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May 24, 2007

Allan Nakanishi
Alaska Department of Environmental Conservation
Division of Environmental Health
Drinking Water Division
555 Cordova Street
Anchorage AK 99501

Re: City of Atka – Water and Sewer Improvements
Drinking Water – Engineering Plan Review

Dear Mr. Nakanishi:

HDR Alaska, Inc. (HDR) has completed the design of domestic water system improvements for the City of Atka (PWSID 2260058). The purpose of this letter is to identify all of the information that is included per plan review requirements as referenced in the State of Alaska Drinking Water Regulations, 18 AAC 80, effective January 11, 2006.

The extent of the water system improvements includes the following:

- Replacement of existing water system distribution piping with approximately 1,950 LF new water distribution main including new 28 new water services and 7 new fire hydrants

Additional information regarding all of the water system improvements is provided in the attached engineer's report.

This project will be using Village Safe Water program funding, so the fee for the review is waived.

The following information is provided as required by the plan review process:

- Facility Information Form
- Drinking Water Program – Project Information Form
- Checklist 1.0 - Approval to Construct – General
- Checklist 5.0 – Distribution
- Engineers Report including Engineering Construction Plans

If you have any questions concerning this plan review submittal please contact myself or Justin Marcum.

Sincerely,

HDR Alaska, Inc.

2525 C Street
Suite 305
Anchorage, AK 99503-2632

Phone: (907) 644-2000
Fax: (907) 644-2022
www.hdrinc.com

HDR ALASKA, INC.

Todd Bethard, P.E.
Project Manager

HDR Alaska, Inc.

2525 C Street
Suite 305
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Alaska Department of Environmental Conservation
Division of Environmental Health

Drinking Water Program - Engineering Plan Review
Approval to Construct - General Checklist

Project Name: City of Atka Water and Sewer Improvements- Phase 1 **Date:** 5/25/07

Engineer Name: Todd Bethard **Registration No.:** CE-10467

This checklist is required for the construction of a new or modification of an existing CWS (Class A), NTNC (Class A), or TNC (Class B) Public Water System. Hard copy plans must be signed and sealed by a registered engineer & submitted in half-size 11"x17" or standard 8"x10" format. If electronic copies are submitted they should be in Adobe ".pdf" format. Incomplete submittals will be returned.

	Description	Regulatory Reference
1.	Plan review fee. (Note: For submittals that request fee calculation assistance, a submittal may be accepted without the fee payment if prior approval from the reviewing engineer and all contact information of the person, agency, or company responsible for fee payment is provided. A plan review will not be completed until payment of the fee is received.)	*18 AAC 80.1910 (c)*
X		
2.	Engineer's written report. Must be signed and sealed by a registered engineer.	*18 AAC 80.205* *18 AAC 80.010(b c d)*
X		
3.	Construction drawings and specifications. Must be sealed, signed and dated by a registered engineer.	*18 AAC 80.205(a)(1)*
X		
4.	Provide the name and contact information of the registered engineer that will sign and seal the record drawings and request operational approval.	*18 AAC 80.210(j)(1)*
X		
5.	Design criteria, calculations, flow analysis and other computations.	*18 AAC 80.205(a)(3)*
X		
6.	Manufacturer's specifications and performance curves for all pumps.	*18 AAC 80.205(a)(3)*
N/A		
7.	Backflow and/or Cross Connection evaluation.	*18 AAC 80.025*
X		
8.	Lead-free pipe, flux, and solder specification.	*18 AAC 80.500* *18 AAC 80.205(b)(7)*
X		
9.	Direct additives for water treatment (i.e. disinfectants, coagulants, or oxidizing agents, antiscalants, and etc.) must be certified to conform with ANSI/NSF Standard 60 for use in potable water systems by an ANSI accredited organization.	*18 AAC 80.010(b)(10)*
N/A		
10.	Materials in direct contact with the water must be certified to conform with ANSI/NSF Standard 61 by an ANSI accredited organization	*18 AAC 80.010(b)(10)*
X		
11.	Raw water analysis results if this is a new public water system proposing a new source.	*18 AAC 80.205(c)(2)*
N/A		
12.	Raw water quality data for a potential contaminant, if the Department determines that the data serves the interest of public health.	*18 AAC 80.205(c)(6)*
N/A		
13.	Design will need to address the need and location of pressure gages, flow meters, rate of flow controllers, sample points, valves, etc to allow the operator to operate the system in compliance with the monitoring requirements of 18 AAC 80.	*18 AAC 80.205(a)(1)*
X		
14.	Submit details concerning the disposal of waters containing high amounts of disinfectant resulting from the disinfection process. A disposal permit may be required from this Department for the disposal of this	*EPA NPDES*

water.

X

15. Provide the name and a copy of certification of the operator that will be running the PWS. An operator certified under 18 AAC 74 may be required to operate the system. The PWS operator certification level is determined by the classification of the PWS based on the complexity of the operation of the system. PWS classification rating system is specified in 18 AAC 74.120. *EPA NPDES*

X

Alaska Department of Environmental Conservation
Division of Environmental Health

Drinking Water Program - Engineering Plan Review
Distribution Checklist

Project Name: City of Atka Water and Sewer Improvements - Phase 1 **Date:** 5/25/07

Engineer Name: Todd Bethard **Registration No.:** CE-10467

This checklist is required for the construction of new, the modification of existing, and/or the extension of an existing water mains and raw-water transmission lines.

	Description	Regulatory Reference
1.	Drawings and specifications that cover construction of the distribution system and raw water transmission lines, including piping materials, jointing, thrust blocking, bedding and the plan and profile of the water main.	*18 AAC 80.205(a)(1)*
X		
2.	The design will need to address the horizontal and vertical separation distance requirements.	*18 AAC 80.020*
X		
3.	Address sizing of mains, peak demand flow rates, velocities.	*18 AAC 80.205(a)(4)* *18 AAC 80.205(b)(2)*
X		
4.	If the proposed distribution system includes dead end lines, address how this will be operated to not adversely affect water quality.	*18 AAC 80.205(b)(9)*
X		
5.	Is there a potential for freezing? How is freeze-protection provided?	*18 AAC 80.205(a)(3)*
X		
6.	Has appropriate thrust blocking been provided?	*18 AAC 80.205(a)(3)*
X		
7.	Can the system be flushed and can areas be isolated during flushing?	*18 AAC 80.205(a)(3)*
X		
8.	If this is a seasonal system, how is it drained or prepared for the time it is not in operation? Issues may be the use of antifreeze, draining to sumps and potential cross connection or contamination.	*18 AAC 80.205(a)(3)*
N/A		
9.	Calculations showing that the design is capable of maintaining at least 20 psi of service pressure at the highest elevation or pressure zone of a distribution main, under peak design demand flow conditions.	*18 AAC 80.205(a)(4)*
X		
10.	Utilidor design adequately protects public health, drinking water systems and the environment. Include construction material, dimensions, thermal considerations, and operational considerations of utilidor should the wastewater collection lines break. If the utilidor contains both water and sewer collection lines that the separation distance requirement is met.	*18 AAC 80.020(g)*
N/A		
11.	If the water main to a Class A system is to be replaced, provide information on how temporary services will be provided.	*18 AAC 80.207(d)(4)*
X		
12.	Specification that water mains and transmission lines will be disinfected in accordance with AWWA Standard C651.	*18 AAC 80.010(d)(2)*
X		

Alaska Department of Environmental Conservation

Facility Information Form
Engineering Plan Review

I. Owner/Responsible Party

Required Fields in Bold

First Name:	Julie	**Last Name:**	Dirks	**Phone:**	907-581-6226
Company Name:	City of Atka			Fax:	907-581-6317
Mailing Address:	P.O. Box 765				
City:	Unalaska	**State:**	AK	**Zip Code:**	99685
Email Address:	atka2@arctic.net				

II. System Operator

First Name:	Arnold	**Last Name:**	Golodoff	**Phone:**	907-839-2233
					907-839-2234
Certification:	Water Distribution OIT - 10705 Water Treatment OIT - 10706			Fax:	
Mailing Address:	P.O. Box 47070				
City:	Atka	**State:**	AK	**Zip Code:**	99547

III. Facility Information

Facility Name:	City of Atka Water System	**Last Name:**		**Phone:**	907-581-6226
AKA:				Fax:	907-581-6317
Mailing Address:	P.O. Box 765				
City:	Unalaska	**State:**	AK	**Zip Code:**	99685
Physical Address:	City of Atka				

Legal Description: Lot: _____ Block: _____ Subdivision: _____ Addition: _____

or

Location: Meridian: Seward Section: 15&22 Township: 92S Range: 176W Tax Lot: _____

IV. Owner's Statement

I submit the enclosed items concerning the above referenced project. By my signature (18 AAC 15.030), I certify that the above information is correct and the project is (check one):

- ☐ privately owned and I am the owner.
- ☐ owned by a sole proprietorship and that I am the proprietor.
- ☐ owned by a partnership of which I am a general partner.
- ☐ owned by a corporation of which I am a principal executive officer of at least the level of vice president, or a duly authorized representative responsible for overall project management.
- ☒ owned by a municipal, state, federal, or other public agency of which I am a principal executive officer, ranking elected official, or other duly authorized employee.

Julie Dirks	5/24/07	Julie Dirks	City Administrator
Signature	Date	Printed Name	Title

City of Atka
Water and Sewer Improvements – Phase 1
Domestic Water Distribution Replacement Plan Review

Engineer's Report

Prepared by:

HDR Alaska, Inc.
2525 C Street, Suite 305
Anchorage, AK 99503

May 2007

General Checklist

Plan Review Fee

This project is being constructed using money awarded through the Village Sage Water program. As such, the fee for the review is waived per the agreement between the ADEC and VSW.

Drawings and Specifications

A complete plan set for water system improvement is included in Appendix A. Specifications are included in Appendix B.

Introduction

The City of Atka (population 90) is divided into two areas. The first is in the south end of town and is the original town site. This area has been identified as the "Old Atka Village" area. The new subdivision located near the airport has been identified as the "New Atka Subdivision".

The City of Atka in cooperation with Village Safe Water (VSW) has contracted with HDR Alaska, Inc. to provide professional engineering and environmental services necessary to design and prepare a plan set for system wide water and sewer improvements in Atka, Alaska, as generally described in the Atka Sanitation Improvements Study, prepared in March 2001.

Major elements of the improvements include:

- Replace water supply impoundment
- Construct a new water treatment facility and replace water treatment equipment
- Replace water distribution lines in old Atka village
- Design and construct two new community potable water storage tanks
- Design and construct a dedicated water service line for the fish processing facility
- Replace existing broken ocean outfall lines

Due to funding limitations, the City has divided the project into two phases. Phase I will consist of replacement of water distribution lines and the outfall lines. Phase II will consist of replacement of the water treatment plant, water storage tanks, water supply impoundment, and construction of a dedicated water service line for the fish processing facility. This approval to construct request will only be for Phase I work for the water distribution replacement, a report for the outfalls lines will be submitted concurrently to the wastewater program reviewers.

Water Distribution System Replacement in Old Atka Village

Water is supplied to the homes in both the old Atka village and new Atka subdivision with PVC piping from the existing 30,000-gallon wood stave water storage tanks. A total of 11 fire hydrants are located on the distribution mains around the city. The old subdivision line provides flow to 6 hydrants. There are also 2 hydrants connected to the tank fill line from the WTP to the new Atka subdivision tank to serve the fire house and fish plant. Water for the fire department, fish plant, and the Nazan Inn is also tapped directly into this tank fill line and is not fed from a tank.

The major deficiencies with the water distribution system expressed by the City employees were:

- Significant leakage in the existing distribution system in Old Atka Village
- Occurrence of low pressure and rusty water in the old Atka subdivision.
- Areas of town experienced water shortages and low pressure when the fish plant is processing.
- Several fire hydrants are leaking.
- There are no hydrants near the school or WTP.
- There is no metering capability for commercial users.

The existing distribution system in Old Atka Village will be replaced with a 6-inch HDPE waterline. This will be SDR 11 piping, capable of pressures up to 160 psi. This size main will allow the fire flow desired by the community, as well as meet maximum hour demands. All fire hydrants on this distribution system will also be replaced.

Name and Contact Information of Engineer

The engineer that signed and sealed the construction drawings and that will also sign and seal the record drawings will be the following:

Todd Bethard, P.E.
AK PE License No. 10463

HDR Alaska, Inc.
2525 C Street, Suite 305
Anchorage, AK. 99503

Phone: 907-644-2049
Fax: 907-644-2022
e-mail: Todd.Bethard@hdrinc.com

Design Criteria

A summary of design criteria used for the design of water improvement in the City of Atka is summarized in Table 1 below. Additional design computations, calculations, and modeling data made for the system are included with descriptions of the general and distribution checklists.

Table 1: Summary of Design Criteria for the Atka Water System

Water System Demands and Design Criteria		
	Current (2006)	**Design (2026)**
Design Population (20-year horizon)	92 residents	139 residents
Water System Design		
Max Day Factor[1]	2	
Peak Hour Demand Factor[2]	4.5	
Daily Capita Demand	145 gpcd	145 gpcd
Average Daily Domestic Demand	13,340 gpd	20,155 gpd
Average Daily Commercial Demand	450 gpd	550 gpd
Average Daily Processing Demand (May-Oct)	13,110 gpd	19,700 gpd
Average Daily School Demand (Sept-May)	630 gpd	955 gpd
Unaccounted Leaks and Losses (15%)	4,130 gpd	6,204 gpd
Total Average Daily Demand (May-Oct)	**31,660 gpd**	**47,564 gpd**
Total Average Daily Demand (Nov-Apr)	**18,550 gpd**	**27,864 gpd**
Max Daily Demand[3]	**46,080 gpd**	**69,224 gpd**
Pressure system range[4]	20-70psi	
Pipe material	HDPE: SDR 11	
Minimum depth of cover	4 feet	
Old Atka fire flow	2 hr event @ 450 gpm	
New Atka Subdivision fire flow	2 hr event @ 300 gpm	

Calculations pertinent to the distribution system are included in Appendix C.

Pump Specifications

There are no pumps for this phase of the project.

Backflow and/or Cross Connection

There are no backflow or cross connection prevention assemblies associated with this water main replacement. Service lines will be replaced to a point outside the home and connect to the existing service lines, it is assumed that plumbing within each structure meets the requirements of preventing backflow or cross connections.

Lead-free Pipe

Piping used for water distribution lines and services will be lead free.

The following specifications were used to develop the manufacturing requirements for the HDPE water pipe for the system extension:

[1] Smith, Cold Climate Utilities Manual, page 5-14. Applied to the domestic contribution.
[2] Daniel W. Smith et al. Cold Climate Utilities Manual Montreal, Quebec: Canadian Society of Civil Engineering, 1986, page 5-14
[3] Max Daily Demand = (Ave. Daily Domestic Demand * Max Day Factor) + Ave. Daily Demand for School + Processor + Commercial
[4] Smith, Cold Climate Utilities Manual, page 5-16.

- AWWA C901 - Polyethylene Pressure Pipe and Tubing, 1/2-inch through 3-inch for Water Service
- AWWA C906 - Polyethylene Pressure Pipe and Fittings, 4-inch through 63-inch for Water Distribution and Transmission
- NSF/ANSI-61 - Drinking Water System Components-Health Effects

Direct Additives

This phase of the project will not incorporate any changes to the water treatment process.

ANSI/NSF Standard 61 Materials

The pipe specifications for pressurized potable water pipe for this project require the following:

"Pipe and fittings for potable water service shall be listed or approved by NSF"

Raw Water Analysis

This system is not a new public water system, nor will they be using a new source water.

Location of Gages and Sampling Points

Existing sample locations are available at the water treatment plant. Phase II design of the new water treatment plant will incorporate pressure gages, flow meters, rate of flow controls, sample points, valves, etc. in order to meet the monitoring requirements of 18 AAC 80. The current phase of this project involving distribution system replacement does not require any of the appurtenances.

Disposal of Disinfection Water

The system will be disinfected and flushed after installation. Water from the flushing operation will be drained from the system through the various fire hydrants or valving into the adjacent drainage ditches.

Authorization under the contained water general permit is required for release of chlorinated water from the disinfection process if the total discharge exceeds 10,000 gallons. The volume of disposal of disinfected water is anticipated around 3,000 gallons, below the threshold for requirement of a permit.

Operator Certification

There are two operators that split time operating the utility system in Atka. Both operators hold a current Operator in Training certificates. The certifications for both of the operators are attached in Appendix D.

Distribution Checklist

Drawings and Specifications

Drawings related to the construction of new water distribution piping are included in Appendix A. Specifications for the pipe and appurtenances are included in Appendix B.

Horizontal and Vertical Separation

Horizontal separation of 10 feet is provided between the water and sewer mainline pipes.

Typical pipe sections and crossing areas require 18-inches of vertical separation between existing sewer pipes and new water lines. Details for typical sections and crossings are provided on sheet C2.7.

Sizing of Mains, Peak Demand Flow Rates, Velocities

Sizing and computations for the system extension were completed using a modeling program (EPANET version 2.0). System modeling was used to determine pipe size requirements for the water distribution system replacement in Old Atka to maintain a fire flow of 450 gpm. A pipe size of 6 inches was selected to minimize headloss in the pipe while at the selected fire flow. Water pressure is supplied by the elevation difference between the water storage tank and the distribution points in the system. Modeling indicates that booster pumps are not required to deliver the water at selected fire flow and that a minimum of 20 psi will be maintained at all service points during a fire flow situation. Modeling outputs are included in Appendix C.

Dead End Lines

Fire hydrants or service connections have been located at the end of all dead end lines such that the line can be flushed if adverse water quality conditions were to occur due to low demand.

This project also provides a loop where in the past dead end lines have existed, the loop will greatly increase reliability of the system.

Potential for Freezing

A minimum depth of bury of 4 feet has been specified to prevent freezing. Where cover requirements can not be met, 4 inches of blue board insulation will be provided.

Thrust Blocking

This system is comprised of butt fused HDPE piping which is inherently thrust restrained, although thrust blocking has also been included and these details are included on sheet C2.9.

System Flushing

The distribution system can be flushed from the fire hydrants. Various areas of the system can be isolated with valving during the flushing process.

Seasonal System

This system is operated and used year-round.

Service Pressure

Service pressure computations were completed using a modeling program (EPANET version 2.0). Modeling outputs are included in Appendix C. Based on modeling results a minimum pressure of 20 psi can be maintained through various operating demands including a fire flow demand.

Utilidor Design

Piping for the system will be direct buried; a utilidor will not be used.

Main Replacement

Service connection disruption will be minimized. Where possible, the new water service main will be installed without removing or disrupting existing service. Installation will occur in stages in order to minimize disruption. The specifications have identified a requirement for a water service interruption plan that will be developed by the construction management firm and submitted to the Engineer for approval.

Specifications for Disinfection

Water mains will be disinfected in accordance with AWWA Standard 651 for newly constructed potable water mains. The process of disinfection is identified in the specifications.

Appendix A: Construction Drawings

Appendix B: Specifications

Appendix C: Calculations and computations

Appendix D: Water Operator Certification

Waiver Checklist – Distribution System

Plan Review Fee

This project is being constructed using money awarded through the Village Sage Water program. As such, the fee for the review is waived per the agreement between the ADEC and VSW.

Reason for Lesser Separation Distance

Five unavoidable water and sewer crossings have been identified in the plan set (summarized below).

Crossing Number	Station	Configuration of Crossing
1	Sta. 2258.42	Existing sewer location 18-inches below proposed water line
2	Sta. 2305.36	Existing sewer location 18-inches below proposed water line
3	Sta. 2402.89	Existing sewer location 18-inches below proposed water line
4	Sta. 2551.26	Existing sewer location 18-inches below proposed water line
5	Sta. 2962.63	Existing sewer location 30-inches above proposed water line

Note:
Stationing comes from City of Atka Water and Sewer Improvement, Phase 1, May 2007 plan set

These locations require a crossing because the sewer line is an existing line and the new waterline route follows the alignment to best keep the two lines separated by 10 feet while still remaining in the ROW. Also, routing of the line has to take into account the connections of the service lines. The design minimized the amount of crossings required, but with the restrictions of the site, these five were unavoidable.

Construction and Water Tightness

The sewer lines are existing infrastructure designed and constructed by the Public Health Service in approximately 1980. The sewer line was constructed with Schedule 40 PVC pipe. As-builts show the pipe to have sufficient bedding material. It is assumed that it was constructed by acceptable construction practices and compaction obtained. As evidence of this the City has not experienced grade issues or other problems with the sewer sections near the crossings.

The sewer lines are currently in service and have multiple operating service connections in pipe sections with the proposed crossing locations. As such, it is not feasible to perform a pressure test for water tightness. It is felt that excavating down to the sewer lines that are below the proposed water line (4 of the crossings) to encase the pipe is not a practical or reasonable solution because excavating the pipes presents a risk of damaging the pipe. Also, for all crossings, encasing the pipe in the area with a stronger jacketed pipe would require a cut in the pipe to allow for the carrier pipe to be slipped over the existing PVC pipe, which would require banded connections to reconnect the cut pipe, which are a potential source of leaks. Additionally, it is not recommended to encase the existing sewer pipe in concrete because this

may develop a loading scenario on aged pipe which could result in the pipe sagging which may cause cracks in the pipe or system backups. Additionally, four of the pipe crossings have the sewer 18-inches below the water, and the water table is well below the trench zone based on the past design information and geotechnical reports, thus it is not felt that cross contamination is a realistic threat to public health in these areas. Furthermore, sliplining the interior of these pipes is marginally feasible due to the capacity reduction with the size of the pipes (6 inch diameter PVC would require 4-in HDPE slipline) and unfeasible financially in terms of project budget.

HDR proposes the following measures for protection of public health, water systems, and the environment.

- Placing the water line above the sewer line where feasible (four of five locations)
- Provide welded HDPE SDR 11 waterline
- Welding to be performed by employees that have received training in the proper welding techniques
- Supervision of the welding to be provided by a construction superintendent with previous HDPE welding experience
- Regular destructive testing to be performed during welding operations
- Pressure test to be conducted on the water line to ensure water tightness
- A minimum of 18-inches of vertical separation between the water and sewer lines
- Water line joints will be spaced at least nine feet from the sewer line joints
- As-built drawings do not indicate elevated groundwater depths

Additionally, at the single crossing where the water line is below the existing sewer pipe the following measures will be used to further protect the public health.

- The vertical separation between the pipes will be maximized to the greatest extent possible (expected 30-inches of separation)
- Adequate support will be provided to the sewer pipe during excavation and water line placement
- Sewer pipe will be cleaned of debris and visually inspected prior to backfilling around the pipe
- Type 4 or Type 5 bedding as specified in AWWA C600 will be used to protect the integrity of the sewer line

Separate Trench

The sewer line is existing infrastructure this project will only replace the water line which will be constructed in a separate trench.

Above Ground Utilidor

The water and sewer lines will not be placed in an above ground utilidor.

Underground Utilidor

The water and sewer lines will not be placed in an underground utilidor.