
Its: Tulksak Chair

LESSEE:

TULUKSAK NATIVE COMMUNITY

By: Moses K. Peto
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. Peter, known to me to be the Tulksak FWC 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.



Nellie C. Davis
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.



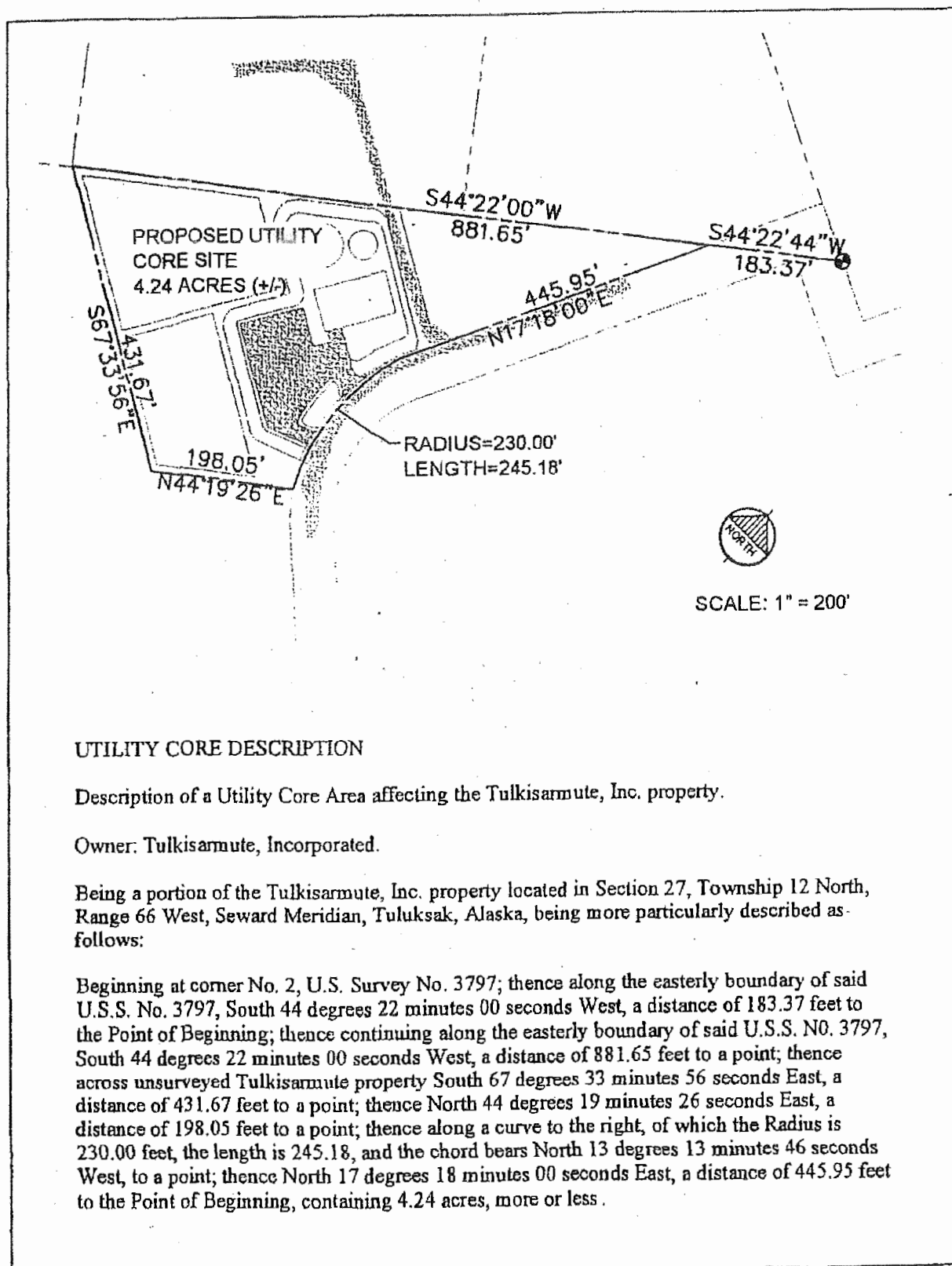
Nellie C. Davis
NOTARY PUBLIC for the State of Alaska
My Commission Expires: Unknown

Lease Agreement (Utility Core)
Tulkisarmute, Inc./Tulksak Native Community

Page 7 of 8



7 of 8
2006-000262-0



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.



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.

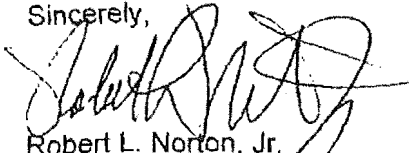
The Federal Aviation Administration (FAA) is charged with the responsibility of policing this property restriction. Informal discussions with FAA (John Lovett 271-5446) suggest that a request for a waiver for this non-aviation use is not recommended.

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

Appendix E – Trip and Inspection Reports

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/Washeteria (notice iron content in filter backwash water).



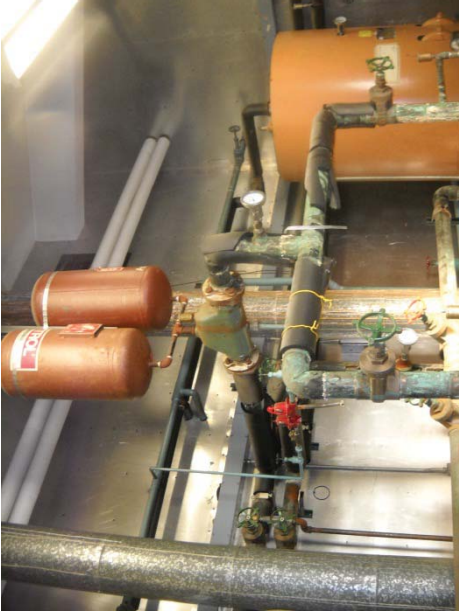
WTP/W Bldg (western end)



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

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

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.

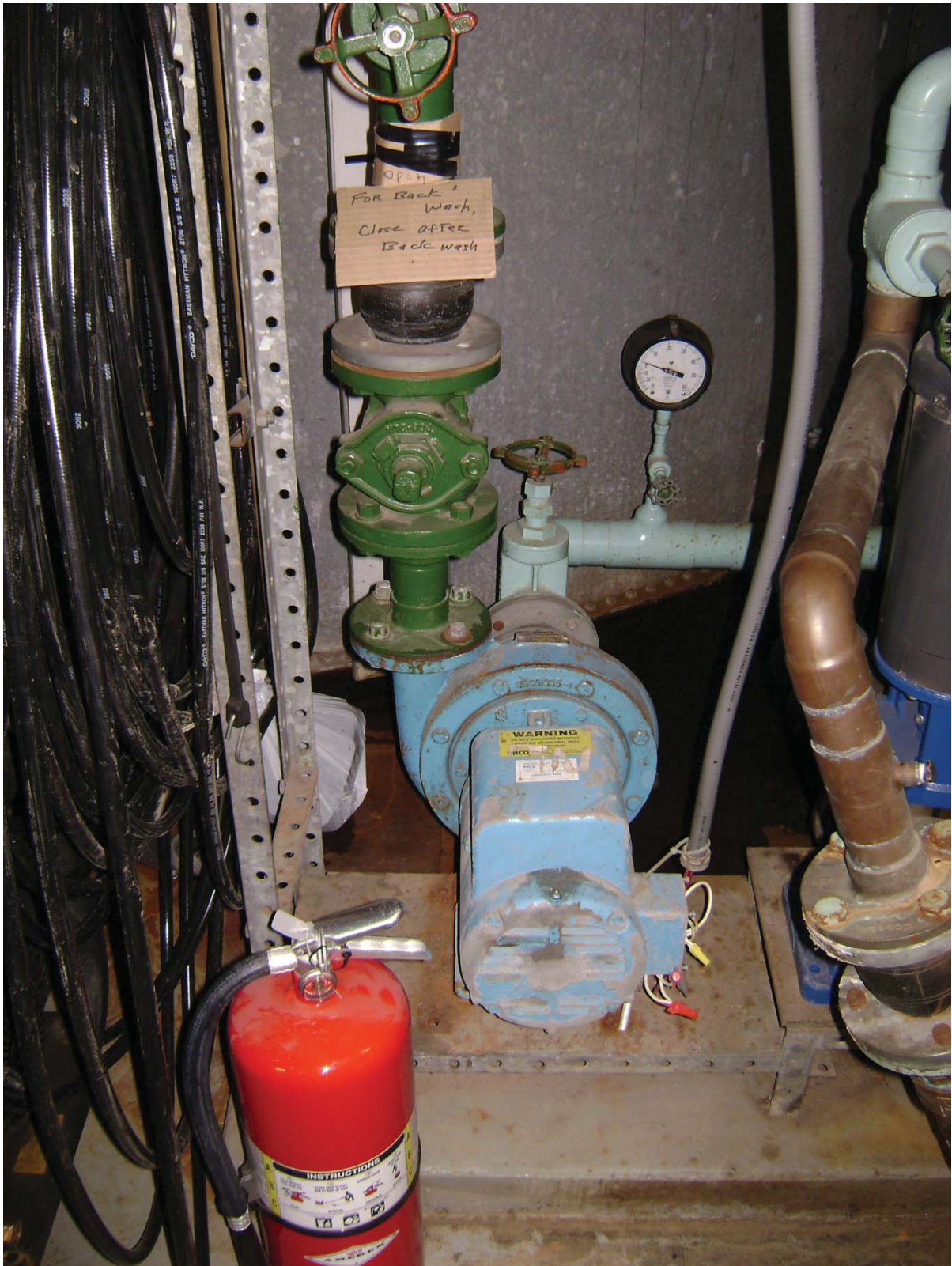


Washeteria area. Two unoccupied washer connections at right. Two stacked dryers are inoperable



Typical Toilet/Shower room. Toilets not connected.

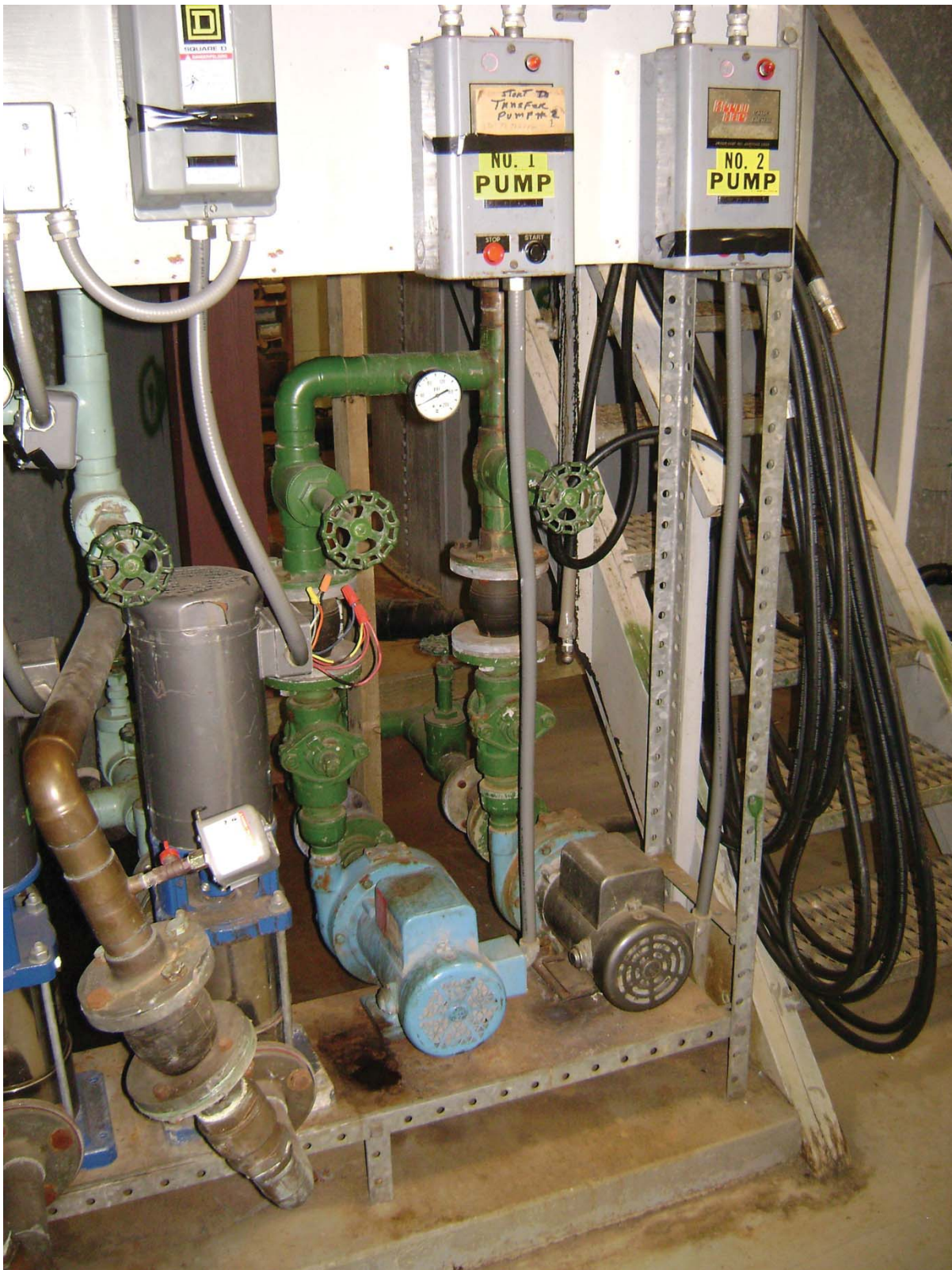
Tuluksak Site Visit - 1/31/13 Photos



Backwash pump



Pressure pumps (right two). One is not working. Note piping obstructing pump maintenance.



Treatment Transfer Pumps (right two). One is not working

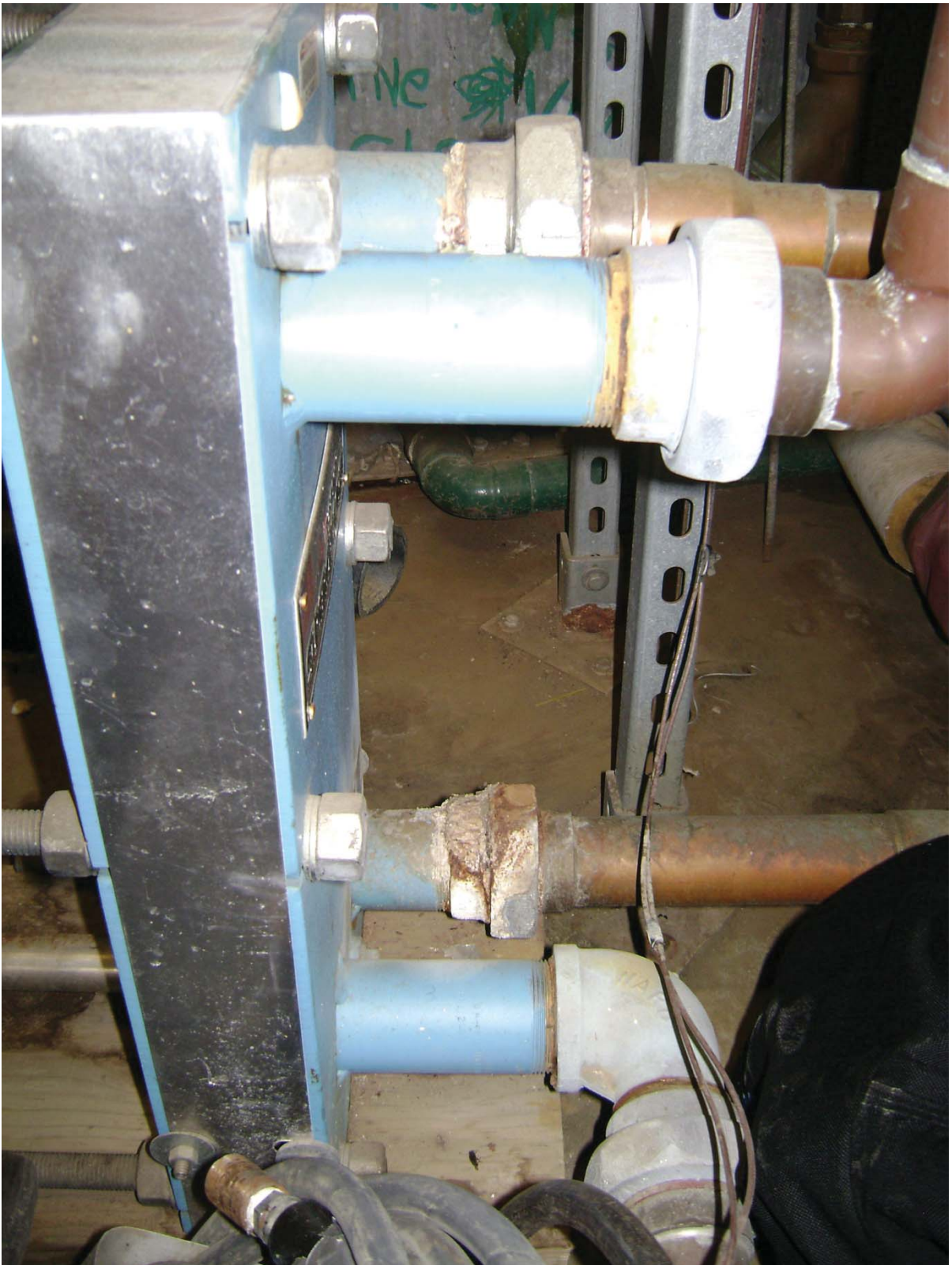
Tuluksak Site Visit - 1/31/13 Photos



Treated water tank corrosion. Tank has been lined, but water still appears on floor underneath



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.

Tuluksak Water Treatment Plant Structural Condition Survey Report

Tuluksak, Alaska

RM Project No. 402013.007

February 2013

Prepared for:
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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



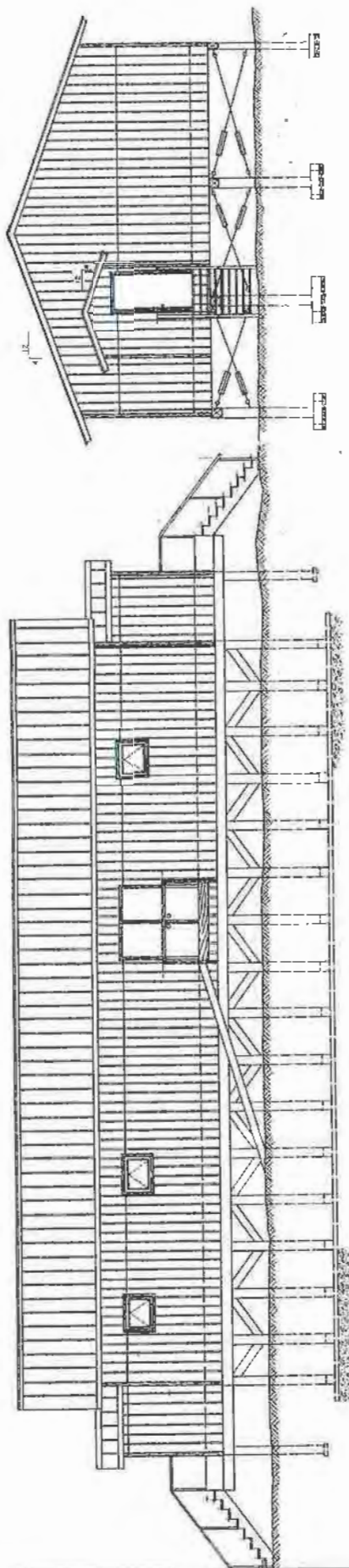
***Photo No. 17: Boiler Room – Rotten plywood and joists
behind Boiler No. 2***



***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



FRONT ELEVATION
SCALE 1/4"=1'-0"

RIGHT END ELEVATION
SCALE 1/4"=1'-0"

- NOTES
1. NO LAR ROOM LAYERS OF 5/8" SHEET ROCK, 1 LAYER OF 1/2" G. C. BOARDING.
 2. JUTTY, COVERED SHEET ROCK IN SHOWER ROOMS AND IN LAUNDRY ROOM.
 3. 8" SECTION OF BOARDING HEATER FOR FUEL OIL PIPE HEATER.

North

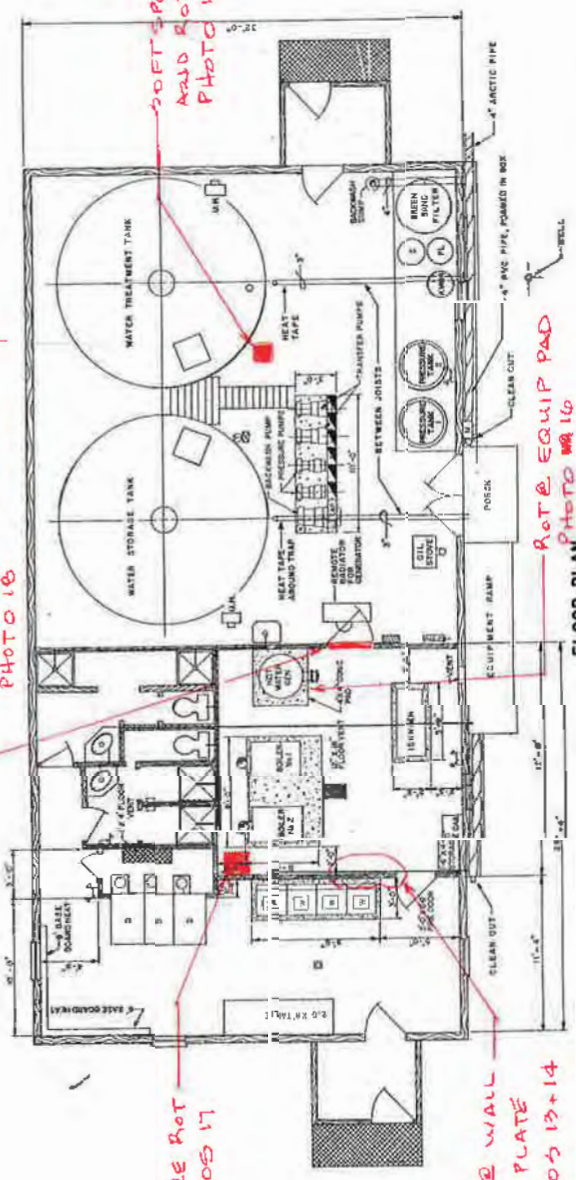
Rot @ Door Threshold
Photo 18

SOFT SPOT IN FLOOR
Add Rot
Photo 19

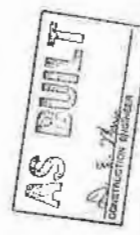
SEVERE ROT
PHOTOS 17

Rot @ WALL
SILL PLATE
PHOTOS 13+14

Rot @ EQUIP PAD
Photo 16



FLOOR PLAN
SCALE 1/4"=1'-0"



DATE	BY	REVISIONS	INITIALS
U. S. Department of Health, B. Human Services			
Public Health Service			
Indian Health Service			

TULUKSAK, ALASKA
WATER TREATMENT PLANT
FLOOR PLAN AND ELEVATIONS
PUBLIC LAW 94-121 PROJECT
PROJECT NO. AA-87-220

DESIGNED BY: [Signature]
CHECKED BY: [Signature]
DATE: [Signature]

CONSTRUCTION BRANCH
ENVIRONMENTAL HEALTH BRANCH
ALASKA AND NORTH SLOPE BRANCH

CONSTRUCTION PLANS

SANITATION FACILITIES TULUKSAK, ALASKA

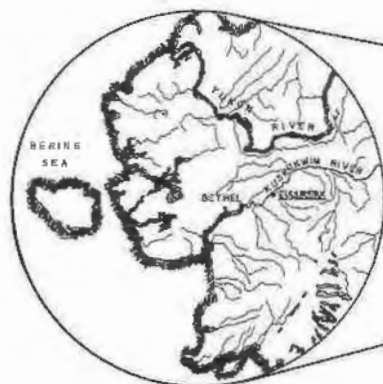


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3	SITE PLAN
4	FOUNDATION FOOTING & BRACING DETAILS
5	FOUNDATION PLAN
6	FOUNDATION ISOMETRIC
7	WTP FLOOR PLAN & ELEVATIONS
8	WTP ELEVATIONS & DETAILS
9	WTP DOOR DETAILS
10	NW BUILDING SYSTEMS
11	NW BUILDING SYSTEMS
12	WTP FLOOR PLAN & ELEVATIONS
13	WTP ELEVATIONS
14	PLUMBING SCHEMATIC
15	HYDRAULIC SYSTEM
16	WTP WATER POINT DETAILS
17	SEWAGE DISPOSAL DRAINER
18	HEATING & VENTILATION DUCT ISOMETRIC
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21	HOT WATER GENERATOR
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23	ELECTRICAL PLAN
24	PANELBOARDS - POWER ONE LINE DIAGRAM
25	WTP FUEL STORAGE
26	WASTE WATER DISPOSAL PLAN
27	WASTE WATER PLUMBING
28	CHAIN LINK FENCE GATE DETAILS
29	CHAIN LINK FENCE CORNER & LINE POST DETAILS
30	SPECIFICATION SHEET

ALASKA AREA NATIVE HEALTH SERVICE
OFFICE OF ENVIRONMENTAL HEALTH
P.O. BOX 7-746
ANCHORAGE, ALASKA 99510

PUBLIC LAW 86-121 PROJECT
PROJECT NO. AN-81-220

U. S. DEPT. OF HEALTH EDUCATION & WELFARE
PUBLIC HEALTH SERVICE
INDIAN HEALTH SERVICE

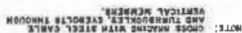


WASHETERIA

www.elsevier.com/locate/ynbme

[illegible]

Sum D Rides
Circuit Engineer
Adrian C. (M.B. Foy) Rye
Adrian C. (M.B. Foy) Rye



END ELEVATION
SCALE 1"=1'-0"



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



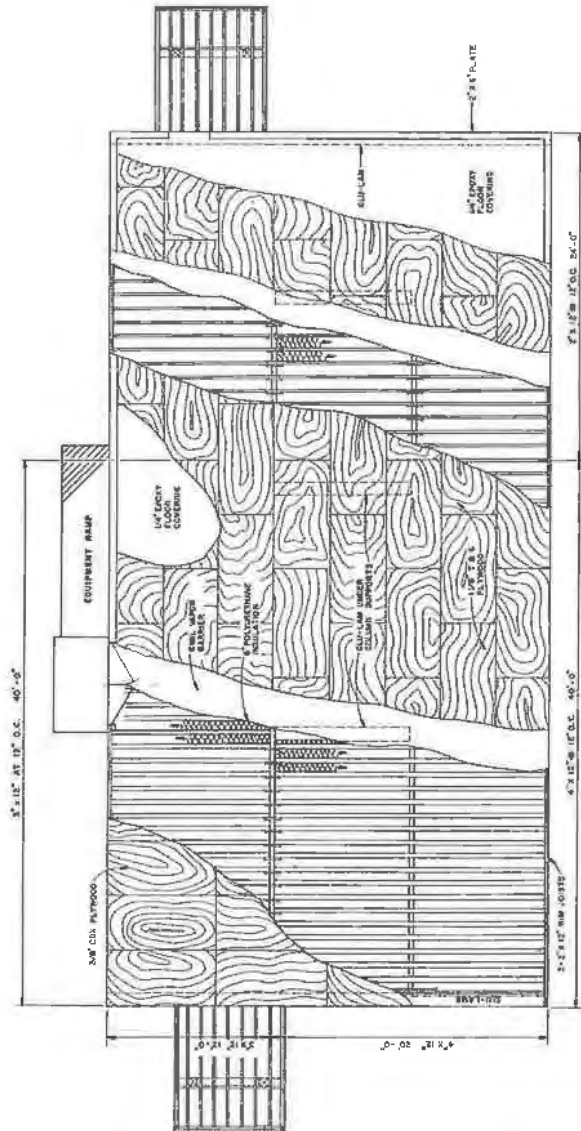
FRONT ELEVATION



Signature: P. T. Deane
 Title: Chief Engineer

8-73	83-1114	0001009	REVISOR	NOT INITIALS
DATE				
U.S. Department of Health, & Human Services Public Health Service Indian Health Service				
TULUOKAS, ALASKA FARMINGTON, PORTLAND AND BRANCH DETAILS PUBLIC LAW 95-11 SUBJECT PROJECT NO. 88-252				
DATE	GRANTS BY	8-8/8/80	ISSUED BY	<i>A. Thayer</i>
DATE	SANITATION FACILITIES		CHARGE	0-2257
ENVIRONMENTAL HEALTH BRANCH ALASKA REGIONAL WATER SERVICE				

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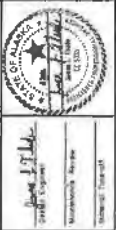
FOUNDATION PLAN
SCALE 1/4" = 1'-0"

AS BUILT
REVISIONS
DATE

NO.	DATE	REVISIONS	INITIALS
1			
2			
3			

U.S. Department of Health & Human Services
Indian Health Service

TULAKSAK, ALASKA
FOUNDATION PLAN
PROJECT NO. AH-81-220
DATE: FEBRUARY 2, 1981
DRAWN BY: J. J. JENSEN
CHECKED BY: J. J. JENSEN
APPROVED BY: J. J. JENSEN
SANTATION FACILITIES CONSTRUCTION BRANCH
EPA/INDIAN HEALTH SERVICE
ALASKA DEPARTMENT OF HEALTH & HUMAN SERVICES



[illegible]

ASBUTT
B. & M.
CONSULTING ENGINEERS

NOTE:
LEADING CONDITIONS TO BE KEPT IN MIND WHEN
CONSIDERING THE FOLLOWING FACTORS:
1. THE FOLLOWING FACTORS ARE TO BE KEPT IN MIND
WHEN CONSIDERING THE FOLLOWING FACTORS:
2. THE FOLLOWING FACTORS ARE TO BE KEPT IN MIND
WHEN CONSIDERING THE FOLLOWING FACTORS:

LEAD	AS-BUILT CONDITIONS	DATE	INITIALS
DATE	REVISIONS		

U.S. Department of Health, Education & Welfare
Public Health Service
Indian Health Service

TULUOKA, ALASKA
WATER TREATMENT PLANT
FLOOR PLAN AND ELEVATIONS
PROJECT NO. A-1511 PROJECT
PROJECT NO. A-1511-210

SHEET NO. 7
OF 30
TOTAL SHEETS

DRAWN BY: JLB
CHECKED BY: JLB
DATE: 12/25/64

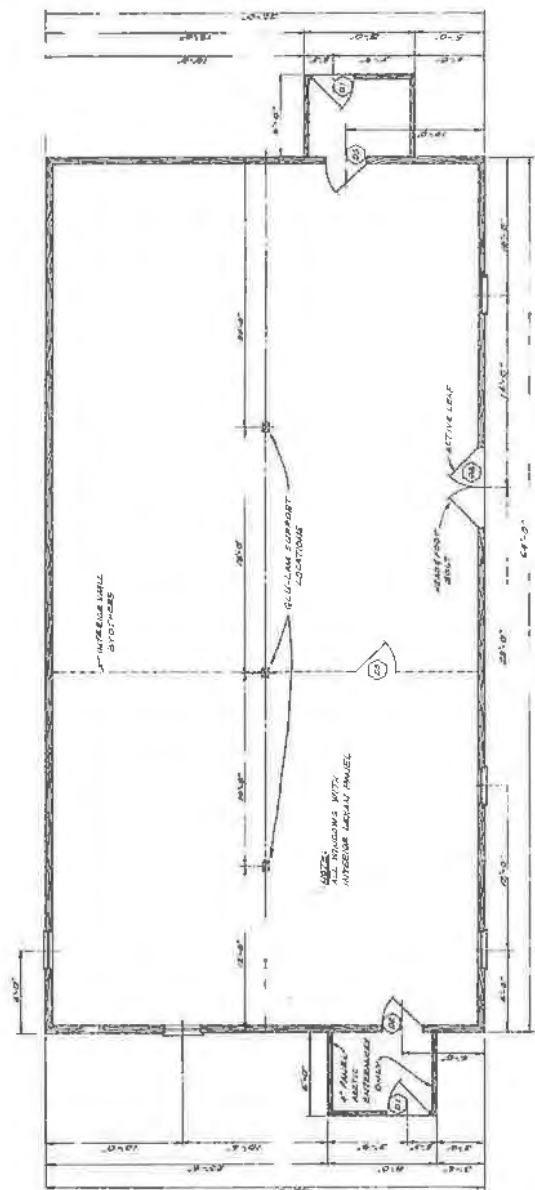
SANITARIUM FACILITY
INDIAN HEALTH SERVICE
ENVIRONMENTAL HEALTH BRANCH
NATIONAL CENTER FOR ENVIRONMENTAL HEALTH SERVICES



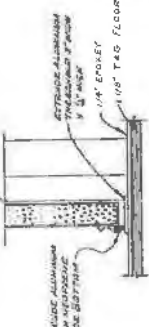
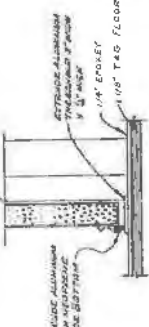
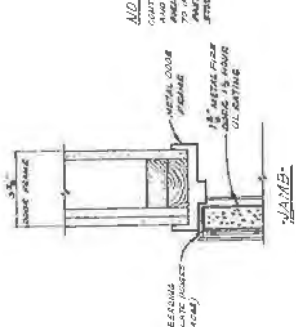
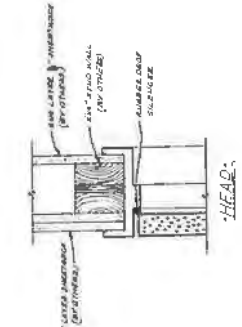
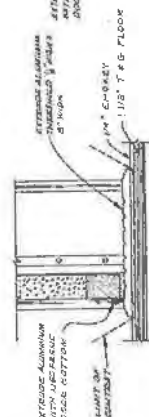
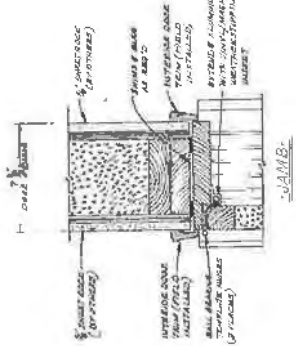
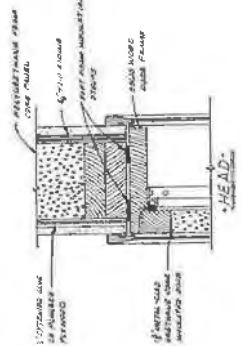
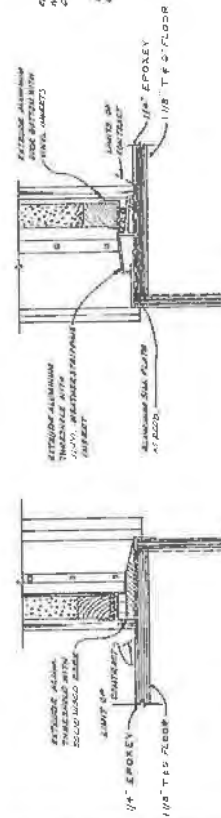
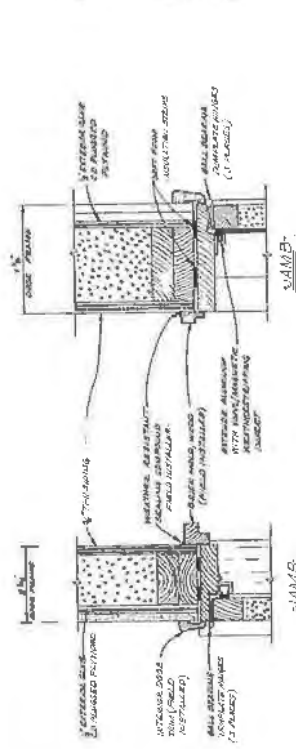
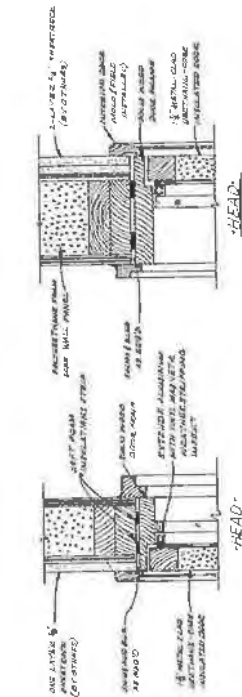
Bureau of Prisons

Washington, D.C.

March 10, 1968



FLOOR PLAN:



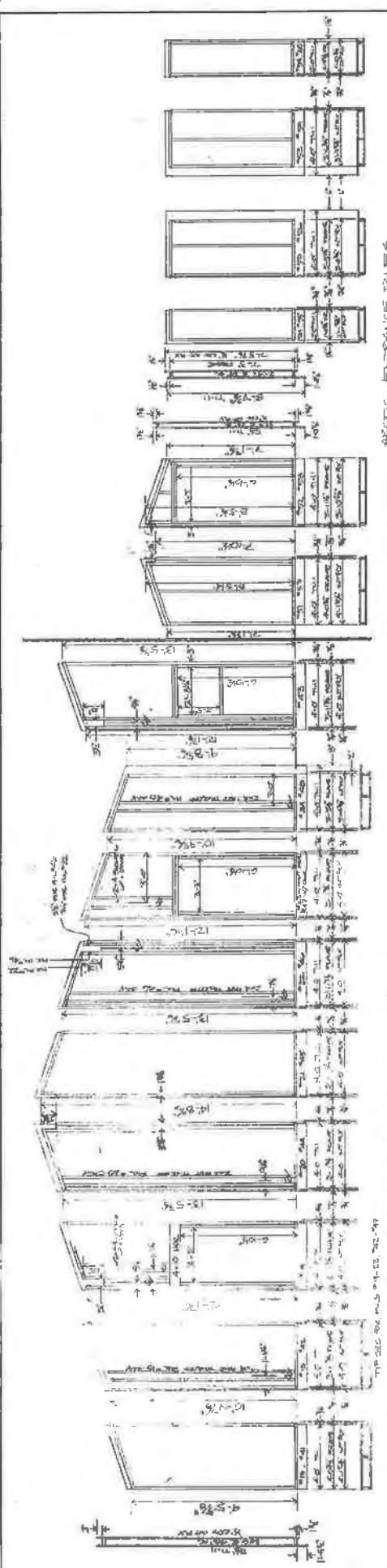
NOTE
CONTRACTOR TO PROVIDE AND
AND APPROVALS, ALL TO BE
FIELD INSTALLED BY CONTRACTOR.
TO INSURE GOOD BOND CLING TO
AFTER INITIAL CURE PERIOD TO JUNE
2000

AS BUILT

[illegible]

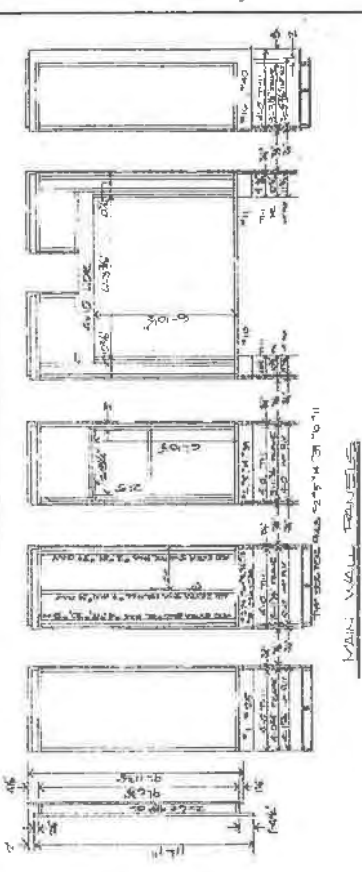
U.S. Department of Health, Education & Welfare
Public Health Service
Indian Health Service

TULUKEA, ALASKA NAUZE TRADING COMPANY COAST DETAIL PUBLIC WORK PROJECT PROJECT NO. 44-80-20	SHEET NO. 9 OF 33 TOTAL SHEETS
DRAWN BY: J. A. S. DATE: 1-28-79	CHECKED BY: J. A. S. DATE: 1-28-79
SANITATION FACILITIES CONSTRUCTION BRANCH ENVIRONMENTAL HEALTH BRANCH ALASKA DEPARTMENT OF HEALTH ANCHORAGE, ALASKA	



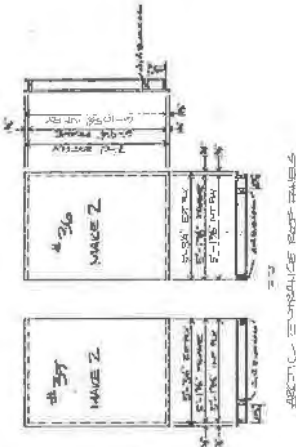
MAIN END WALL PANELS

ALTERNATE END WALL PANELS

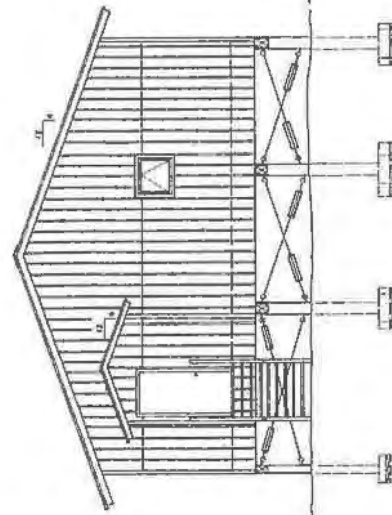


IF SANDWICH PANEL IS UTILIZED BY THE ENGINEERS
CALCULATIONS THE MIDDLE STRINGERS NOT USE
ALL THE PANELS (TOP + MID)

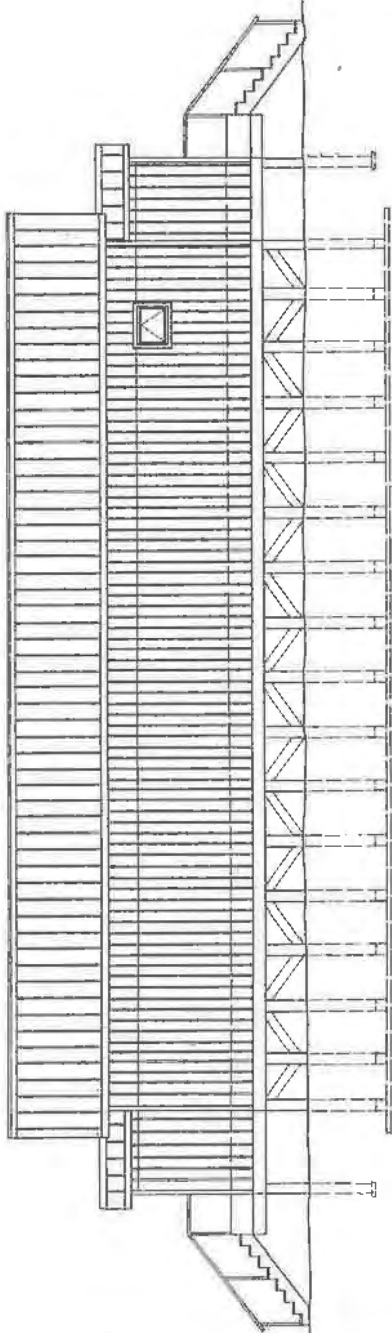
AS BUILT
CONTINUOUS NUMBER



MAIN ROOF PANELS



LEFT END ELEVATION
SCALE 1/4"=1'-0"



REAR ELEVATION
SCALE 1/4"=1'-0"

AS BUILT
A. E. M. H.
CONSTRUCTION FOR 1922

DATE	AS-BUILT	CONDITIONS	REVISIONS	INITIALS
U.S. Department of Health & Human Services Public Health Service Indian Health Service				
TULUKEAK, ALASKA MADE ELEVATIONS				
PUBLIC LAW 84-721 PROJECT PROJECT NO. 241-01-020				
QUARTER	ALASKA	DESIGNED BY	CHECKED BY	DATE
DATE	FEBRUARY 1981	DATE	DATE	DATE
SAFETY & FACILITIES CONSTRUCTION BRANCH DIVISION OF FACILITIES CONSTRUCTION ALASKA, ALASKA, NORTHERN CALIFORNIA DIVISION WASHINGTON, D.C. 20540				



James J. Hobb
Professional Engineer
Registration No. 1000
Expiration Date 12/31/81

Appendix F – Cost Estimates

CAPITAL COST ESTIMATES

Alternative 2 - New WTP/W Facility at Utility Core Site (2534 ft²)

New WTP/Washeteria Facility at Utility Core Site				
Area	Quantity	Unit	Unit Cost	Total
Mobilization and Demobilization	1	LS	\$ 240,000	\$ 240,000
Subtotal				\$ 240,000
New WTP/Washeteria Building and Associated Costs				
New Building Construction (shell, outside finishes)	2,540	SF	\$ 200	\$ 508,000
Post and Pad Foundation	1	LS	\$ 200,000	\$ 200,000
Pad Development	650	CY	\$ 100	\$ 65,000
Access Ramp	1	EA	\$ 50,000	\$ 50,000
Washing Machine	6	EA	\$ 10,000	\$ 60,000
Dryer	4	EA	\$ 10,000	\$ 40,000
Bathroom and Shower Space Finishes	185	SF	\$ 300	\$ 55,500
Office/Furniture	125	SF	\$ 120	\$ 15,000
Storage	146	SF	\$ 95	\$ 13,900
Open Area/Treatment Area	690	SF	\$ 50	\$ 34,500
Mechanical - Heating and Ventilation	1	LS	\$ 87,000	\$ 87,000
Mechanical - Plumbing	1	LS	\$ 70,000	\$ 70,000
General Electrical	1	LS	\$ 100,000	\$ 100,000
Standby Generator/Automatic Transfer Switch	1	EA	\$ 75,000	\$ 75,000
Pumps (Pressure and Circ.) and Hydropneumatic Tanks	2	EA	\$ 12,000	\$ 24,000
Bulk Fuel Tank (5,000-gal)	1	EA	\$ 16,000	\$ 16,000
Fuel Day Tank (25-gal)	1	EA	\$ 7,000	\$ 7,000
Well House	256	SF	\$ 100	\$ 25,600
Distribution Lines (Raw Water, Circ. Main, Connections)	2,350	LF	\$ 200	\$ 470,000
Waste Heat Recovery System	1	LS	\$ 100,000	\$ 100,000
Ozone Injection Equipment	6	EA	\$ 15,000	\$ 90,000
Subtotal				\$ 2,107,000
Water Treatment Process				
Water Storage Tank	1	EA	\$ 247,500	\$ 247,500
Water Storage Tank Piping/Doghouse	1	LS	\$ 25,000	\$ 25,000
Package Water Treatment Plant	1	EA	\$ 275,000	\$ 275,000
Chem Tank & Pump	5	EA	\$ 7,000	\$ 35,000
Electrical and Controls	1	LS	\$ 90,000	\$ 90,000
Treatment Piping	1	LS	\$ 50,000	\$ 50,000
Subtotal				\$ 722,500
Subtotal				\$ 3,069,500
20% Construction Contingency				\$ 613,900
Total				\$ 3,683,400
8% Design (Primary, Subs & Specialists)				\$ 294,672
10% Construction Management				\$ 368,340
8% VSW/Admin				\$ 294,672
Estimated Total				\$ 4,642,000

CAPITAL COST ESTIMATES

Alternative 3 - Rehabilitate Existing WTP/W (2503 ft²)

Rehabilitate Existing WTP/W				
Area	Quantity	Unit	Unit Cost	Total
Mobilization and Demobilization	1	LS	\$ 240,000	\$ 240,000
Subtotal				\$ 240,000
Rehabilitate Existing WTP/Washeteria Building and Associated Costs				
Selective Demolition	1	LS	\$ 70,000	\$ 70,000
Building Rehabilitation	2,048	SF	\$ 150	\$ 307,200
Building Expansion	453	SF	\$ 220	\$ 99,660
Post Foundation for Expansion	1	LS	\$ 40,000	\$ 40,000
Temporary Washeteria	1	LS	\$ 50,000	\$ 50,000
Access Ramp	1	EA	\$ 50,000	\$ 50,000
Washing Machine	6	EA	\$ 10,000	\$ 60,000
Dryer	4	EA	\$ 10,000	\$ 40,000
Bathroom and Shower Space Finishes	185	SF	\$ 300	\$ 55,500
Office/Furniture	125	SF	\$ 120	\$ 15,000
Storage	146	SF	\$ 95	\$ 13,870
Open Area/Treatment Area	690	SF	\$ 50	\$ 34,500
Mechanical - Heating and Ventilation	1	LS	\$ 87,000	\$ 87,000
Mechanical - Plumbing	1	LS	\$ 70,000	\$ 70,000
General Electrical	1	LS	\$ 100,000	\$ 100,000
Standby Generator/Automatic Transfer Switch	1	EA	\$ 75,000	\$ 75,000
Pumps (Pressure and Circ.) and Hydropneumatic Tanks	2	EA	\$ 7,500	\$ 15,000
Bulk Fuel Tank (5,000-gal)	1	EA	\$ 16,000	\$ 16,000
Fuel Day Tank (25-gal)	1	EA	\$ 7,000	\$ 7,000
Well House	256	SF	\$ 100	\$ 25,600
Distribution Lines (Raw Water, Circ. Main, Connections)	2,750	LF	\$ 200	\$ 550,000
Waste Heat Recovery System	1	LS	\$ 100,000	\$ 100,000
Ozone Injection Equipment	6	EA	\$ 15,000	\$ 90,000
Subtotal				\$ 1,971,330
Water Treatment Process				
Water Storage Tank	1	EA	\$ 247,500	\$ 247,500
Water Storage Tank Piping/Doghouse	1	LS	\$ 25,000	\$ 25,000
Package Water Treatment Plant	1	EA	\$ 275,000	\$ 275,000
Chem Tank & Pump	5	EA	\$ 7,000	\$ 35,000
Electrical and Controls	1	LS	\$ 90,000	\$ 90,000
Treatment Piping	1	LS	\$ 50,000	\$ 50,000
Subtotal				\$ 722,500
Subtotal				\$ 2,933,830
20% Construction Contingency				\$ 586,766
Total				\$ 3,520,596
8% Design (Primary, Subs & Specialists)				\$ 281,648
10% Construction Management				\$ 352,060
8% VSW/Admin				\$ 281,648
Estimated Total				\$ 4,436,000

CAPITAL COST ESTIMATES

Alternative 4 - Separate WTP and Washeteria Facilities

Separate WTP and Washeteria Facilities				
Area	Quantity	Unit	Unit Cost	Total
Mobilization and Demobilization	1	LS	\$ 240,000	\$ 240,000
Subtotal				\$ 240,000
Rehabilitate Existing Washeteria and Associated Costs				
Selective Demolition	1	LS	\$ 39,000	\$ 39,000
Building Rehabilitation	1	LS	\$ 140,000	\$ 140,000
Access Ramp	1	EA	\$ 50,000	\$ 50,000
Washing Machine	6	EA	\$ 10,000	\$ 60,000
Dryer	4	EA	\$ 10,000	\$ 40,000
Bathroom and Shower Space Finishes	185	SF	\$ 300	\$ 55,500
Office/Furniture	125	SF	\$ 120	\$ 15,000
Storage	146	SF	\$ 95	\$ 13,870
Mechanical - Heating and Ventilation	1	LS	\$ 87,000	\$ 87,000
Mechanical - Plumbing	1	LS	\$ 55,000	\$ 55,000
General Electrical	1	LS	\$ 80,000	\$ 80,000
Standby Generator/Automatic Transfer Switch	1	EA	\$ 75,000	\$ 75,000
Pumps (Pressure and Circ.) and Hydropneumatic Tanks	2	EA	\$ 12,000	\$ 24,000
Bulk Fuel Tank (5,000-gal)	1	EA	\$ 16,000	\$ 16,000
Fuel Day Tank (25-gal)	1	EA	\$ 7,000	\$ 7,000
Well House	256	SF	\$ 100	\$ 25,600
Distribution Lines (Raw Water, Circ. Main, Connections)	2,475	LF	\$ 200	\$ 495,000
Waste Heat Recovery System	1	LS	\$ 100,000	\$ 100,000
Ozone Injection Equipment	6	EA	\$ 15,000	\$ 90,000
Subtotal				\$ 1,467,970
New WTP Building and Associated Costs				
New Building Construction (shell, outside finishes)	1,550	SF	\$ 200	\$ 310,000
Post and Pad Foundation	1	LS	\$ 125,000	\$ 125,000
Access Ramp	1	EA	\$ 50,000	\$ 50,000
Open Area/Treatment Area	700	SF	\$ 50	\$ 35,000
Mechanical - Heating and Ventilation	1	LS	\$ 87,000	\$ 87,000
Mechanical - Plumbing	1	LS	\$ 55,000	\$ 55,000
General Electrical	1	LS	\$ 80,000	\$ 80,000
Subtotal				\$ 742,000
Water Treatment Process				
Water Storage Tank	1	EA	\$ 247,500	\$ 247,500
Water Storage Tank Piping/Doghouse	1	LS	\$ 25,000	\$ 25,000
Package Water Treatment Plant	1	EA	\$ 275,000	\$ 275,000
Chem Tank & Pump	5	EA	\$ 7,000	\$ 35,000
Electrical and Controls	1	LS	\$ 90,000	\$ 90,000
Treatment Piping	1	LS	\$ 50,000	\$ 50,000
Subtotal				\$ 722,500
Subtotal				\$ 3,172,470

20% Construction Contingency				\$ 634,494
Total				\$ 3,806,964
8% Design (Primary, Subs & Specialists)				\$ 304,557
10% Construction Management				\$ 380,696
8% VSW/Admin				\$ 304,557
Estimated Total				\$ 4,797,000

Water Distribution Revenue	Monthly Gallons	Annual Gallons	Rate	Monthly Revenues	Annual Revenues
Watering Point Self Haul	36,600	439,200	\$0.20	\$7,320	\$87,840
School Fee				\$3,500	\$42,000
Clinic Fee				\$500	\$6,000
Camp Building Fee				\$500	\$6,000
Store Fee				\$500	\$6,000
Estimated Revenue					\$147,840

NOTE: Monthly gallons is based on 1200 gpd at the watering point and 30.5 day/month

Washeteria Revenue	Monthly	Annual	Proposed Rate	Monthly Revenues	Yearly Revenues
Washers	763	9156	\$4.50	\$3,433.50	\$41,202.00
Dryers	763	9156	\$6.50	\$4,959.50	\$59,514.00
Showers	47	564	\$2.00	\$94.00	\$1,128.00
Estimated Revenue					\$101,844.00

NOTE: Washer and Dryer use based on 2 washes and showers/household/week and 111 households in 2034

Washeteria and WTP Costs	Annual Estimate
O&M	
Operator Labor	\$43,461
Electricity and Utilities	\$30,026
Heating Fuel	\$73,496
Chemicals, Supplies, Freight, ar	\$26,420
Office and Administrative	\$8,246
Equipment Replacement	\$17,606
Repair and Replacement	\$45,000
Estimated Expenses	\$244,256

NOTE: R&R was taken from Napaskiak, which has similar facilities and infrastructure

WATER UTILITY - GENERAL COSTSUser Data:

Average Daily Demand	5,485 gallons
Average Monthly Demand	167,293 gallons
Average Daily Flow	11.4 gpm
Design Flow	40 gpm

Administrative Staff Labor:

Burdened labor rate	\$25 /hr
	5 hr/wk

Other Assumptions

Audit	\$0 /yr
Insurance	\$2,500 /yr
Misc Supplies	\$1,000 /yr
Postage/Freight	\$500 /yr
Travel and Training	\$500 /yr
Licenses and Permits	\$175 /yr
Utilities	\$1,000 /yr

Estimated Annual Operation & Maintenance Cost

Labor Administrative	\$6,500	
Audit	\$0	
Insurance	\$2,500	Freight and
Misc Supplies	\$1,000	Supplies
Postage/Freight	\$500	1,500
Travel and Training	\$500	
Licenses and Permits	\$175	Office/Admin
Utilities	\$1,000	Costs
		3,175
Total	\$12,175	

Estimated Monthly Operation & Maintenance Cost

\$1,015 \$ 0.01 \$/gallon

**EXISTING SITE
WELL, PUMPS, GALLERY**User Data:

Design Flow	40 gpm
Storage Volume	20,000 gallons
Time to Fill Tank	0.3 days
Fill time for per year	34.8 days
Annual Water Production	2,002,025 gallons

Operational Assumptions:

Misc Materials and Supplies	\$50 /yr
Burdened rate for Water Operator	\$25 /hr
Operational Time at Intake	1.5 hr/week
Electricity	\$0.96 /kwh

<u>Capital Equipment Replacement:</u>	<u>Cost</u>	<u>Expected Equipment Life</u>	<u>Annual Cost</u>
Submersible Pump	\$1,000	5 yr	\$255
Air Compressor	\$1,400	5 yr	\$357
Drop Pipe	\$300	5 yr	\$77
Inflation		5 %	

Electrical Demand:

<u>Equipment</u>	<u>Power</u>	<u>Usage (hrs/year)</u>	<u>Yearly Demand (kwh)</u>	<u>Annual Cost</u>
Submersible Pump	1 hp	834	622	\$597
Heat Trace	1,500 watts	144	216	\$207
Well Housing Lights	60 watts	144	9	\$8

Estimated Annual Intake O & M Costs

Labor	\$1,950.00
Materials (Routine O&M and repairs)	\$50
Electricity	\$813
Equipment Replacement Cost	\$689
Total	\$3,502

Estimated Monthly Operation & Maintenance Cost

\$292 \$ 0.0017 \$/gallon

WTP / WASHETERIA BUILDINGUser Data:

Average Daily Demand	5,485 gallons
Average Daily Flow	3.8 gpm
Design Flow	40 gpm
Annual Water Production	2002025 gallons

System Data:

WTP / Washeteria Building Area	2,503 ft ²
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Operational Costs:

Burdened labor rate for an Operator	\$25 /hr
Labor - Operation and maintenance of building	3 hr/wk
Misc Materials and Supplies	\$500 /yr
Floor Resurfacing	\$300 /yr
Electricity	\$0.96 /kwh
Heating fuel oil	\$7.00 /gallon
Fuel Heating Value	83,000 BTU/gal

Capital Costs:

<u>Cost</u>	<u>Expected Equipment Life</u>	<u>Annual Cost</u>
Unit Heaters	5 yr	\$1,300
Inflation	5 %	

Electrical Demand:

<u>Equipment</u>	<u>Power</u>	<u>Usage</u> (hr/day)	<u>Yearly Demand</u> (kwh)	<u>Annual Cost</u>
Building Unit Heater	100 watts	9	329	\$315
Building Lights	0.4 watts/ft ²	6	2,193	\$2,105
Misc. Building Power	1,500 kwh/yr		1,500	\$1,440

Estimated Yearly Fuel Demand:

<u>Equipment</u>	<u>Quantity</u> <u>BTU/sf/hr</u>	<u>Total Annual</u> <u>Heating</u> <u>Consumption</u> (1000 BTU)	<u>Annual Heating</u> <u>Consumption</u> (gallons)	<u>Annual Cost</u>
WTP Building (maintained @ 68 F	19.86	330,175	3,978	\$27,846

Estimated Annual Building O & M Cost

Labor	\$3,900
Materials (Routine O&M and repairs)	\$500
Electricity	\$3,870
Fuel Oil	\$27,850
Equipment Replacement Cost	\$1,300
Total	\$37,500

Estimated Monthly Operation & Maintenance Cost

\$3,125 0.0187 \$/gal

Date: 5/14/2014

WATER TREATMENT SYSTEM
WELL WATER TREATMENT w/ BATCH SYSTEMUser Data:

Design Flow	40 gpm
Storage Volume	20,000 gallons
Time to Fill Tank	0.3 days
Fill Time Per Year	34.8 days
Annual Water Production	2,002,025 gallons

Operational Costs:

Electricity Service Charge	\$40 /mo
Electricity	\$0.96 /kwh
Burdened labor rate for an Operator	\$25 /hr
Labor - Operator	50 hr/mo

<u>Chemicals</u>	<u>Unit Cost</u>	<u>Annual Use</u>	<u>Annual Cost</u>
Ferric Chloride	\$2.61 /lb	5375	\$14,030
Soda Ash	\$2.62 /lb	2890	\$7,600
Calcium Hypochlorite	\$3.10 /lb	77	\$240

<u>Capital Equipment Replacement:</u>	<u>Cost</u>	<u>Expected Equipment Life</u>	<u>Annual Cost</u>
Chemical Systems	\$3,500	5 yr	\$893
Filter Effluent Pump	\$3,000	5 yr	\$1,072
Magnetic Flow Meter (3)	\$4,200	5 yr	\$766
Backwash Pumps (1 + spare)	\$3,000	5 yr	\$766
Air Blower	\$2,000	5 yr	\$511
Inflation		5 %	

<u>Analysis:</u>	<u>Cost</u>	<u>Frequency</u>	<u>Annual Cost</u>
Total Coliform	\$75.00 /ea	1 /mo	\$900
Chlorine Residual	\$2.00 /ea	1 /mo	\$24
Arsenic	\$40.00 /ea	1 /yr	\$40
Sanitary Survey	\$3,500.00 /ea	1 / 3 yrs	\$1,167
TTHM/HAA5	\$537.50 /ea	4 /yr	\$2,150
Lead and Copper	\$40.00 /ea	1 /yr	\$40
Miscellaneous Regulatory Testing		1 LS	\$500
Chemical Shipping and Freight		1 LS	\$250

Estimated Yearly Electrical Demand

<u>Equipment</u>		<u>Usage</u> <u>(hrs/year)</u>	<u>Yearly</u> <u>Demand</u> <u>(kwh)</u>	<u>Annual</u> <u>Cost</u>
Chlorine Pump	20 watts	1,095	22	\$21
KMnO4 Pump	0.33 hp	1,095	269	\$259
Mixers	0.33 hp	104	52	\$50
Floc Drives	0.75 hp	1,095	612	\$588
Filter Effluent Pump	0.75 hp	1,095	612	\$588
Backwash Pump	3 hp	156	349	\$335
Air Blower	2 hp	10.4	16	\$15

Estimated Annual Operation & Maintenance Cost

Operator Labor	\$15,000
Electricity	\$2,335
Materials	\$21,870
Analysis	\$5,071
Equipment Replacement	\$4,008
 Total	 \$48,283

Estimated Monthly Operation & Maintenance Cost

\$4,024 \$0.0241 \$/gallon

WATER STORAGEUser Data:

Average Daily Demand	5,485 gallons
Design Flow	40 gpm
Time to Fill Tank	0.3 days
Fill for each year	34.8 days
Annual Water Production	2,002,025 gallons

System Data:

Water Storage Tank Diameter	16 ft
Water Storage Tank Height	16 ft
Storage Volume	20,000 gallons

Operational Assumptions:

Burdened labor rate for an Operator	\$25 /hr
Operation and maintenance of WST	0.25 hr/wk
Misc Materials and Supplies	\$100 /yr
Electricity	\$0.96 /kwh
Heating fuel oil	\$7.00 /gallon
Energy per gallon of heating fuel oil	70,000 BTU

<u>Capital Equipment Replacement:</u>	<u>Cost</u>	<u>Expected Equipment Life</u>	<u>Annual Cost</u>
Water Circulation Pumps	\$1,000	5 yr	\$255
Heat Exchanger	\$2,500	5 yr	\$638
Inflation	5 %		

Fuel Demand:

	<u>Quantity</u>	<u>Yearly Demand</u>	<u>Yearly Fuel Demand</u>	<u>Annual Cost</u>
Equipment	<u>BTU/hr</u>	<u>(1,000 BTU)</u>	<u>(gal)</u>	
Water Storage Tank (maintained @ 42 F)	472	4,136	59	\$414

Electricity: No Circ. Pump

Estimated Annual Tank O & M Cost

Labor	\$325
Materials (Routine O&M and repairs)	\$100
Fuel Oil	\$414
Electricity	\$0
Equipment Replacement Cost	\$893
Total	\$1,732

Estimated Monthly Operation & Maintenance Cost

\$144 \$ 0.0009 \$/gallon

DISTRIBUTION SYSTEMUser Data:

Average Daily Demand	5,485 gallons
Average Daily Flow	3.8 gpm
Design Flow	40 gpm
Average Annual Demand	2002025 gallons

Operational Assumptions:

Burdened labor rate for an Operator	25 /hr
Labor - Distribution System	1.50 hr/wk
Misc Materials and Supplies	\$100 /yr
Electricity	\$0.96 /kwh
Heating fuel oil	\$7.00 /gallon
Available energy per gallon of heating fuel oil	70,000 BTU

<u>Capital Equipment Replacement:</u>	<u>Cost</u>	<u>Expected Equipment Life</u>	<u>Annual Cost</u>
Pressure Pumps (2)	\$4,400	5 yr	\$1,123
Circulation Pumps (4)	\$4,000	5 yr	\$1,021
Watering Point	\$1,000	5 yr	\$255
Inflation		5 %	

Fuel Demand:

	<u>Quantity</u>	<u>Yearly Demand</u> (1,000 BTU/hr)	<u>Yearly Fuel Demand</u> (gal)	<u>Annual Cost</u>
Equipment Distribution Loop 1	3,601	18,322	262	\$1,832

Loop maintained @ 45 F

Estimated Yearly Electrical Demand:

<u>Equipment</u>	<u>Power</u>	<u>Average Usage</u> (hr/day)	<u>Yearly Demand</u> (kwh)	<u>Annual Cost</u>
Pressure Pumps (2)	2 hp	4.5	2,450	\$2,352
Circulation Pumps - big loop	1 hp	24	6,532	\$6,271
Watering Point Heat Trace	200 watts	18	1,314	\$1,261

Estimated Annual Distribution O & M Cost

Labor	\$1,950
Materials (Routine O&M and repairs)	\$100
Fuel Oil	\$1,832
Electricity	\$9,884
Equipment Replacement Cost	\$2,399
Total	\$16,166

Estimated Monthly Operation & Maintenance Cost

\$1,347.14 \$0.01 \$/gal

WASHETERIA & LAUNDRYUser Data:

Average Daily Demand	5,485 gallons
Average Annual Demand	2,002,025 gallons
Average Daily Flow	3.8 gpm
Design Flow	40 gpm
Washer/Dryer Loads	46 per day
Dryer Duration	0.5 hr

Operational Assumptions:

Washeteria Operator	20.0 hr/wk
Burdened rate for Washeteria Operator	\$15 /hr
Electricity	\$0.96 /kwh
Heating fuel oil	\$7.00 /gallon
Misc Materials and Supplies	\$300 /yr
Washer and Dryer Maintenance	\$2,000 /yr
BTU per gallon of heating fuel oil	83,000 BTU
Makeup Air per Dryer	500 cfm

Capital Equipment Replacement:

	<u>Cost</u>	<u>Expected Equipment Life</u>	<u>Annual Cost</u>
Washers (6)	\$33,098	5 yr	\$8,448
Dryers (4)	\$26,240	5 yr	\$6,698
Water Heater (1)	\$2,500	5 yr	\$638

Inflation Rate 5 %

<u>Fuel Oil Consumption:</u>	<u>Heating Demand (BTU/hr)</u>	<u>Usage (hr/day)</u>	<u>Annual Usage (BTU/yr)</u>	<u>Annual Usage (gal)</u>	<u>Annual Cost</u>
30 lb Dryers	85,000	23	713,575,000	8,597	\$60,181
Dryer Makeup Air	21,060	23	176,798,700	2,130	\$14,911
Water Heater	15,000	6	32,850,000	396	\$2,770

<u>Electrical Demand:</u>	<u>Load Amps</u>	<u>kwh/load</u>	<u>Usage (kwh/day)</u>	<u>Annual Usage (kwh/yr)</u>	<u>Annual Cost</u>
20 lb Washers	3.6	0.37	17.2224	6,286	\$6,035
30 lb Dryers	3.2	0.33	15.3088	5,588	\$5,364

Washeteria O&M Costs

Labor	Annual Cost
Materials, Supplies and Washer & Dryer Maintenance	\$15,600
Electricity	\$2,300
Fuel Oil	\$11,399
Equipment Replacement	\$77,862
	\$15,784
Total	\$122,946

Estimated Monthly Operation & Maintenance Cost

\$10,245 \$0.06 \$/gallon

WATER UTILITY - GENERAL COSTSUser Data:

Average Daily Demand	5,485 gallons
Average Monthly Demand	167,293 gallons
Average Daily Flow	11.4 gpm
Design Flow	40 gpm

Administrative Staff Labor:

Burdened labor rate	\$25 /hr
	5 hr/wk

Other Assumptions

Audit	\$0 /yr
Insurance	\$2,500 /yr
Misc Supplies	\$1,000 /yr
Postage/Freight	\$500 /yr
Travel and Training	\$500 /yr
Licenses and Permits	\$175 /yr
Utilities	\$1,000 /yr

Estimated Annual Operation & Maintenance Cost

Labor Administrative	\$6,500	
Audit	\$0	
Insurance	\$2,500	Freight and
Misc Supplies	\$1,000	Supplies
Postage/Freight	\$500	1,500
Travel and Training	\$500	
Licenses and Permits	\$175	Office/Admin
Utilities	\$1,000	Costs
		3,175
Total	\$12,175	

Estimated Monthly Operation & Maintenance Cost

\$1,015 \$ 0.01 \$/gallon

**CORE UTILITY SITE
WELL, PUMPS, GALLERY**User Data:

Design Flow	40 gpm
Storage Volume	20,000 gallons
Time to Fill Tank	0.3 days
Fill for each year	34.8 days
Annual Water Production	2,002,025 gallons

Operational Assumptions:

Misc Materials and Supplies	\$50 /yr
Burdened rate for Water Operator	\$25 /hr
Operational Time at Intake	1.5 hr/week
Electricity	\$0.96 /kwh

<u>Capital Equipment Replacement:</u>	<u>Cost</u>	Expected Equipment <u>Life</u>	Annual <u>Cost</u>
Submersible Pump	\$1,000	10 yr	\$163
Air Compressor	\$1,400	15 yr	\$194
Drop Pipe	\$300	5 yr	\$77
Inflation		5 %	

Electrical Demand:

Equipment	<u>Power</u>	Usage <u>(hrs/year)</u>	Yearly Demand <u>(kwh)</u>	Annual <u>Cost</u>
Submersible Pump	1 hp	834	622	\$597
Heat Trace	1,500 watts	144	216	\$207
Building Lights	60 watts	144	9	\$8

Estimated Annual Intake O & M Costs

Labor	\$186
Materials (Routine O&M and repairs)	\$50
Electricity	\$813
Equipment Replacement Cost	\$433
Total	\$1,483

Estimated Monthly Operation & Maintenance Cost

\$124 \$ 0.0007 \$/gallon

WTP / WASHETERIA BUILDINGUser Data:

Average Daily Demand	5,485 gallons
Average Daily Flow	3.8 gpm
Design Flow	40 gpm
Average Annual Demand	2,002,025 per day

System Data:

WTP / Washeteria Building Area	2,534 ft ²
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Operational Costs:

Burdened labor rate for an Operator	\$25 /hr
Labor - Operation and maintenance of building	3 hr/wk
Misc Materials and Supplies	\$500 /yr
Floor Resurfacing	\$300 /yr
Electricity	\$0.96 /kwh
Heating fuel oil	\$7.00 /gallon
Fuel Heating Value	110,000 BTU/gal

<u>Capital Equipment Replacement Costs:</u>	<u>Cost</u>	<u>Expected Equipment Life</u>	<u>Annual Cost</u>
Unit Heaters (5 total)	\$5,000	15 yr	\$700
Inflation	5 %		

Electrical Demand:

<u>Equipment</u>	<u>Power</u>	<u>Usage (hr/day)</u>	<u>Yearly Demand (kwh)</u>	<u>Annual Cost</u>
Building Unit Heater	100 watts	9	329	\$315
Building Lights	0.4 watts/ft ²	6	2,220	\$2,131
Misc. Building Power	1,500 kwh/yr		1,500	\$1,440

Estimated Yearly Fuel Demand:

<u>Equipment</u>	<u>Quantity BTU/sf/hr</u>	<u>Total Annual Heating Consumption (1000 BTU)</u>	<u>Annual Heating Consumption on (gallons)</u>	<u>Annual Cost</u>
WTP Building (maintained @ 68 F)	16.79	177,196	1,611	\$11,276

Estimated Annual Building O & M Cost

Labor	\$3,900
Materials (Routine O&M and repairs)	\$500
Electricity	\$3,890
Fuel Oil	\$11,280
Equipment Replacement Cost	\$700
Total	\$20,300

Estimated Monthly Operation & Maintenance Cost

\$1,692 \$0.01 \$/gal

WATER TREATMENT SYSTEM
WELL WATER TREATMENT w/ CONVENTIONAL FILTRATIONUser Data:

Design Flow	40 gpm
Storage Volume	20,000 gallons
Time to Fill Tank	0.3 days
Fill Time Per Year	34.8 days
Annual Water Production	2,002,025 gallons

Operational Costs:

Electricity Service Charge	\$40 /mo
Electricity	\$0.96 /kwh
Burdened labor rate for an Operator	\$25 /hr
Labor - Operator	50 hr/mo

<u>Chemicals</u>	<u>Unit Cost</u>	<u>Annual Use</u>	<u>Annual Cost</u>
Ferric Chloride	\$2.61 /lb	5375	\$14,030
Soda Ash	\$2.62 /lb	2890	\$7,600
Calcium Hypochlorite	\$3.10 /lb	77	\$240

<u>Capital Equipment Replacement:</u>	<u>Cost</u>	<u>Expected Equipment Life</u>	<u>Annual Cost</u>
SCD	\$14,500	10 yr	\$2,362
Chemical Systems	\$3,500	7 yr	\$704
Filter Effluent Pump	\$3,000	10 yr	\$684
Magnetic Flow Meter (3)	\$4,200	10 yr	\$489
Backwash Pumps (1 + spare)	\$3,000	10 yr	\$489
Air Blower	\$2,000	10 yr	\$326
Inflation		5 %	

<u>Analysis:</u>	<u>Cost</u>	<u>Frequency</u>	<u>Annual Cost</u>
Total Coliform	\$75.00 /ea	1 /mo	\$900
Chlorine Residual	\$2.00 /ea	1 /mo	\$24
Arsenic	\$40.00 /ea	1 /yr	\$40
Sanitary Survey	\$3,500.00 /ea	1 / 3 yrs	\$1,167
TTHM/HAA5	\$537.50 /ea	4 /yr	\$2,150
Lead and Copper	\$40.00 /ea	1 /yr	\$40
Miscellaneous Regulatory Testing			\$500
Chemical Shipping and Freight		1 ls	\$250

Estimated Yearly Electrical Demand

<u>Equipment</u>		<u>Usage</u> <u>(hrs/year)</u>	<u>Yearly</u> <u>Demand</u> <u>(kwh)</u>	<u>Annual</u> <u>Cost</u>
Chlorine Pump	20 watts	1,095	22	\$21
Polymer Pump	0.33 hp	1,095	269	\$259
Mixers	0.33 hp	104	52	\$50
Floc Drives	0.75 hp	1,095	612	\$588
Filter Effluent Pump	0.75 hp	1,095	612	\$588
Backwash Pump	3 hp	156	349	\$335
Air Blower	2 hp	10.4	16	\$15

Estimated Annual Operation & Maintenance Cost

Operator Labor	\$15,000
Electricity	\$2,335
Materials	\$21,870
Analysis	\$5,071
Equipment Replacement	\$5,053
Total	\$49,328

Estimated Monthly Operation & Maintenance Cost

\$4,111 \$0.0246 \$/gallon

WATER STORAGEUser Data:

Average Daily Demand	5,485 gallons
Design Flow	40 gpm
Time to Fill Tank	0.3 days
Fill for each year	34.8 days
Annual Water Production	2,002,025 gallons

System Data:

Water Storage Tank Diameter	16 ft
Water Storage Tank Height	16 ft
Storage Volume	20,000 gallons

Operational Assumptions:

Burdened labor rate for an Operator	\$25 /hr
Operation and maintenance of WST	0.25 hr/wk
Misc Materials and Supplies	\$100 /yr
Electricity	\$0.96 /kwh
Heating fuel oil	\$7.00 /gallon
Energy per gallon of heating fuel oil	110,000 BTU

<u>Capital Equipment Replacement:</u>	<u>Cost</u>	Expected Equipment <u>Life</u>	Annual <u>Cost</u>
Water Circulation Pumps	\$1,000	5 yr	\$255
Heat Exchanger	\$2,500	15 yr	\$346
Inflation	5 %		

Fuel Demand:

	Quantity <u>BTU/hr</u>	Yearly Demand (1,000 BTU)	Yearly Fuel Demand (gal)	Annual <u>Cost</u>
Equipment				
Water Storage Tank (maintained @ 42 F)	472	4,136	38	\$263

Electrical Demand:

	<u>hp</u>	Average Usage (hr/day)	Yearly Demand (kwh)	Annual <u>Cost</u>
Equipment				
Water Circulation Pumps (9 months)	0.15	18	734.9	\$705

Estimated Annual Tank O & M Cost

Labor	\$325
Materials (Routine O&M and repairs)	\$100
Fuel Oil	\$263
Electricity	\$705
Equipment Replacement Cost	\$602
Total	<u>\$1,995</u>

Estimated Monthly Operation & Maintenance Cost

\$166 \$ 0.0010 \$/gallon

DISTRIBUTION SYSTEMUser Data:

Average Daily Demand	5,485 gallons
Average Daily Flow	3.8 gpm
Design Flow	40 gpm
Average Annual Demand	2,002,025 gallons

Operational Assumptions:

Burdened labor rate for an Operator	25 /hr
Labor - Distribution System	1.50 hr/wk
Misc Materials and Supplies	\$100 /yr
Electricity	\$0.96 /kwh
Heating fuel oil	\$7.00 /gallon
Available energy per gallon of heating fuel oil	110,000 BTU

<u>Capital Equipment Replacement:</u>	<u>Cost</u>	<u>Expected Equipment Life</u>	<u>Annual Cost</u>
Pressure Pumps (2)	\$4,400	10 yr	\$717
Circulation Pumps (4)	\$4,000	10 yr	\$652
Watering Point	\$1,000	10 yr	\$163
Inflation		5 %	

Fuel Demand:

Equipment	Quantity	BTU/hr	Yearly Demand (1,000 BTU)	Yearly Fuel Demand (gal)	Annual Cost
Distribution Loop 1	9,890		50,320	457	\$3,202

Loop maintained @ 45 F

Estimated Yearly Electrical Demand:

Equipment	Power	Average Usage (hr/day)	Yearly Demand (kwh)	Annual Cost
Pressure Pumps (2)	2 hp	4.5	2,450	\$2,352
Circulation Pumps - big loop	1 hp	24	6,532	\$6,271
Watering Point Heat Trace	200 watts	18	1,314	\$1,261

Estimated Annual Distribution O & M Cost

Labor	\$1,950
Materials (Routine O&M and repairs)	\$100
Fuel Oil	\$3,202
Electricity	\$9,884
Equipment Replacement Cost	\$1,531
Total	\$16,667

Estimated Monthly Operation & Maintenance Cost

\$1,388.96 \$0.01 \$/gal

WASHETERIA & LAUNDRYUser Data:

Average Daily Demand	5,485 gallons
Annual Water Demand	2,002,025 gallons
Average Daily Flow	3.8 gpm
Design Flow	40 gpm
Washer/Dryer Loads	46 per day
Dryer Duration	0.5 hr

Operational Assumptions:

Washeteria Operator	20.0 hr/wk
Burdened rate for Washeteria Operator	\$15 /hr
Electricity	\$0.96 /kwh
Heating fuel oil	\$7.00 /gallon
Misc Materials and Supplies	\$300 /yr
Washer and Dryer Maintenance	\$2,000 /yr
BTU per gallon of heating fuel oil	110,000 BTU
Makeup Air per Dryer	500 cfm

Capital Equipment Replacement:

	<u>Cost</u>	<u>Expected Equipment Life</u>	<u>Annual Cost</u>
Washers (6)	\$33,098	12 yr	\$4,953
Dryers (4)	\$26,240	12 yr	\$3,927
Water Heater (1)	\$2,500	10 yr	\$407

Inflation Rate 5 %

<u>Fuel Oil Consumption:</u>	<u>Heating Demand (BTU/hr)</u>	<u>Usage (hr/day)</u>	<u>Annual Usage (BTU/yr)</u>	<u>Annual Usage (gal)</u>	<u>Annual Cost</u>
30 lb Dryers	85,000	23	713,575,000	6,487	\$45,409
Dryer Makeup Air	21,060	23	176,798,700	1,607	\$11,251
Water Heater	15,000	6	32,850,000	299	\$2,090

<u>Electrical Demand:</u>	<u>Load Amps</u>	<u>kwh/load</u>	<u>Usage (kwh/day)</u>	<u>Annual Usage (kwh/yr)</u>	<u>Annual Cost</u>
20 lb Washers	3.6	0.37	17.2224	6,286	\$6,035
30 lb Dryers	3.2	0.33	15.3088	5,588	\$5,364

Washeteria O&M Costs

Labor	Annual Cost
Materials, Supplies and Washer & Dryer Maintenance	\$15,600
Electricity	\$2,300
Fuel Oil	\$11,399
Equipment Replacement	\$58,751
	\$9,287
Total	\$97,337

Estimated Monthly Operation & Maintenance Cost

\$8,111.41 \$0.05 \$/gal

WATER UTILITY - GENERAL COSTSUser Data:

Average Daily Demand	5,485 gallons
Average Monthly Demand	167,293 gallons
Average Daily Flow	11.4 gpm
Design Flow	40 gpm

Administrative Staff Labor:

Burdened labor rate	\$25 /hr
	5 hr/wk

Other Assumptions

Audit	\$0 /yr
Insurance	\$2,500 /yr
Misc Supplies	\$1,000 /yr
Postage/Freight	\$500 /yr
Travel and Training	\$500 /yr
Licenses and Permits	\$175 /yr
Utilities	\$1,000 /yr

Estimated Annual Operation & Maintenance Cost

Labor Administrative	\$6,500	
Audit	\$0	
Insurance	\$2,500	Freight and
Misc Supplies	\$1,000	Supplies
Postage/Freight	\$500	1,500
Travel and Training	\$500	
Licenses and Permits	\$175	Office/Admin
Utilities	\$1,000	Costs
		3,175
Total	\$12,175	

Estimated Monthly Operation & Maintenance Cost

\$1,015 \$ 0.01 \$/gallon

**CORE UTILITY SITE
WELL, PUMPS, GALLERY**User Data:

Design Flow	40 gpm
Storage Volume	20,000 gallons
Time to Fill Tank	0.3 days
Fill for each year	34.8 days
Annual Water Production	2,002,025 gallons

Operational Assumptions:

Misc Materials and Supplies	\$50 /yr
Burdened rate for Water Operator	\$25 /hr
Operational Time at Intake	1.5 hr/week
Electricity	\$0.96 /kwh

<u>Capital Equipment Replacement:</u>	<u>Cost</u>	Expected Equipment <u>Life</u>	Annual <u>Cost</u>
Submersible Pump	\$1,000	10 yr	\$163
Air Compressor	\$1,400	15 yr	\$194
Drop Pipe	\$300	5 yr	\$77
Inflation		5 %	

Electrical Demand:

Equipment	<u>Power</u>	Usage <u>(hrs/year)</u>	Yearly Demand <u>(kwh)</u>	Annual <u>Cost</u>
Submersible Pump	1 hp	834	622	\$597
Heat Trace	1,500 watts	144	216	\$207
Well Housing Lights	60 watts	144	9	\$8

Estimated Annual Intake O & M Costs

Labor	\$186
Materials (Routine O&M and repairs)	\$50
Electricity	\$813
Equipment Replacement Cost	\$433
Total	\$1,483

Estimated Monthly Operation & Maintenance Cost

\$124 \$ 0.0007 \$/gallon

WTP / WASHETERIA BUILDINGUser Data:

Average Daily Demand	5,485 gallons
Average Daily Flow	3.8 gpm
Design Flow	40 gpm
Average Annual Demand	2,002,025 per day

System Data:

WTP / Washeteria Building Area	2,503 ft ²
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Operational Costs:

Burdened labor rate for an Operator	\$25 /hr
Labor - Operation and maintenance of building	3 hr/wk
Misc Materials and Supplies	\$500 /yr
Floor Resurfacing	\$300 /yr
Electricity	\$0.96 /kwh
Heating fuel oil	\$7.00 /gallon
Fuel Heating Value	110,000 BTU/gal

Capital Equipment Replacement Costs:

<u>Cost</u>	<u>Expected Equipment Life</u>	<u>Annual Cost</u>
Unit Heaters (5 total)	15 yr	\$700
Inflation	5 %	

Electrical Demand:

<u>Equipment</u>	<u>Power</u>	<u>Usage</u>	<u>Yearly Demand</u>	<u>Annual Cost</u>
		<u>(hr/day)</u>	<u>(kwh)</u>	
Building Unit Heater	100 watts	9	329	\$315
Building Lights	0.4 watts/ft ²	6	2,193	\$2,105
Misc. Building Power	1,500 kwh/yr		1,500	\$1,440

Estimated Yearly Fuel Demand:

<u>Equipment</u>	<u>Quantity</u>	<u>Total Annual Heating Consumption</u>	<u>Annual Heating Consumption</u>	<u>Annual Cost</u>
	<u>BTU/sf/hr</u>	<u>(1000 BTU)</u>	<u>n (gallons)</u>	
WTP Building (maintained @ 68 F)	19.09	198,451	1,804	\$12,629

Estimated Annual Building O & M Cost

Labor	\$3,900
Materials (Routine O&M and repairs)	\$500
Electricity	\$3,870
Fuel Oil	\$12,630
Equipment Replacement Cost	\$700
Total	\$21,600

Estimated Monthly Operation & Maintenance Cost

\$1,800 \$0.01 \$/gal

WATER TREATMENT SYSTEM
WELL WATER TREATMENT w/ CONVENTIONAL FILTRATIONUser Data:

Design Flow	40 gpm
Storage Volume	20,000 gallons
Time to Fill Tank	0.3 days
Fill Time Per year	34.8
Annual Water Production	2,002,025 gallons

Operational Costs:

Electricity Service Charge	\$40 /mo
Electricity	\$0.96 /kwh
Burdened labor rate for an Operator	\$25 /hr
Labor - Operator	50 hr/mo

<u>Chemicals</u>	<u>Unit Cost</u>	<u>Annual Use</u>	<u>Annual Cost</u>
Ferric Chloride	\$2.61 /lb	5375	\$14,030
Soda Ash	\$2.62 /lb	2890	\$7,600
Calcium Hypochlorite	\$3.10 /lb	77	\$240

<u>Capital Equipment Replacement:</u>	<u>Cost</u>	<u>Expected Equipment Life</u>	<u>Annual Cost</u>
SCD	\$14,500	10 yr	\$2,362
Chemical Systems	\$3,500	7 yr	\$704
Filter Effluent Pump	\$3,000	10 yr	\$684
Magnetic Flow Meter (3)	\$4,200	10 yr	\$489
Backwash Pumps (1 + spare)	\$3,000	10 yr	\$489
Air Blower	\$2,000	10 yr	\$326
Inflation		5 %	

<u>Analysis:</u>	<u>Cost</u>	<u>Frequency</u>	<u>Annual Cost</u>
Total Coliform	\$75.00 /ea	1 /mo	\$900
Chlorine Residual	\$2.00 /ea	1 /mo	\$24
Arsenic	\$40.00 /ea	1 /yr	\$40
Sanitary Survey	\$3,500.00 /ea	1 / 3 yrs	\$1,167
TTHM/HAA5	\$537.50 /ea	4 /yr	\$2,150
Lead and Copper	\$40.00 /ea	1 /yr	\$40
Miscellaneous Replacement Testing			\$500
Chemical Shipping and Freight		1 ls	\$250

Estimated Yearly Electrical Demand

<u>Equipment</u>		<u>Usage</u> <u>(hrs/year)</u>	<u>Yearly</u> <u>Demand</u> <u>(kwh)</u>	<u>Annual</u> <u>Cost</u>
Chlorine Pump	20 watts	1,095	22	\$21
Polymer Pump	0.33 hp	1,095	269	\$259
Mixers	0.33 hp	104	52	\$50
Floc Drives	0.75 hp	1,095	612	\$588
Filter Effluent Pump	0.75 hp	1,095	612	\$588
Backwash Pump	3 hp	156	349	\$335
Air Blower	2 hp	10.4	16	\$15

Estimated Annual Operation & Maintenance Cost

Operator Labor	\$15,000
Electricity	\$2,335
Materials	\$21,870
Analysis	\$5,071
Equipment Replacement	\$5,053
Total	\$49,328

Estimated Monthly Operation & Maintenance Cost

\$4,111 \$0.0246 \$/gallon

WATER STORAGEUser Data:

Average Daily Demand	5,485 gallons
Design Flow	40 gpm
Time to Fill Tank	0.3 days
Fill for each year	34.8 days
Annual Water Production	2,002,025 gallons

System Data:

Water Storage Tank Diameter	16 ft
Water Storage Tank Height	16 ft
Storage Volume	20,000 gallons

Operational Assumptions:

Burdened labor rate for an Operator	\$25 /hr
Operation and maintenance of WST	0.25 hr/wk
Misc Materials and Supplies	\$100 /yr
Electricity	\$0.96 /kwh
Heating fuel oil	\$7.00 /gallon
Energy per gallon of heating fuel oil	110,000 BTU

<u>Capital Equipment Replacement:</u>	<u>Cost</u>	Expected Equipment <u>Life</u>	Annual <u>Cost</u>
Water Circulation Pumps	\$1,000	5 yr	\$255
Heat Exchanger	\$2,500	15 yr	\$346
Inflation	5 %		

Fuel Demand:

Equipment	Quantity <u>BTU/hr</u>	Yearly Demand (1,000 BTU)	Yearly Fuel Demand (gal)	Annual <u>Cost</u>
Water Storage Tank (maintained @ 42 F)	472	4,136	38	\$263

Electrical Demand:

Equipment	<u>hp</u>	Average Usage (hr/day)	Yearly Demand (kwh)	Annual <u>Cost</u>
Water Circulation Pumps (9 months)	0.15	18	734.9	\$705

Estimated Annual Tank O & M Cost

Labor	\$325
Materials (Routine O&M and repairs)	\$100
Fuel Oil	\$263
Electricity	\$705
Equipment Replacement Cost	\$602
Total	\$1,995

Estimated Monthly Operation & Maintenance Cost

\$166 \$ 0.0010 \$/gallon

DISTRIBUTION SYSTEMUser Data:

Average Daily Demand	5,485 gallons
Average Daily Flow	3.8 gpm
Design Flow	40 gpm
Average Annual Demand	2,002,025 gallons

Operational Assumptions:

Burdened labor rate for an Operator	25 /hr	
Labor - Distribution System	1.50 hr/wk	
Misc Materials and Supplies	\$100 /yr	
Electricity	\$0.96 /kwh	
Heating fuel oil	\$7.00 /gallon	
Available energy per gallon of heating fuel oil	110,000	BTU

<u>Capital Equipment Replacement:</u>	<u>Cost</u>	<u>Expected Equipment Life</u>	<u>Annual Cost</u>
Pressure Pumps (2)	\$4,400	10 yr	\$717
Circulation Pumps (4)	\$4,000	10 yr	\$652
Watering Point	\$1,000	10 yr	\$163
Inflation		5 %	

Fuel Demand:

Equipment	Quantity	<u>BTU/hr</u>	Yearly Demand (1,000 BTU)	Yearly Fuel Demand (gal)	Annual Cost
Distribution Loop 1	12,269		62,425	567	\$3,972

Loop maintained @ 45 F

Estimated Yearly Electrical Demand:

Equipment	<u>Power</u>	<u>Average Usage (hr/day)</u>	<u>Yearly Demand (kwh)</u>	<u>Annual Cost</u>
Pressure Pumps (2)	2 hp	4.5	2,450	\$2,352
Circulation Pumps - big loop	1 hp	24	6,532	\$6,271
Watering Point Heat Trace	200 watts	18	1,314	\$1,261

Estimated Annual Distribution O & M Cost

Labor	\$1,950
Materials (Routine O&M and repairs)	\$100
Fuel Oil	\$3,972
Electricity	\$9,884
Equipment Replacement Cost	\$1,531
Total	\$17,438

Estimated Monthly Operation & Maintenance Cost

\$1,453.15 0.0087 \$/gal

WASHETERIA & LAUNDRYUser Data:

Average Daily Demand	5,485 gallons
Average Annual Demand	2,002,025 gallons
Average Daily Flow	3.8 gpm
Design Flow	40 gpm
Washer/Dryer Loads	46 per day
Dryer Duration	0.5 hr

Operational Assumptions:

Washeteria Operator	20.0 hr/wk
Burdened rate for Washeteria Operator	\$15 /hr
Electricity	\$0.96 /kwh
Heating fuel oil	\$7.00 /gallon
Misc Materials and Supplies	\$300 /yr
Washer and Dryer Maintenance	\$2,000 /yr
BTU per gallon of heating fuel oil	110,000 BTU
Makeup Air per Dryer	500 cfm

Capital Equipment Replacement:

	<u>Cost</u>	<u>Expected Equipment Life</u>	<u>Annual Cost</u>
Washers (6)	\$33,098	12 yr	\$4,953
Dryers (4)	\$26,240	12 yr	\$3,927
Water Heater (1)	\$2,500	10 yr	\$407

Inflation Rate 5 %

<u>Fuel Oil Consumption:</u>	<u>Heating Demand (BTU/hr)</u>	<u>Usage (hr/day)</u>	<u>Annual Usage (BTU/yr)</u>	<u>Annual Usage (gal)</u>	<u>Annual Cost</u>
30 lb Dryers	85,000	23	713,575,000	6,487	\$45,409
Dryer Makeup Air	21,060	23	176,798,700	1,607	\$11,251
Water Heater	15,000	6	32,850,000	299	\$2,090

<u>Electrical Demand:</u>	<u>Load Amps</u>	<u>kwh/load</u>	<u>Usage (kwh/day)</u>	<u>Annual Usage (kwh/yr)</u>	<u>Annual Cost</u>
20 lb Washers	3.6	0.37	17.2224	6,286	\$6,035
30 lb Dryers	3.2	0.33	15.3088	5,588	\$5,364

Washeteria O&M Costs

Labor	Annual Cost
Materials, Supplies and Washer & Dryer Maintenance	\$15,600
Electricity	\$2,300
Fuel Oil	\$11,399
Equipment Replacement	\$58,751
	\$9,287
Total	\$97,337

Estimated Monthly Operation & Maintenance Cost

\$8,111.41 \$0.05 \$/gal

WATER UTILITY - GENERAL COSTSUser Data:

Average Daily Demand	5,485 gallons
Average Monthly Demand	167,293 gallons
Average Daily Flow	11.4 gpm
Design Flow	40 gpm

System Data:Administrative Staff Labor:

Burdened labor rate	\$25 /hr
	5 hr/wk

Other Assumptions

Audit	\$0 /yr
Insurance	\$2,500 /yr
Misc Supplies	\$1,000 /yr
Postage/Freight	\$500 /yr
Travel and Training	\$500 /yr
Licenses and Permits	\$175 /yr
Utilities	\$1,000 /yr

Estimated Annual Operation & Maintenance Cost

Labor Administrative	\$6,500	
Audit	\$0	
Insurance	\$2,500	Freight and
Misc Supplies	\$1,000	Supplies
Postage/Freight	\$500	1,500
Travel and Training	\$500	
Licenses and Permits	\$175	Office/Admin
Utilities	\$1,000	Costs
		3,175
Total	\$12,175	

Estimated Monthly Operation & Maintenance Cost

\$1,015 \$ 0.01 \$/gallon

**CORE UTILITY SITE
WELL, PUMPS, GALLERY**User Data:

Design Flow	40 gpm
Storage Volume	20,000 gallons
Time to Fill Tank	0.3 days
Fill for each year	34.8 days
Annual Water Production	2,002,025 gallons

Operational Assumptions:

Misc Materials and Supplies	\$50 /yr
Burdened rate for Water Operator	\$25 /hr
Operational Time at Intake	1.5 hr/week
Electricity	\$0.96 /kwh

<u>Capital Equipment Replacement:</u>	<u>Cost</u>	<u>Expected Equipment Life</u>	<u>Annual Cost</u>
Submersible Pump	\$1,000	10 yr	\$163
Air Compressor	\$1,400	15 yr	\$194
Drop Pipe	\$300	5 yr	\$77
Inflation		5 %	

Electrical Demand:

<u>Equipment</u>	<u>Power</u>	<u>Usage (hrs/year)</u>	<u>Yearly Demand (kwh)</u>	<u>Annual Cost</u>
Submersible Pump	1 hp	834	622	\$597
Heat Trace	1,500 watts	144	216	\$207
Building Lights	60 watts	144	9	\$8

Estimated Annual Intake O & M Costs

Labor	\$186
Materials (Routine O&M and repairs)	\$50
Electricity	\$813
Equipment Replacement Cost	\$433
Total	\$1,483

Estimated Monthly Operation & Maintenance Cost

\$124 \$ 0.0001 \$/gallon

WTP / WASHETERIA BUILDINGUser Data:

Average Daily Demand	5,485 gallons
Average Daily Flow	3.8 gpm
Design Flow	40 gpm
Average Annual Demand	2,002,025 per day

System Data:

Washeteria Building	1,340 ft ²
WTP Building	1,414 ft ²

Operational Costs:

Burdened labor rate for an Operator	\$25 /hr
Labor - Operation and maintenance of building	4 hr/wk
Misc Materials and Supplies	\$700 /yr
Floor Resurfacing	\$500 /yr
Electricity	\$0.96 /kwh
Heating fuel oil	\$7.00 /gallon
Fuel Heating Value	110,000 BTU/gal

Capital Equipment Replacement Costs:

<u>Cost</u>	<u>Expected Equipment Life</u>	<u>Annual Cost</u>
Unit Heaters (5 total)	15 yr	\$1,400
Inflation	5 %	

Electrical Demand:

<u>Equipment</u>	<u>Power</u>	<u>Usage (hr/day)</u>	<u>Yearly Demand (kwh)</u>	<u>Annual Cost</u>
Building Unit Heater	100 watts	9	329	\$315
Building Lights	0.4 watts/ft ²	6	2,413	\$2,316
Misc. Building Power	1,500 kwh/yr		1,500	\$1,440

Estimated Yearly Fuel Demand:

<u>Equipment</u>	<u>Quantity BTU/sf/hr</u>	<u>Total Annual Heating Consumption (1000 BTU)</u>	<u>Annual Heating Consumption (gallons)</u>	<u>Annual Cost</u>
Washeteria Building	16.67	78,865	717	\$5,019
Water Treatment Building	18.07	107,809	980	\$6,861

Estimated Annual Building O & M Cost

Labor	\$5,200
Materials (Routine O&M and repairs)	\$700
Electricity	\$4,080
Fuel Oil	\$11,880
Equipment Replacement Cost	\$1,400
Total	\$23,300

Estimated Monthly Operation & Maintenance Cost

\$1,942	0.012 \$/gal	\$1,942
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WATER TREATMENT SYSTEM
SURFACE WATER TREATMENT w/ CONVENTIONAL FILTRATIONUser Data:

Design Flow	40 gpm
Storage Volume	20,000 gallons
Time to Fill Tank	0.3 days
Fill Time Per Year	34.8
Annual Water Production	2,002,025 gallons

Operational Costs:

Electricity Service Charge	\$40 /mo
Electricity	\$0.96 /kwh
Burdened labor rate for an Operator	\$25 /hr
Labor - Operator	50 hr/mo

<u>Chemicals</u>	<u>Unit Cost</u>	<u>Annual Use</u>	<u>Annual Cost</u>
Ferric Chloride	\$2.61 /lb	5375	\$14,030
Soda Ash	\$2.62 /lb	2890	\$7,600
Calcium Hypochlorite	\$3.10 /lb	77	\$240

<u>Capital Equipment Replacement:</u>	<u>Cost</u>	<u>Expected Equipment Life</u>	<u>Annual Cost</u>
SCD	\$14,500	10 yr	\$2,362
Chemical Systems	\$3,500	7 yr	\$704
Filter Effluent Pump	\$3,000	10 yr	\$684
Magnetic Flow Meter (3)	\$4,200	10 yr	\$489
Backwash Pumps (1 + spare)	\$3,000	10 yr	\$489
Air Blower	\$2,000	10 yr	\$326
Inflation		5 %	

<u>Analysis:</u>	<u>Cost</u>	<u>Frequency</u>	<u>Annual Cost</u>
Total Coliform	\$75.00 /ea	1 /mo	\$900
Chlorine Residual	\$2.00 /ea	1 /mo	\$24
Arsenic	\$40.00 /ea	1 /yr	\$40
Sanitary Survey	\$3,500.00 /ea	1 / 3 yrs	\$1,167
TTHM/HAA5	\$537.50 /ea	4 /yr	\$2,150
Lead and Copper	\$40.00 /ea	1 /yr	\$40
Miscellaneous Regulatory Testing			\$500
Chemical Shipping and Freight		1 ls	\$250

Estimated Yearly Electrical Demand

<u>Equipment</u>		<u>Usage</u> <u>(hrs/year)</u>	<u>Yearly</u> <u>Demand</u> <u>(kwh)</u>	<u>Annual</u> <u>Cost</u>
Chlorine Pump	20 watts	1,095	22	\$21
Polymer Pump	0.33 hp	1,095	269	\$259
Mixers	0.33 hp	104	52	\$50
Floc Drives	0.75 hp	1,095	612	\$588
Filter Effluent Pump	0.75 hp	1,095	612	\$588
Backwash Pump	3 hp	156	349	\$335
Air Blower	2 hp	10.4	16	\$15

Estimated Annual Operation & Maintenance Cost

Operator Labor	\$15,000
Electricity	\$2,335
Materials	\$21,870
Analysis	\$5,071
Equipment Replacement	\$5,053
Total	\$49,328

Estimated Monthly Operation & Maintenance Cost

\$4,111 \$0.0246 \$/gallon

WATER STORAGEUser Data:

Average Daily Demand	5,485 gallons
Design Flow	40 gpm
Time to Fill Tank	0.3 days
Fill for each year	34.8 days
Annual Water Production	2,002,025 gallons

System Data:

Water Storage Tank Diameter	16 ft
Water Storage Tank Height	16 ft
Storage Volume	20,000 gallons

Operational Assumptions:

Burdened labor rate for an Operator	\$25 /hr
Operation and maintenance of WST	0.25 hr/wk
Misc Materials and Supplies	\$100 /yr
Electricity	\$0.96 /kwh
Heating fuel oil	\$7.00 /gallon
Energy per gallon of heating fuel oil	110,000 BTU

<u>Capital Equipment Replacement:</u>	<u>Cost</u>	Expected Equipment <u>Life</u>	Annual <u>Cost</u>
Water Circulation Pumps	\$1,000	5 yr	\$255
Heat Exchanger	\$2,500	15 yr	\$346
Inflation	5 %		

Fuel Demand:

Equipment	Quantity <u>BTU/hr</u>	Yearly Demand (1,000 BTU)	Yearly Fuel Demand (gal)	Annual <u>Cost</u>
Water Storage Tank (maintained @ 42 F)	472	4,136	38	\$263

Electrical Demand:

Equipment	<u>hp</u>	Average Usage (hr/day)	Yearly Demand (kwh)	Annual <u>Cost</u>
Water Circulation Pumps (9 months)	0.15	18	734.9	\$705

Estimated Annual Tank O & M Cost

Labor	\$325
Materials (Routine O&M and repairs)	\$100
Fuel Oil	\$263
Electricity	\$705
Equipment Replacement Cost	\$602
Total	\$1,995

Estimated Monthly Operation & Maintenance Cost

\$166 \$ 0.0010 \$/gallon

DISTRIBUTION SYSTEMUser Data:

Average Daily Demand	5,485 gallons
Average Daily Flow	3.8 gpm
Design Flow	40 gpm
Average Annual Demand	2,002,025 gallons

Operational Assumptions:

Burdened labor rate for an Operator	25 /hr
Labor - Distribution System	1.00 hr/wk
Misc Materials and Supplies	\$100 /yr
Electricity	\$0.96 /kwh
Heating fuel oil	\$7.00 /gallon
Available energy per gallon of heating fuel oil	110,000 BTU

<u>Capital Equipment Replacement:</u>	<u>Cost</u>	<u>Expected Equipment Life</u>	<u>Annual Cost</u>
Pressure Pumps (2)	\$4,400	10 yr	\$717
Circulation Pumps (4)	\$4,000	10 yr	\$652
Watering Point	\$1,000	10 yr	\$163
Inflation		5 %	

Fuel Demand:

Equipment	Quantity	<u>BTU/hr</u>	Yearly Demand (1,000 BTU)	Yearly Fuel Demand (gal)	<u>Annual Cost</u>
Distribution Loop 1		9,677	49,237	448	\$3,133

Loop maintained @ 45 F

Estimated Yearly Electrical Demand:

Equipment	<u>Power</u>	<u>Average Usage (hr/day)</u>	<u>Yearly Demand (kwh)</u>	<u>Annual Cost</u>
Pressure Pumps (2)	2 hp	4.5	2,450	\$2,352
Circulation Pumps - big loop	1 hp	24	6,532	\$6,271
Watering Point Heat Trace	200 watts	18	1,314	\$1,261

Estimated Annual Distribution O & M Cost

Labor	\$1,300
Materials (Routine O&M and repairs)	\$100
Fuel Oil	\$3,133
Electricity	\$9,884
Equipment Replacement Cost	\$1,531
Total	\$15,949

Estimated Monthly Operation & Maintenance Cost

\$1,329 \$0.01 \$/gal

WASHETERIA & LAUNDRYUser Data:

Average Daily Demand	5,485 gallons
Average Annual Demand	2,002,025 gallons
Average Daily Flow	3.8 gpm
Design Flow	40 gpm
Washer/Dryer Loads	46 per day
Dryer Duration	0.5 hr

Operational Assumptions:

Washeteria Operator	20.0 hr/wk
Burdened rate for Washeteria Operator	\$15 /hr
Electricity	\$0.96 /kwh
Heating fuel oil	\$7.00 /gallon
Misc Materials and Supplies	\$300 /yr
Washer and Dryer Maintenance	\$2,000 /yr
BTU per gallon of heating fuel oil	110,000 BTU
Makeup Air per Dryer	500 cfm

Capital Equipment Replacement:

	<u>Cost</u>	<u>Expected Equipment Life</u>	<u>Annual Cost</u>
Washers (6)	\$33,098	12 yr	\$4,953
Dryers (4)	\$26,240	12 yr	\$3,927
Water Heater (1)	\$2,500	10 yr	\$407

Inflation Rate 5 %

<u>Fuel Oil Consumption:</u>	<u>Heating Demand (BTU/hr)</u>	<u>Usage (hr/day)</u>	<u>Annual Usage (BTU/yr)</u>	<u>Annual Usage (gal)</u>	<u>Annual Cost</u>
30 lb Dryers	85,000	23	713,575,000	6,487	\$45,409
Dryer Makeup Air	21,060	23	176,798,700	1,607	\$11,251
Water Heater	15,000	6	32,850,000	299	\$2,090

<u>Electrical Demand:</u>	<u>Load Amps</u>	<u>kwh/load</u>	<u>Usage (kwh/day)</u>	<u>Annual Usage (kwh/yr)</u>	<u>Annual Cost</u>
20 lb Washers	3.6	0.37	17.2224	6,286	\$6,035
30 lb Dryers	3.2	0.33	15.3088	5,588	\$5,364

Washeteria O&M Costs

Labor	Annual Cost
	\$15,600
Materials, Supplies and Washer & Dryer Maintenance	\$2,300
Electricity	\$11,399
Fuel Oil	\$58,751
Equipment Replacement	\$9,287

Total \$97,337

Estimated Monthly Operation & Maintenance Cost

\$8,111

Trip to Do Laundry or Wash at Home

Route	Distance
1	3326 ft
2	1442 ft
3	3000 ft
4	1300 ft
Average Distance	2267 ft
Round Trip	1 Miles

	Quantity	Unit
Average round trip between home and laundromat (ALT 2)	1	mile
Gas mileage of average atv in the area	6	mpg
Gallons of fuel used per load of laundry	0.166667	gallons
Cost per gallon of fuel	7	dollars
Price per KWH (With PER)	0.6648	dollars/kwh
Price per gallon of water at watering point	0.2	dollars/gallon
Estimated loads per household per year	104	

Cost of Washing Clothes at Home			
Expense	Quantity	Unit	Cost Per Load
Electricity For Washer	0.4	kwh/load	\$0.27
Water	30	gal/load	\$6.00
Gas to transport water	0.17	gal/load	\$1.17
Estimated Expense per Load			\$7.43
Estimated Expense per lb of laundry			\$0.74

Cost of Washing Clothes at Washeteria			
Expense	Quantity	Unit	Cost Per Load
Fee per load of laundry	\$4.50	Dollars/load	\$4.50
Gas to transport laundry	0.17	gal/load	\$1.17
Estimated Expense per Load			\$5.67
Estimated Expense per lb of laundry			\$0.28

	FY 2012 Actual						FY 2013 Projected					
	Sewage Handling	Utilities	Laundry	Water Plant	Combined		Sewage Handling	Utilities	Laundry	Water Plant	Combined	
Personnel Services	\$ 25,879	\$ 59,162	\$ 24,493	\$ 69,853	\$ 94,346		\$ 24,679	\$ 27,225	\$ 24,493	\$ 30,551	\$ 55,044	
Travel	\$ -	\$ 4,466	\$ -	\$ -	\$ -		\$ -	\$ -	\$ -	\$ -	\$ -	
Facility Expenses	\$ -	\$ 2,209	\$ 132	\$ -	\$ 132		\$ -	\$ 2,055	\$ 132	\$ -	\$ 132	
Supplies	\$ 414	\$ 20,176	\$ 5,285	\$ 235	\$ 5,520		\$ 414	\$ 20,176	\$ 2,000	\$ 500	\$ 2,500	
Equipment	\$ 594	\$ 856	\$ -	\$ -	\$ -		\$ 590	\$ 856	\$ -	\$ -	\$ -	
Other Operating	\$ -	\$ 5,182	\$ -	\$ 280	\$ 280		\$ 1,200	\$ 2,448	\$ 1,800	\$ 600	\$ 2,400	
TOTAL	\$ 26,887	\$ 92,051	\$ 29,910	\$ 70,368	\$ 100,278		\$ 26,883	\$ 52,760	\$ 28,425	\$ 31,651	\$ 60,076	
Revenue	\$ 2,918	\$ 100,341	\$ 11,796	\$ 60,000	\$ 71,796		\$ 9,120	\$ 117,960	\$ 17,790	\$ 60,000	\$ 77,790	
TOTAL	\$ 2,918	\$ 100,341	\$ 11,796	\$ 60,000	\$ 71,796		\$ 9,120	\$ 117,960	\$ 17,790	\$ 60,000	\$ 77,790	
			\$ (18,114)	\$ (10,368)	\$ (28,482)				\$ (10,635)	\$ 28,349	\$ 17,714	
					\$ (28,482)						\$ 17,714	

	2013/2014 Actual (from P&L)						FY 2014 Projected					
	Sewage Handling	Utilities	Laundry	Water Plant	Combined		Sewage Handling	Utilities	Laundry	Water Plant	Combined	
Personnel Services			\$ 24,812	\$ 36,547	\$ 61,360		\$ 30,941	\$ 51,871	\$ 24,402	\$ 51,926	\$ 76,328	
Travel			\$ -	\$ 1,108	\$ 1,108		\$ -	\$ -	\$ -	\$ -	\$ -	
Facility Expenses			\$ 938	\$ -	\$ 938		\$ 210	\$ 8,200	\$ 1,800	\$ 5,700	\$ 7,500	
Supplies			\$ 632	\$ 4,381	\$ 5,013		\$ 500	\$ 4,900	\$ 2,460	\$ 5,300	\$ 7,760	
Equipment			\$ 1,870	\$ 100	\$ 1,970		\$ -	\$ -	\$ -	\$ 650	\$ 650	
Other Operating			\$ 1,289	\$ 2,298	\$ 3,587		\$ 1,120	\$ 143,900	\$ -	\$ 3,050	\$ 3,050	
TOTAL	\$ -	\$ -	\$ 29,541	\$ 44,434	\$ 73,975		\$ 32,771	\$ 208,871	\$ 28,662	\$ 66,626	\$ 95,288	
Revenue			\$ 18,886	\$ 31,509	\$ 50,396		\$ 13,500	\$ 154,000	\$ 21,000	\$ 33,375	\$ 54,375	
TOTAL	\$ -	\$ -	\$ 18,886	\$ 31,509	\$ 50,396		\$ 13,500	\$ 154,000	\$ 21,000	\$ 33,375	\$ 54,375	
			\$ (10,655)	\$ (12,925)	\$ (23,580)				\$ (7,662)	\$ (33,251)	\$ (40,913)	
					\$ (23,580)						\$ (40,913)	