State of Alaska
Department of Environmental Conservation
Village Safe Water Program
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February 13, 2025

To: Vendor List

Re: Amendment 1
RFP 25-VSW-SAKK-019
Water Intake and Water Transmission Line
RFP Due Date: March 4, 2025 @ 2:00 PM AST

The following are vendor questions and the department's response:

1. Vendor: The PER refers to trip reports in Appendix A but there are no appendices included in the .pdf, can you please provide a copy?

   Department: Please see attached.

Evan Patterson
Evan Patterson
Procurement Specialist

Shaktoolik PER Site Visit Trip Report

Date:	Monday, July 27, 2020
Project:	Shaktoolik Water Source PER SKK-WO-04-20
To:	Oscar Menendez, P.E.
From:	Eric S. Packer, E.I.T., Wescott Bott, P.E.
Subject:	Shaktoolik Site Visit Report

HDR engineers Eric Packer and Wescott Bott conducted a site visit to Shaktoolik, Alaska to inspect the community water system and winter water source as part of the Shaktoolik Water Source PER project, work order SKK-WO-04-20. The scope of the project is to identify and study alternatives for addressing issues with the winter water source.

HDR engineers arrived in Shaktoolik with two Norton Sound Health Corporation (NSHC) employees at 1:00 PM on July 21, 2020. The trip began with meeting the Shaktoolik city clerk, Crystal Sagoonick, and water treatment plant (WTP) operator, Lewis Nakarak. Mr. Nakarak then led HDR engineers and NSHC employees through a general tour of the water system, including the winter water source, summer water source, water treatment plant (WTP), 848,000-gallon water storage tank, and washeteria.

The following day, July 22, HDR engineers conducted a more detailed field assessment of these water system components, collected photo and video documentation, measured existing pipelines, and assessed potential alternatives. Financial data was collected regarding operation of the WTP, washeteria, and water system. Ms. Sagoonick provided additional utility rate information. HDR engineers discussed alternative solutions with Mr. Nakarak and NSHC representatives, and potential alternative water source sites were documented.

The trip concluded on July 23, 2020 when HDR engineers and NSHC employees departed in the morning. The following pages contain photographs documenting the site visit and preliminary discussion. Expanded discussion of the site visit will be provided in the draft PER.

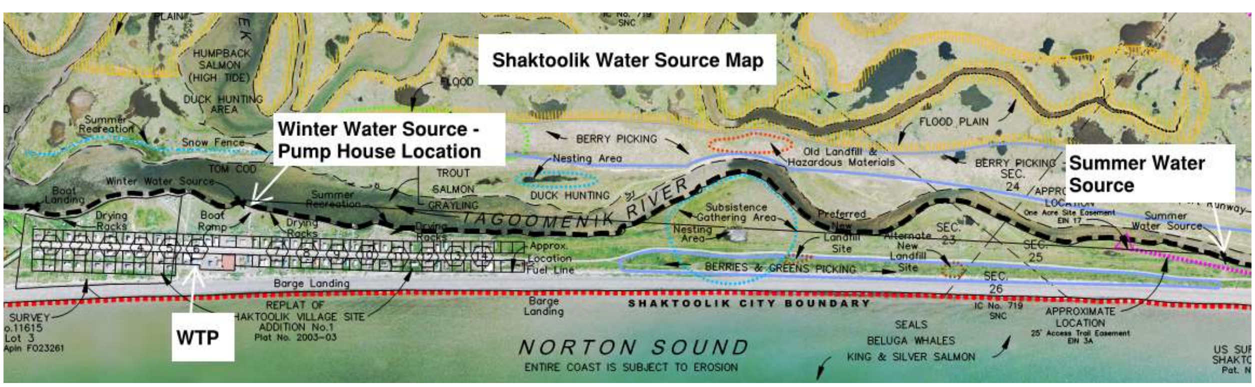

Figure 1: Overview map showing location of Shaktoolik along the Tagoomenik River, the WTP, Winter Water Source, and Summer Water Source.

Figure 2: Areal image of Shaktoolik, with Norton Sound to the left and the Tagoomenik River to the right.

Shaktoolik operates a fill and draw water system, collecting raw water from the Tagoomenik River. Water from the Tagoomenik River is pumped, filtered, chlorinated and used to fill the 848,000-gallon water storage tank. The fill process occurs roughly once every six weeks and takes one week to complete. In the summer, raw water is collected from the river approximately 1.5 miles upstream of town, while during winter, water is collected from the river directly adjacent to the community. WTP operator Mr. Nakarak indicated that both the summer and winter water sources are located in the intertidal zone. HDR engineers confirmed this at the upstream summer water source where river water was observed to be brackish during a relatively high tide. If the salinity of pumped water is too high, the WTP has a bypass system. Salinity is measured continuously with a conductivity meter. A conductivity reading above the set point of 500 microsiemens per centimeter causes water to automatically bypass the WTP and be wasted to Norton Sound.

While fall storm surge tides (as well as general high tides) regularly inundate both the summer and winter water source locations with seawater, Mr. Nakarak indicated that they have never had any issue working around these periods of inundation to fill the water storage tank with fresh water. Based on discussions Mr. Nakarak and review of the system, the primary concern appears to be related to freezing of pipes and equipment at the winter water source location due to repeated inundation with seawater.

Part 1: Winter Water Source System

Figure 3: Water source intake foot valve. The same intake foot valve is used for the summer and winter intakes (pictured at the summer water source).

Figure 4: Trailer with hoses used at the winter water source for fill operations (roughly once every six weeks). The 100 foot long 3 inch diameter hose (blue) connects to the foot valve (pictured in Figure 3) and runs from a hole in the ice to the pump house where it connects to the pump suction. The 20 foot long 4 inch diameter discharge hose (wrapped with duct tape to secure heat trace and homemade insulation) runs from the pump discharge to the Winter Raw Water pipe connection point (photos provided on subsequent pages).

Figure 5: Winter water intake frame. In the winter, a hole is prepared in the ice and then covered with this wooden frame, which is packed in insulation to prevent the hole from refreezing. The foot valve is placed in the water, protected by the insulated wooden frame. The 100 foot long hose comes out of the insulated wooden frame and is routed to the pump house. An electric hair dryer is placed inside the insulated wooden frame to further protect from refreezing.

Figure 6: Insulation for 100 foot long river hose, used to wrap the hose while it is extended over the ice.

Figure 7: Winter water source pump house located adjacent to town along the Tagoomenik River.

Figure 8: WTP Operator Mr. Nakarak indicating the estimated high water line during fall storm surge flooding. Note the location of the electrical box. No remote service disconnect switch is available to de-energize the pump house during extreme flooding.

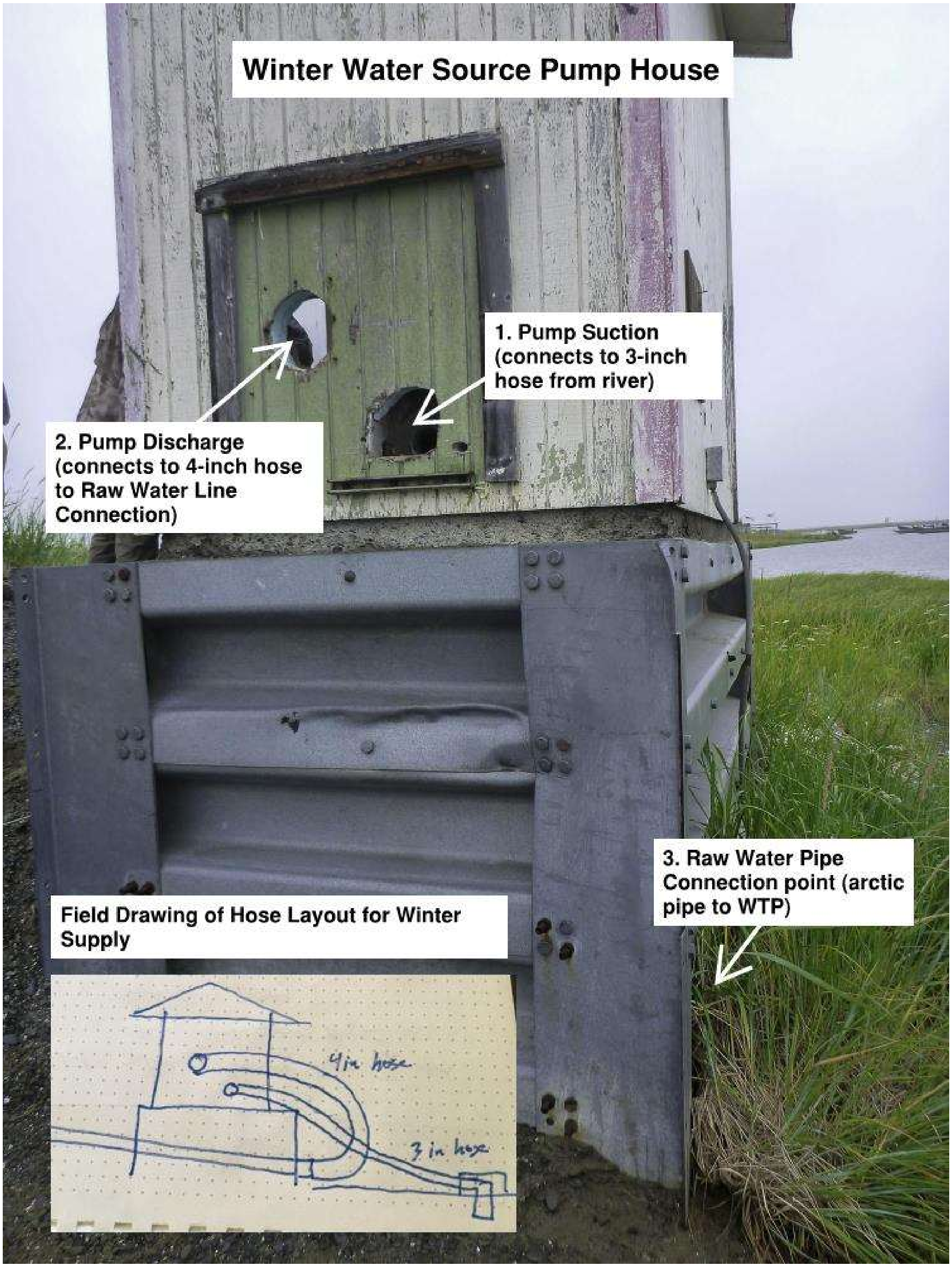

Figure 9: Layout of the winter water source pump house. The 100 foot long 3 inch hose from the river intake connects to the pump suction (1). The 20 foot long 4 inch hose connects the pump discharge (2) to the raw water line connection point (3).

Figure 10: Tide gauge adjacent to the winter water source pump house. Records for the gauge were not available.

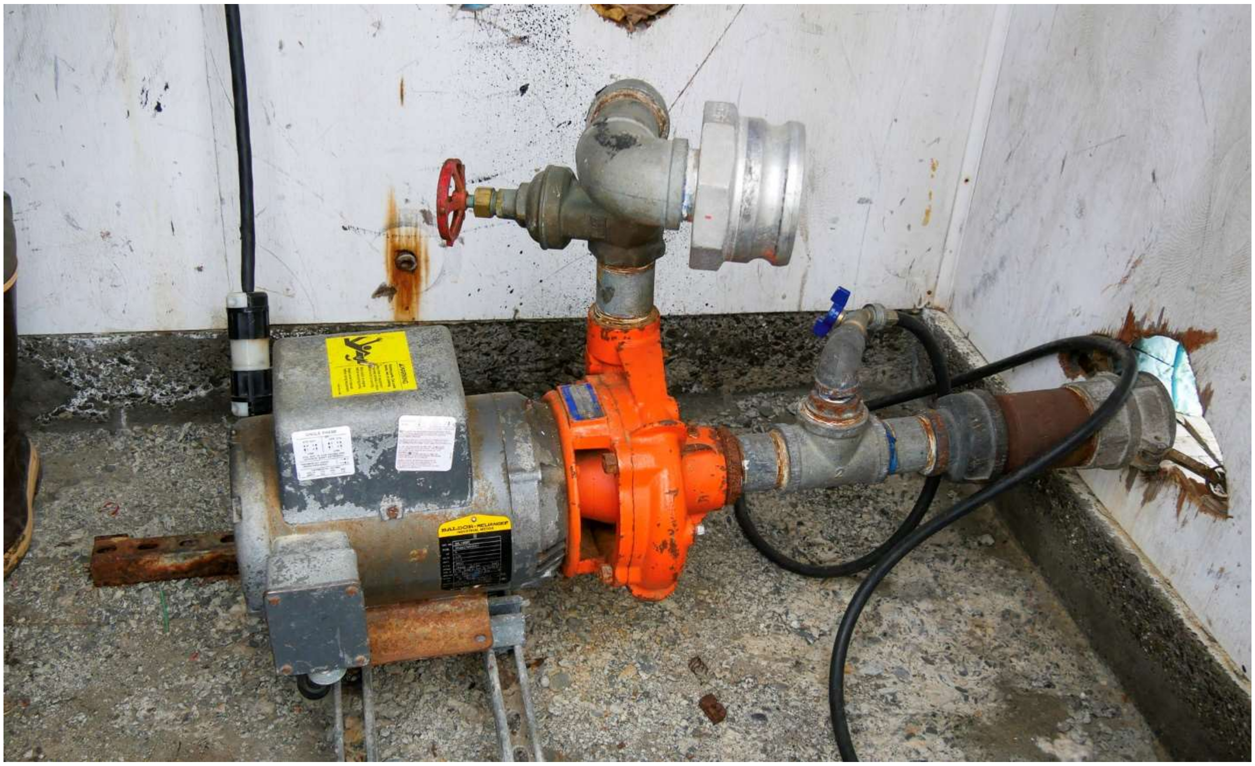

Figure 11: Winter water source 5 HP pump within the pump house (pump is removed during flooding).

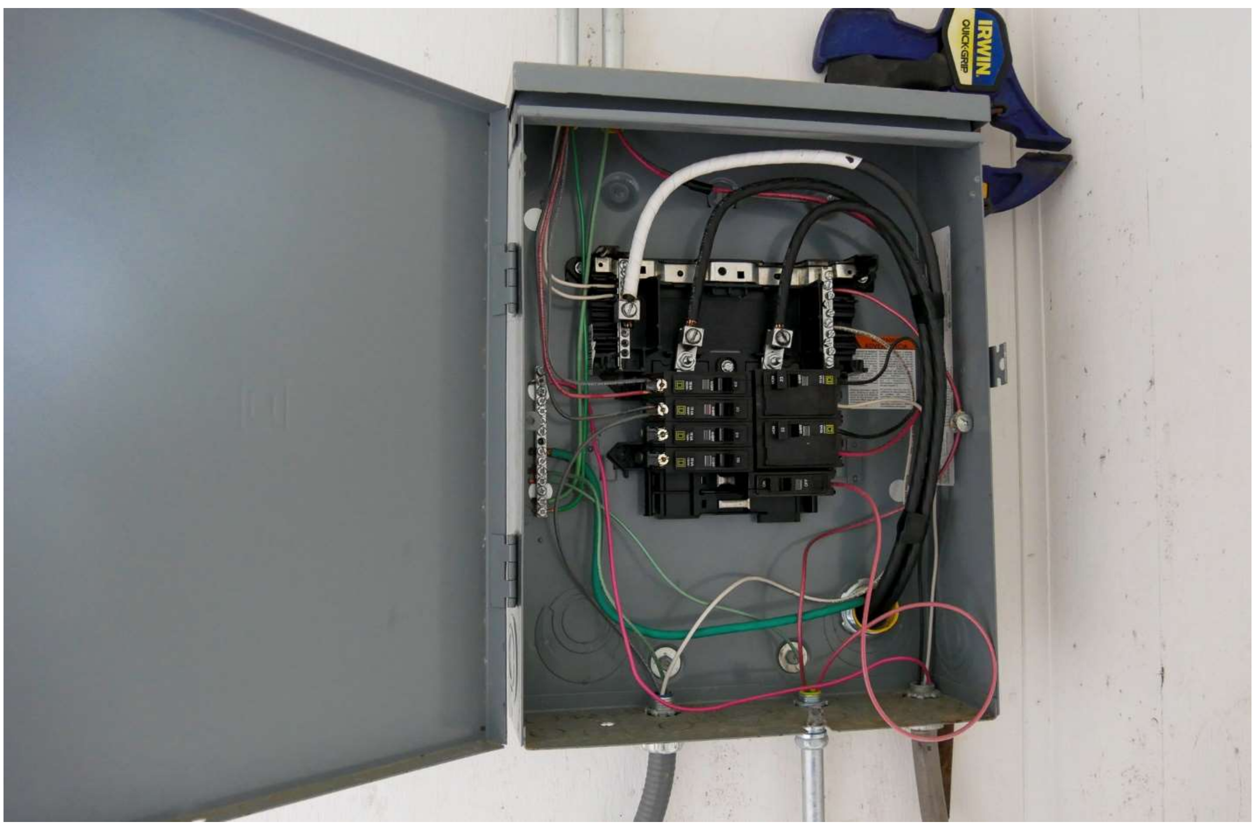

Figure 12: Electrical panel within the winter water source pump house.

Figure 13: Floor drain hole within the winter water source pump house. Mr. Nakarak indicated that the drain hole occasionally freezes, impeding drainage after flooding. Note the concrete degradation of the floor.

Figure 14: Mild erosion around the foundation of the winter water source pump house.

Figure 15: The raw water line connection point (at the pump house) that connects to the WTP via 600 feet of buried arctic pipe. The 600 foot long arctic pipe runs at approximately a 1% grade to gravity drain back to the river. The connection point features a cam-lock hose connection fitting, but no valve. The connection is regularly inundated at high tide such that seawater surcharges into the pipe and freezes within the pipe. The heat trace previously run through the arctic pipe is no longer functional. Frozen seawater inside this pipe is the primary concern with the existing winter water source. The frozen seawater is impossible to prevent without a valve, is challenging to thaw, and frequently delays wintertime pumping operations (Raw water line connection point photo 1 of 5).

Figure 16: Raw water line connection point (photo 2 of 5).

Figure 17: Raw water line connection point (photo 3 of 5).

Figure 18: Raw water line connection point, with residual water from high tide visible (photo 4 of 5).

Figure 19: Corroded and disconnected heat trace wire at the raw water line connection point (photo 5 of 5).

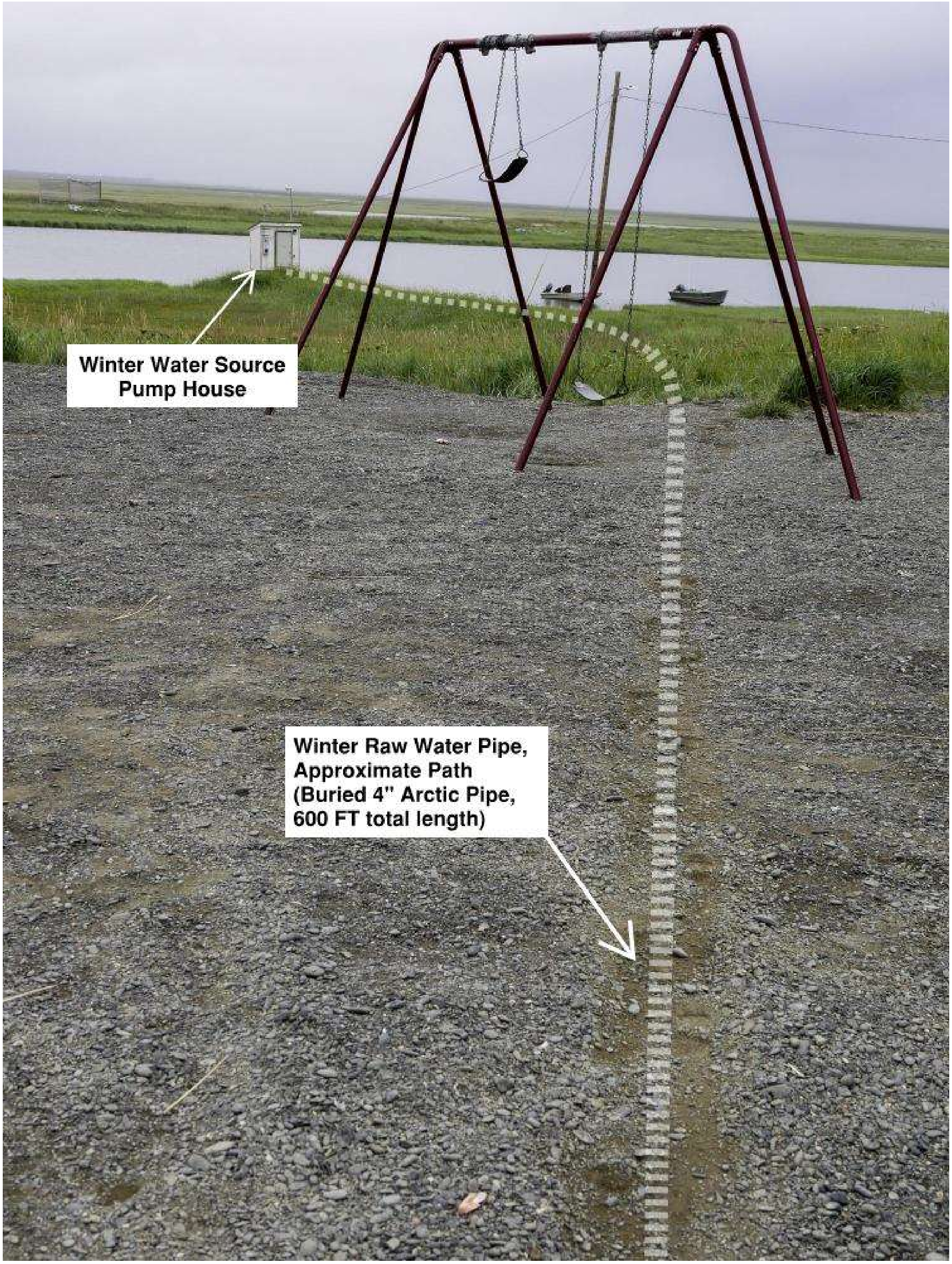

Figure 20: Approximate path of winter raw water line, looking from line midpoint toward winter water source on the Tagoomenik River.

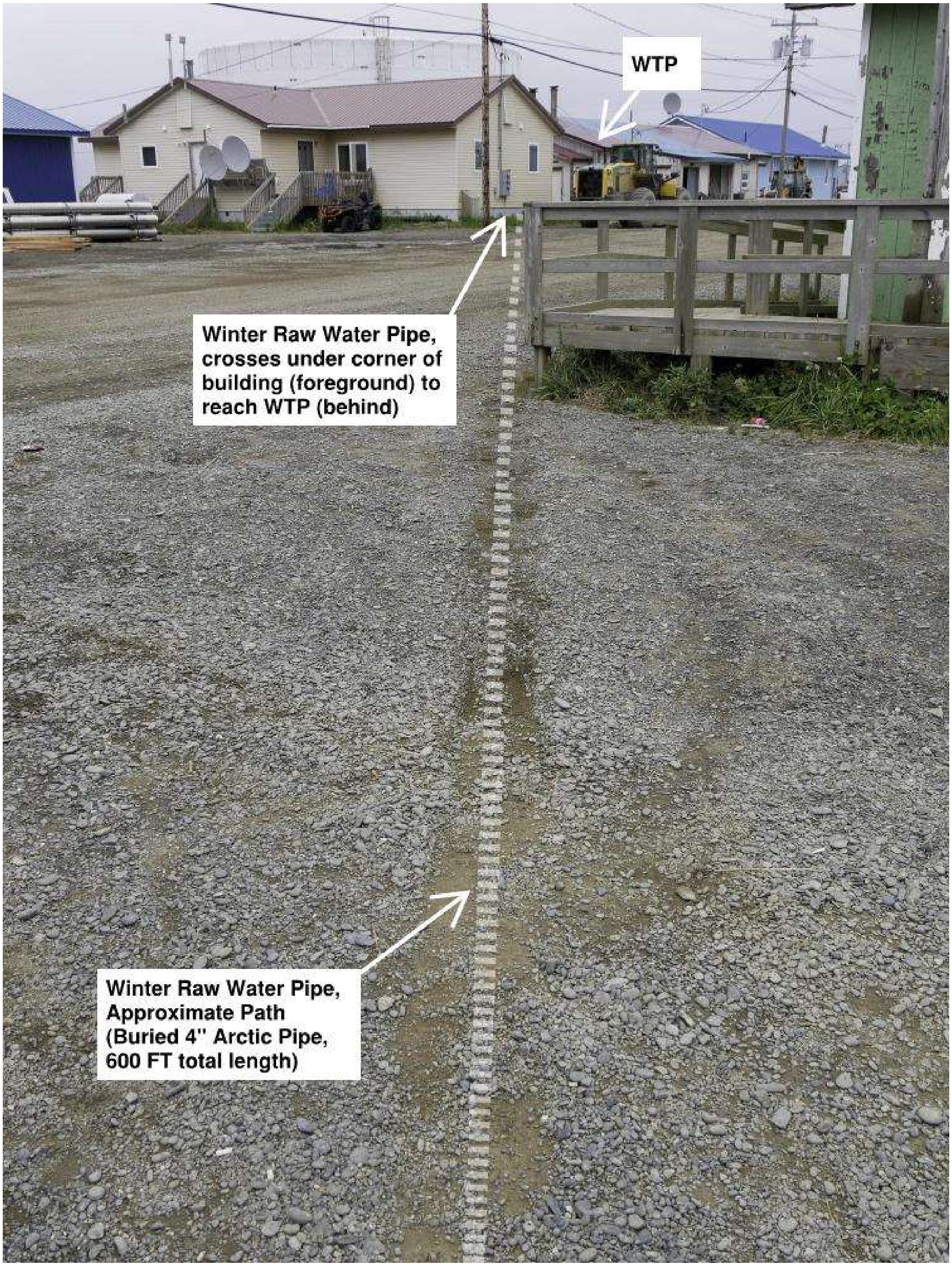

Figure 21: Approximate path of winter raw water line, looking from line midpoint toward WTP.

Figure 22: Winter raw water pipe routing at Water Treatment Plant.

Figure 23: Winter raw water pipe routing into Water Treatment Plant. Note, differential settlement has caused the insulation jacket on the winter raw water pipe to separate where it penetrates the building.

Figure 24: Winter raw water pipe as it penetrates inside the WTP. The small valves and attachments are used by operators to attempt to thaw ice in the pipe by alternately injecting warm water and compressed air.

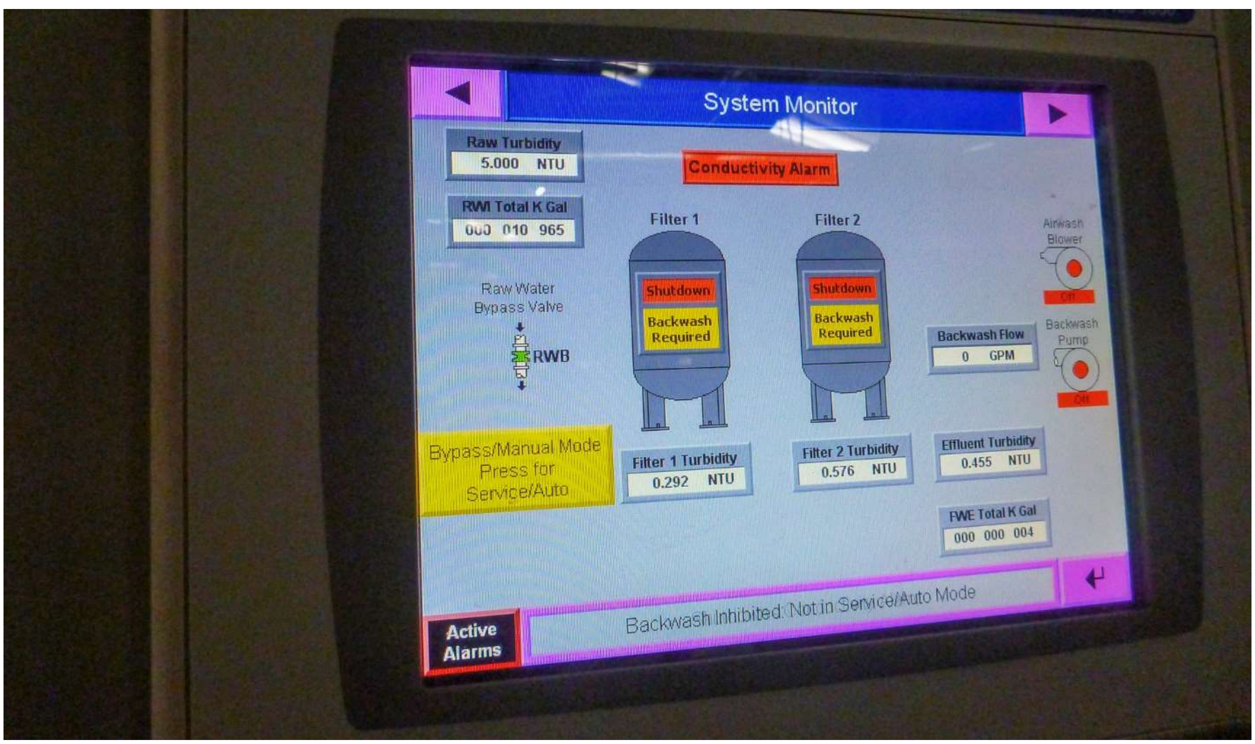

Figure 25: Conductivity monitoring system. Raw water is automatically wasted above a set point of 500 microsiemens per centimeter to prevent bringing saline water into the water treatment system during high tides.

Figure 26: Raw water bypass valve system. Water is automatically wasted above a set point of 500 microsiemens per centimeter.

Part 2: Additional Water System Documentation

Figure 27: WTP (foreground) with 848,000 gallon water storage tank (background)

Figure 28: Mr. Nakarak describing WTP operations.

Figure 29: WTP backup generator.

Figure 30: WTP Polymer and potassium permanganate feed systems.

Figure 31: WTP mixed media filters (5 feet diameter by 8 feet tall. The WTP operator reported that these filters were installed as part of a 2018 project by Bristol construction. The new filters are larger than the old filters. Community officials believe the additional weight of the new filters is causing foundation settlement and structural issues at the WTP.

Figure 32: Previous filters, 4 feet diameter by 6 feet tall.

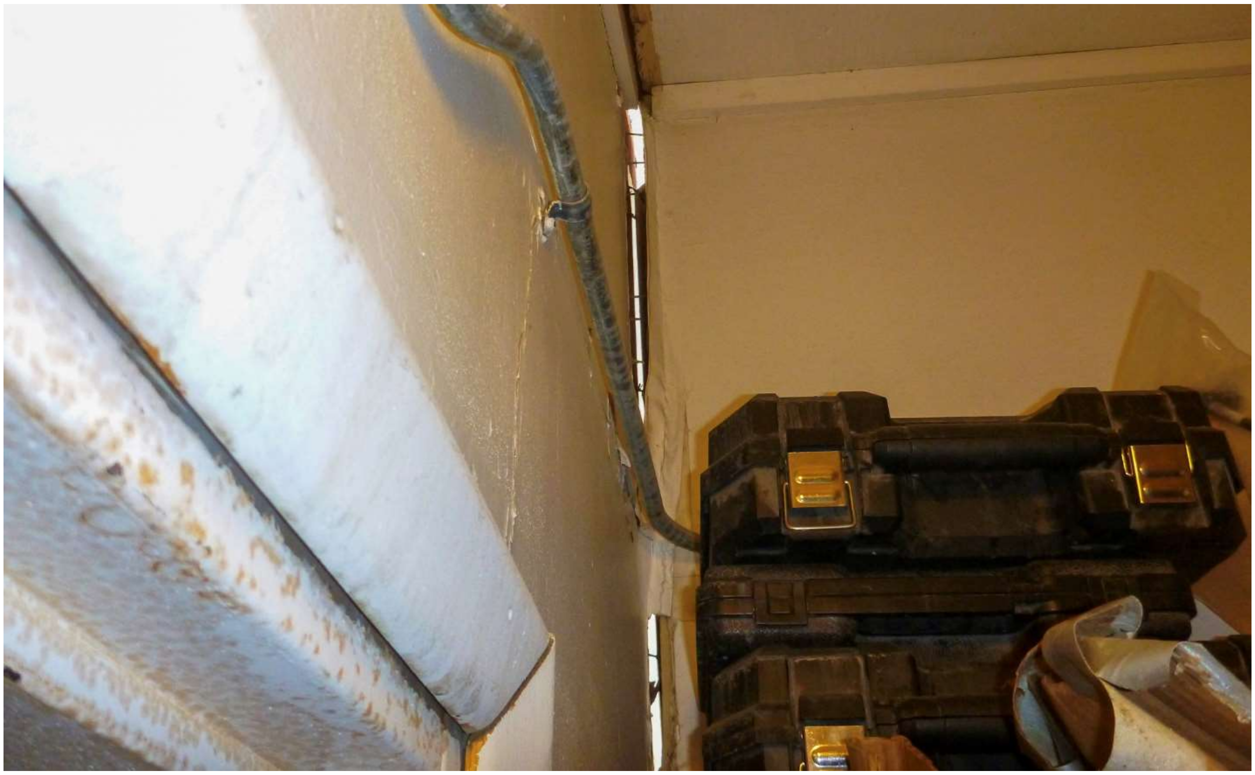

Figure 33: One of several locations where daylight is visible along exterior walls of the WTP . WTP operation logs indicated the facility is unable to maintain room temperature during winter within the building. Community officials reported these cracks appeared after installation of the new mixed media filters (Photo 1 of 5).

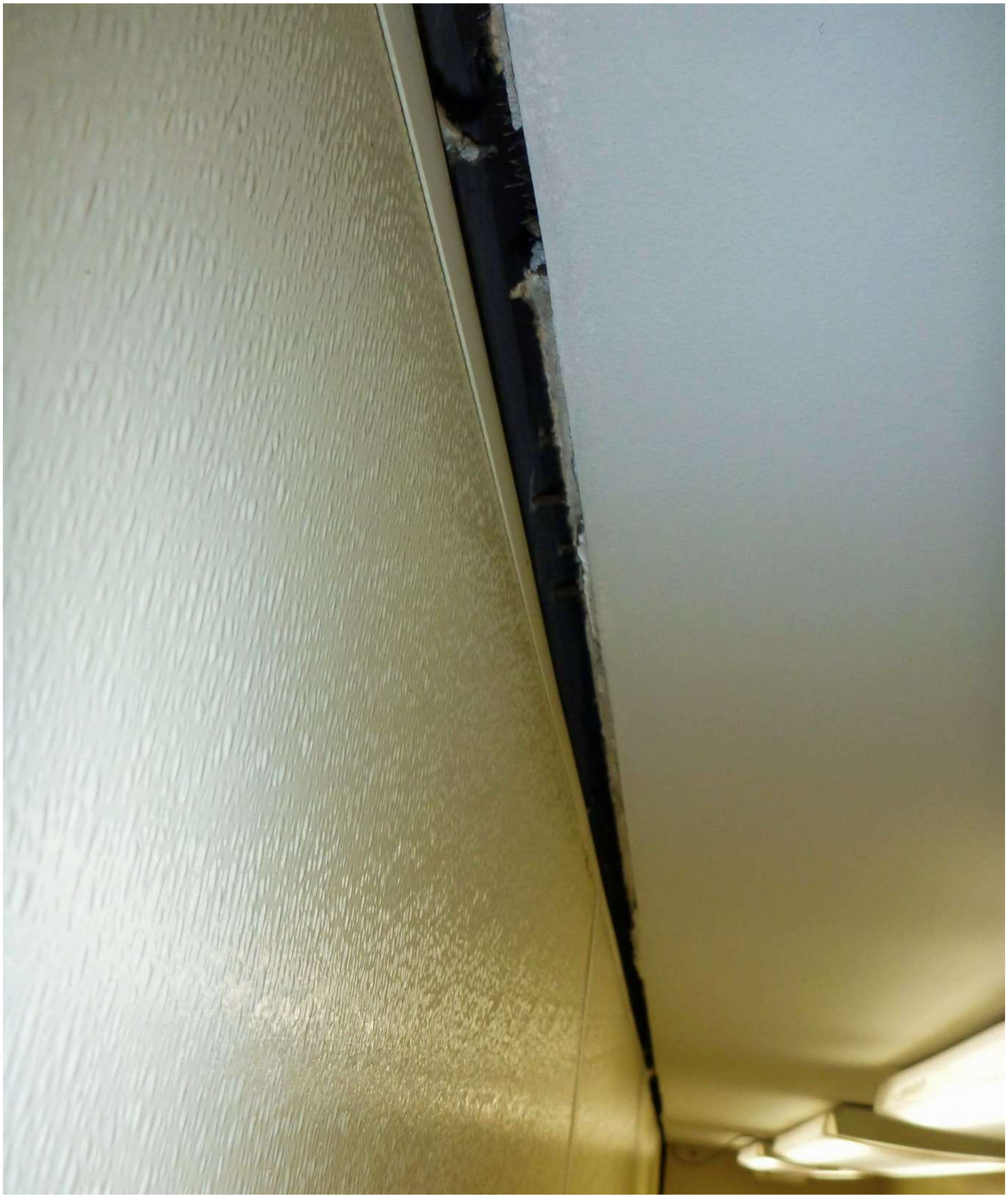

Figure 34: Cracks along exterior walls of the WTP. WTP operation logs indicate the facility is unable to maintain room temperature during winter within the building. Community officials reported these cracks appeared after installation of the new mixed media filters (photo 2 of 5).

Figure 35: Cracks along exterior walls. WTP operation logs indicate the facility is unable to maintain room temperature during winter within the building. Community officials reported these cracks appeared after installation of the new mixed media filters (photo 3 of 5).

Figure 36: Cracks along exterior walls. WTP operation logs indicate the facility is unable to maintain room temperature during winter within the building. Community officials reported these cracks appeared after installation of the new mixed media filters (photo 4 of 5).

Figure 37: Photograph underneath the WTP. Timber beams lie on wooden footers on a gravel pad on grade to support the building and appear to be original construction.

Figure 38: Inspection of washeteria (located within WTP).

Figure 39: Shaktoolik community Water Storage Tank. A rehabilitation of the water storage tank was completed in the summer of 2015 which consisted of roof repairs, new exterior siding, and new insulation.

Figure 40: Water intake hose at the summer water supply approximately 6,500 feet south of the WTP. The summer supply provides water upstream of fish cleaning areas adjacent to the community, as well as upstream of the the community dump. The summer source is used as long as possible, with operators targeting ground freeze-up before switching to the winter water source.

Figure 41: Diesel engine powered pump located at the summer water supply point.

Figure 42: HDPE summer raw water supply line running across the surface of the tundra back to town. The line is approximately 6500 feet long, and is not insulated nor heat taped. The line is purged with air at the end of the year to prevent freezing.

Figure 43: The most pressing threat to the community is "the berm" a narrow point approximately three miles south of town where an oxbow bend in the Tagoomenik river cuts dangerously close to Norton Sound. Storm surge flooding and waves from a large fall storm could possibly breach the berm and relocate the mouth of the river to this location, cutting Shaktoolik off from its summer and winter water supply points as well as a primary evacuation route. A permanent breach of the berm would likely require relocation of the community. A separate project is currently underway to study and reinforce the berm in this location.

Figure 44: Collapsed rock protection placed along the berm. (Looking from the berm north toward Shaktoolik)

Figure 45: Collapsed rock protection placed along the berm. (Looking from the berm south away from Shaktoolik).

Figure 46: Collapsed rock protection and high water line visible along the berm (Looking from ocean shore inland).