Agency: Commerce, Community and Economic Development

Grants to Municipalities (AS 37.05.315)

Grant Recipient: Bethel **Federal Tax ID:** 926001644

Project Title: **Project Type:** New Construction and Land Acquisition

Bethel - Sewer and Water Project Institutional Corridor

State Funding Requested: $11,500,000 **House District:** 37 / S

One-Time Need

Brief Project Description:

Construct new 30-acre holding cell, construct 20-acre treatment area, replace curtains in cells, overhaul sewer truck discharge area, and purchase dredge and geobags to remove sludge.

Funding Plan:

Total Project Cost:	$11,500,000
Funding Already Secured:	($0)
FY2014 State Funding Request:	($11,500,000)
Project Deficit:	$0

Funding Details:

The City of Bethel received a 2009 USDA preplanning grant to complete a design to rehabilitate the sewage lagoon. The preliminary engineering report/engineering report are being reviwed by USDA for approval at present.

Detailed Project Description and Justification:

Construct a third holding cell 30 acres in size just south of the existing two holding cells. The new holding cell would be developed on City land. Construct a 20-acre treatment area with native plants, insects, and microorganisms on City land. Replace the baffles (curtains) inside the lagoons that help separate the particulates in the lagoon by size. Rehabilitate the sewer truck deposit area, including bolstering the driveway, strengthening the banks, replace the pipes and structure holiding the pipes. Purchase or lease a dredge to dredge the lagoon of its solids. The dredgeed material would sit in large 45-ft. geobags to dewater. After 1-2 years, the geobag material would be used as cover for the landfil.

Project Timeline:

August 1, 2013 - Sign grant agreement with State of Alaska for project funds.
August 30, 2013 - Issue Request for Proposals to hire a contractor to peform the work.
September 30, 2013 - Receive proposals. Begin evaluation of proposals.
October 15, 2013 - Sign contract with contractor to perform sewage lagoon work. Issue Purchase Order.
June 1, 2014 - September 30, 2014 - Contractor completes scope of work.

Entity Responsible for the Ongoing Operation and Maintenance of this Project:

Water and Sewer Utilities Division of Public Works Dept.

Contact Name: Pat Walker
Contact Number: 465-4453

For use by Co-chair Staff Only:

$7,000,000 Approved

2:01 PM 5/9/2013

Grant Recipient Contact Information:

Name:	John Sargent
Title:	Grant Manager
Address:	PO Box 1388/300 State Highway
	Bethel, Alaska 99559
Phone Number:	(907)543-1386
Email:	jsargent@cityofbethel.net

Has this project been through a public review process at the local level and is it a community priority? [X] Yes [ ] No

For use by Co-chair Staff Only:

2:01 PM 5/9/2013

Contact Name: Pat Walker
Contact Number: 465-4453

City of Bethel

Sewage Lagoon Rehabilitation and Dredge

FY 2014 State of Alaska Capital Budget Request

Contact Person
John Sargent, Grant Manager
City of Bethel
P.O. Box 1388
Bethel, AK 99559
907-543-1386 tel. / 907-543-1388 fax
jsargent@cityofbethel.net

1. Summary Statement

The City of Bethel requests that $11,500,000 be put in the FY 2014 State Capital Budget to fund the rehabilitation of the community's sewage lagoon and the purchase of a dredge that will allow the City to maintain proper lagoon depth. The sewage lagoon rehabilitation and dredge purchase is the City's number one priority. See Resolution #12-22 as Attachment A.

The Sewage Lagoon Rehabilitation and Dredge project entails the following major repairs to the City's only sewage lagoon, one of the largest lagoons of its type in North America:

1. Construction of a new holding pond on City land.
2. Construction of a new treatment area on open tundra owned by the City.
3. Renovation of the truck deposit driveway and facility.
4. Purchase of dredge with auger capable of dredging lagoon and Bethel Small Boat Harbor.
5. Replacement of curtains separating lagoon cells and water release apparatus.
6. Purchase of geobags to dewater solids removed from lagoon.

2. Brief Community Profile

Physical Environment

The community of Bethel is located four hundred air miles from Anchorage and forty air miles from the Bering Sea. Isolated from the road network of Alaska, the city is encompasses 44 square miles in Southwest Alaska, including six miles of Kuskokwim River shoreline.

The average annual snowfall in Bethel is 53 inches. The average annual precipitation is 16 inches. The mean summer temperature is 53°F and typically fluctuates between 42°F and 62°F. The mean winter temperature is 11° and typically fluctuates between -10°F and 20°F.

Bethel is located in treeless sub-arctic tundra that remains moist in the summertime and frozen in the wintertime. The land in and around Bethel is nearly all permafrost, except for some land surrounding lakes and ponds. The Kuskokwim River becomes a frozen road in the winter, connecting Bethel to many villages along the river.

Regional Hub

Bethel is a hub community for 56 Yukon-Kuskokwim villages in the region. Bethel is home to the third busiest airport in the state of Alaska, due largely to its cargo shipments, and home to the largest medium draft port in the state in terms of tonnage off-loaded. Goods destined for Kuskokwim River villages land in Bethel first and then are repackaged and taken to villages by plane, river barge, automobile, four-wheeler, boat, or snowmobile. Petroleum products are handled the same way, off-loaded in Bethel to smaller river fuel barges that transport the fuel to villages upriver and downriver.

Many of the 26,000 residents who live in the 55 villages around Bethel come to Bethel to shop, access government services, satisfy health care needs, attend college or trade school courses, visit friends and relatives, and work. Bethel attracts a continual influx of people because it typically has 100 or more available jobs, private property for sale, businesses for sale, and a variety of places to spend money, including restaurants, hotels, grocery stores, and specialty shops (e.g., hardware, auto parts, party supplies, sporting goods). Village residents also travel to Bethel to reconnect with family members.

Government

The City of Bethel was incorporated in 1957 while Alaska was still a territory and has since evolved to become a second-class city with a Council/Manager form of government. The seven elected City Council members hire and direct the City Manager, who oversees nine departments: Administration, Finance, Fire, Police, Port, Planning, Parks and Recreation, Technology, and Public Works. Bethel is a municipal government in the unorganized borough area of western Alaska and contains no other cities within its boundaries.

The Bethel City Council develops its annual budget by June 15 for the following fiscal year, which runs from July 1 to June 30. The total budget is approximately $14 million.

Population

Bethel is the eighth largest town in Alaska with a population of 6,080 (Alaska Department of Community and Economic Development website, 2012).

The average annual rate of increase for Bethel's population between 1990 and 2000 was 1.6% (U.S. Census 1990; U.S. Census 2000). The Alaska Department of Labor reported that the rate of increase in Bethel's population between 2000 and 2002 was 2.1%. After two years of population decline (2007-2008) totaling 5.2%, the population leveled off in 2009 and then rose 2.4% in 2010. Bethel's population is likely to stabilize or increase as a result of recent improvements in the U.S. and Alaska economy coupled with the advent of several major capital projects taking place in Bethel (e.g., new Swanson's grocery store/movie theater/restaurant, new Yukon Kuskowkim Regional Aquatic Health and Training Center, and new prematernal home).

Need for Financial Resources

According to the Alaska Department of Commerce, Community and Economic Development (2004), 67.4% of residents in Bethel Census Area villages are in the low to moderate income category. A substantial percent of people living in Bethel are in the low to moderate income category (42.2%). According to the September 2011 edition of the *Alaska Economic Trends* publication put out by the Alaska Department of Labor and Workforce Development, the current unemployment rate in the Bethel Census Area is 15.3%. This figure really hurts the City because more than 50% of its revenues come from sales taxes and there is a strong correlation between employment rates and sales.

The City has $8 million in "due to" and "due from" accounts between departments on its books. This money is recorded as long-term receivables that must be reimbursed.

The City provides water and sewer service to 451 households on the piped system and 1,260 households on the hauled system. Despite collecting $350 per month per household on average in water and sewer fees, the City had to subsidize the program with $667,000 last year and expects to need $623,000 during FY 2012. The following types of annual cost increases make it difficult for the City to break even on its water/sewer operations: fuel prices for its delivery/evacuation trucks, heating oil for its two water treatment plants, and the cost of diesel-generated electricity. The cost of water treatment chemicals, plant and truck parts, and supplies/materials have increased because the cost to transport them to Bethel has increased.

The City of Bethel needs $11,500,000 in State Capital funds to complete the sewage lagoon rehabilitation and purchase one dredge. The Port of Bethel has no capital funds in its current budget to cover the cost of this capital project. The City has funds to operate and maintain the sewage facility, once the project is finished.

3. Justification and Level of Need

Cost Justification

The City of Bethel needs $11,500,000 in State of Alaska Capital Budget funds to complete the sewage lagoon rehabilitation and dredge project. The City of Bethel paid an engineering firm to estimate the cost of the project in the form of a Rough Order of Magnitude (ROM). The cost estimate was $9,615,162 in 2012 dollars. The City used a 3.2% inflation figure to estimate the cost in 2014, when the project construction would begin with State of Alaska funding. The actual cost will be determined when the City goes out to bid for the purchase of services and one dredge.

Project Need

The City of Bethel relies on its open sewage lagoon to contain all sewage deposited into it by pipe and evacuation truck. Due to the cold temperatures in Bethel, decomposition is slow. The solids settle out and the liquids move around the curtains from one cell to another. Due to the volume of sludge accumulating in the lagoon and water infiltration, the City must release 230 million gallons at a time into the Kuskokwim River for four to six weeks every spring and fall. That amounts to 460 million gallons of effluent dumped into the river each year.

The City of Bethel does not have a current Alaska Pollution Discharge Elimination System permit issued by the Alaska Department of Environmental Conservation (ADEC) and necessary for any discharge of wastewater into the river. The ADEC provides the City with an administrative permit extension to discharge under the condition that the City actively work to rehabilitate the lagoon to achieve a healthier, more sanitary condition, such that a discharge permit is no longer needed. The ADEC has the right to fine the City up to $25,000 per day for continued violations. The Sewage Lagoon and Rehabilitation Dredge project will meet this need and allow the City to obtain a current permit.

According to Section 6.3.1 Project Need in the Water Loops A, B & C and Wastewater Upgrades — Preliminary Engineering Report (June 2012) published by Larsen Consulting Group, LLC, "The City's end-of-pipe effluent quality data has, at times, exceeded the EPS's and State of Alaska's maximum levels for total suspended solids (TSS), biochemical oxygen demand (BOD) and fecal coliforms (FC) during both spring and fall pumping events" (p. 27). See Attachment C.

The Project Need section of the report also said, "Another issue of increasing concern is the lagoon baffle curtains and sheet piling around the hauled sewage areas that are beginning to show signs of failure and are in need of replacement" (p. 27).

Funding for this project is essential to retain wall integrity and avoid a breach like the one that occurred in 2006. The City had to scramble to repair the wall in the middle of winter by using heavy equipment, sand, and topsoil.

4. Project Description

The Sewage Lagoon Rehabilitation and Dredge project entails the following major repairs to the City's only sewage lagoon, one of the largest lagoons of its type in North America:

1. Construction of a new holding pond on City land.
2. Construction of a new treatment area on open tundra owned by the City.
3. Renovation of the truck deposit driveway and facility.
4. Purchase of dredge with auger capable of dredging lagoon and Bethel Small Boat Harbor.
5. Replacement of curtains separating lagoon cells and replacement of water release apparatus.
6. Dredge 40,000 cubic yards of sludge from Cell #1 of the sewage lagoon.
7. Purchase of geobags to dewater solids removed from lagoon.

The full list of items that are part of this project are listed in the Budget section. The costs include design, surveying, and public relations and coordination. The construction of Cell #3 and treatment area (constructed wetland) represent major new additions to the lagoon. Other costs include repairs and improvements to the discharge area, berm reinforcement, and baffle replacement.

A tentative timeline with major tasks appears in Table 1.

Table 1 Tasks and Timeline Sewage Lagoon Rehabilitation and Dredge Project	
Task	**Date of Completion**
Sign State Designated Legislative Grant Agreement	August 15, 2013
Bid Process and Selection of Contractor	November 15, 2013
Design	May 30, 2014
Construction of Cell #3, treatment area, baffle installation, bank stabilization, dredge Cell #1	October 31, 2014
Rehabilitation of piling wall and driver dump area	October 31, 2014
Submit final report and grant close-out documentation	December 1, 2014

The dredge would have an auger attachment in order to break up the solid bottom of the lagoon. Once the particles are broken up under water, a suction dredge pulls them up and down a large hose to shore. On shore, the contents emanating from the hose flow into geobags where it will dewater over the course of one to two years. The material left after dewatering will be used as landfill cover, saving the City the time, effort, and cost currently incurred to haul sand as cover from the City's sandpit, five miles away from the landfill.

5. Budget

Sewage Lagoon Rehabilitation and Dredge Project

Design	400,000
Mobilization/Demobilization	$687,190
Public relations and coordination	10,000
Construction surveying	25,000
Preparation of SWPPP	12,500
Biosolids dredging, dewatering and disposal	2,250,000
Repair sheet pile wall at hauled sewage disposal site	740,000
Furnish and install new baffles	500,000
New holding cell earthwork	2,305,000
New holding cell hydraulic control structure	15,000
New holding cell hydraulic control structure – sheet piles	222,000

New holding cell outfall piping	36,000
Furnish and install reinforcement matting	10,400
Constructed wetland (treatment area) earthwork	196,000
Constructed wetland plants and lining	150,000
Contingency (20%)	1,511,818
Administration (2%)	181,418
Bid phase costs (1%)	90,709
Construction administration (3%)	272,127
Total Cost in 2012 Dollars	9,615,162
Inflation at 3.2% per year to convert to 2014 Dollars	625,216
New dredge with auger and hoses in 2014 Dollars	$1,259,622
Total	**$11,500,000**

6. Operation and Maintenance

The City's Utilities Division in the Public Works Department is responsible for operating and maintaining the sewage lagoon. The City has an experienced Utility Foreman who oversees all water and sewer capital projects, leads a four-person team for daily operations, and manages the City's two water treatment plants. The City's Utility Foreman was recently recognized by the Alaska Municipal League with a 2012 Community Award of Excellence for his "Creative Ideas for Savings and Effectiveness in Water and Sewer Operations."

The best part about the Sewage Lagoon Rehabilitation and Dredge project is that once it is completed, very little maintenance is required for a period of twenty years. The City's evacuation trucks will be able to safely deposit their contents into the lagoon. Piped sewage to the lagoon will continue unabated. New curtains dividing each of the three cells will act to mix and aerate the liquids as the "black water" moves from one cell to another and eventually reaches the open tundra treatment area. The natural bacteria and "bugs" of the tundra and open air will go to work decomposing the human waste naturally and cost-effectively. During the summer months when the lagoon is in its liquid form, the solids will settle out in the first holding cell and the liquids will follow a controlled release to the tundra treatment area where decomposition will continue as it slowly works its way to the creek that leads to Brown's Slough and out to the Kuskokwim River. The filtration system amounts to a three-step process: 1) Eflluent deposited to Cell #1 by pipe or evacuation truck where the solids settle out, 2) liquids breakdown aerobically and anaerobically as they migrate from Cell #1 to Cell #3, and 3) liquids breakdown further in tundra treatment area after being released from Cell #3.

7. What if no State Capital Funds are provided?

If no capital funds are provided from the State to support the sewage lagoon rehabilitation and dredge project, the City will continue dumping 460 million gallons of raw sewage into the Kuskokwim River every year. The City will fail to meet the Alaska Department of Environmental Conservation's standards for health, safety, and sanitary conditions necessary for the issuance of a permit to operate the lagoon. The City faces fines from the ADEC of up to $25,000 a day for non-compliance. The City of Bethel cannot afford to pay fines of this magnitude and survive as a going concern.

8. What if State Capital Funds are provided?

If State Capital funds are provided for the sewage lagoon rehabilitation and dredge project, a major crisis will be averted. The City will likely be able to satisfy the Alaska Department of Environmental Conservation that significant steps were taken to improve the sanitary conditions of the lagoon and its operation. The City will be in a strong position to obtain a five-year permit to operate the rehabilitated lagoon and not be subject to annual administrative extensions, granted out of desperation. Once the permit is obtained, the City avoids fines associated with the lagoon's current condition and operation.

The sanitary conditions of the lagoon system will be improved such that the City may not need to release effluent liquids into the Kuskokwim River at all. Less raw, untreated sewage released into the river means less hazardous fecal bacteria in the river where humans harvest fish, water fowl, and fur-bearing animals during trapping season.

According to the preliminary engineering report on the sewage lagoon rehabilitation project done by Larsen Consulting Group, LLC, this project represents one of the most inexpensive options available to the City and is the most inexpensive to maintain.

Attachment A

City of Bethel Resolution #12-22:

City of Bethel Priorities for the FY 2014 State of Alaska Capital Budget

Introduced by: Lee Foley, City Manager
Date: October 9, 2012
Action: Passed
Passed: 5-0

CITY OF BETHEL

Resolution # 12-22

CITY OF BETHEL PRIORITIES FOR THE FY 2014 STATE OF ALASKA CAPITAL BUDGET

WHEREAS, the Bethel City Council is a seven-member body elected by resident voters of Bethel to act in the best interest of the community;

WHEREAS, the City intends to exhibit transparency, oversight, and accountability for all funds awarded through this request;

WHEREAS, the priorities established herein are rank-ordered and vital to the well-being of the community and municipality of Bethel;

WHEREAS, a summary of the City of Bethel's priorities and requested funding amounts are listed in the following table:

Five Priorities	Request
1. Sewage Lagoon Rehabilitation and Dredge	$11,500,000
2. Petro Port/Multiuse Expansion and City Dock Repair	$29,000,000
3. Construction of Donut Hole Road and Dust Control Measures	$6,400,000
4. Network Wiring and New Telephone System	$265,431
5. New Animal Control Facility	$426,010
Total	$47,591,441

#1 Sewage Lagoon Rehabilitation and Dredge

WHEREAS, the City of Bethel provides hauled sewage service to 1,306 buildings and piped sewage service to 430 buildings;

WHEREAS, all sewage is deposited into the City's sewer lagoon, which is divided into two cells that occupy 61.7 acres;

Introduced by: Lee Foley, City Manager
Date: October 9, 2012
Action: Passed
Passed: 5-0

WHEREAS, the lagoon capacity and simple technological design of using earthen berms without liners and two curtains to filter particles by size are no longer adequate for a community the size of Bethel;

WHEREAS, the City is given an administrative extension from the Alaska Department of Environmental Conservation each year to discharge effluent into the Kuskokwim River with the understanding that the City is actively pursuing lagoon remediation efforts;

WHEREAS, the City discharged 295 million gallons of effluent into the Kuskokwim River last year in order to lower lagoon volume and avoid a cataclysmic breach or overflow situation;

WHEREAS, the fact that a portion of the upper lagoon cell wall breached in 2005, causing the discharge of thousands of gallons of effluent onto open tundra, underscores the need for rehabilitation;

WHEREAS, professional engineering firm, Larsen Consulting Group, LLC, described the poor condition of the lagoon and made recommendations for improvement in a preliminary engineering report in 2010;

WHEREAS, these recommendations comprise the majority of this project: construction of a new third 30-acre holding cell, construction of a 20-acre treatment area, use of a dredge to remove sludge from the bottom of the lagoon and increase capacity, use of 80 geobags to contain the sludge removed from the lagoon and help it dewater and decompose, replacement of curtains, and complete overhaul of the sewer truck discharge area;

WHEREAS, potential fines up to $25,000/day could be levied by the Department of Environmental Conservation if remediation efforts are not undertaken immediately;

NOW, THEREFORE, BE IT RESOLVED that the Bethel City Council, as elected representatives of the community and city of Bethel, Alaska, do hereby formally request that the State of Alaska provide $11,500,000 in the FY 2014 Alaska Capital Budget for Bethel to fund the Sewage Lagoon Rehabilitation and Dredge project.

#2 Petro Port/Multiuse Expansion and City Dock Repair

WHEREAS, the City of Bethel owns and operates a petroleum port where millions of gallons of petroleum products are off-loaded safely to storage tanks or smaller fuel barges every year;

WHEREAS, the Petro Port in Bethel serves the 56-village region surrounding it by accepting ocean-going fuel barges from Seattle and Anchorage and offering a safe fuel transfer facility;

Introduced by: Lee Foley, City Manager
Date: October 9, 2012
Action: Passed
Passed: 5-0

WHEREAS, rural Alaskan towns like Bethel and surrounding villages rely on petroleum-based products to produce electricity, heat homes, and engage in subsistence hunting, fishing, and gathering activities;

WHEREAS, the City has a concept plan outlining the proposed Petro Port expansion and the construction of a seawall and its related set-down area for cargo containers;

WHEREAS, the Bethel City Dock receives ocean-going barges from Seattle and Anchorage from May 28 to October 5 every year;

WHEREAS, Bethel City Dock serves as the receiving and transshipment center for the 56-village region for essential goods, materials, equipment, vehicles, and buildings;

WHEREAS, the poor structural condition of the East Timber Wall renders useless its upland area (375 feet by 50 feet) and renders its Brown's Slough water space unusable for moorage;

WHEREAS, the poor structural condition of the East Sheet Pile Wall qualifies its uplands area (408 feet by 50 feet) for light duty only and its Brown's Slough water space unusable for moorage;

WHEREAS, the City Dock's old timber wall on its east side must be replaced with an open cell sheet pile wall with fenders, bull rail, bollards, and lighting in order to put the upland area near the wall to productive Port use;

WHEREAS, the population growth of the Yukon-Kuskokwim region and hub community of Bethel, coupled with the prospect of large-scale economic development projects coming online, like Donlin Gold Mine, support the need for the Petro Port/Multiuse expansion and City Dock Repair project;

Whereas, the City proposes that the replacement of the City Dock East Timber Wall and the Petro Port/multiuse expansion be considered as Phase 1 of this project and that the replacement of the City Dock East Sheet Piling Wall be considered as Phase 2 of this project—both of which can be completed in three years;

WHEREAS, professional engineering firm PND Engineers estimates the cost of this project to be $29,000,000;

NOW, THEREFORE, BE IT RESOLVED that the Bethel City Council, as elected representatives of the community and City of Bethel, do hereby formally request that the State of Alaska provide $29,000,000 in its FY 2014 Capital Budget to fund the Petro Port/Multiuse Expansion and City Dock Repair project;

Introduced by: Lee Foley, City Manager
Date: October 9, 2012
Action: Passed
Passed: 5-0

#3 Construction of Donut Hole Road and Dust Control Measures

Construction of Donut Hole Road

WHEREAS, the primary need of a new road connecting Chief Eddie Hoffman Highway with Ptarmigan Street is to reduce response time for emergency vehicles leaving the Bethel Fire Station or Bethel Police Station and responding to people living in Tundra Ridge and on Ptarmigan Street;

WHEREAS, the closure of Tundra Ridge Road in 2008 put a severe burden on the community in terms of time and cost;

WHEREAS, people living in Tundra Ridge were disproportionately affected by the closure of Tundra Ridge Road because they had to take a longer, circuitous route to access the airport, Larsen subdivision, Kasayulie subdivision, and west-side businesses;

WHEREAS, the 35-mile road system in the community emanates from a large ten-mile oval, referred to as "the donut hole," inside of which is land owned by the city, native allottees, and Bethel Native Corporation;

WHEREAS, the proposed "donut hole road" would be 1.5 miles long with a 100-foot easement, ample shoulder space, and a proper hydroseeded slope to the base;

WHEREAS, constructing the road as a continuation of Caslista Drive that runs by the Post Office would shorten the required length of the new road, link a new low-income housing development (under construction), connect up with the City's new aquatic center (under construction), and require permission from only two land owners;

WHEREAS, the City of Bethel is willing and able to provide sand, heavy equipment, and personnel to assist in the development of the new road;

WHEREAS, a new road between the state highway and Ptarmigan Street is expected to benefit residents by saving time, fuel cost, and vehicle maintenance cost;

Dust Control Measures

WHEREAS, the community of Bethel is plagued by airborne dust and the ill-health effects associated with its inhalation, ingestion, and contact with eyes, ears, and skin;

WHEREAS, the addition of a new water truck and sander to augment limited on-hand equipment would enhance the City's Streets and Roads Division personnel ability to apply their experience and expertise to more fully apply dust control measures to the City's streets;

WHEREAS, proven dust control measures on City streets include the application of gravel and calcium chloride to road surfaces, and the act of hydroseeding road slopes;

Introduced by: Lee Foley, City Manager
Date: October 9, 2012
Action: Passed
Passed: 5-0

WHEREAS, funding dust control measures in large sum allocations allow the City to purchase gravel and other materials in bulk quantities, saving money and time;

WHEREAS, the City has the heavy equipment, trained personnel, and operating costs in its budget to support and maintain the new donut hole road and the dust control measures once employed;

NOW, THEREFORE, BE IT RESOLVED that the Bethel City Council, as elected representatives of the community and City of Bethel, do hereby formally request that the State of Alaska provide $6,400,000 in its FY 2014 Capital Budget to fund the Construction of Donut Hole Road and Dust Control Measures project;

#4 Network Wiring and New Telephone System

WHEREAS, the Bethel City Hall building contains multiple generations of wires strung throughout the building, resulting in a patchwork of interties, patch panels, and terminations;

WHEREAS, the mass of CAT5 wire above the ceiling in City Hall and in the network equipment room hinders repairs and new installations by City Information Technology personnel, United Utilities, Inc. servicemen, and the telephone repairmen;

WHEREAS, the wiring at several City building (e.g., City Hall and Public Works building), has been identified as the cause for slow data transmission and related lower worker productivity;

WHEREAS, the City's Information Technology Director recommends the purchase and installation of CAT6 network cable and an Internet Protocol (IP) telephone system in order to save $3,000 per month in telephone charges or $36,000 per year;

WHEREAS, contemporary network wiring installations adhere to standards, which dictate specific requirements for the type of wiring, outlets, patch panels, and routing parameters;

WHEREAS, the new IP telephone system will be easier to maintain than the current system and support modern telephone services, like Caller ID;

WHEREAS, after installation of CAT6 network cable, City personnel can expect an experience an increase in transmission efficiency of 30%;

NOW, THEREFORE, BE IT RESOLVED that the Bethel City Council, as elected representatives of the community and City of Bethel, do hereby formally request that the State of Alaska provide $265,431 in its FY 2014 Capital Budget to fund the Network Wiring and New Telephone System project;

Introduced by: Lee Foley, City Manager
Date: October 9, 2012
Action: Passed
Passed: 5-0

#5 New Animal Control Facility

WHEREAS, the City's leash law that prevents loose dogs from roaming neighborhoods, harming children, and being bitten by rabid foxes is enforced by Bethel Police Department personnel;

WHEREAS, the City of Bethel owns and operates the animal control facility and pays community safety officers to collect and care for loose animals;

WHEREAS, the City's current animal control building is ill-suited to house animals due to a multitude of reasons, including poor to non-existent ventilation, insufficient and exceptionally cramped kennel space, inadequate sanitation removal capability, rotted flooring, inhumane conditions in general, and is located in an out-of-the-way section of the City that greatly increases the difficulty in providing animal care and fostering animal adoption;

WHEREAS, the animal shelter's current six-dog capacity is woefully inadequate relative to the daily demand to house fifteen or more dogs;

WHEREAS, the City Manager, Police Chief, and Public Works Director recommend the demolition of the existing "dog pound" and construction of a new, state-of-the-art animal facility;

WHEREAS, the new animal facility would be constructed on the grounds of the City's new police station in Blueberry Subdivision in order to facilitate: care and feeding of animals, adoption of animals by residents, and time and money savings in animal control operations;

NOW, THEREFORE, BE IT RESOLVED that the Bethel City Council, as elected representatives of the community and City of Bethel, do hereby formally request that the State of Alaska provide $426,010 in its FY 2014 Capital Budget to fund the construction of a new Animal Control Facility;

THEREFORE, BE IT FURTHER RESOLVED that the Bethel City Council, as elected representatives of the community and City of Bethel, hereby set and affirm five projects for the City's FY 2014 State of Alaska Capital Budget funding request as: 1) Sewage Lagoon Rehabilitation and Dredge, 2) Petro Port/Multiuse Expansion and City Dock Repair, 3) Construction of Donut Hole Road and Dust Control Measures, 4) Network Wiring and New Telephone System, and 5) New Animal Control Facility in the amounts indicated herein.

Introduced by: Lee Foley, City Manager
Date: October 9, 2012
Action: Passed
Passed: 5-0

ENACTED THIS 9th DAY OF OCTOBER 2012 BY A VOTE OF 5 IN FAVOR AND 0 OPPOSED.

Joseph A. Klejka, Mayor

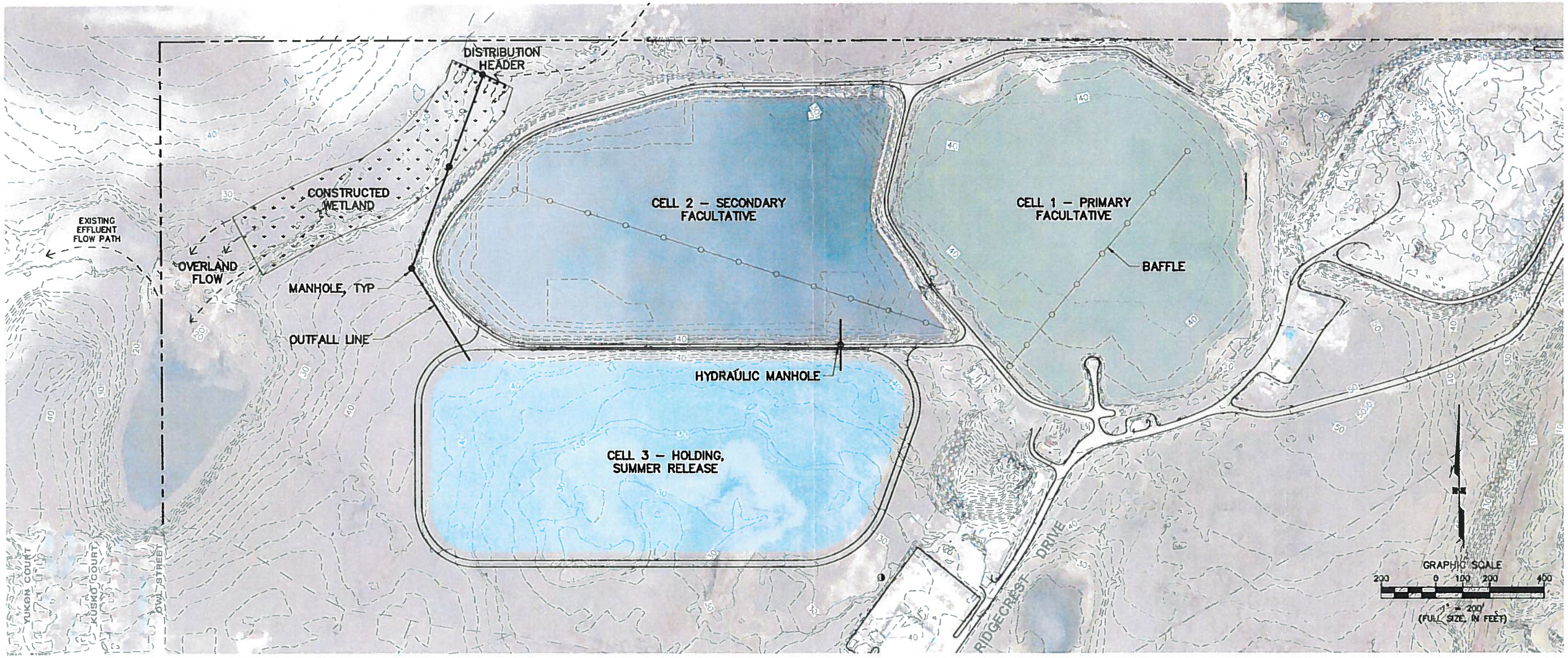
ATTEST:

Lori Strickler, City Clerk

Attachment B

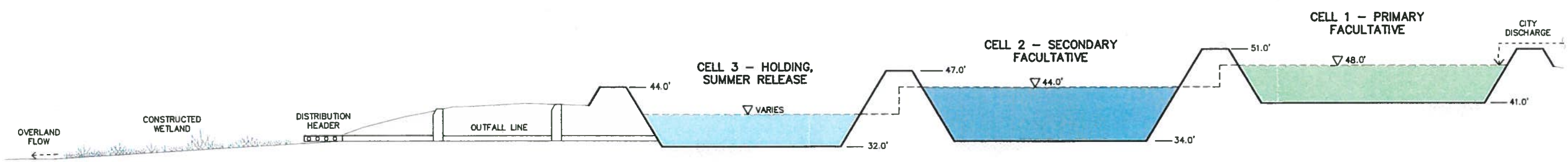
City of Bethel Waste Water Lagoon — Site Option 4 Concept Plan

(Map)



TREATMENT PLAN

SCALE: 1"= 200' (FULL SIZE)



HYDRAULIC PROFILE - SCHEMATIC

SCALE: NTS

LGG Inc. LARSEN CONSULTING GROUP
architecture · engineering · surveying
3710 Woodland Dr.
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Anchorage, AK. 99517
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NO.	DATE	BY	REVISION

CITY OF BETHEL

CITY OF BETHEL
WASTE WATER LAGOON

SITE OPTION 4
CONCEPT PLAN

SCALE:	AS SHOWN
DESIGNED BY:	DM
DRAWN BY:	CRS/SJ/JG
CHECKED BY:	DC
DATE:	06/29/12
FILE NO.	824 01

SHEET NUMBER 1 OF 1

Plotted By: Curtis
Date/Time: 29 Jun 2012 9:48 am
Layout: Site Plan
Filename: F:\Civil Projects\824 City of Bethel Water & Sewer Improvements\824.04 COB Wastewater Lagoon\dwg\824.04_DSL_BETHEL Wastewater Lagoon-Presentation.dwg

City of Bethel

Sewage Lagoon Rehabilitation & Dredge

Need $11,500,00

to rehabilitate Bethel Sewage Lagoon & Purchase Dredge.

- The Bethel Sewage Lagoon is one of the largest in North America, occupying 61.7 acres for a community of 6,080.
- The City of Bethel relies on the lagoon to settle out solids, decompose liquids, and dilute wastewater.
- The City is given an administrative extension from the Alaska Department of Environmental Conservation each year to discharge effluent into the Kuskokwim River with the understanding that the City will actively pursue lagoon remediation efforts.
- The need for lagoon rehabilitation is underscored by the north cell wall breach that occurred in 2005, which caused the discharge of thousands of gallons of effluent onto open tundra.
- Fines up to $25,000/day could be levied by the Department of Environmental Conservation if remediation efforts are not undertaken immediately.

Project Description

Construct new 30-acre holding cell and 20-acre treatment area, purchase and use dredge to remove sludge from the bottom of the lagoon, purchase 80 geobags to contain the sludge removed from the lagoon and help it dewater and decompose, replace cell curtains, and complete overhaul of the sewer truck discharge area.

City of Bethel
300 State Highway
P.O. Box 1388
Bethel , Alaska 99559

Lee M. Foley, City Manager
Phone: 907-543-2297
Fax: 907-543-1394
Email: lfoley@cityofbethel.net

TRANSPORTATION CENTER OF THE KUSKOKWIM

1.0 EXECUTIVE SUMMARY/INTRODUCTION

1.1. PROJECT OVERVIEW

Larsen Consulting Group, Inc. (LCG) was retained by the City of Bethel to prepare a design study report (DSR) evaluating the feasibility of extending the water main system in the City Subdivision area to serve multiple institutions along the Chief Eddie Hoffman Highway.

By including the City's major institutions located on the Institutional Corridor as customers in the community water system, the City stands to gain additional revenue while the institutions can eliminate costly operation and maintenance expenses for their individual on-site water systems. The additional revenue gained by the City could help reallocate the cost of operating the water system among a wider base of customers, increase operating and maintenance efficiency and make it more affordable for all.

The purpose of this Concept Design Report is to present background project information, initial survey research, conceptual level plans, design considerations, and a preliminary cost estimate for constructing a new water main loop and associated booster pump station and water storage tank in order to serve the Institutional Corridor along Chief Eddie Hoffman Highway.

1.2. COST ESTIMATE

A preliminary cost evaluation, based on the concept level plan layouts, was performed for two preferred alternatives, both of which provide water service to the Institutional Corridor. The primary difference between the two alternatives considered is the size of the water storage tank and booster pump station. Alternative #1 consists of a 355,000 gallon storage tank and a 1,200 square foot booster pump station designed for the immediate water services associated with the Institutional Corridor. The second Alternative (#2) looks at installing the infrastructure needed to support the long term expansion into this area of the City, with a 655,000 gallon water service tank and a 3,000 square foot booster pump station.

The cost evaluation summary, found in Appendix F, includes project administration, engineering design, construction management and a 20% contingency on construction cost. The total estimated project cost in Year 2010 dollars for the recommended alternatives are as follows:

- Alternative #1: 355,000 gallon water tank and 1,200 ft2 booster station = $11,708,450
- Alternative #2: 655,000 gallon water tank and 3,000 ft2 booster station = $14,417,880

2.0 BACKGROUND

The City of Bethel currently bills approximately 1,631 customers for water and sewer services (1,376 hauled and 255 piped) and operates two water treatment facilities. Existing components associated with expansion into the Institutional Corridor include the following:

2.1. CITY SUBDIVISION WATER TREATMENT PLANT (CSWTP)

The City Subdivision Water Treatment Plant (CSWTP) currently provides water for the City's water truck-haul operations, the City's governmental offices, and piped services to 180 properties within City Subdivision through three Loops (A, B & C). The City Center Water Treatment Plant (CCWTP), originally constructed to support the City's governmental offices, was decommissioned and replaced by the City Subdivision piped water and sewer system when it became operable.

2.1.1. *Water Source*

The CSWTP utilizes a groundwater source for its raw water supply, with the wellhead located inside the building. The well, comprised of a 10-inch diameter steel casing, was drilled to a depth of approximately 500 feet. Within the casing, a Grundfos 385-S400-4 6-inch diameter 40 HP submersible turbine pump was installed at about 210 BGS and can supply water at about 400 GPM. The City Subdivision WTP was intended to have an exterior back-up well but no water was found at the drill rig's maximum depth so the well was eventually filled with sand, plugged with grout, capped, and abandoned. No other back-up well sources have been implemented.

2.1.2. *Treatment Methodology*

The City Subdivision WTP was constructed in 1999. Water treatment primarily targets the removal of iron and manganese and provides disinfection. Raw water from the well is heated and mixed with potassium permanganate before being filtered, chlorinated and fluoridated. The plant has three 9' diameter greensand pressure filters, two 30 Hp backwash pumps, and operates at a constant 400 gallon per minute (gpm) capacity.

2.1.3. *Plant Capacity*

The water treatment capacity of the existing CSWTP is 400 GPM with a water storage capacity of 505,000 gallons. According to the 2005 Master Plan prepared by CRW (CRW, 2005), the plant is currently operating at approximately 69 GPM average daily flow to serve the existing piped system and truck-haul operations. There is ample treatment capacity at the CSWTP to serve additional expansion; however, the water storage tank capacity is limited to the existing piped system (City Subdivision and City Center).

Further expansion of the water distribution system from the CSWTP would require additional water storage to account for fluctuations in flow, to provide additional dedicated reserves against possible interruption in supply and to accommodate fire-fighting requirements. Water distribution modeling completed for the 2005 Master Plan(CRW, 2005) shows that the CSWTP can support a piped water distribution system to serve development east of Ridgecrest Drive (Mission Lake area, the "Avenue" area, Harbor areas, and the development around the new YKHC offices) as well as development around the Hospital. However, additional water storage tanks, booster pump stations, circulation pumps, and water heating systems would be needed to serve these areas and will be discussed in Section 4.0.

2.1.4. *Water Storage*

Currently, there is a 60 foot diameter by 24 feet high, 505,000 gallon steel storage tank located adjacent to the treatment plant. Thermal siphons and air duct vents were installed in the soils below the tank in order to freeze the underlying soils for the foundation. Tank storage capacity is sufficient for the needs of the existing system only and can store several days' worth of the existing average daily flow of approximately 100,000 gallons per day, as well as meet peaking demands and fire flow requirements.

2.1.5. *Electrical Systems*

The electrical requirements for the proposed additions to the existing Bethel water treatment plant consist of providing power to (2) new 5 HP circulation pumps for freeze protection of the new proposed water line. Based on as-builts dated February 1999 the existing facility has 115 amps (A) of spare capacity at 480 volts (V) 3-phase. With the water circulation pumps operating as lead/lag, where only one pump can operate at any time, there is space in the existing motor control center MCC-A for (1) breaker to feed the controller for these pumps. There is also adequate space and capacity on the existing Panel 'B' at 208V if the pumps are unavailable at 480V. We assume that this will not require any upgrades to the service at this time.

2.1.6. *Boiler Equipment*

Water in the existing tank is heated by circulating water through a heat exchanger located inside the CSWTP building. Once initially heated by the treatment process, the water inside an insulated storage tank requires relatively little additional energy to maintain a constant temperature due to its heat capacity.

The existing water treatment boiler plant will be used to heat the water line between the existing water treatment plant and the new booster station. The existing boiler plant heating mains will be connected to a new double wall heat exchanger. Water transferred to the booster

station will be heated via the heat exchanger prior to being pumped to the new booster station. A domestic water circulation pump will also be provided to continuously circulate the water between the booster station and water treatment facility when the tank is not being filled.

2.2. TRUCK HAUL FACILITIES

One exterior water truck filling station with 5 HP pumps is located at the CSWTP. With the City's water truck fleet, this truck fill facility, along with the two at the Bethel Heights WTP, provide water distribution for most consumers in Bethel. A fleet of water trucks are employed to distribute water. Trucks and equipment specifications are designed by the City and are typically Ford Sterling L TS500's with an estimated design life of 5 to 10 years. Truck components include a 3,500 to 4,000 gallon capacity tank, chassis, motor, cab, heavy duty suspension, pumps, hoses, valves, and monitoring equipment.

2.3. EXISTING DISTRIBUTION

Water lines served by the City Subdivision WTP consist of water mains and service lines. Currently there are three water main loops; Loop A, Loop B and Loop C, which serve buildings in the City Subdivision. The water mains are aboveground 6-inch diameter HDPE pipe, featuring insulated arctic pipe construction. Certain sections of the water main have a 1/2-inch diameter HDPE circulating glycol line located below the 6-inch diameter water line, which are used for heating the circulating water line. Each lot is served by the water main via a service line, which stubs off the main lines through a service box. Both water and sewer service lines are usually contained in one arctic pipe. The water service has a 1-inch diameter HDPE supply and return line, contained inside of a carrier pipe. The water from the service line runs through a water service box that feeds the house or is circulated back into the water main. Leveling sleepers (4x12 pressure-treated timbers) provide the primary support for the aboveground water mains. The timbers are typically secured to the ground with a "Duckbill" style earth anchor while the arctic pipe is secured in place by a steel strap that wraps around the CMP and attaches to the leveling sleeper.

3.0 INSTITUTIONAL CORRIDOR

For purposes of this study, the Institutional Corridor can be defined as the area along Chief Eddie Hoffman Highway, beginning near the Alaska State Fish and Wildlife facility and ending up at the Public Health Service building, including many of the City of Bethel's major support institutions and covering approximately 0.8 mile.

3.1. COMMERCIAL INSTITUTIONS

There are currently seventeen facilities associated with the Institutional Corridor. Each facility has unique functions, existing water systems and future demand requirements. This list includes several potential facilities along the corridor that are being addressed for future water demands. Details of each institution are as follows:

- ***YKHC – 40 housing units.*** This facility has been slated for demolition and is to be replaced by an 18-bed long-term care facility.
- ***YKHC – Hospital.*** This facility has its own well and a 100,000 gallon water storage tank on site. 50,000 gallons of this is dedicated fire water storage. The well equipment and storage tanks are old, however, and are in need of replacement.
- ***YKHC – Annex.*** This facility is served by the Hospital Well.
- ***YKHC – Outpatient Hostel.*** This facility is served by the Hospital Well.
- ***YKHC – Keys Receiving Home.*** This facility is served by the DHHS Well.
- ***Alaska DHHS – Youth Detention Facility.*** This facility is served by the DHHS Well.
- ***Alaska DHHS – Corrections Facility.*** This Facility has its own well and three ten-thousand gallon fire water storage tanks. The well equipment and storage tanks are old, however, and are in need of replacement.
- ***YKHC – Housing.*** This facility has been slated for demolition and is to be replaced by a 32-bed pre-maternal facility.
- ***AVCP Pacifica House.*** This facility has its own well.
- ***YKHC Sobering Center.*** This future facility will have hauled water.
- ***US Post Office.*** This facility has hauled water.
- ***Alaska Public Health Service.*** This facility has hauled water.
- ***YKHC – Main Administration Office.*** This facility is served by the Hospital Well.

- ***Alaska State Fish and Wildlife.*** This facility has hauled water.
- ***YKHC Special Needs Housing.*** This facility has hauled water.
- ***YKHC Warehouse.*** Currently, there is no water at this building but it will eventually need a sprinkler system only.
- ***Crowley Warehouse.*** Currently, there is no water at this building but it will eventually need a sprinkler system and domestic water.

3.2. WATER USAGE

Each of the identified institutions has unique water demands based on functionality and history of water usage. Table 3.1 outlines the average water usage of the various facilities along with the anticipated future improvements. Appendix C contains spreadsheets detailing the water usage for most of the identified properties for the period of September 1, 2008 through August 31, 2009.

Table 3.1 – Current and Future Water Usage

Water Service	Annual Water Usage (gallons per year)	Notes
YKHC – 18-Bed Long Term Care Facility	173,500	Based on 18 beds times 26.4 gallons per bed per day
YKHC – Hospital	12,776,440	Well with Fire Protection Storage Tank
YKHC – Annex		Served by Hospital Well
YKHC – Outpatient Hostel		Served by Hospital Well
YKHC – Keys Receiving Home		Served by DHHS Well
Alaska DHHS – Youth Detention Facility		Served by DHHS Well
Alaska DHHS – Corrections Facility	2,507,800	Well with Fire Protection Storage Tanks
YKHC Housing – 32-Bed Pre-Maternal Facility	308,500	Based on 32 beds times 26.4 gallons per bed per day
AVCP Pacifica House	995,040	Well
YKHC – Sobering Center	52,000	Future Development - Hauled Water
US Post Office	78,000	Hauled Water
Alaska Public Health Service	65,000	Hauled Water

YKHC – Main Administrative Office		Served by Hospital Well
Alaska State Fish and Wildlife	268,200	Hauled Water
YKHC – Special Needs Housing	240,900	Hauled Water
YKHC – Warehouse		Sprinkler system only in future
Crowley Warehouse	71,175	Sprinkler and domestic water in future
Totals	**17,536,555 gals/year**	
With 10% estimated growth in area	**19,290,210.5 gals/year**	
	52,850 gals/day	
	36.70 gals/min	

3.3. SUMMARY OF EXISTING EASEMENTS AND ROWS ALONG THE CORRIDOR

Plats for the Institutional Corridor area were researched for this project to determine the locations and dimensions of recorded utility easements and existing right of ways. Currently there are several existing plats and recorded documents that control the property along the Institutional Corridor, but there are areas where there are no recorded easements. Additional research, such as Title Searches and Reports should be commissioned prior to design implementation to verify whether or not easements are available along the full alignment.

Appendix B contains the existing ROW documents along Chief Eddie Hoffman Highway, along with other applicable plats.

In addition, the land identified as a potential site for a new water storage tank and booster pump station, Lot 2 of the Wave Center Subdivision, is currently owned by Tunista Properties, Inc. and is managed by Calista Corporation. A lease or purchase agreement with them would have to be entered into by the City in order to move forward with this proposed expansion. A copy of the Plat and legal documents can be found in Appendix B.

4.0 CONCEPTUAL ALTERNATIVES

It has been determined through various studies and planning efforts that progressive, phased elimination of the truck haul delivery system is a primary City objective. The 2005 Master Plan (CRW, 2005) identified two options for meeting this goal: ten Water Treatment Plants spread around the City versus three Water Treatment Plants with ten booster pump stations. Evaluations showed that the second option was recommended due to significantly lower capital costs as well as operations and maintenance costs.

The booster pump stations would eventually provide interim truck haul operations along with up to three circulating water loops to serve the surrounding areas. Water storage tanks for peak water demand, dedicated reserves for potential supply interruption and fire flow would be located near these booster stations. This report will make recommendations that will fit in to this "Backbone" type of piped water system layout that was identified in the 2005 master planning effort.

This report has identified two alternatives: sizing the water storage tank and booster pump station for the initial Institutional Corridor facilities versus installing the infrastructure needed to support the long term expansion into this part of the City. Key design issues considered in this Conceptual Report are: CSWTP capacity, water main alignment, and booster pump station and water storage design. Also considered was the No Build Alternative, however, this option would not meet the project purpose of eliminating the truck-haul delivery system.

Designs of key elements include the following parameters:

4.1. WATER MAIN LOOP

Evaluation of velocity and headloss for a variety of flow rates for both the line going from the CSWTP to the water storage tank as well as the proposed circulating loop around the corridor can be found in Appendix D.

According to these calculations, for the line running between the CSWTP and the proposed water storage tank, a 6-inch diameter pipeline running approximately 5,400 lineal feet will be sufficient to convey the required flows while maintaining headloss at acceptable levels. It is recommended that this line be heat traced for freeze protection, since it is not a looped system.

At this conceptual level, it appears that 3Hp circulation pumps installed in the CSWTP will be required to transfer this flow to the proposed storage tank. More detailed design in the future will be needed to confirm the pump selection.

For the approximately 8,600 lineal foot of looped water main along Chief Eddie Hoffman Highway, preliminary hydraulic analysis shows that an 8-inch diameter pipeline will require flows of 300 and 395 gallons per minute for average and peak flows, respectively, through the system in order to maintain a desired velocity of two feet per second while maintaining headloss at acceptable levels. In addition, an 8-inch line will allow for expansion of the loop in subsequent projects and will be sufficient for fire flow requirements. Consequently, it is recommended that a water loop in the institutional corridor be constructed of 8-inch HDPE arctic insulated pipe.

It appears that 5 Hp circulation pumps installed in the proposed booster pump station will be required to transfer this flow around the new loop. In addition, booster pumps for fire flow will be required to meet the 1,500 gallons per minute proposed flow, which will be achieved by delivering 750 gallons per minute through the system from both the supply and return piping under such an event. More detailed system analysis and design in the future will be needed to fine-tune the pump selection. Other design parameters, such as the required pressures for the existing sprinkler systems currently installed in some of the buildings and existing fire storage tanks, will need to be taken into careful consideration during the design process.

It is recommended that all water main piping meet VSW/ANTHC specifications for pre-insulated pressure water mains using SDR 11 HDPE carrier pipe and aluminum jacket casing material. The installation of isolation, drain and air release valves in this mainline, as required, is also recommended.

Drawings 2-4 in Appendix A show conceptual level alignments. This route will transfer treated water from the SCWTP to the proposed water storage tank approximately 5,350 feet away. From there it will flow through the booster pump station circulation pumps and out along the Chief Eddie Hoffman Highway Right of Way until just past the Alaska State Fish and Wildlife building, where it will loop back to the Booster pump station along the opposite side of the road. This loop will entail approximately 8,600 lineal feet of water pipe, with approximately 25 road crossings and 600 pile foundations.

This alignment will not only pick up the currently identified Institutions, but will also allow for expansion into adjacent residential areas in future infrastructure development projects.

4.2. WATER SERVICES

New water services sizes will vary, depending on the water requirements of the facility. Variations include 1" HDPE circulating supply and return lines housed inside 4" x 12" arctic insulated carrier pipes, 2" HDPE circulating supply and return lines housed inside 6" x 15" arctic

insulated carrier pipes, 4" HDPE supply with 1" return lines or 6" HDPE supply with 1" return lines. Larger facilities with existing sprinkler systems will require 6-inch services. Table 4.1 outlines a preliminary estimate of the water service types and approximate length of service for each of the identified facilities.

Table 4.1 - Water Service Connections

Potential Client	1" Supply & Return	2" Supply & Return	4" Supply & 1" Return	6" Supply & 1" Return
YKHC – 18-Bed Long Term Care Facility			100'	309'
YKHC – Hospital				311'
YKHC – Annex				
YKHC – Outpatient Hostel				
YKHC – Keys Receiving Home			340'	
Alaska DHHS – Youth Detention Facility				248'
Alaska DHHS – Corrections Facility				85'
YKHC Housing – 32-Bed Pre-Maternal Facility				238'
AVCP Pacifica House			206'	166' 92'
YKHC – Sobering Center		50'		
US Post Office				10
Alaska Public Health Service	121'			
YKHC – Main Administrative Office			280'	
Alaska State Fish and Wildlife	102'			
YKHC Warehouse				38'
Crowley Warehouse				60'
Totals	**223'**	**50'**	**926'**	**1,557'**

Pitoriface type of connections should be installed at the mainline for all 1" and 2" diameter service lines. It is recommended that circulation pumps be installed inside all of the facilities

receiving water service to ensure suitable freeze protection through adequate flow velocities. The various institutions would be responsible for operating and maintaining these circulation pumps, which will lower the velocities required in the mainline. This in turn will reduce the pumping horse power requirements, which will decrease capital output, annual electrical consumption costs, and overall operation and maintenance costs for the City.

4.3. PILE FOUNDATIONS

Warm, ice-rich permafrost (just slightly below 32 degrees F), as found in Bethel, is particularly susceptible to thawing and even small changes to the thermal regime of an area containing warm permafrost can result in significant thawing and subsequent loss of soil strength; often resulting in significant ground settlements.

As such, water and sewer utilities in the Bethel area are typically supported by foundations which are designed to reduce the potential for utility damage as a result of permafrost thawing and subsequent settlement. These foundations typically consist of steel H- piles driven into the permafrost or thawed soils. Driven H-piles, installed during specific times of the year to minimize impact to the warm permafrost, are the recommended alternative.

4.4. WATER STORAGE

Mathematical modeling and a cost benefit analysis were performed as part of the preparation of previous studies in order to determine the most efficient and effective option for expanding the City of Bethel's water system (CRW, 2008). It was determined that a "Backbone" System, consisting primarily of three water treatment plants and ten booster pump stations is the most efficient and cost-effective configuration for expanding piped water to the citizens of Bethel and the requirements for water storage will proceed along these lines.

Two alternatives have been identified for water storage associated with this approach. Alternative #1, which is designed to serve only the facilities along the Institutional Corridor, would construct a 355,000 gallon welded or bolted steel water storage tank. This insulated tank would have the capacity to meet peak water demand, would provide dedicated reserves for potential supply interruption and provide enough capacity for fire flow requirements for these facilities.

Alternative #2 would construct a 655,00 gallon bolted or welded steel water storage tank on the same lot. This storage tank has been sized with the same parameters as Alternative #1, except that it also adds the additional capacity for future expansion into the subdivisions to the south and northwest of the corridor site, where an additional 485 developable lots have been

identified. Drawing 5 in Appendix A shows a conceptual layout of the water storage tank and booster pump station, while Drawing 1 identifies the expansion areas associated with Alternative #2.

Previous studies (CRW, 2005) had suggested using a fire flow requirement of 500 gallons per minute for two hours as a minimum flow. For the purposes of this study, we are utilizing a minimum fire flow of 1,500 gallons per minute for two hours, as recommended by Appendix B of the 2006 International Fire Code (IFC, 2006), for minimum fire flow for buildings in urban areas. Additionally, the Alaska State Fire Marshall and the City of Bethel Fire Department have requested this flow rate for fire-fighting capacity and reserves. While we understand that rural Alaska has unique socio-economic, geographic and climatic constraints that many times require a relaxing of urban standards with regards to fire flow and domestic water use, we recommend planning for these standard fire flows in this part of Bethel. The corridor area houses some of the essential social and health institutions in the City, including the Corrections Facility and the Hospital, with associated support buildings, which must be adequately protected from fire hazards.

Table 4.2, below, outlines the water storage requirements for each Alternative.

Table 4.2 - Water Storage	
ALT #1	Peaking Volume + Fire Flow + Outage Requirements
	2(52,850) + 180,000 + 1(52,850) = 338,550 gal
	54'ϕ by 20' high Bolted Tank = 354,981 gal
ALT #2	Peaking Volume + Fire Flow + Outage Requirements
	2(147,425) + 180,000 + 1(147,425) = 622,275 gal
	65'ϕ by 26' high Bolted Tank = 655,612 gal

It has been suggested to purchase the lot located west of the existing SCWTP for a new water storage tank to support the peak demands and fire flow of the new Institutional Corridor water main. However, in moving more in concert with the Master Planning efforts of creating a "Backbone" system, we have identified a lot along Chief Eddie Hoffman that could house both a new water storage tank along with a booster pump station. The 2005 Master Plan identifies this location as the Nunvak Booster Station and Water Storage Tank. This property, Lot 2 of Wave Center Subdivision, is currently owned by Tunista, Inc. and a purchase or lease agreement would need to be entered into by Tunista and the City of Bethel. Other lots in this vicinity could

be analyzed for suitability should this lot not be available, or if a suitable agreement cannot be worked out between the parties.

Either alternative would require the installation of either thermal siphons and air duct vents installed in the soils below the tank in order to freeze the underlying soils for the foundation or the installation of thermo-piles. Detailed design will need to analyze these options and recommend a preferred alternative.

4.5. Water Treatment Plant Renovations

New circulations pumps with associated equipment such as flow meters, temperature and pressure gauges, etc. will need to be installed in the CSWTP to circulate water approximately 5,350 feet to the proposed water storage tank on Chief Eddie Hoffman Highway. Initial calculations indicate a 5 Hp pump would be sufficient to transfer the flow over this distance while maintaining adequate flow to prevent freezing.

The required average flow for the institutions along the corridor is approximately 36.70 gallons per minute, as shown in Table 3.1. Since the plant is currently operating at approximately 69 gallons per minute average daily flow and has a water treatment capacity of 400 gallons per minute, there is sufficient capacity at the plant and modifications to the treatment system will not be required. In addition, there is sufficient flow to accommodate the potential expansion into the future development areas, as shown on Drawing 1 in Appendix A. These areas will require additional flows of approximately 66 gallons per minute, which will still leave the plant at close to 43% of its design capacity. Peaking flow requirements for both Alternatives will be handled by the water storage tank reserves.

Due to the fact that the proposed expansion covers many of Bethel's most sensitive institutions, it is recommended that a back-up water source be provided for the CSWTP. The new well will most likely be comprised of a 10-inch diameter steel casing, drilled approximately 500 feet and equipped with a 6-inch diameter 40 -50 HP submersible turbine pump.

4.6. Booster Pump Station

As mentioned previously, the 2005 Master Plan (CRW, 2005) identifies a Backbone type of development as the preferred option for water service expansion. Two alternatives have been identified for booster pump station construction in line with this approach.

Alternative #1 would construct a 1,200 square foot booster pump station that would serve as a heated facility to house only the circulation and booster pumps and mechanical and electrical equipment for just the 17 identified facilities associated with the Institutional Corridor.

Alternative #2 would construct an approximately 3,000 square foot booster pump station. Initially, this building would house the equipment identified in Alternative #1 associated with the Institutional Corridor. Eventually, this building could be utilized to house circulation and booster pumps for several water main loops in this area. Buildings to be served would include those in the subdivisions to the south and northwest of the site, where approximately 485 additional lots have been identified. In addition, truck haul facilities could eventually be located here to serve other outlying areas until piped expansion reaches them as well. The portion not utilized initially would be only roughed in and sealed off from the 1,200 ft2 required for the initial corridor phase. The cost estimates for this alternative only include the equipment for servicing just the Institutional corridor facilities.

The square footages identified for these booster stations are approximate. More detailed design will fine-tune the required area for a more cost-effective solution. Construction can be either stick built wood--framed construction or a pre-manufactured metal building. Foundation system alternatives include thermo-syphons installed in the pad for refrigeration or a thermo-pile type of foundation. Both options will need to be analyzed and detailed during the design process and a preferred alternative recommended.

4.7. MECHANICAL CONSIDERATIONS

The building mechanical and plumbing design will conform to the following guidelines:

- 2006 International Building Code
- 2006 International Mechanical Code
- 2006 International Fire Code
- 2006 Uniform Plumbing Code

Design conditions for determining building loads and equipment sizing will be in accordance with climatic conditions as outlined by ASHRAE and local experience. Specific conditions to be used are:

- Winter Design, Outside: -40 F
- Winter Design, Inside: +60 F
- Summer Design, Outside: +74 F

4.7.1. *Plumbing*

Domestic hot water and cold water piping mains will be Type 'L' copper with lead free solder fittings for sizes 3" and smaller; and schedule 40 steel for larger sizes. Piping will be specified to be insulated with preformed fiberglass semi-rigid insulation. Waste and vent piping will be no-hub cast iron pipe. The waste system vent will be routed through the roof.

Domestic hot water will be generated using a 10 gallon, 120 volt, 2000 watt electric heater. Plumbing fixtures will consist of a service sink and emergency eye/face wash. The service sink will be a wall mounted cast iron sink with a service sink type faucet. The eye/face wash will be a wall mounted unit with a tempering valve.

Floor drains will be provided as necessary in the booster station. All floor drains will be provided with trap primers. A reduced pressure principle backflow preventer will be provided on the water service for the pump station.

A 1000-gallon fuel oil tank storage will be provided to supply fuel for the heating boilers. Fuel from the storage tank will be pumped to a 50-gallon day tank located inside of the booster station. The boilers will be connected to the day-tank. Schedule 40 steel pipe with threaded joints will be used for fuel oil piping.

4.7.2. *Heating*

The heating plant will consist of fuel oil fired cast iron boilers. Boilers will be selected to include two boilers each sized at 100% of the total heating and ventilation load. The boilers will operate in a lead / lag configuration such that if one boiler fails the other will operate to provide heat for the water booster station. Each boiler will have its own circulator pump for primary/secondary pumping into the main building heating loop. The boilers will be vented to the exterior via a vent routed through the roof.

The main heating system pumps will circulate hydronic fluid to the unit heaters used to the heat the facility; and to the heat exchangers used to heat the water storage tanks and water service mains. The pumping system will consist of two heating pumps, an expansion tank, air separator, and glycol fill pump. There will be two heating glycol pumps for redundancy; if one pump fails, the second pump will automatically start.

Hydronic piping will be type 'L' copper with soldered fittings. The piping will be insulated with preformed fiberglass semi-rigid insulation.

A glycol fill tank will be provided. The hydronic heating solution will consist of inhibited propylene glycol and water mixed 50-50. The solution will be pre-mixed by the manufacturer and shipped to the site in sealed barrels.

The exterior domestic water storage tank, under both Alternative #1 and #2, will be heated via a double walled heat exchanger and circulating pumps. Water from the tank will be continuously pumped through the cold side of the heat exchanger and back to the tank. Heated glycol from the boiler system will be circulated through the hot side of the heat exchanger. There will be two tank water circulating pumps for redundancy; if one pump fails, the second pump will automatically start.

The domestic water mains being routed out of the booster station will also be heated by the boiler system. Domestic water will be pulled out of the domestic water mains heated up and then injected back into the piping system. A double walled heat exchanger will be utilized with domestic water on the cold side and heated glycol on the hot side.

Hydronic unit heaters will be provided to heat the pump station interior spaces.

4.7.3. *Ventilation*

Ventilation for the pump station will be provided by a ventilation fan and an undampered relief opening. Combustion air for the boilers will be via the relief opening. Arctic hoods will be utilized for all ventilation intakes and relief air openings.

4.7.4. *Controls*

A direct digital control system will be provided for the facility. All mechanical systems will be controlled by the DDC system. Internal alarms generated by the DDC system will be transmitted to the owner's office in Bethel via the phone lines.

4.7.5. *Testing and Balancing*

A contractor specializing in the balancing and testing of mechanical systems will accomplish the testing and balancing. The contractor will verify system operation, control integration and adjust the systems to the design flow rates. The balancing contractor will be proficient in the use of the latest computer technology for integrating with the direct digital control systems. All balance points will be marked in the field on the balance valves and dampers as well as included in the balancing report that will become part of the operation and maintenance manual.

4.7.6. *Equipment*

Required mechanical equipment under each Alternative are detailed below:

Mechanical Equipment – Alternative #1

Boiler B-1 and B-2: Oil Fired, 212,000 Btuh Output, Weil-McLain WGO-6.
Boiler Pumps CP-1 and CP-2: 20 Gpm, 8 Ft Head, 1/25 h.p., Taco 0014.
System Circulation Pumps CP-3 and CP-4: 20 Gpm, 25 Ft Head, 1/3 h.p. Taco 1400-45.
Unit Heater UH-1,2,3,4: 8400 Btuh, 400 Cfm, 1/30 h.p., Rittling RH-18.
WTP to Storage Heat Exchanger HX-1: 110,000 btu transferred 180 EGT, 140 LGT, 40 EWT, 80 LWT, Double Wall Brazed Plate and Frame. (Located in existing WTP.)
Tank Heat Exchanger HX-2: 6,600 btu transferred 180 EGT, 140 LGT, 40 EWT, 80 LWT, Double Wall Brazed Plate and Frame.
Domestic Service Loop Heat Exchanger HX-3: 160,000 btu transferred 180 EGT, 140 LGT, 40 EWT, 80 LWT, Double Wall Brazed Plate and Frame.
Ventilation Fan VF-1: 1200 Cfm, 1.20 in static, explosion proof motor, spark resistant fan construction, 3/4 h.p., Cook 150SQN-HP.
Water Heater WH-1: 10 Gallon tank, 9 gph at 90 F Rise, 120 Volt, 2000 watt element, Bradford White M-1-6U6SS.
Service Sink, P-1: Cast iron service sink, Kohler Bannon.
Eye/face Wash, EW-1: Wall-mounted eye/face wash, tempering valve, Haws 7360BT.
Fuel Oil Storage Tank, FST-1: 1000 gallon, double wall, above-grade, skid mounted.
Fuel Oil Day Tank, DT-1: 50 gallon, rupture basin, duplex pumps.

Mechanical Equipment – Alternative #2

Boiler B-1 and B-2: Oil Fired, 242,000 Btuh Output, Weil-McLain WGO-6.
Boiler Pumps CP-1 and CP-2: 23 Gpm, 8 Ft Head, 1/25 h.p., Taco 0014.
System Circulation Pumps CP-3 and CP-4: 23 Gpm, 25 Ft Head, 1/3 h.p. Taco 1400-45.
Unit Heater UH-1,2,3,4: 17,600 Btuh, 630 Cfm, 1/15 h.p., Rittling RH-33.
WTP to Storage Heat Exchanger HX-1: 110,000 btu transferred, 180 EGT, 140 LGT, 40 EWT, 80 LWT, Double Wall Brazed Plate and Frame. (Located in existing WTP.)
Tank Heat Exchanger HX-2: 13,500 btu transferred, 180 EGT, 140 LGT, 40 EWT, 80 LWT, Double Wall Brazed Plate and Frame.
Domestic Service Loop Heat Exchanger HX-3: 160,000 btu transferred, 180 EGT, 140 LGT, 40 EWT, 80 LWT, Double Wall Brazed Plate and Frame.
Ventilation Fan VF-1: 3000 Cfm, 1.20 In static, In-line fan, 2.0 h.p., Cook 165SQN-B.
Water Heater WH-1: 10-Gallon tank, 9 gph at 90 F Rise, 120 Volt, 2000-watt element, Bradford White M-1-6U6SS.
Service Sink, P-1: Cast iron service sink, Kohler Bannon.
Eye/face Wash, EW-1: Wall-mounted eye/face wash, tempering valve, Haws 7360BT.
Fuel Oil Storage Tank, FST-1: 1000 gallon, double wall, above-grade, skid mounted.
Fuel Oil Day Tank, DT-1: 50 gallon, rupture basin, duplex pumps.

Table 4.3 outlines the heating requirements for the various components associated with each Alternative.

Table 4.3 - Heating Requirements		
Length of Main		
Component	**Length**	
WTP to Storage Tank	5,334 ft	
Chief Eddie Hoffman Highway Loop	8,567 ft	
Assumed Heat Loss		
Water Mains	50 BTU/day/ft	
Building	10 BTU/hr	
Storage Tank	0.3 BTU/gal/day	
Water Main Calculations		
Component	**Results**	
WTP to Storage Tank	(5,344') (50 BTU/day/ft) = 267,200 BTU/day	
Chief Eddie Hoffman Highway Loop	(8,567') (50 BTU/day/ft) = 428,350 BTU/day	
Water Storage Tank Calculations		
Alternatives	**Results**	
Alt #1	(354,981 gal) (0.3 BTU/gal/day) = 106,494 BTU/day	
Alt #2	(655,612 gal) (0.3 BTU/gal/day) = 196,684 BTU/day	
Booster Pump Station Calculations		
Alternatives	**Results**	
Alt #1	(3,000 sf) (10 BTU/hr/sf) = 30,000 BTU/hr	
Alt #2	(1,200 sf) (10 BTU/hr/sf) = 12,000 BTU/hr	
Total Requirements		
	Alt #1	**Alt #2**
Water Mains	267,200 / 24 = 11,133 BTU/hr 428,350 / 24 = 17,848 BTU/hr	267,200 / 24 = 11,133 BTU/hr 428,350 / 24 = 17,848 BTU/hr
WST	106,494 / 24 = 4,437 BTU/hr	196,684 / 24 = 8,195 BTU/hr
Booster Station	12,000 BTU/hr	30,000 BTU/hr
TOTAL	**45,418 BTU/hr**	**67,176 BTU/hr**

4.8. ELECTRICAL CONSIDERATIONS

The electrical design will conform to the following codes and guidelines:

- 2006 International Building Code
- 2006 International Fire Code
- 2008 National Electrical Code
- The Illuminating Engineers Society (IES) of North America Lighting Handbook 9th Ed.

4.8.1. *Power Distribution*

The proposed booster station will require a new electrical service and systems for operation. Assuming a 50HP booster pump is required for service; Alternative #1 will require a minimum 400A service at 208V, 4-wire, 3-phase. For Alternative #2, the minimum service size will be 600A at the same voltage. These services will both require current transformer cabinets for metering the building. Primary line extensions will have to be coordinated with local utility as required.

4.8.2. *Lighting*

The lighting for the booster station will utilize fluorescent sources with T8 lamps where ever possible. Exterior fixtures will utilize pulse width metal halide building fixtures. IES recommended lighting levels for a maintenance work station should be provided.

4.8.3. *Telecommunication*

The telecommunication will consist of a single telephone line for building maintenance to use for convenience purposes. It does not appear that any security systems are required at this time.

5.0 DESIGN CONSIDERATIONS

5.1. GEOTECHNICAL INVESTIGATIONS

The City of Bethel is located in a western region of Alaska known as the Yukon-Kuskokwim Delta, and is situated adjacent to the Kuskokwim River. The soils in the area are typically characterized by thick, fluvial deposits of interbedded fine sand and silt. Discontinuous permafrost conditions persist throughout the area, and shallow permafrost conditions have been repeatedly documented throughout the City of Bethel, including along the Chief Eddie Hoffman Highway corridor. Shallow permafrost (as it pertains to this evaluation) can be defined as any permafrost which occurs at depths less than five feet below the existing ground surface. Shallow permafrost is usually observed in undisturbed areas, where the organic tundra mat has insulated the permafrost surface from additional thermal inputs. Once an area is disturbed, permafrost surface depths can increase significantly as thawing occurs. Permafrost in the Bethel area can be classified as "warm permafrost" which refers to permafrost with temperatures ranging between approximately 30-32 degrees F. Warm permafrost is particularly susceptible to thawing, and even small changes to the thermal regime of an area containing warm permafrost can result in significant thawing and subsequent loss of soil strength; often resulting in significant ground settlements.

A full geotechnical investigation will be essential for this project prior to full design. Such investigations are necessary to determine cost-effective design parameters for the water tank and booster pump station foundations as well as for the piling and other support systems. It will also provide confirmation to the funding and regulatory agencies that competent study of the site has been performed in concert with the design and will provide soils information for construction bids so that potential contractors will know what the subsurface conditions are prior to bidding the project.

A preliminary geotechnical report was prepared for this project by Northern Geotechnical Engineering and is attached in Appendix G. Results of this initial evaluation indicate that both shallow and warm permafrost conditions likely exist within the proposed project alignment, and that further subsurface explorations will need to be conducted along the proposed alignment and at the tank site in order to better characterize the nature and extent of the existing soils.

5.2. SURVEYING

Surveying must be performed to provide topographic and horizontal location of the existing lines and right of way. Detailed information will be required at road crossings so that elevations

can be established for design. Additionally, suitable easements and rights-of-way must be confirmed or established, as necessary.

Establishment of right-of-way and platting can be a time consuming project component and should be started as soon as possible. The surveying can be done at any time of the year but will be most efficient when the weather, ground surface, and snow conditions are ideal. Cold weather and darkness slow productivity and deep snow requires digging to make measurements.

5.3. PERMITTING REQUIREMENTS

Various Agency permits will be required to be obtained during the design process and prior to construction activities, as follows:

5.3.1. *OPMP Coastal Project Questionnaire*

A Coastal Project Questionnaire (CPQ) is required for all proposed projects located in or potentially affecting coastal areas in Alaska. Bethel lies in a coastal area and therefore completion of a CPQ will be required and the completed documentation sent to the Office of Project Management and Permitting (OPMP). OPMP would then forward the questionnaire to the following:

- Alaska Department of Environmental Conservation (ADEC)
- Alaska Department of Fish and Game
- Alaska Department of Natural Resources (ADNR)
- Affected local coastal communities
- Other interested members of the public

Required permits will be identified based on responses to questions posed in the CPQ for permitting agencies at both state and district levels.

5.3.2. *ADEC Approval to Construct and Operate*

Projects that modify an existing Class A or Class B Public Water System must apply for an Approval to Construct from the Alaska Department of Environmental Conservation (ADEC). Because of the mutual proximity of water and sewer mains, a separation distance waiver will also be required for these facilities. After construction, an Approval to Operate permit will need to be requested from ADEC by the City with a submittal of record drawings.

5.3.3. *ADOT/PF Utility permit*

For the crossing located within Ridgecrest Drive and any other State property, a utility permit will need to be issued by ADOT/PF. A utility permit is essentially a legal agreement made between the State and the local municipality to defile the rights and responsibilities of each party with regard to operating a facility within State rights of way.

5.4. DESIGN CRITERIA

Design Parameters	
Component	**Parameters**
Mean Annual Temperature	29.1 °F
Mean Minimum Temperature	0 °F
99% Design Temperature	-46 °F
Mean Annual Precipitation	16 inches
Mean Annual Snowfall	55 inches
Design Thawing Index	3,200 °F – days
Design Freezing Index	4,400 °F – days
Design Wind Speed (3 sec gusts)	120 miles per hour
Seismic Load	Per current edition of IBC
Ground Snow Load	40 PSF
Active Layer Depth	2 – 7 feet
Presence of Permafrost	Generally continuous

Design Criteria	
Component	**Criteria**
Design Period	20 Years (2030)
Piped Water	65 gallons/capita/day (GCPD)
Fire Flow	1500 GPM (minimum – 750 gpm both ways)
Residual Pressure	20 PSIG (minimum)
Hydrant Spacing	500 feet (minimum)
Water Storage	
Reserve Volume	3-day supply of Average Daily Demand (ADD)
Fire Supply	2-hour duration at 1500 GPM (minimum)
Equalization Volume	Max Daily Demand (MDD) less 8 hours of well pump output
Water Distribution (for local systems)	
Water Demand Peaking Factors	
Maximum Day Demand (MDD)	PHD ÷ 1.75
Peak Hour Demand (PHD)	125 + (1.2 x (N-50)), where N is the number of dwellings served (per ADEC design criteria.)
Minimum Pressure	20 PSIG
Maximum Pressure	100 PSIG
Minimum Pipe Diameter	6 inches
Pressure Pumps	Design based on peak hourly demand (PHD) with step-up pressure and hydro pneumatic system to efficiently accommodate fluctuations in water distribution demand.
Water Heating System	Maintain temperature of return water from distribution system @ 45 to 55 °F.
Water Storage Tank	Bolted or welded steel tank with vertical side shells. Minimum 5 inches of insulation on exposed tank surfaces. Tank inlet and outlet shall be located to minimize short-circuiting. Tank inlet shall provide pinch valve diffusers at pipe end to improve circulation of stored water.
Circulation Systems	Size system to meet peak hourly demands. Locate circulation pumps on return ends of loops.
Emergency Standby Generator	Required as back up for power outages.
General	Provide floor-mounted, powered, alternating backup for major equipment components
Circulation Loops	Provide between 1 – 2 ft/sec flow rate for water distribution loop circulation.

6.0 ENGINEER'S COST ESTIMATE

The two alternatives evaluated for cost considerations both deliver potable water to the Institutions along the Chief Eddie Hoffman Highway. Alternative #1 would size the water storage tank and booster pump station for the initial Institutional Corridor facilities. Alternative #2 would install the infrastructure needed to support the long term expansion into this part of the City, as suggested in previous planning efforts.

New funding is required for survey, geotechnical investigations, design and bidding services, project construction and site inspection and administration services.

A cost breakdown for each Alternative is included in Appendix F. These cost estimates are based on previous estimates performed for the Bethel area, with expected escalations of future construction and materials costs. The cost evaluation includes project administration, engineering design, construction management and a 15% contingency on construction cost. The contingency takes into account design and construction details not foreseen at this conceptual feasibility study level. The total estimated project cost in Year 2010 dollars for the recommended alternatives are as follows:

- Alternative #1: 355,000 gallon water tank and 1,200 ft2 booster station = $11,708,450
- Alternative #2: 655,000 gallon water tank and 3,000 ft2 booster station = $14,417,880

7.0 CONCLUSIONS AND RECOMMENDATIONS

7.1. GENERAL

The primary goal of this design study report was to evaluate the feasibility of extending piped water service to the Institutions along the Chief Eddie Hoffman Highway corridor.

This will be an important and strategic project that can be accomplished cost-effectively with minimal disturbance to the terrain and without disruption to Bethel's existing water treatment and distribution systems.

7.2. MASTER PLAN COMPATIBILITY

The *2005 Water and Sewer Master Plan Update (CRW, 2005)* reflects a preferred general distribution expansion plan that features circulating transmission lines which extend from three regional water treatment plants to remote storage and distribution facilities, or booster pump stations. The transmission lines would fill water storage tanks at these facilities and the booster stations would provide pressure and circulation pumps to distribute the water into separate circulating water loops as well as serve as local truck fill facilities. Development of this Institutional Corridor study has been conducted with this planning strategy.

7.3. RECOMMENDED ALTERNATIVE

Because treated water storage reservoirs or tanks tend to be quite large and expensive, a fairly distant planning horizon is recommended to avoid the premature need for expansion. In addition, much of the capital construction costs of buildings can be attributed to mobilization, labor force and shipping costs. Thus, the costs of building a larger structure and only finishing out and utilizing a portion of it initially is more cost-effective than building a smaller building and adding on in future projects.

Therefore, based on anticipated population growth in Bethel, preliminary cost estimates and the desire to expand the City's infrastructure in a manner consistent with the overall plan for development, this study recommends moving forward with Alternative #2: a 655,000 gallon storage tank and a 3,000 ft2 building.

A preliminary economic analysis was performed, included in Appendix E, to look at the operation and maintenance costs of the two Alternatives as well as to estimate the potential annual income to the City. Table 7.1 outlines the two alternatives with respect to capital costs, annual operation and maintenance costs and the present worth of each option. It also looks at

the potential income for the City from both the Institutional Corridor properties as well as from residences located in future development areas within this area.

This analysis substantiates the benefits of Alternative #2 in that while the present worth of this Alternative is slightly higher than Alternative #1, the potential payback to the City in increased revenue from water service sales is considerably higher and can substantially contribute to the City's ability to continue its expansion of the piped water system into more areas of the City through increased revenues.

Alternative	Capital Cost	Annual O&M Costs	Present Worth (2030)	Services Income	Future Services Income	Advantages/ Disadvantages
ALT #1	$ 7,337,940	$ 158,685	$ 15,689,856	$ 36,386	$ 36,386	Lower Capital costs. No room for expansion into future development areas.
ALT #2	$ 7,534,140	$ 171,206	$ 16,350,497	$ 36,386	$ 764,352	Provides capacity for expansion into future development. Higher initial capital costs.
NO BUILD Alternate	$0	$0	$0	$0	$0	Does not meet project purpose and need. Users will remain on delivered water or their own well and treatment systems.

Introduced by: Council Member Robb
Date: November 27, 2012
Action: Passed
Vote: 6-0

CITY OF BETHEL, ALASKA

Resolution # 12-25

CITY OF BETHEL SUPPORT FOR THE INSTITUTIONAL COORIDOR

WHEREAS, the Bethel City Council is a seven-member body elected by resident voters of Bethel to act in the best interest of the community;

WHEREAS, Several major institutions are located along a short distance of the Chief Eddie Hoffman Highway. These include US Fish and Wildlife Service, Yukon Kuskokwim Health Corporation, the Delta Regional Hospital, YK Correctional Facility, Bethel Youth Facility, a new Swanson's store (under construction), State of Alaska Public Health Service, the US Post Office, Allanavik Hotel, VIP restaurant, Pre-maternal home (under construction) and the Long Term Care Facility (under construction).

WHEREAS, The institutions located along Chief Eddie Hoffman Highway are requesting state capitol to develop the "Institutional Corridor" providing piped water and sewer.

WHEREAS, Piped water and sewer would increase the health and infrastructure of these important institutions

WHEREAS, Piped water and sewer would increase the financial viability of these institutions, and allow them to concentrate their efforts on their missions and not on water projects

WHEREAS, These institutions are major employers in town, greatly support the local and regional economy, and provide needed services to the people of Bethel and the YK

NOW, THEREFORE, BE IT RESOLVED that the Bethel City Council, as elected representatives of the community and City of Bethel, support in principal the construction of the Institutional Corridor water and sewer project.

ENACTED THIS 27 DAY OF November 2012 BY A VOTE OF 6 IN FAVOR AND 0 OPPOSED.

Joseph Klejka, Mayor

ATTEST:

Kajena Baty, City Clerk

CITY OF BETHEL

Post Office Box 1388
Bethel, Alaska 99559
Voice: 907-543-1373
Fax: 907-543-1394

March 27, 2013

The Honorable Lyman F. Hoffman
Alaska State Senator
Senate District S
Post Office Box V
Juneau, Alaska 99811

Dear Senator Hoffman:

During the course of the regularly scheduled meeting of the Bethel City Council that was held on Tuesday, March 26, 2013, I briefed Council members on a necessary project that will be of tremendous benefit to the residents of our community. That project is the Institutional Corridor, conceptually designed to extend the City's water main system in order to serve multiple institutions along the Chief Eddie Hoffman Highway.

The institutions involved along the corridor have long had to endure the costly operation and maintenance expenses for their individual on-site water systems. For some of the entities that must expand to continue their missions, their water systems are already at capacity. Without an alternative like the institutional corridor, they have no other means of obtaining water. For others, their sources of water have started to dry up, drastically reducing the ability to produce water vital to their existence. For one institution in particular, bottled water must be purchased and dispensed because their water source is seriously degraded and the water is not fit for human consumption.

This project is extremely important to the community and to the City of Bethel. To the facilities along the proposed corridor, the City will provide a safe and unlimited water supply while increasing its revenue stream and playing a key role in helping to create new jobs. In the Council's view, funding of this project is of the highest priority. Underscoring that view, they passed Resolution #12-25, describing the City's support for the Institutional Corridor. A copy of the Resolution is enclosed.

At the conclusion of tonight's Council meeting, The Members directed that I write to you on their behalf, conveying their strongest support to move this project forward during the current Session of the Alaska State Legislature. .

Your advocacy for this project in the Legislature would be most deeply appreciated.

Thank you for your consideration.

Respectfully,

Lee M. Foley
City Manager

Enclosure

Cc: City Council