Source Water Assessment

A Hydrogeologic Susceptibility and Vulnerability Assessment for NORTHWAY WASHETERIA/CLINIC – WL002 (Well #2) Public Drinking Water System,
Northway Village, Alaska
PWSID# 381422.002

DRINKING WATER PROTECTION REPORT 1860

Alaska Department of Environmental Conservation

February, 2011

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The Drinking Water Protection (DWP) group within the Drinking Water Program is producing Source Water Assessments in compliance with the Safe Drinking Water Act Amendments of 1996. Each assessment includes a delineation of the source water area, an inventory of potential and existing contaminant sources that may impact the water, a risk ranking for each of these contaminants, and an evaluation of the potential vulnerability of these drinking water sources.

These assessments are intended to provide public water systems owners/operators, communities, and local governments with the best available information that may be used to protect the quality of their drinking water. The assessments combine information obtained from various sources, including the U.S. Environmental Protection Agency, Alaska Department of Environmental Conservation (ADEC), public water system owners/operators, and other public information sources. The results of this assessment are subject to change if additional data becomes available. It is anticipated this assessment will be updated every five years to reflect any changes in the vulnerability and/or susceptibility of public drinking water source. If you have any additional information that may affect the results of this assessment, please contact DWP staff at #1-866/956-7656.

February, 2011

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EXECUTIVE SUMMARY

The public water system for NORTHWAY WASHETERIA/CLINIC is a Community Water System (CWS) consisting of two wells. WL002 (Well #2) is the only active well and is addressed by this report, and is located just east of the Washeteria/Clinic, in Northway Village, Alaska. An assessment of the susceptibility of the wellhead and aquifer to contamination, and the vulnerability of the public water system to potential and existing contamination were evaluated as of February, 2011. The wellhead received a susceptibility rating of **Low** and the aquifer received a susceptibility rating of **High**. Combining these two ratings produces a **Medium** rating for the natural susceptibility of the well. Identified potential and existing sources of contamination for the NORTHWAY WASHETERIA/CLINIC – WL002 (Well #2) include domestic wastewater collection systems (sewer lines or lift stations), a domestic wastewater treatment plant disposal pond/lagoon, wastewater holding tanks, closed wastewater holding tanks, single-family septic systems, residential fuel tank (underground), residential heating oil tanks (aboveground), nonresidential heating oil tanks (aboveground), improperly abandoned water wells, other water supply wells, dirt/gravel roads, and glacial flour (rivers/streams). These are considered sources of one or more of the following six (6) contaminant categories evaluated: 1) bacteria and viruses; 2) nitrates and/or nitrites; 3) volatile organic chemicals (VOCs); 4) heavy metals, cyanide, and other inorganic chemicals; 5) synthetic organic chemicals (SOCs); and 6) other organic chemicals (OOCs).

Combining the natural susceptibility of the well with the six (6) contaminant risk categories evaluated, the public water system for NORTHWAY WASHETERIA/CLINIC – WL002 (Well #2) received an overall vulnerability rating of **High** for bacteria and viruses**, High** for nitrates and/or nitrites, **High** for VOCs, **High** for heavy metals, cyanide, and other inorganic chemicals, **High** for SOCs, and **High** for OOCs.

NORTHWAY WASHETERIA/CLINIC PUBLIC DRINKING WATER SYSTEM - WL002 (WELL #2)

NORTHWAY WASHETERIA/CLINIC public water system is a Community water system consisting of two wells. WL002 (Well #2) is the only active well and was evaluated in this report, and is located just east of the Washeteria/Clinic, in Northway Village, Alaska (See Map 1 of Appendix A). Northway Village is located between the Nabesna River and Skate Lake, on a 9-mile spur road off of the Alaskan Highway. It lies in the Tetlin National Wildlife Refuge, 42 miles from the Canadian border. Northway presently consists of three dispersed settlements: Northway Junction (milepost 1264), Northway (the airport), and the Native village (2 miles north of the airport) (Please see the inset of Map 1 in Appendix A for location). The current population is approximately 76 (2009 Alaska Department of Commerce, Community, and Economic Development, DCCED, Estimated Population - not certified).

Northway lies in the Continental climate zone, with long, cold winters and relatively warm summers. Temperatures range from -27 to 70 °F. The average low temperature in January is -27 °F; the average high during July is 69 °F. Extreme temperatures have been recorded from -72 to 91 °F. Average precipitation is 10 inches per year; snowfall averages 30 inches annually. (DCCED, Accessed 2/14/2011).

The community well, water treatment plant, washeteria, and sewage lagoon are operated by the tribe. A flush/haul system is operated in the village and includes holding tanks and household plumbing. Refuse is hauled to Northway's landfill (DCCED, Accessed 2/14/2011).

WL002 (Well #2) was completed 4/1/2004, at 220 feet below land surface (bls) in sand and gravel (screened from 194.5-205 feet bls). The sand and gravel zone where water is produced from (aquifer) is overlain by zones that may hamper the downward movement of water in the subsurface (confining zones); one zone is approximately 59 feet of frozen silty clay (confining layer) and the other is approximately 17 feet of frozen silty sand. The static water level in the well is high (measured at 8.5 feet above land surface at the time the well was completed) relative to the top of the unfrozen sand and gravel aquifer, which is another indication of aquifer confinement.

According to the most recent sanitary survey (10/11/2010), the land surface is sloped away from the

wellhead. Generally, land surfaces that slope away from the wellhead promote surface water drainage, which reduces the potential of contaminant migration down the well casing annulus. The sanitary survey indicates that the well is grouted according to DEC regulations (18 AAC 80.015). Proper grouting provides added protection against contaminants traveling along the well casing annulus and into source waters. The NORTHWAY WASHETERIA/CLINIC public water system serves approximately 300 residents and 20 non-transient persons through two (2) approved service connections.

Northway Village, and the surrounding area, is situated near the Nabesna River floodplain, shallow lakes, and wetland (muskeg) areas. Potential flooding is suspected but documentation of recent flooding was not found.

NORTHWAY WASHETERIA/CLINIC – WL002 (WELL #2) DRINKING WATER PROTECTION AREA

The pathways most likely for surface contamination to reach the groundwater are identified as the first step in determining a drinking water system's risk. These areas are determined by looking at the characteristics of the soil, groundwater, aquifer, and well.

The most probable area for contamination to reach the drinking water well is the drinking water protection area. The drinking water protection area is the area circling the well (the area influenced by pumping) and also the area upgradient of the well, usually forming a parabola shape. Because releases of contaminants within the protection area are most likely to impact the well, this area will serve as the focus for voluntary protection efforts.

There are many different methods for calculating the size of protection areas. For wells that are completed in unconsolidated subsurface materials, Drinking Water Protection (DWP) uses a combination of two simple numerical groundwater flow equations, the Thiem and uniform flow equations. The orientation of the protection zone is then drawn using a water table elevation map (if available) or a land surface elevation map of the area. The protection zone delineated by the DWP is an estimate using the available information and resources, and may differ slightly from the actual capture zone. Because of uncertainties and changing site conditions, a factor of safety is added to the protection zone to form the drinking water protection area (DWPA) for the well.

The DWPA established for wells by the DEC are usually separated into two zones, limited by the watershed. These zones correspond to differences in the time-of-travel (TOT) of the water moving through the aquifer to the well.

The confined aquifer levels in the Northway Village area are not well-understood, but at WL002 (Well #2) are likely primarily influenced by recharge within the immediate watershed. The protection area was drawn based on the regional topography because the well is deep and appears to be completed in a subpermafrost aquifer.

The time of travel for contaminants within the water varies and is dependent on the physical and chemical characteristics of each contaminant. The following is a summary of the two protection area zones for wells and the calculated time-of-travel for each:

Table 1. Definition of Zones

Zone	Definition
A	Several months time-of-travel
B	Less than the 2 year time-of-travel

The DWPA for the NORTHWAY WASHETERIA/CLINIC – WL002 (WELL #2) found on Map 1 of Appendix A will serve as the focus for voluntary protection efforts.

INVENTORY OF POTENTIAL AND EXISTING CONTAMINANT SOURCES

Drinking Water Protection (DWP) has completed an inventory of potential and existing sources of contamination within the NORTHWAY WASHETERIA/CLINIC – WL002 (WELL #2) DWPA (Table 1 in Appendix B). This inventory was completed through a search of agency records and other publicly available information. Potential sources of contamination to the drinking water aquifer include a wide range of categories and types. Potential drinking water contaminants are found within agricultural, residential, commercial, and industrial areas, but can also occur within areas that have little or no development.

For the basis of all Community public water system assessments, the following six categories of drinking water contaminants were inventoried:

- Bacteria and viruses;
- Nitrates and/or nitrites;
- Volatile organic chemicals;
- Heavy metals, cyanide, and other inorganic chemicals;
- Synthetic organic chemicals; and
- Other organic chemicals.

The sources are displayed on Map 2 of Appendix C and summarized in Table 1 of Appendix B.

RANKING OF CONTAMINANT RISKS

Once the potential and existing sources of contamination have been identified, they are each assigned a ranking according to what type and level of risk they represent. Ranking of contaminant risks for a "potential" or "existing" source of contamination is a combination of toxicity and volume associated with that source. Rankings include:

- Low
- Medium
- High
- Very High

The time-of-travel for contaminants within the water varies and is dependent on the physical and chemical characteristics of each contaminant.

Tables 2 through 7 in Appendix B contain the ranking of inventoried potential and existing sources of contamination with respect to bacteria and viruses, nitrates and/or nitrites, volatile organic chemicals, heavy metals, cyanide and other inorganic chemicals, synthetic organic chemicals and other organic chemical

VULNERABILITY OF NORTHWAY WASHETERIA/CLINIC PUBLIC DRINKING WATER SYSTEM -WL002 (WELL #2)

The vulnerability of public drinking water systems to regulated contaminants is determined by assessing the susceptibility of the wellhead, the susceptibility of the aquifer and the potential contaminant sources identified within the DWPA.

Drinking Water Protection staff developed a vulnerability assessment tool that assigns a vulnerability risk ranking based upon various factors associated with the well, aquifer and potential and existing contaminants identified within the DWPA.

Factors contributing to the susceptibility of the wellhead are: whether the sanitary seal in place, protection from flooding, and if the well casing is properly grouted.

The wellhead for the NORTHWAY WASHETERIA/CLINIC – WL002 (WELL #2) received a **Low** susceptibility rating. The most recent sanitary survey (completed 10/11/2010) indicates that the well is capped with a sanitary seal, the land surface is sloped away from the well, and the well is properly grouted. A sanitary seal prevents potential contaminants from entering the well while sloping of the land surface and grouting help to prevent potential contaminants from traveling down the outside of the well casing.

Factors contributing to the susceptibility of the aquifer are: whether the aquifer is confined or unconfined, whether the well is completed in unconsolidated or fractured bedrock, whether other wells and bore holes are penetrating the aquifer and, if applicable, the characteristics of the confining layer(s).

The aquifer that NORTHWAY WASHETERIA/CLINIC – WL002 (WELL #2) is completed in is unconsolidated sand and gravel, and received a **High** susceptibility rating. The aquifer is confined by approximately 59 feet of frozen silty clay, and 17 feet of frozen silty sand. Confining layers may help inhibit transport of contaminants to the aquifer.

The wellhead and aquifer susceptibility ratings are combined to form the overall natural susceptibility. Table 2 summarizes the susceptibility scores and ratings for NORTHWAY WASHETERIA/CLINIC – WL002 (WELL #2).

Table 2. Susceptibility

	Rating
Susceptibility of the Wellhead	Low
Susceptibility of the Aquifer	High
Natural Susceptibility	Medium

The Contaminant Risk was derived from an evaluation of the routine sampling results of the water system and the presence of potential sources of contamination. Contaminant risks to a drinking water source depend on the type and distribution of contaminant sources.

Table 3 summarizes the Contaminant Risks for each category of drinking water contaminants.

Table 3. Contaminant Risks

Category	**Rating**
Bacteria and Viruses	Very High
Nitrates and/or Nitrites	Very High
Volatile Organic Chemicals	Very High
Heavy Metals, Cyanide, and Other Inorganic Chemicals	Very High
Synthetic Organic Chemicals	Very High
Other Organic Chemicals	Very High

Finally, an overall vulnerability is determined for each water system by combining each of the contaminant risk scores with the natural susceptibility score:

Natural Susceptibility
+
Contaminant Risks
=
Vulnerability of the
Drinking Water Source to Contamination

Table 4 contains the overall ratings for each of the six categories of drinking water contaminants.

Table 4. Overall Vulnerability

Category	Rating
Bacteria and Viruses	High
Nitrates and Nitrites	High
Volatile Organic Chemicals	High
Heavy Metals, Cyanide, and Other Inorganic Chemicals	High
Synthetic Organic Chemicals	High
Other Organic Chemicals	High

Bacteria and Viruses

The nearby wastewater disposal pond/lagoon, the nearby wastewater sewer lines, the identified improperly abandoned wells, and the relatively high density of wastewater holding tanks in the protection area have the greatest influence on the risk for bacteria and viruses to the drinking water well.

Only a small amount of bacteria and viruses are required to endanger public health. Coliform bacteria are found naturally in the environment and although they aren't necessarily a health threat, it is an indicator of other potentially harmful bacteria in the water, more specifically, fecal coliform bacteria and E. coli which only come from human and animal fecal waste (EPA, 2011). Harmful bacteria can cause diarrhea, cramps, nausea, headaches, or other symptoms (EPA, 2011). No total coliform or fecal coliform have been detected for this well.

After combining the contaminant risk for bacteria and viruses with the natural susceptibility of the well, the overall vulnerability of the well to contamination is **High**.

Nitrates and Nitrites

The nearby wastewater disposal pond/lagoon, the identified improperly abandoned wells, the nearby wastewater sewer lines, and the relatively high density of wastewater holding tanks in the protection area have the greatest influence on risk for nitrates and nitrites to this source of public drinking water.

Nitrates are very mobile, moving at approximately the same rate as water. Nitrates have recently been detected within source waters for WL002 (Well #2), at 0.29 mg/L, well below the maximum contaminant level (MCL) of 10 mg/L.

After combining the contaminant risk for nitrates and nitrites with the natural susceptibility of the well, the overall vulnerability of the well to contamination is **High**.

Volatile Organic Chemicals

Identified improperly abandoned wells, the relatively high density of above ground residential heating oil tanks, the relatively high density of wastewater holding tanks, the above ground diesel tank(s), and the high density of nearby closed wastewater holding tanks in the protection area have the greatest influence on the risk for volatile organic chemicals (VOCs) to the well.

Additional potential sources of diesel range organics (DRO), which are petroleum hydrocarbon fractions, are identified beyond Zone B, but were not used for assigning contaminant risk scores to the well. The status for each of these identified DEC Contaminated Sites is listed as "Cleanup Complete", which means that no contamination is present. These sites include Northway Staging Field: OU1, Area 18; OU1, Area 41; OU1, Area 44; OU1, Area 46; OU1, Area 52; OU3, Area 16. More information can be found by visiting the DEC Contaminated Sites Program web site, at http://www.dec.state.ak.us/spar/csp/sites/northway.htm.

VOCs have not been detected within source waters. After combining the contaminant risk for VOCs with the natural susceptibility of the well, the overall vulnerability of the well to contamination is **High**.

Heavy Metals, Cyanide, and Other Inorganic Chemicals

Identified improperly abandoned wells and the relatively high density of wastewater holding tanks (active and closed) in the protection area, and possibly natural sources have the greatest influence on the risk for inorganic chemicals to the well.

Water samples have been collected and analyzed roughly annually for heavy metals, cyanide, and/or other inorganic chemicals. Barium, chromium, and nickel have been detected well below their respective maximum contaminant levels (MCLs). The highest detection was of nickel on 5/20/2009, at 1.74 µg/L (17.4% of the MCL of 0.01 mg/L). Because of the low level detected, it is presumed from that this is from natural sources in the area.

After combining the contaminant risk for heavy metals, cyanide and other inorganic chemicals with the natural

susceptibility of the well, the overall vulnerability of the well to contamination is **High**.

Synthetic Organic Chemicals

The identified improperly abandoned wells in the protection area have the greatest influence on the risk for synthetic organic chemicals (SOCs) to the well.

No baseline monitoring for SOCs has been reported for this well. This system received an SOC monitoring waiver for the 2008-2010 Compliance Period. After combining the contaminant risk for SOCs with the natural susceptibility of the well, the overall vulnerability of the well to contamination is **High**.

Other Organic Chemicals

Identified improperly abandoned wells and the relatively high density of wastewater holding tanks (active and closed) in the protection area have the greatest influence on the risk for other organic chemicals (OOCs) to the well.

No baseline monitoring for OOCs has been reported for this well. This system received an SOC monitoring waiver for the 2008-2010 Compliance Period, which includes a waiver for OOC monitoring. After combining the contaminant risk for OOCs with the natural susceptibility of the well, the overall vulnerability of the well to contamination is **High**.

Using the Source Water Assessment

This assessment of contaminant risks can be used as a foundation for local voluntary protection efforts as well as a basis for the continuous efforts on the part of NORTHWAY WASHETERIA/CLINIC public water system to protect public health. It is anticipated that Source Water Assessments will be updated every five years to reflect any changes in the vulnerability and/or susceptibility of the NORTHWAY WASHETERIA/CLINIC – WL002 (WELL #2) drinking water source.

REFERENCES

Alaska Department of Commerce, Community and Economic Development (DCCED), Accessed 2011 [WWW document].
URL http://www.commerce.state.ak.us/dca/commdb/CF_BLOCK.cfm.

United States Environmental Protection Agency (EPA), Accessed 2011 [WWW document].
URL http://www.epa.gov/safewater/contaminants/index.html.

APPENDIX A

NORTHWAY WASHETERIA/CLINIC – WL002 (WELL #2)
Drinking Water Protection Area Location Map
(Map 1)

PWSID 381422.002: NORTHWAY WASHETERIA/CLINIC: Well #2

MAP 1

1,000 500 0 1,000 Feet

1 inch = 1,000 feet

Created November 29th, 2010
Created By: Charley Palmer, DEC/EH-Drinking Water Protection
Data Sources:
Imagery: AlaskaMapped WMS/BDL

Public Water Systems

- Community water system (CWS)
- Non-transient non-community water system (NTNCWS)
- Transient non-community water system (TNCWS)
- State-regulated Class C water system

Drinking Water Protection Areas

- Zone A (Several Months Time of Travel)
- Zone B (2 Year Time of Travel)

Alaska Department of Environmental Conservation

APPENDIX B

Contaminant Source Inventory and Risk Ranking for NORTHWAY WASHETERIA/CLINIC – WL002 (WELL #2) (Tables 1-7)

Table 1

Contaminant Source Inventory for
NORTHWAY WASHETERIA/CLINIC-WELL #2

PWSID 381422.002

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Map Number*	*Comments*
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-1	A	2	From washeteria to lagoon. 50 feet from well. Waiver approved 5/27/2009. (2010 SanSurv)
Domestic wastewater treatment plant disposal ponds/lagoons	D02	D02-1	A	2	350 feet to lagoon from well. (2010 SanSurv)
Septic systems (serves one single-family home)	R02	R02-1	A	2	Identified in 2010 SanSurv. ~200' from well. Location not specified.
Tanks, fuel, residential (underground)	R06	R06-1	A	2	Northway Village Community Hall. (Per S&W, 9/10/2003).
Tanks, heating oil, residential (above ground)	R08	R08-1-16	A	2	
Tanks, heating oil, nonresidential (aboveground)	T14	T14-1	A	2	Northway Village Community Hall, per S&W 9/10/2003.
Tanks, heating oil, nonresidential (aboveground)	T14	T14-2	A	2	Northway washeteria & treatment plant.
Wastewater Holding Tank	T22	T22-1-17	A	2	Individual Residential pump & haul systems
Closed Wastewater Holding Tank	T23	T23-1-15	A	2	General storage area east of washeteria near old treatment plant. Tanks appear empty, some adapter ports appear open or covered with rotting duct tape. Tanks are stored on ground.
Abandoned wells	W01	W01-1	A	2	Behind Northway Village Tribal Office. Some openings in top through pump stand pipe, wire ports, etc. (see photo)
Abandoned wells	W01	W01-2	A	2	Unknown owner. Along main village road near old water tank - at northwest corner of intersection of Northway Rd and W 1st St.
Water supply wells	W09	W09-1	A	2	PWSID 381422.001 (Well #1). Inactive and disconnected (2010 SanSurv).
Water supply wells	W09	W09-2	A	2	PWSID 380375.001 - Northway Community Hall. Active, managed well.
Highways and roads, dirt/gravel	X24	X24-1	A	2	E 1st St
Highways and roads, dirt/gravel	X24	X24-2	A	2	Northway Rd
Highways and roads, dirt/gravel	X24	X24-3	A	2	W 1st St
Glacial flour (rivers/streams)	B03	B03-1	B	2	Nabesna River
Tanks, heating oil, residential (above ground)	R08	R08-17-33	B	2	
Tanks, diesel (above ground)	T06	T06-1	B	2	Northway Radio Towers, per S&W 9/10/2003.
Wastewater Holding Tank	T22	T22-18-34	B	2	
Highways and roads, dirt/gravel	X24	X24-4	B	2	Circle Dr
Highways and roads, dirt/gravel	X24	X24-5	B	2	Northway Rd

Table 2

Contaminant Source Inventory and Risk Ranking for NORTHWAY WASHETERIA/CLINIC-WELL #2

Sources of Bacteria and Viruses

PWSID 381422.002

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-1	A	Medium	2	From washeteria to lagoon. 50 feet from well. Waiver approved 5/27/2009. (2010 SanSurv)
Domestic wastewater treatment plant disposal ponds/lagoons	D02	D02-1	A	High	2	350 feet to lagoon from well. (2010 SanSurv)
Septic systems (serves one single-family home)	R02	R02-1	A	Low	2	Identified in 2010 SanSurv. ~200' from well. Location not specified.
Wastewater Holding Tank	T22	T22-1-17	A	Low	2	Individual Residential pump & haul systems
Abandoned wells	W01	W01-1	A	Medium	2	Behind Northway Village Tribal Office. Some openings in top through pump stand pipe, wire ports, etc. (see photo)
Abandoned wells	W01	W01-2	A	Medium	2	Unknown owner. Along main village road near old water tank - at northwest corner of intersection of Northway Rd and W 1st St.
Highways and roads, dirt/gravel	X24	X24-1	A	Low	2	E 1st St
Highways and roads, dirt/gravel	X24	X24-2	A	Low	2	Northway Rd
Highways and roads, dirt/gravel	X24	X24-3	A	Low	2	W 1st St
Wastewater Holding Tank	T22	T22-18-34	B	Low	2	
Highways and roads, dirt/gravel	X24	X24-4	B	Low	2	Circle Dr
Highways and roads, dirt/gravel	X24	X24-5	B	Low	2	Northway Rd

Table 3

Contaminant Source Inventory and Risk Ranking for NORTHWAY WASHETERIA/CLINIC-WELL #2 Sources of Nitrates/Nitrites

PWSID 381422.002

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-1	A	Medium	2	From washeteria to lagoon. 50 feet from well. Waiver approved 5/27/2009. (2010 SanSurv)
Domestic wastewater treatment plant disposal ponds/lagoons	D02	D02-1	A	High	2	350 feet to lagoon from well. (2010 SanSurv)
Septic systems (serves one single-family home)	R02	R02-1	A	Low	2	Identified in 2010 SanSurv. ~200' from well. Location not specified.
Wastewater Holding Tank	T22	T22-1-17	A	Low	2	Individual Residential pump & haul systems
Abandoned wells	W01	W01-1	A	High	2	Behind Northway Village Tribal Office. Some openings in top through pump stand pipe, wire ports, etc. (see photo)
Abandoned wells	W01	W01-2	A	High	2	Unknown owner. Along main village road near old water tank - at northwest corner of intersection of Northway Rd and W 1st St.
Highways and roads, dirt/gravel	X24	X24-1	A	Low	2	E 1st St
Highways and roads, dirt/gravel	X24	X24-2	A	Low	2	Northway Rd
Highways and roads, dirt/gravel	X24	X24-3	A	Low	2	W 1st St
Wastewater Holding Tank	T22	T22-18-34	B	Low	2	
Highways and roads, dirt/gravel	X24	X24-4	B	Low	2	Circle Dr
Highways and roads, dirt/gravel	X24	X24-5	B	Low	2	Northway Rd

Table 4

Contaminant Source Inventory and Risk Ranking for NORTHWAY WASHETERIA/CLINIC-WELL #2 Sources of Volatile Organic Chemicals

PWSID 381422.002

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-1	A	Low	2	From washeteria to lagoon. 50 feet from well. Waiver approved 5/27/2009. (2010 SanSurv)
Domestic wastewater treatment plant disposal ponds/lagoons	D02	D02-1	A	Low	2	350 feet to lagoon from well. (2010 SanSurv)
Septic systems (serves one single-family home)	R02	R02-1	A	Low	2	Identified in 2010 SanSurv. ~200' from well. Location not specified.
Tanks, fuel, residential (underground)	R06	R06-1	A	Medium	2	Northway Village Community Hall. (Per S&W, 9/10/2003).
Tanks, heating oil, residential (above ground)	R08	R08-1-16	A	Medium	2	
Tanks, heating oil, nonresidential (aboveground)	T14	T14-1	A	Low	2	Northway Village Community Hall, per S&W 9/10/2003.
Tanks, heating oil, nonresidential (aboveground)	T14	T14-2	A	Low	2	Northway washeteria & treatment plant.
Wastewater Holding Tank	T22	T22-1-17	A	Medium	2	Individual Residential pump & haul systems
Closed Wastewater Holding Tank	T23	T23-1-15	A	Low	2	General storage area east of washeteria near old treatment plant. Tanks appear empty, some adapter ports appear open or covered with rotting duct tape. Tanks are stored on ground.
Abandoned wells	W01	W01-1	A	High	2	Behind Northway Village Tribal Office. Some openings in top through pump stand pipe, wire ports, etc. (see photo)
Abandoned wells	W01	W01-2	A	High	2	Unknown owner. Along main village road near old water tank - at northwest corner of intersection of Northway Rd and W 1st St.
Highways and roads, dirt/gravel	X24	X24-1	A	Low	2	E 1st St
Highways and roads, dirt/gravel	X24	X24-2	A	Low	2	Northway Rd
Highways and roads, dirt/gravel	X24	X24-3	A	Low	2	W 1st St
Tanks, heating oil, residential (above ground)	R08	R08-17-33	B	Medium	2	
Tanks, diesel (above ground)	T06	T06-1	B	Medium	2	Northway Radio Towers, per S&W 9/10/2003.
Wastewater Holding Tank	T22	T22-18-34	B	Medium	2	
Highways and roads, dirt/gravel	X24	X24-4	B	Low	2	Circle Dr

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Highways and roads, dirt/gravel	X24	X24-5	B	Low	2	Northway Rd

Table 5

Contaminant Source Inventory and Risk Ranking for NORTHWAY WASHETERIA/CLINIC-WELL #2

Sources of Heavy Metals, Cyanide and Other Inorganic Chemicals

PWSID 381422.002

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-1	A	Low	2	From washeteria to lagoon. 50 feet from well. Waiver approved 5/27/2009. (2010 SanSurv)
Domestic wastewater treatment plant disposal ponds/lagoons	D02	D02-1	A	Low	2	350 feet to lagoon from well. (2010 SanSurv)
Septic systems (serves one single-family home)	R02	R02-1	A	Low	2	Identified in 2010 SanSurv. ~200' from well. Location not specified.
Tanks, heating oil, nonresidential (aboveground)	T14	T14-1	A	Low	2	Northway Village Community Hall, per S&W 9/10/2003.
Tanks, heating oil, nonresidential (aboveground)	T14	T14-2	A	Low	2	Northway washeteria & treatment plant.
Wastewater Holding Tank	T22	T22-1-17	A	Medium	2	Individual Residential pump & haul systems
Closed Wastewater Holding Tank	T23	T23-1-15	A	Low	2	General storage area east of washeteria near old treatment plant. Tanks appear empty, some adapter ports appear open or covered with rotting duct tape. Tanks are stored on ground.
Abandoned wells	W01	W01-1	A	Very High	2	Behind Northway Village Tribal Office. Some openings in top through pump stand pipe, wire ports, etc. (see photo)
Abandoned wells	W01	W01-2	A	Very High	2	Unknown owner. Along main village road near old water tank - at northwest corner of intersection of Northway Rd and W 1st St.
Highways and roads, dirt/gravel	X24	X24-1	A	Low	2	E 1st St
Highways and roads, dirt/gravel	X24	X24-2	A	Low	2	Northway Rd
Highways and roads, dirt/gravel	X24	X24-3	A	Low	2	W 1st St
Wastewater Holding Tank	T22	T22-18-34	B	Medium	2	
Highways and roads, dirt/gravel	X24	X24-4	B	Low	2	Circle Dr
Highways and roads, dirt/gravel	X24	X24-5	B	Low	2	Northway Rd

Table 6

Contaminant Source Inventory and Risk Ranking for NORTHWAY WASHETERIA/CLINIC-WELL #2 Sources of Synthetic Organic Chemicals

PWSID 381422.002

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-1	A	Low	2	From washeteria to lagoon. 50 feet from well. Waiver approved 5/27/2009. (2010 SanSurv)
Domestic wastewater treatment plant disposal ponds/lagoons	D02	D02-1	A	Low	2	350 feet to lagoon from well. (2010 SanSurv)
Septic systems (serves one single-family home)	R02	R02-1	A	Low	2	Identified in 2010 SanSurv. ~200' from well. Location not specified.
Abandoned wells	W01	W01-1	A	High	2	Behind Northway Village Tribal Office. Some openings in top through pump stand pipe, wire ports, etc. (see photo)
Abandoned wells	W01	W01-2	A	High	2	Unknown owner. Along main village road near old water tank - at northwest corner of intersection of Northway Rd and W 1st St.

Table 7

Contaminant Source Inventory and Risk Ranking for NORTHWAY WASHETERIA/CLINIC-WELL #2 Sources of Other Organic Chemicals

PWSID 381422.002

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-1	A	Low	2	From washeteria to lagoon. 50 feet from well. Waiver approved 5/27/2009. (2010 SanSurv)
Domestic wastewater treatment plant disposal ponds/lagoons	D02	D02-1	A	Low	2	350 feet to lagoon from well. (2010 SanSurv)
Septic systems (serves one single-family home)	R02	R02-1	A	Low	2	Identified in 2010 SanSurv. ~200' from well. Location not specified.
Wastewater Holding Tank	T22	T22-1-17	A	Medium	2	Individual Residential pump & haul systems
Closed Wastewater Holding Tank	T23	T23-1-15	A	Low	2	General storage area east of washeteria near old treatment plant. Tanks appear empty, some adapter ports appear open or covered with rotting duct tape. Tanks are stored on ground.
Abandoned wells	W01	W01-1	A	High	2	Behind Northway Village Tribal Office. Some openings in top through pump stand pipe, wire ports, etc. (see photo)
Abandoned wells	W01	W01-2	A	High	2	Unknown owner. Along main village road near old water tank - at northwest corner of intersection of Northway Rd and W 1st St.
Highways and roads, dirt/gravel	X24	X24-1	A	Low	2	E 1st St
Highways and roads, dirt/gravel	X24	X24-2	A	Low	2	Northway Rd
Highways and roads, dirt/gravel	X24	X24-3	A	Low	2	W 1st St
Wastewater Holding Tank	T22	T22-18-34	B	Medium	2	
Highways and roads, dirt/gravel	X24	X24-4	B	Low	2	Circle Dr
Highways and roads, dirt/gravel	X24	X24-5	B	Low	2	Northway Rd

APPENDIX C

NORTHWAY WASHETERIA/CLINIC – WL002 (WELL #2)
Drinking Water Protection Area
with Potential and Existing Contaminant Sources
(Map 2)

381422.001 - Northway Washeteria/Clinic-Well #1
D01 D02
381422.002 - NORTHWAY WASHETERIA/CLINIC-WELL #2

Zone A: Other potential sources of contamination.
--Water supply wells (W09)
>PWSID 381422.001 (Well #1). Inactive and should be decommissioned.
>PWSID 380375.001 - Northway Community Hall. Active, managed well.
--Dirt roads (Northway Rd, W 1st St, E 1st St) (X24)
--Septic system (tank and leachfiled identified in 2010 Sanitary Survey - ~200' from well:specific location not specified)

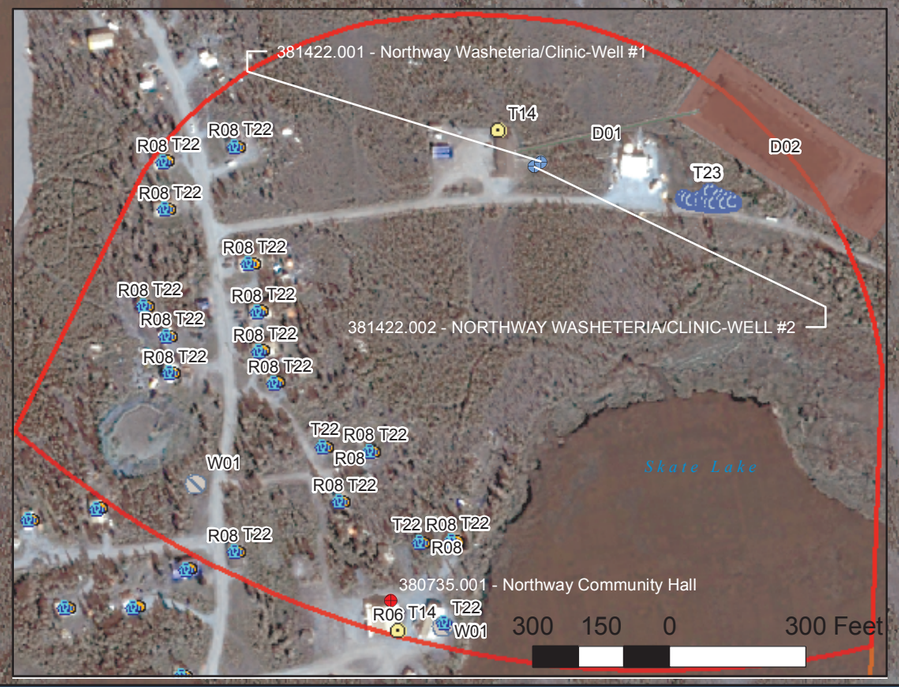
380735.001 - Northway Community Hall

Nebesna River

Skate Lake

Zone B: Other potential sources of contamination.
--Dirt roads (Northway Rd, Circle Dr) (X24)
--Glacial flour (rivers/streams) (B03)

T06



Potential Sources of Contamination

- Tanks, fuel, residential (underground) (R06)
- Tanks, heating oil, residential (above ground) (R08)
- Tanks, diesel (above ground) (T06)
- Tanks, heating oil, nonresidential (aboveground) (T14)
- Wastewater Holding Tank (T22)
- Closed Wastewater Holding Tank (T23)
- Abandoned wells (W01)
- D01, Domestic wastewater collection system (sewe
- D02, Domestic wastewater treatment plant disposa

PWSID 381422.002: NORTHWAY WASHETERIA/CLINIC: Well #2

MAP 2

1,000 500 0 1,000 Feet

1 inch = 666.67 feet

Created November 29th, 2010, Revised February 4th, 2011
Created By: Charley Palmer, DEC/EH-Drinking Water Protection
Data Sources:
Imagery: AlaskaMapped WMS/BDL

Public Water Systems

- Community water system (CWS)
- Non-transient non-community water system (NTNCWS)
- Transient non-community water system (TNCWS)
- State-regulated Class C water system

Drinking Water Protection Areas

- Zone A (Several Months Time of Travel)
- Zone B (2 Year Time of Travel)

Alaska Department of Environmental Conservation