SOURCE PROTECTION PLAN UPDATE

Village of Johnson Water System - WSID 5156
Johnson, Vermont
August 2018

Prepared by:
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Village of Johnson Water System

With Assistance from:
Vermont Rural Water Association

Review Annually and Update Every 3 Years

Date Reviewed	Reviewer	Changes or Comments
6/27/13	Duncan Hastings	Amendments to address landowner concerns and correct information
August 2015	Sandford Miller	Review as part of 2015 submission
August 2016	Meredith Birkett	Review to become familiar with the Plan (new Village Manager)
October 2017	Meredith Birkett	Review in anticipation of 2018 update

Village of Johnson Source Protection Plan

Meredith Birkett

Meredith Birkett, Village Manager
System Administrative Contact

8/23/18
Date

Dan Copp

Dan Copp, Chief Operator

8/23/18
Date

I. INTRODUCTION

A. Background and Purpose

The purpose of a Source Protection Plan is to identify water system vulnerabilities and to suggest techniques to manage land uses and activities that potentially may contaminate a public water source.

This Source Protection Plan[1] covers two public wells in Johnson, Vermont – both serving the Village of Johnson Water System (WSID #5156). Since the original plan in 2005, and the 2008 update, the French Brook surface water source has been abandoned. This system is located in Lamoille County and the Lamoille River Basin.

A Public Water System is defined as "any system(s) or combination of systems owned or controlled by a person, that provides drinking water through pipes or other constructed conveyances to the public and that has at least fifteen (15) service connections or serves an average of at least twenty five (25) individuals daily for at least sixty (60) days out of the year." (Vermont Water Supply Rule, Chapter 21, Subchapter Section 2.2)

This Source Water Protection Plan was developed to protect the quality and quantity of these sources and was prepared by the Village of Johnson Water System. The objective of this plan is to identify potential contamination sources that occur within the Source Protection Areas of these public water supplies and to provide specific recommendations to manage these potential threats in order to maintain quality drinking water.

This document has been prepared in accordance with the Vermont Water Supply Rule, Chapter 21, December 1, 2010 Revision. Under the Rule, a Source Protection Plan consists of the following basic elements:

- An inventory of potential sources of contamination (PSOCs);
- An assessment of risks posed by these PSOCs;
- A management plan to minimize risks to the water source(s); and
- A contingency plan for responding to emergency loss of the water supply.

This plan is a working document that will be reviewed at least annually and updated every three years to remain current, active, and viable. In August 2018, Village staff reached out to several property owners within the Source Protection Areas to confirm the information in this plan is still accurate. A carefully researched and thoughtfully drafted Source Protection Plan is an important first step in source water protection because it sets priorities for actions to take in protecting a water source. Actions taken by water system management, surrounding landowners, and the larger community are key to achieving comprehensive protection.

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[1] *Note: This document provides an update to the original Source Protection Plans for the Johnson Village Water System WSID # 5156, dated March 2002 and August 2005. Additional updates were completed during October 2008 and October 2012.*

B. Description of the Johnson Village Water System

The Village of Johnson Water System is a Community Public Water System. The system provides domestic water to 403 service connections for a total average population of 1350 people (estimated). The water system serves Johnson Village and a small portion of Johnson Town, including residences, Johnson State College, and many businesses. The average daily demand for July 2018 is 100,074 gallons per day (GPD) and the maximum daily demand is not to exceed 408 gallons per minute. Table 1 provides more information on the water system.

The Public Water System Permit to Operate was issued by the Vermont Drinking Water and Groundwater Protection Division on October 31, 2012. The most recent sanitary survey inspection was performed on September 5, 2017.

The distribution system consists of 6-8 and 12 inch PVC and ¾, 1, and 1 ¼ inch copper, and 2, 4, 6, 8, and 10-inch cast iron piping.

The Water System has chlorine disinfection capability for the Nadeau/Route 15 Well (Source 001) with over 20 minutes of chlorine disinfection contact time. Chlorine is introduced at this well source as necessary in order to maintain a measurable free chlorine residual to the distant ends of the distribution system.

The Collins Hill Storage Tank, a poured in place concrete tank, holds 355,000 gallons of finished water. A submersible pump in the Nadeau Well delivers water through treatment and directly to the distribution system. Through the distribution system, water from both the groundwater sources flows under pressure up to the Collins Hill Storage Tank.

The Clay Hill Pump Station, consisting of two booster pumps serving three rubber-bladdered hydropneumatic pressure tanks, delivers water to service connections in the Clay Hill service area. The three Katy Winn Pump Stations deliver water to three different service lines within the Katy Winn Mobile Home Park.

Table1. Summary of System Information for Village of Johnson - WSID 5156

System Name	Village of Johnson Water Department
Water Supply ID Number	WSID 5156
Public System Type	Community Water System
Number of Connections	406
Population Served	Estimated 1350
Average Daily Demand	100,074 GPD
Maximum Daily Demand	Not to exceed 408 GPM
Permit Issued	10/31/12 No expiration date
System Contacts	Chief Operator – Dan Copp Administrative Contact – Meredith Birkett Owner/Official – Johnson Village Board of Trustees

New Well Treatment Building

New Well Treatment Building

II. SOURCE AND PROTECTION AREA DESCRIPTIONS

A. Description of the System Sources

The Village of Johnson Water System has one permanent, full-time source and one back-up source. These sources are two gravel wells known as the Nadeau/Route 15 Well (Source 001) and Gravel Well A (Source 003). Source 002 – French Brook – has been abandoned. Table 2 provides additional information on both of these groundwater sources.

Route 15/Nadeau Well (WSID 5156 Source 001)

The Route 15 Well, locally known as the Nadeau Well, serves primarily as a back-up source for the Johnson Village Water System. The well is "exercised" on a regular basis but is not used as a primary source. Eventually it is hoped to retire this well and replace it with another source. The proximity to Route 15 means this well is subject to greater risk of contamination than the Osgood well.

This well was constructed on land owned by the gravel pit, and was installed by the Village long before there was a Wellhead Protection Plan requirement. The current owner(s) of the gravel pit are very concerned that the WHPA imposes land use limitations on their property and would like to see the well re-located. Due to the major capital costs associated with the 2006 Water System Improvements, it is not likely that the well can be re-located any time soon, but this plan should recognize the landowner concerns.

The well is located east of Johnson Village off of Route 15 just north of the former asphalt plant and southwest of the Katy Win Mobile Home Park. This location is just south of the Johnson Village line and between the intersections of Route 15 with 100C and Collins Hill Road. The altitude of the well is approximately 624 feet.

The Nadeau Well was drilled in 1971 at a depth of 139 feet with a casing of 8 inches. The casing is steel and extends approximately 135 feet below the ground. The static level is approximately 110 to 113 feet and the drawdown level is approximately 113 to 115 feet. The driller's yield for the well is 275 GPM with a permitted yield of 230 GPM.

The well pumps water using a 15Hp motor at 230 GPM to the pump house and the water enters the distribution system directly.

	
Nadeau Well Building	Nadeau Well & SPA Zone 1
	
Gravel Well A	Gravel Well A – SPA Zone 1

Table 2. Summary of Well Information for Johnson Village Water System, Vermont.

WSID	System Name	Source Number	Source Name	Source Use	Type	Depth (feet)	Casing	Date Drilled	Yield (GPM)
5156	Johnson Village WS	001	Nadeau Well	Permanent Back-up	Drilled Gravel Well	139	135 feet of 8 inch steel	October 1971	275
5156	Johnson Village WS	003	Gravel Well A	Permanent Full Time	Drilled Gravel Well	95	16 inch & screen	February 2004	286

Nadeau Well – SPA Zone 1

New Well – SPA Zone 1

Gravel Well A (WSID 5156 Source 003)

Gravel Well A, locally known as the Osgood Well, serves as the primary permanent, full time source for the Johnson Village Water System. The Osgood Well went online during December 2006. The well is located just west of Johnson Village off of Route 15 below the Highland Heights Mobile Home Park. This location is across the river from the southwest corner of the Johnson Village boundary. The altitude of the well is approximately 420 feet.

Gravel Well A provides the primary source of water for the Village of Johnson. The well was drilled in 2004 at a depth of 95 feet with a sixteen-inch casing. The casing is steel and extends approximately 85 feet below the ground. The hydraulic base is 85 feet below grade and the static level is 20 feet below grade. Based on pump tests, the sustainable long term yield is estimated to be to 286 GPM. Based on actual pumping data, it is assumed this well may produce in excess of the pump yield tests. Gravel Well A has over 50 feet of watertight casing and is more than 150 feet from surface water, and therefore qualifies for an exemption from the MPA testing requirement. The water chemistry is typical of groundwater. Therefore, the well is not under the direct influence of surface water. A completed MPA exemption form was submitted to the Drinking Water and Groundwater Protection Division and an exemption was granted on October 2, 2004.

Collins Hill Reservoir

The old Collins' Hill Reservoir was built prior to 1935 and refurbished in 1974. This reservoir, located on the north side of Collins' Hill Road within the Village, served as a storage area for excess waters in the distribution system but has been abandoned. In December 2005, a new reservoir was constructed on the same site. This reservoir has the capacity to store 355,000 gallons of water.

B. Description of Source Protection Areas

A Source Protection Area is defined as "the surface and subsurface area through which contaminants are likely to move toward and reach water supplies" (Vermont Water Supply Rule). The purpose of delineating a Source Protection Area is to determine the recharge area that supplies water to a public water source. The recharge area or Source Protection Area for a groundwater source is defined by the nature of subsurface flow and that induced by pumping. Within a Source Protection Area, land uses and/or naturally occurring materials may cause a public water system to be vulnerable to contamination. While naturally occurring contaminants can usually be controlled by treatment methods, potentially contaminating land uses can be managed by activities outlined in a Source Protection Plan. A Source Protection Plan identifies water system vulnerabilities and enumerates techniques to manage potentially contaminating land uses.

Source Protection Areas for Public Community Water Systems may be delineated using the following methods:

1. Calculated fixed radius

2. Simplified variable shapes
3. Analytical methods
4. Hydro geologic mapping
5. Flow models

The Source Protection Area of Public Community Water Systems is further classified into three zones:

- Zone 1 – 200 foot radius around well
- Zone 2 – Estimated zone of influence with "probable impacts"
- Zone 3 – Remainder of recharge area (2 year travel time for sewage disposal)

Zone 1: is a 200-foot radius around the well, also known as the sanitary radius. This is the area where impacts are likely to be immediate and certain. The Sanitary Radius is the most critical area for protection. Only activities that are related to the water system should occur within the sanitary radius. The sanitary radius should be under the control of the water system.

Zone 2: Consists of contributions from the monitoring radius as established as part of the Source Interference Testing for new systems and outside Zone 1. This zone is based on criteria such as water usage and pump test rate and is the area where impacts are probable from potential sources of contamination.

Zone 3: Is the outer most boundary of the Source Protection Area. Zone 3 consists of the remaining recharge area not delineated in Zone 2 and is the area where possible impacts from potential sources of contamination may occur. This area may also be thought of as the area supplying recharge to the public source simply by natural groundwater flow. A two-year travel time zone is used to identify a protection area to provide adequate protection from pathogen threats resulting from onsite disposal of sewage.

Town Geology and Soils

The surficial geology of the Johnson region is dominated by both till and lacustrine sediments deposited by the late Wisconsinan advance of the Laurentide ice sheet and a series of glacial lakes that occupied the river valleys during retreat. The most common till at the lower elevations is relatively loose, has a fine sand or silt matrix, and contains only sparse erratics that are cobble size and larger. The bedrock valley of the Lamoille River and smaller tributaries are deeply buried beneath ice-contact, lacustrine, and modern alluvial sediments west of Ithiel Falls in Johnson. An esker system is exposed in the village of Johnson continues west along the Lamoille valley, but is deeply buried. Water well logs have allowed us to partially trace this esker and to document its utility as a high-yield, although hard-water-bearing, confined aquifer. Thick sequences of undeformed, varved lacustrine silt and clay fill much of the valley bottoms.

The soil structure attributes in Johnson provide both opportunities and limitations for construction and agriculture. The Adams/Colton/Duxbury association is found in level to steep areas along the Lamoille and Gihon Rivers. This soil includes excessively drained and

well drained sandy soil and is a main source of sand and gravel. The Berkshire/Marlow/Peru association includes well drained to somewhat poorly drained, loamy soil that is suitable for wildlife habitat, recreation, woodland and found across portions of southern uplands and Johnson Village.

The Town of Johnson and Lamoille County are some of the most gravel rich areas of the state. Since gravel is a non-renewable resource, it is important to plan for its wise use. Areas which are likely to be gravel rich should be identified and noted so that the resource can be extracted as needed in the future. Underground talc mining in Johnson ended in the mid 1980's, but the extent of the remaining talc deposit and its economic viability today is uncertain at best.

Nadeau Well (Source 001)

The source protection area has been delineated by the Drinking Water and Groundwater Protection Division of the Department of Environmental Conservation and consists of three specific areas. Zone 1 consists of a 200-foot radius circle around the well and is considered the well isolation zone within which no activity that may impact the water quality should be allowed. Zones 2 and 3 are considered the areas of primary contribution to the well and are areas where land uses should be monitored for their impact on water quality at the well site. The area of the SPA is of mixed use; rural residential, commercial, manufacturing/ industrial, there is no agricultural activity within the SPA. The total source protection area is approximately 161 acres (0.25 square miles). It should be noted that the delineation of the well head zone is not based on detailed hydrogeological testing. The owner of Nadeau Sand and Gravel is on record as objecting to this delineation and methodology and believes the recharge area is overstated.

Gravel Well A (Source 003)

The hydrogeologic setting for Gravel Well A is the Lamoille River Valley. The well is located on a flat field about 300 feet north of the river, outside of the 100-year floodplain as mapped by FEMA. The well taps into a semi-confined gravel aquifer which consists of a buried former channel of the river. This former channel is located between 85 and 95 feet below grade at the wellhead, and was most likely deposited by glacial meltwater running through what is now the Lamoille River Valley. Beneath the productive gravel channel are layers of dense, non-water bearing sand, then a vertically thin productive gravel zone at 116 to 121 feet deep. The bedrock surface appears to be uneven, having been located at 114 to 121 feet below grade in test borings near the production well. Alternate layers of sand and gravel cover the most productive gravel zone, which were most likely deposited by later glacial melt events of lesser intensity. The total source protection area is approximately 180 acres (0.28 square miles).

The source protection area (SPA) for Gravel Well A consists of the following zones:

Zone 1: The default 200-foot radius circle, or well isolation zone

Zone 2: The area under the pumping influence of Gravel Well A, as determined by the pump test. This zone, which is generally 700 feet in radius around the well, was

delineated based on calculations of the well's zone of influence, and adjusted based on the site geology and individual observation wells.

A distance-drawdown plot was created from the responding well data. The end-of-pump drawdown levels were plotted for all affected wells. The distance-drawdown method was used to determine a zero-drawdown distance from Well A of 26,000 feet (5 miles), which is not a realistic representation of the well's zone of influence based on the facts that the most distant responding well was 600 feet away from the production well, and that wells 890 feet and further from the production well did not respond.

A second calculation method was employed to determine the extent of the zone of influence based on the interference monitoring. Using the average transmissivity and storativity values from the six responding wells, the zone of influence was calculated for the 180 days plus 3 day peak pumping scenario at 286 GPM. This method determined the zone of influence to be 700 feet in radius, which is consistent with the observations of responding and no responding wells during the test. An irregular-shaped Zone 2 was delineated based on the no responding well TW-4A near the river, and the Lamoille River itself which appears to be a hydro geologic divide. Test well drilling across the river indicates that the gravel channel does not cross under the river; hence the SPA's southern boundary is the edge of the river.

Zone 3: Created by delineating all land area topographically up gradient from Zone 2.

Two-Year Time of Travel Zone: A 2-year time of travel zone was delineated in order to identify unacceptable areas for installation of wastewater disposal systems. The vertical flow rate from the ground surface to the aquifer, and the horizontal flow rate through the gravel aquifer to Gravel Well A were individually calculated in order to map out the two-year travel zone. The groundwater velocity through the aquifer was calculated using Darcy's Law, based on the gradient to Gravel Well A under pumping conditions, thus taking into account the well's cone of depression. The permeability values used in the calculation were measured from the pump test: the aquifer-wide average transmissivity value from the observation well monitoring, divided by the saturated thickness observed at Gravel Well A, equals the permeability. Finally, textbook values for porosity were used.

Town and Village Planning

The 2011-2016 Johnson Town Plan and 2013-2018 Johnson Village Plan recognize the existence and importance of ground water and wellhead protection. The following are excerpts from those plans.

Village and Town Plan, Groundwater Resources Section

"Groundwater is the source for over 90% of the drinking water for rural communities in Vermont. It is replenished through rain and surface waters which percolate through the soil. Any activity that introduces contaminants directly into the

ground (such as underground storage tanks, septic disposal fields, abandoned wells, junk cars and agricultural activities) can affect groundwater quality. Since surface waters may also travel underground, surface water quality may affect groundwater quality as well.

Groundwater is an important source of drinking water for Johnson residents. For homes outside of the Village Water System service area, groundwater is the primary source of drinking water.

Public groundwater sources in Vermont are assigned a Source Protection Area (SPA). SPAs are defined as the surface and subsurface areas from or through which contaminants are reasonably likely to reach a public water system source. The state Agency for Natural Resources (ANR) Drinking Water and Groundwater Protection Division is responsible for the Vermont Source Protection Program. A public water supply is defined as one serving fifteen or more connections or 25 or more people.

There are five Source Protection Areas in Johnson. The first is an area defined by a 3,000-foot radius around the Wescom Trailer Park wells. The second is a hydrogeologically delineated area around the Nadeau Well, which is supposed to be a back-up supply well for the Village Water Department but is used daily to meet peak demand. The third and fourth protection areas are in the northeast corner of town, and are delineated for the protection of the North Hyde Park Fire District #1 and Mountain View Mobile Home Park. The fifth source protection area surrounds a new well build in 2006 and serving the Johnson Village water system. The well is located just west of Johnson Village off Route 15 below the Highland Heights Mobile Home Park and serves as a permanent and primary source."

Water Supply Section

"Residents within the Village are serviced by a municipal water system, which is managed and maintained by the Village Water Department. Connection to the system is decided on a per case basis by the Village Trustees. The Johnson State College campus is also connected to the Village system. Residents outside the Village supply their own water through on-site, private systems (e.g. springs or wells).

There are two sources of public drinking water: The Nadeau Well located southeast of the Village and drilled in 1974, and the new Osgood well just west of Johnson Village off Route 15 drilled in 2004."

Since the last Plan update the Village has completed a major water supply improvement project that implemented the following improvements to the public water system:

- Acquisition of a property where a new water supply well was located, drilled and tested in 2003-2004. Final development of water source, and construction of filtration plant for manganese removal.
- Replacement and construction of water mains and hydrants and new 350,000-gallon storage reservoir for improved domestic water and fire service in the Village.

- Improvements to the existing Nadeau well to serve as a back-up supply.
- Replacement of the two existing water booster pump stations
- Replacement of all customer water meters
- Abandonment of the French Hill impoundment and filtration building.

In addition, one of the Natural, Scenic and Historic Resource Policies refers to protecting the quality of public drinking water supplies and restricting development in Source Protection Areas.

The purpose of the Well Head Protection Town Sewer Service Area district overlay is to serve a significant public benefit by protecting the public health and investment of public funds in the so called Osgood water supply by limiting land uses to those that will not harm the Public Water Supply.

Gravel Well A – Wellhead

Gravel Well A – Wellhead

III. INVENTORY OF POTENTIAL SOURCES OF CONTAMINATION AND ASSESSMENT OF THREATS

In order to assess current and future impacts from land uses in the Source Protection Areas, past land use was reviewed, existing zoning and planning options were determined, and a review of current property owners and their associated land uses was conducted. Windshield surveys were conducted by system operators and Vermont Rural Water Association staff during the summer of 2005, 2008 and 2015. In addition, all past source protection plans and well evaluation reports were examined. This information has been combined for the current inventories of Potential Sources of Contamination for the two Johnson Village Water System sources: Source 001 – Nadeau Well and Source 003 – Gravel Well A.

Figure 4 shows the zones of the Source Protection Area for the Johnson Village – Nadeau Well, and numbered Potential Sources of Contamination which are further explained in the next section. Figure 5 shows the zones of the Source Protection Area for the Johnson Village – Gravel Well A, and numbered Potential Sources of Contamination which are further explained the next section.

After the Potential Sources of Contamination inventories were completed, PSOCs were ranked "Low", "Medium" or "High" based upon factors such as: distance to source, toxicity of element, elevation, and geology.

A. Nadeau Well

Current land uses identified with the Source Protection Area for the Nadeau Well include: rural residential, commercial, and manufacturing/ industrial. There is no agricultural activity within the SPA.

Zoning within the Source Protection Area

Approximately one-third of the Nadeau SPA lies within the Johnson Village boundaries. As of August 2018, the Town of Johnson is in the process of implementing Form Based Code zoning in a portion of the Village, but none of the SPA lies within the area for the proposed zoning. The Village of Johnson Leases a small parcel (approximately 1 acre) immediately surrounding the Nadeau wellhead and pump building. The road frontage includes 239 feet on Vermont Rte. 15 for protection of the well lot near Nadeau's pit.

Table 3. Potential Sources of Contamination Inventory and Risk Evaluation – Nadeau Well

PSOC	Name & Description	Property Type/Use	Zone	PSOCs	Risk
1	Route 15 – main transportation corridor	Transportation	1	VOCs Road Salt Sediment	High
2	Nadeau Garage and Gravel Pit: 3000 gallon diesel AST - alarmed, containment 1000 diesel AST for generator – double walled 500 gallon AST for used motor oil – double walled Hazardous Waste Site #941607 1000 gallon gasoline UST removed in 1994 Contamination was found and remediated SMAC designation as of 2007	Industrial	2	VOCs Hydrocarbons Lead	High (required due to identified haz site)
3	Katy Win Garage: 275 gallon AST – diesel Floor drain to holding tank	Commercial/Residential	3	VOCs Hydrocarbons	Medium
4	Residences – mix of town sewer and septic	Residential	3	Bacteria Nitrates	Low
5	Possible heating oil UST in Katy Win MHP	Residential	3	VOCs	Medium
6	Residences – mix of propane and heating oil ASTs	Residential	3	VOCs Hydrocarbons	Low
7	Former Landfill – Nadeau owns presently In use during late 1950s Closed, no monitoring	Industrial	3	Unknown	Low
8	Old Town Landfill #JHL02 Conger owns presently Closed since 1970, no monitoring	Industrial	3	Unknown	Low

PSOC Details

There is one potential source of contamination within Zone 1:

PSOC #1: Vermont Rt. 15, a main transportation corridor, less than 90 ft. away. The above PSOC is considered high risk because it occurs within Zone 1.

There are no USTs within Zone 1.

There is one potential source of contamination within Zone 2:

There is one UST within Zones 2 and 3.

It should be noted that since the 2008 Plan Update PSOC sites Carroll Concrete and Pike Industries have been decommissioned and removed and no longer represent a possible source of contamination. Several USTs have also been removed as stated below.

PSOC#2: Nadeau Garage & Gravel Pit : Nadeau Sand and Gravel is a commercial gravel pit which has been operated by the Nadeau family for many years. The Nadeau family owns the land where the village well is located and made this water source available to the Village many years ago, long before Wellhead Protection Plans were required. Based on a meeting with Andre Nadeau the inventory of the premises includes:

1. 3,000 gal. Highland AST with closed top steel dike containment for diesel fuel, 2006.
2. 1000 gal. Double wall AST, diesel fuel for generator, 2002.
3. 500 gal. Granby doublewalled AST, used motor oil, 2006.
4. 1000 gal. ACF AST, propane tank heating fuel - Jack F Corse 1956.
5. 6 55 gal. Drums, motor and hydraulic oil, in steel container. 2003
6. On-site septic system, 1000 gallon concrete septic tank and leachfield.

PSOC#2 was previously assigned a low/medium risk due to storage of diesel fuel and other petroleum products, and the presence of a septic system, in an area of alluvial deposits consisting of coarse sands and gravels which could permit the rapid movement of contaminants within the aquifer with possible impacts to the well. The risk can be considered on the low side due to efforts of Nadeau Sand and Gravel to provide double wall and steel dike containment systems for the storage of these possible sources of contamination.

As of the 2018 SPP Update, the PSOC risk is corrected to be high. While current land use is not likely to have an impact on groundwater, the presence of a hazardous waste site on the property requires the high risk ranking. A hazardous waste site within the SPA is an actual source of contamination, even if the contamination has been remediated and the site has received the SMAC designation. From the 2010 Vermont Water Supply Rule:

(k) detection of chemical or microbiological contaminants; and
(l) other factors which might help evaluate the level of risk as high, medium, or low.

For Zone 1 of a groundwater source, the risk ranking shall be "high" for any activity identified as a "prohibited land use" in Appendix A Subpart 3.3.1.2(e).

For any actual sources of contamination, the risk ranking shall be "high."

There are multiple potential sources of contamination within Zone 3.

PSOC#3: Katy Win Garage. An inventory of the premises included:
1. 275 gal. AST, diesel.
2. Floor drain to holding tank.

PSOC#3 is assigned a medium risk due to the floor drain/ holding tank system possibly failing in near proximity to the well but considerably down slope in an area of alluvial deposits consisting of coarse sands and gravels which would permit the rapid movement of contaminants within the aquifer and therefore directly to the well.

PSOC#4: Residential housing is located within Zone 3. This housing relies on the Village sewer system for waste disposal. The site marked with "#4" in Figure 4 is an individual septic system.

The #4 site is considered to be of low risk as it occurs at some distance and down slope from the well in an area of alluvial deposits consisting of coarse sands and gravels which would permit the rapid movement of contaminants within the aquifer and therefore directly to the well.

PSOC#5: In the 2008 SPP there were 3 underground storage tanks listed (UST) of heating oil; two in the mobile home park at #50 (Glynn, 1000-gallon?) and #28 (Langlois), Zone 3 and a 1000-gallon UST of heating oil at the S.R. Miller Insurance Co, Zone 2. The tank at S.R. Miller was installed in 1967 and assumed to be single wall. In 1997 this tank was exposed and new lines were fitted. At that time it was noted the tank was in good shape and did not show signs of rust. S.R. Miller notified the Village of Johnson on June 15th 2009 that the UST had been removed by the Veterre Group in 2004 and provided documentation to that affect, therefore that UST represents no potential risk. The owner of Katy Win Mobile Home Park has notified us that one UST remains at lot 28 (Morse) which would leave one UST remaining in the mobile home park. It must be assumed that within Zones 2 & 3 there is at least the potential for oil contamination due to these tanks. Sites marked with "#8" are the locations of the above UST's.

The one #5 site located in the mobile home park is considered to be of medium/high risk as the condition and age of these tanks is unknown. The tank at S.R. Miller has been removed and presents no risk. #5 site occurs at some distance from the well and down slope in an area of alluvial deposits consisting of coarse sands and gravels which would permit the rapid movement of contaminants within the aquifer and therefore directly to the well.

PSOC#6: During the windshield survey it was noted that aboveground propane tanks and stand-alone 275 gal. AST's of home heating oil were in use to heat homes. A single designation of #6 represents these heating oil tanks in Figure 4.

PSOC#7: Former Solid Waste Landfill #2208 is an inactive landfill, which in large part has been capped with a layer of waste concrete from the former concrete batch plant. This landfill has been abandoned for decades and was in use during the late 1950s. The former landfill is located along the southwestern edge of the SPA. This landfill is currently owned by Andre Nadeau. PSOC#7 is assigned a low risk.

PSOC#8: Former landfill currently owned by Conger (#JHL02). The northern landfill was the old town landfill that was in use during the late 1960s. It was closed in 1970 and no monitoring is required.

In addition, an Act 250 permit was identified within the SPA but it does not appear to be current so it is not included as a PSOC. Act 250 Permit #5L0923 was issued to George Desmaris for Katy Win MHP and self storage buildings.

B. Gravel Well A

Current land uses identified with the Source Protection Area for Gravel Well A include: residential development, Laraway Youth and Family Services (LY&FS), forested land, agriculture, transportation corridors, and commercial properties. The Village owns several acres surrounding the wellhead and future site of the pump building southwest of the Highland Heights MHP off Route 15.

Zoning within the Source Protection Area

The Source Protection Area (SPA) for Gravel Well A lies just outside the western Village boundary within the Town of Johnson. Currently, there is no zoning or land restrictions in the town or the Village.

PSOC Details

There are no potential sources of contamination within the Source Protection Area which pose a significant risk to water quality in Gravel Well A. The following PSOCs were identified in the source application: Jolly's Store (gasoline station, underground storage tanks), Vermont Electric Co-op (underground storage tanks), Laraway Youth & Family Services (LY&FS) cornfield (pesticides and fertilizers), and a handful the residential septic systems in the vicinity of the well. The onsite septic system serving the former Nichols property (now LY&FS) has been abandoned and sewage disposal is by connection to the Village sewer system. The former Vermont Talc Mill (industrial lagoons) and the Lamoille River are also identified, but are not in the source protection area. Test results indicate that as predicted, these PSOCs did not have an impact on the water quality in Gravel Well A.

In 2009, the Village of Johnson obtained an easement from LY&FS which provides significant protection to the Source Protection Area for Gravel Well A. The following language is an excerpt from that easement:

> "The above described premises are subject to the restrictive covenant that neither Grantor, nor its successors or assigns shall construct or maintain any land uses or improvements on or within the real estate conveyed to Sidney A. Nichols and Marian H. Nichols trustees of the Sidney A. Nichols trust and the Marian H. Nichols Trust by (1) Warranty deed of Sidney A. Nichols and Marian H. Nichols dated January 24, 1995 and recorded at Book 73 Page 277 and (2) Warranty deed of Clara S. Hopkins dated January 24, 1995 and recorded at Book 73 Page 275, in conflict with Appendix A, Standards for Water System, Design, Construction, and Protection, of Chapter 21, of the Vermont water Supply Rules, effective on September 24, 1992, and revised April 25, 2005 as amended. This real estate has a 9-1-1 address of 275 Vt. Route 15".

Sampling at the end of the pump test confirmed that wastewater indicators such as nitrate, nitrite, chloride, surfactants, and coliform bacteria were either non-detectable or present at background levels. No volatile organic compounds or pesticides were detected in the well water, showing no impact from the cornfield or the USTs. The former Vermont Talc Mill is located across the Lamoille River where nearby observation wells showed no hydraulic

connection to Gravel Well A; the mill is outside of the source protection area. These data demonstrate that the PSOCs identified in the Source Application have not impacted water quality in the aquifer.

PSOC #1: There is currently one potential source of contamination within Zone 1, which is mainly composed of an open meadow. A diesel backup generator next to the well building has a new 250-gallon double walled storage tank. This is a high-risk PSOC.

There are multiple potential sources of contamination within Zone 2:

PSOC#2: Residential properties and single-family homes which may include one or more of the following PSOCs:

1. Septic systems
2. Heating oil tanks
3. Driveways
4. Private Wells

PSOC#2 is assigned a medium risk due to the upslope proximity of the homes to the well. Two homes within the SPA along Route 15 will be hooked up to the town sewer in the near future.

PSOC#3: LY&FS Field – This agricultural use may include one or more of the following, however, the property is now subject to a Well Head Protection Easement, which specifically limits all land uses on the property to those that would not have an impact on the Source Protection Zones. PSOCs:

1. Fertilizers
2. Pesticides
3. Erosion and Runoff

As of summer 2015, LY&FS has leased the former cornfield to Foote Brook Farm. The crops planted are rotated annually. The farm is certified organic, so no chemical fertilizers or pesticides will be applied. The Laraway School has a small section of farmland in the SPA that is also organic. They are currently planting trees on this parcel. In June 2018, LY&FS notified the Village that they were have trouble with poison ivy growth within the SPA. LY&FS verified that no herbicides could be used to eradicate the poison ivy, which the Village confirmed. This correspondence between the Village and LR&FS is a good indication that the parties understand the need to protect water quality within the SPA.

PSOC#3 is assigned a low risk.

There are also multiple potential sources of contamination within Zone 3:

PSOC#4: Highland Heights MHP:

1. Highland Heights pumping station
2. Heating oil tanks
3. Driveways

4. Two abandoned PWS wells – cut and capped – abandoned?

PSOC#4 is assigned a low risk.

PSOC#5: Jolley Store – formerly Bradley's General Store

1. Three 10,000 gallon gasoline tanks installed in 1996
2. One 10,000 gallon diesel tank installed in 1996
3. One 10,000 gallon kerosene tank installed in 1996
4. One 1000 gallon fuel oil #2 or #4 tank installed in 2004
5. Hazardous Waste Site #96-2025:
   Four USTs were pulled in 1996 – two 4000 gallon gasoline, one 2000 gallon gasoline and one 1000 gallon diesel UST. Groundwater contamination was found in monitoring wells – benzene, toluene, xylenes, and MTBE. There was no GW contamination detected off site.

PSOC#5 is assigned a high risk due to the presence of a hazardous waste site.

PSOC#6: Vermont Electric Cooperative property:

1. 6000 gallon gasoline UST installed in 1997 – double walled and alarmed
2. 6000 gallon diesel UST installed in 1997 – diesel generator
3. Substation transformers have been relocated inside new building and do not contain PCBs
4. Parking lot – stormwater
5. Hazardous Waste Site #92-1235:
   One UST was pulled in 1992 – one 4000 gallon gasoline tank. Two additional USTs were pulled in 1997 – gas and diesel. VOC contamination was detected and a release of hydrocarbons was reported. There was no GW contamination detected off site. The site received a SMAC designation on November 18, 2013.

PSOC#6 is assigned a high risk due to the presence of a hazardous waste site.

PSOC#7: Route 15 – Regional Transportation Corridor

1. Road salt
2. VOCs

PSOC#7 is assigned a medium risk due to the high use of the state road.

Stormwater Permit #3932-9001 expired in 2008 but was issued for Village of Johnson Water Ssytem Improvements. Construction has been completed and is no longer a risk.

In addition, several Act 250 permits were identified within the SPA but do not appear to be current so they are not included as PSOCs. Act 250 Permit #5L0179 was issued to Clifton Wescom Jr for expanding existing MHP by 32 additional lots. Act 250 Permit #5L1512 was issued to LY&FS for renovating existing farmhouse and barn into offices and classrooms.

Table 4. Potential Sources of Contamination Inventory and Risk Evaluation – New Well

PSOC	Name & Description	Property Type/Use	Zone	PSOCs	Risk
1	Diesel Generator at Well Building 250 gallon double walled storage tank	Water System	1	VOCs Hydrocarbons	High
2	Residential properties and single-family homes: Mix of Septic systems and town sewer, heating oil tanks, driveways, private wells	Residential	2/3	Bacteria Nitrates VOCs Various	Medium
3	LY&FS Fields – all organic or leased to organic vegetable producer – products used include NEEM and baking soda	Agricultural	2/3	Organic fertilizers and pest control	Low
4	Highland Heights MHP: pumping station, heating oil tanks, driveways, two abandoned PWS wells	Residential	2/3	Bacteria Nitrates VOCs Various	Low
5	Jolley Store – formerly Bradley's General Store: Three 10,000 gallon gasoline tanks, one 10,000 gallon diesel tank, one 10,000 gallon kerosene tank and one 1000 gallon fuel oil #2 or #4 tank **Hazardous Waste Site #96-2025:** Four USTs were pulled in 1996 – two 4000 gallon & one 2000 gallon gasoline and one 1000 gallon diesel UST. Groundwater contamination was found in monitoring wells.	Commercial	3	VOCs (Benzene, Toluene, Xylenes, MTBE detected)	High
6	Vermont Electric Cooperative property: One 6000 gallon gasoline UST & one 6000 gallon diesel UST **Hazardous Waste Site #92-1235:** One UST pulled in 1992 – 4000 gallon gasoline tank. Two additional USTs were pulled in 1997 – gas and diesel. VOC contamination was detected.	Commercial/ Industrial	3	VOCs Hydrocarbons	High
7	Route 15 – main transportation corridor	Transportation	3	VOCs Road Salt Sediment	Medium

IV. MANAGEMENT OF RISK

After reviewing the potential sources of contamination inventory for each of the sources, the water system developed a list of management priorities. These activities are discussed more specifically in the summaries below.

A. Education and Outreach

The Johnson Village Water System and its partners will begin implementing an education and outreach campaign. Public education and outreach are central to this plan because increased awareness leads to better management of contamination risks within the Source Protection Areas.

A letter and copy of the SPP will be sent to local and regional planning boards and state agencies to notify them of the location of the public water sources and the source protection areas. A copy of an example letter is presented in Appendix A. This letter will be sent out within three months of receiving state approval of this plan. The mailing addresses are presented in Appendix B.

A letter and map of the SPA will be sent to all property owners located within the SPA, to notify them that their property is located within the SPA for the Johnson Village public water system. A list of property owners is provided in Appendix B. A copy of educational materials regarding relevant topics such as septic system maintenance and the proper disposal of hazardous materials will be sent with each notice. A sample letter is found in Appendix A.

The Village will post the updated Source Protection Plan on the municipal website and will also create a post and link for the Village Facebook page to make residents and property owners aware of it.

B. Source Protection Areas – Zoning, Planning, and Land Purchase Options

Village of Johnson Water System and the Vermont Rural Water Association will work with the Johnson Village Trustees and Johnson Planning Commission to discuss options for municipal protection of each SPA. In August 2016, the Village and Town of Johnson, with the assistance of the Lamoille County Planning Commission (LCPC), passed a unified Municipal Development Plan and future versions of the plan will consider wellhead protection zoning districts and overlay districts as potential tools to further protect the SPAs.

C. Contingency/Emergency Response/Security

Johnson Village will continue discussing ways to increase security throughout the water system. The wellheads and pump buildings have been and will continue to be inspected to determine if there are any low-cost ways to prevent tampering or possible contamination of the water supply. Signs that are available from the Vermont Rural Water Association include "Source Water Protection Area" and "Federal Offense for Tampering with this Facility."

The new well has been secured with a concrete vault. In addition, a security system was installed at the new water treatment facility next to the well. Signs will be posted at the perimeter of the new SPA.

Also since 2008, most of the private wells within the new SPA have been abandoned.

D. Town Infrastructure

On Site Sewage Systems are regulated By the State of Vermont

The Village of Johnson has a duly adopted Water System Rules and Regulations as well as Sewer Ordinance, regulating the connections for water and sewer. A Spill Prevention Control and Countermeasures Plan was drafted in 2005 and updated during 2008. This Plan addresses the town and village maintenance garages and College Hill substation. The source protection areas are identified on the maps included with this plan.

Johnson Wastewater Treatment Facility

Johnson Village owns and operates a municipal wastewater sewage treatment plant built in 1968. In 1969, all houses in the Village for which it was physically possible were required to connect to the system. The Village sewer district currently encompasses the entire Village plus two sewer service areas located in the Town. Not all development in the Village is required to connect to the system, although application for connection is required. Development in the Village not connected to the system is required to have an approved onsite system. The Village Trustees decide about extensions of sewer mains on a per case basis. The Wastewater Treatment Plant's capacity has been expanded to handle a daily capacity of 270,000 gallons. Highland Heights MHP and Johnson MHP have all been connected to municipal sewer and water and the sewer mains and pump station are under the control and care of the Village of Johnson. These parks are located in and outside the west boundary of the Village. The Water System will consider advocating for the possibility of adding more homes in source protection areas to the wastewater system.

Town Roads

The Village will maintain an open dialogue with the State of Vermont Agency of Transportation and the Town of Johnson Road Commissioner related to best management practices for road maintenance and salt use within the SPA areas. At this time, few salt alternatives are feasible because of cost and/or de-icing effectiveness. Once current studies are completed and more information becomes available, the alternatives should be re-evaluated.

E. Source Water Protection Committee – Plan Updates

The Johnson Village System Operator and Responsible Person will oversee implementation of the measures outlined in this Source Protection Plan. They may also comment on development proposals that are located in the Source Protection Areas. After the management activities in this plan have been implemented, a designated representative should review the plan once per year. The system operator will perform an inspection of the

SPA every three years to confirm that all parties are following best management practices, and to identify any changes in land uses or property owners. Updates indicating any changes in land use or PSOC's will be submitted to the Drinking Water and Groundwater Protection Division. The updates may simply consist of a letter, which describes any changes to the original SPP or a letter stating that there have been no changes. See Appendix G for information on updating the plan.

The Johnson Village Water System reserves the right to amend or update this plan before the three-year submittal cycle has been completed.

V. CONTINGENCY PLAN

The Contingency Plan outlines the steps that the water system may take in the event that their well becomes contaminated, is at imminent risk of becoming contaminated (e.g., due to hazardous contaminant spill in the vicinity of the well), or declines in yield. The Vermont Drinking Water and Groundwater Protection Division considers a source to be in an emergency situation if the source experiences water quality problems, environmental releases, or water quantity problems. Examples of an interruption of service include power outages or mechanical failure. The plan may also be implemented if there are mechanical problems with the water system which require repair.

The above possible situations may result in a loss of water supply for the village for a number of hours, days, weeks, or even permanently. The Contingency Plan specifies emergency response procedures including names and phone numbers of key people/officials that may be needed to solve the particular problem. The village will need to identify the appropriate people to call for each situation. In addition, short-term and long-term water supply alternatives are outlined. Being prepared for potential emergency situations will greatly improve the system's ability to address problems.

A. Water Supply Disruption Response Procedures

If an emergency occurs, such as a contaminant spill in the Source Protection Area or if a regulated compound is detected in the water supply above acceptable levels, the following notification procedure should be implemented.

Step 1: The person discovering the emergency situation will call the responsible person and/or the operator of the water system:

JOHNSON SYSTEM RESPONSIBLE PERSON	
Meredith Birkett Village Manager	802-635-2611 Office vojmanager@townofjohnson.com

JOHNSON SYSTEM OPERATORS	
Dan Copp	(802) 535-0575 Cell Dan.Copp@utilitypartnersllc.com
Steve Edgerley	(802) 730-9514 Cell

Step 2: The responsible person and/ or operator will then be responsible for notifying some of the following officials, depending on the nature of the situation:

EMERGENCY CONTACT LIST	
Statewide Emergency Services	911
Vermont State Police – Lamoille Cluster Office	(802) 878-7111
Lamoille County Sheriff	(802) 888-3502
Northeastern Ambulance	(802) 635-7511
Johnson Fire Department	(802) 635-7225

STATE CONTACT LIST	
Vermont Drinking Water and Groundwater Protection Division	Phone: 802-828-1535 Pager:: 802-741-5311
Vermont DEC Hazardous Materials Spills Hotline	(800) 641-5005
Vermont Department of Health	(800) 439-8550
VTrans St. Albans – Maintenance District #8	(802) 524-5926

SERVICE/REPAIR NOTIFICATION LIST	
Local Plumber – Spafford Wells	(802) 635-7222
Local Electrician – Pratt and Smith Electric	(802) 324-4750 (802) 893-1437(work)
Pipe Supplier – Ferguson	(802)223-6681 (cell)
Chlorine Supplier – Allen Engineering	(800) 649-5942
Water Testing Laboratory - Endyne	(802) 879-4333

TOWN AND VILLAGE CONTACTS	
Johnson Town/Village Clerk – Rosemary Audibert	(802) 635-2611
Village Manager – Meredith Birkett	(802) 635-2611
Johnson Health Officer – Sharon Duffy	(802) 730-2138
Johnson Village Trustees – Gordon Smith	(802) 730-9285
Johnson Wastewater Operator – Dan Copp	(802) 635-2951

It will be the RP's responsibility to determine who should be called on this list. If the RP is not available, the operator will assume this responsibility. Actions that may be considered include:

- Seeking advice from a consultant or the Vermont Drinking Water and Groundwater Protection Division
- Providing an alternate water source (bottled water, hauled water)
- Ordering repair equipment, or contracting for repair
- Remediating or cleanup related to a hazardous materials spill
- Providing water system treatment
- Implementing water conservation measures

B. Notification of Water System Users

In the event of a shutdown and use of an alternative source, the system operator will notify water users by one or more of the following methods:

- Door-to-door hand delivery
- Public posting (post office, store, town hall, library, etc.)
- Front Porch Forum and Municipal Webpage
- An announcement by radio on 93.9 WLVB in Morrisville
- Posting in the Morrisville newspaper *The News & Citizen*
- An announcement using the fire department public address system

Utility customers will be told the nature of the problem and expected duration. Short-term treatment options will be specified – such as boiling or do-not-drink orders. Notice of interruption of service for emergency repairs and maintenance is not typically required. While is it best for the operator to give notice to affected customers in advance of any interruption of service, it is not a requirement of the Village. In case of a water main break or other emergency repairs, water may need to be shut off without notice. Users such as Johnson State College and village businesses have special needs and should be contacted before shutting off the water if possible.

The Village has the right to restrict, curtail, or prohibit the use of water for secondary purposes in periods of drought or when deemed essential for the protection of public health, safety and welfare. The Village has the right to fix the hours and periods when water may be used for such purposes.

C. Short-Term Contingency Options

In the event that water from the Johnson Village Water System is determined to be unsuitable to drink or use, the following situation may occur:

- The first option is to shut down the unsuitable source and switch to an acceptable source
- When the water is deemed unsuitable for drinking, the Water System Operator will issue a Boil Water notice and/or recommend that bottled water be utilized for drinking water purposes. In the event of a coliform hit, notification and sampling procedures from the Vermont Drinking Water and Groundwater Protection Division should be followed.
- When the water supply has been deemed temporarily unsuitable for use, the Water System Operator will issue a "Do Not Use" notice indicating that water is only to be used for flushing toilets. In addition, treatment alternatives should be considered.
- In the event that water quantity problems arise, conservation measures will go into effect. These conservation measures may include:
  - water use only for drinking and food preparation
  - no irrigation of lawns and gardens
  - no washing of motor vehicles
  - no use of water for pools

Short-term water supply alternatives include bottled water delivery to individual homes or bulk water delivery to fill the reservoirs. Bottled water for use at individual homes serviced by Johnson Village Water System is available from the following suppliers:

BOTTLED WATER SUPPLIERS		
Vermont Heritage	Newport, VT	802-334-2528
Crystal Rock/Vermont Pure	VT and CT	800-525-0070
Misty Meadows	Rutland, VT	802-775-1172

A short term supply of water can be provided by filling the Johnson water reservoirs. A number of bulk water suppliers can provide 4000 to 6000 gallon loads. A water use restriction should be put in place to conserve supply in the event of water hauling. Sanitary tank truck delivery can be provided from:

BULK WATER SUPPLIERS		
Fresh Water Hauler	Underhill	802-658-2223
P & P Water Hauler	Williston	1-800-281-4100
A-1 Water Delivery	St. Albans	802-355-4892

D. Long-Term Contingency Options

No alternate water supplies are connected to the Johnson Village Water System. There may be a possibility of connecting to current of abandoned public water systems in the nearby vicinity, such as a well for a mobile home park. Although the Lamoille River runs through the Village, it is not acceptable as a potable water source but is available to supply water for fire-fighting purposes.

If a source from the Johnson Village Water System becomes continuously unavailable due to quantity or quality issues, the Village will initiate a program to determine future necessary steps. Decisions will be made to determine if, in the case of contamination, water can be treated until contamination is no longer present, or if the contaminated source(s) will need to be abandoned.

If existing sources must be abandoned or permanently modified, long-term options include:

- Drilling one or more new wells
- Installing an appropriate water treatment system

E. Water System Shut Down & Start Up Procedures

The procedure for a non-scheduled sequenced shutdown and startup for the Johnson Village Water System will be included in the Operations and Maintenance manual. If the contamination requires that the system well must be shut down for an emergency situation, the operators should follow the procedures outlined below:

Shut Down Procedures – Nadeau Well

To shut the system down:

1. Enter the pumphouse off Route 15 - just south of Katy Win Rd
2. Locate the HOA switch along the eastern wall
3. Shut the well pump off by switching to hand only
4. Switch off the breaker
5. Valves can be closed as necessary to facilitate repairs.

Shut Down Procedures – New Well

To shut the system down:

1. Enter the pumphouse off Wescom Road
2. Locate the "filter required" panel and HOA switch along the north wall

3. Shut down the well pump by switching to off
4. Switch off the breaker on the west wall panel
5. Valves can be closed as necessary to facilitate repairs.

Start Up Procedures – Nadeau Well

To re-start the system:

1. Open the valve from the well to the distribution line.
2. Turn the well pump on using the switch on wall.

Start Up Procedures – New Well

To re-start the system:

1. Open the valve from the well to the distribution line.
2. Turn the well pump on using the PLC switch.

VI. REFERENCES

Source Protection Plan, Johnson Village Water System
WSID #5156, Source 001
Prepared by the Northeast Rural Water Association

Gravel Well A: Source Evaluation Report
Johnson Village Water System
Prepared by Heindel and Noyes
August 18, 2004

Public Water System Permit to Operate
Johnson Village Water System WSID #5156
August 29, 2008

Vermont Water Supply Rule
Agency of Natural Resources, Department of Environmental Conservation
Revision Date 2010

Town & Village of Johnson
Municipal Development Plan, 2016-2024
Prepared by the Johnson Planning Commission

Online References:

Vermont Drinking Water and Groundwater Protection Division
http://drinkingwater.vt.gov/index.htm

Vermont Geological Survey
http://www.anr.state.vt.us/dec/geo/vgs.htm

Lamoille County Planning Commission
http://www.lcpcvt.org/

Town of Johnson
http://www.townofjohnson.com/

Vermont Rural Water Association
http://www.vtruralwater.org/

VII. FIGURES - Figure 1. Topographic Map

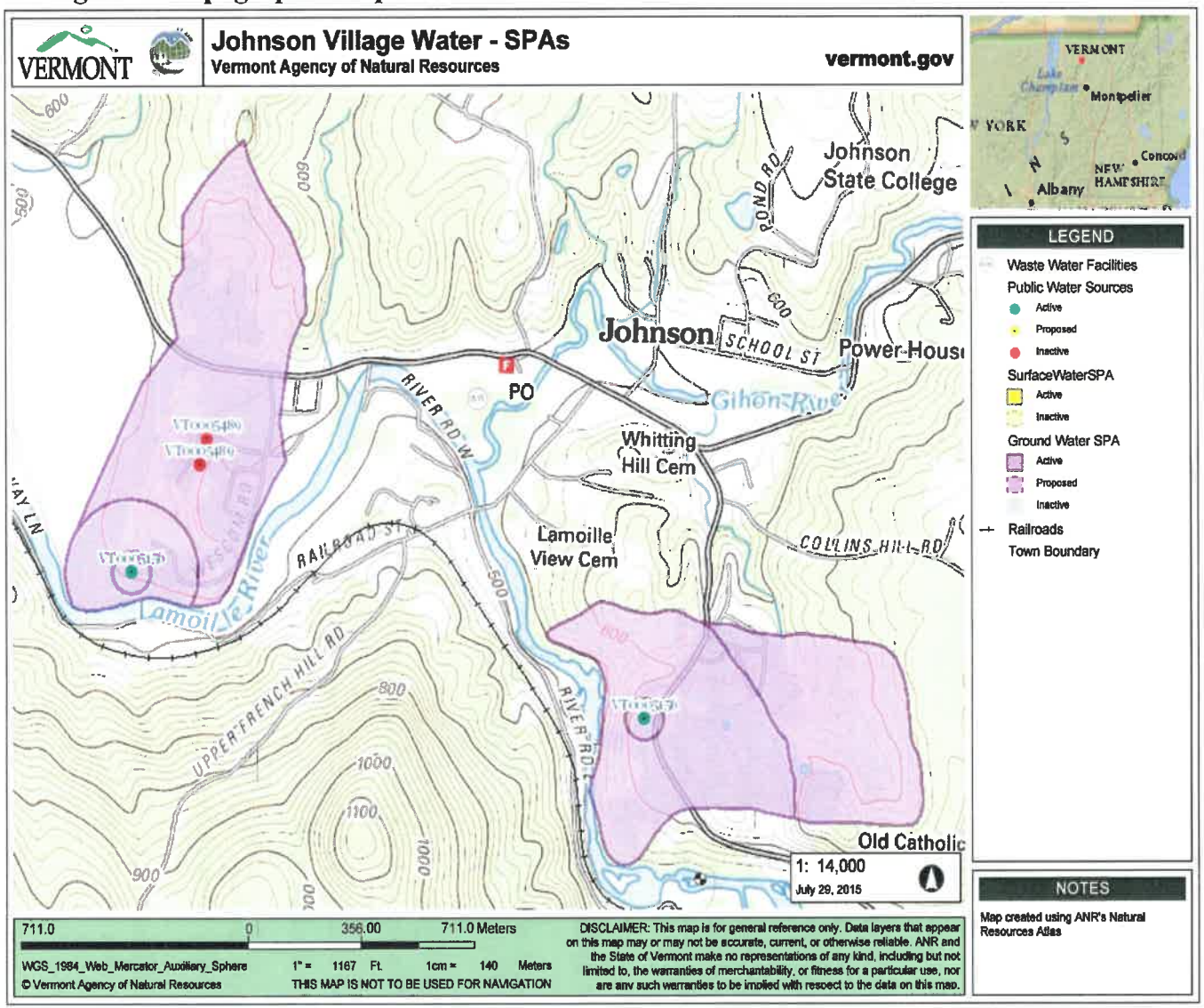


Figure 2. Orthophoto with Parcels – Nadeau Well

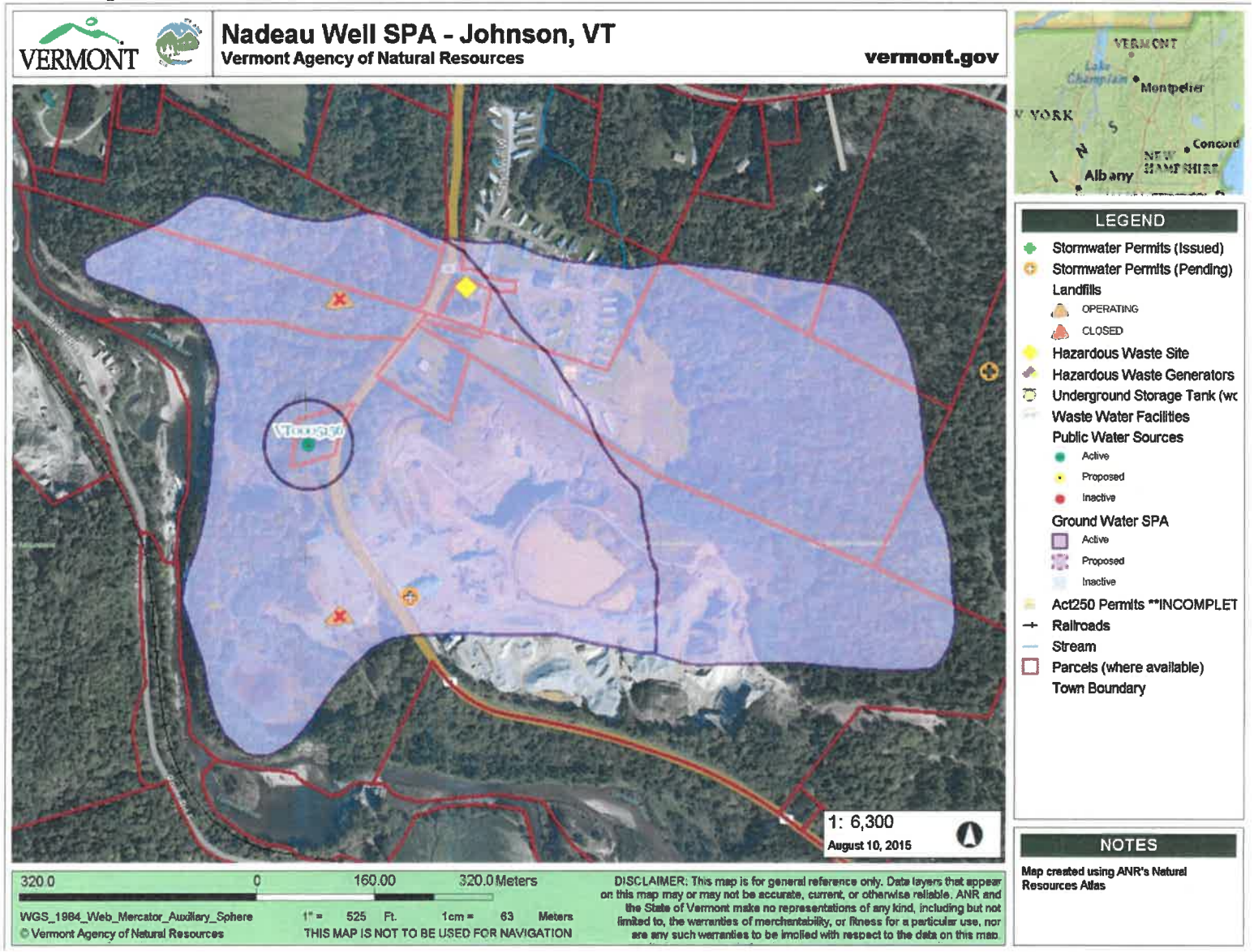


Figure 3. Orthophoto with Parcels – Gravel Well A

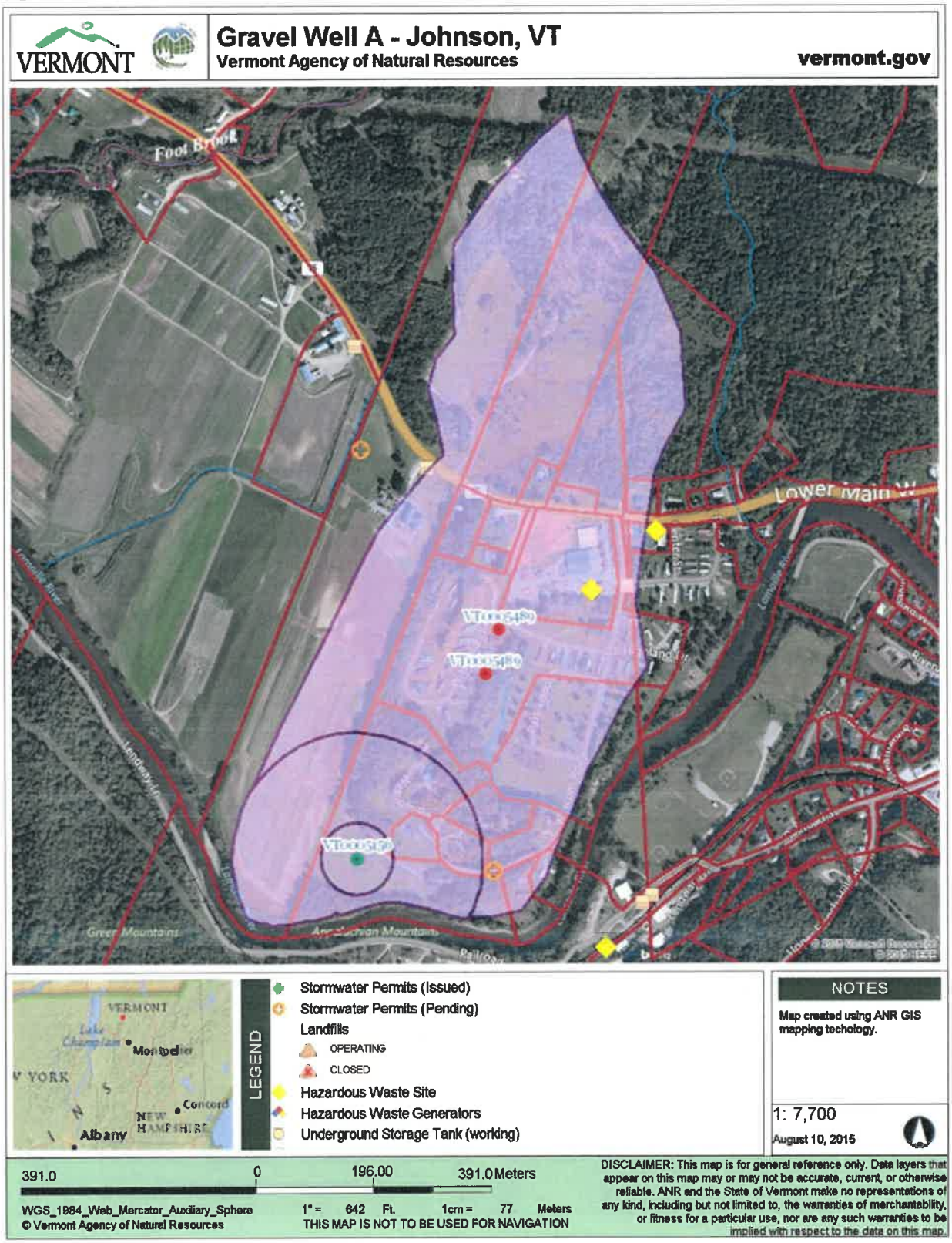


Figure 4. Potential Sources of Contamination Map – Nadeau Well (001)

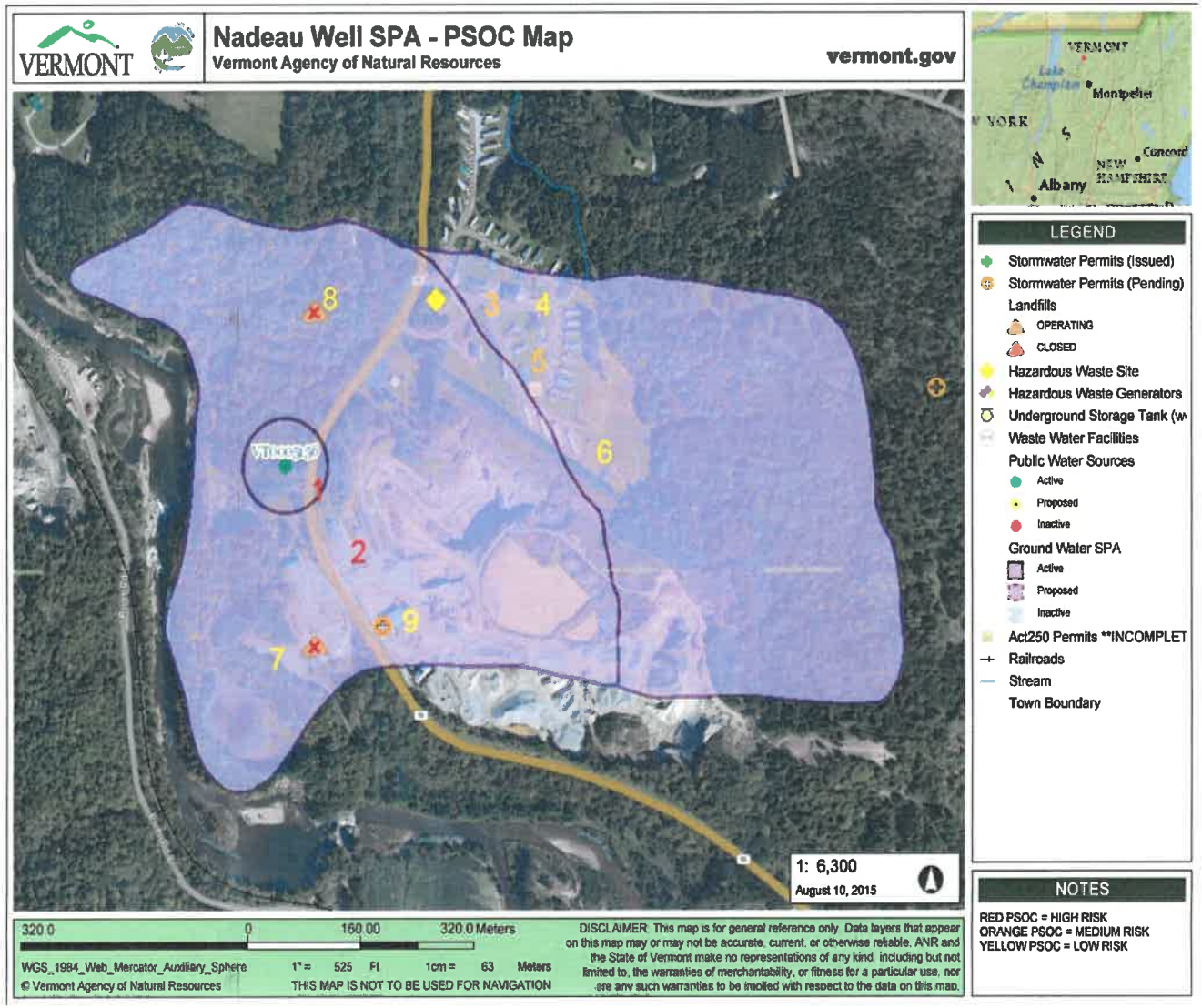
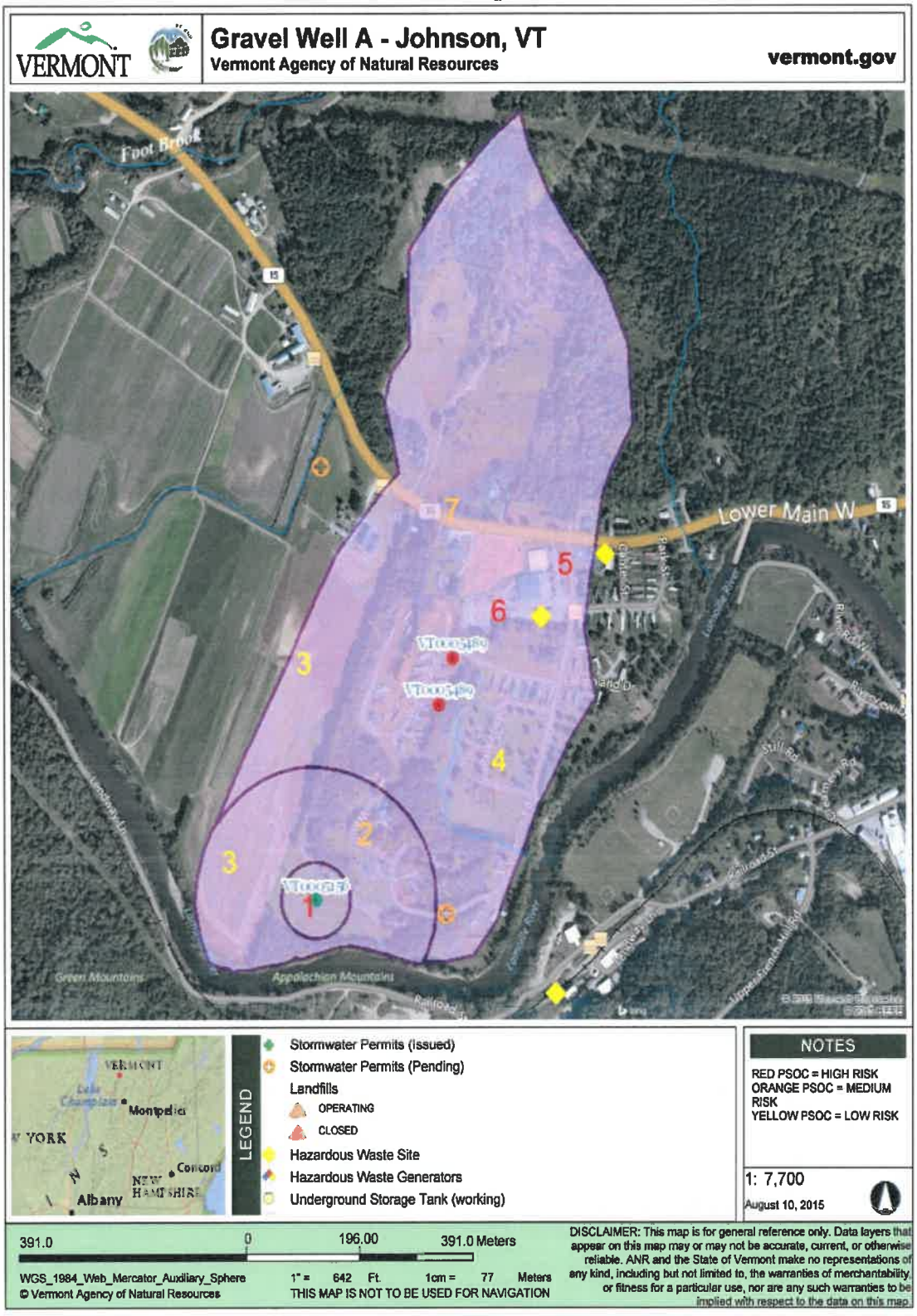


Figure 5. Potential Sources of Contamination Map – Gravel Well A (003)



VIII. APPENDICES

Appendix A. Letters to Landowners and Public Officials

Johnson Village Water Department
Johnson, VT 05656

September 4, 2018

Dear Landowner,

As required by the State of Vermont, the Village has been working to update a Source Protection Plan to protect the Village drinking water wells. The purpose of the plan is to identify potential contaminants and to manage and maintain the quality and quantity of our public drinking water sources.

Your land is located in one of Johnson's source protection areas (see enclosed map). If you own a home in one of the source protection areas, you may have already been contacted to provide information necessary in the development of this plan. A source protection area is the land from which contaminants are considered likely to reach a well. Within a source protection area, human land uses and naturally occurring materials may cause a public water system to become vulnerable to contamination. While naturally-occurring contaminants can usually be controlled by treatment methods, property owners are often able to manage their land uses to further lower the risk of contamination.

Land use activities that occur within a Source Protection Area have the ability to negatively impact a water source. For example, activities such as improperly disposing of household hazardous wastes and motor oil, overuse of fertilizer and pesticides, and spillage of gasoline or home heating fuel all have the potential to contaminate a water source. Many of the negative impacts associated with these activities can be avoided with good management.

If you have any questions, please contact the Johnson Village Water Department. Copies of the Johnson Source Protection Plan are available for review at the Municipal Office and the State of Vermont Drinking Water and Groundwater Protection Division in Montpelier.

Thank you in advance for helping us protect the drinking water in our community.

Sincerely,

Meredith Birkett
Village Manager

Johnson Village Water Department
Johnson, VT 05656

September 4, 2018

Dear State, Local and Regional Officials,

As required by the State of Vermont, the Village of Johnson has been working to update a Source Protection Plan to protect the village drinking water wells. The purpose of the plan is to identify potential contaminants and to manage and maintain the quality and quantity of our public drinking water sources.

Enclosed is a map showing the Source Protection Areas for the Johnson Public Community Water System. A Source Protection Area consists of the surface and subsurface area from or through which contaminants are likely to reach a water supply source. Land use activities located in the protection area have the potential to adversely impact water quality of the associated wells. If the ground water that supplies our well becomes contaminated, it may be impossible to eliminate the contamination so that the source can continue to be used for drinking water. We are proactively trying to protect our water sources by implementing a source protection plan of which this letter of notification is a part.

We are contacting you to request your assistance in protecting these water supplies. There are a number of ways in which your agency may be able to help with protection that can help reduce the possibility of contamination of the water supply. For example, please keep us informed of any related land use decisions or permitting issues and involve us in the planning and decision process where it is deemed appropriate.

On behalf of the Village of Johnson, I would like to thank you for your attention to this matter. If you have any questions, please contact the Johnson Village Water Department.

Sincerely,

Meredith Birkett
Village Manager

Appendix B. Addresses of Source Protection Area Landowners and Public Officials

NADEAU WELL – SOURCE 001 (updated October 2008, July 2015, and August 2018)

Plot #	Landowner Name and Mailing Address	Physical Address	Type
137236 01-27	Charles Conger PO Box 608 Johnson VT 05656	118 Clark Ave	42 ac DWL
136236 02-10	Johnson Village PO Box 383 Johnson, VT 05656		
136236 02-11	Nine A Holdings LLC Nadeau Family Trust 1980 VT Route 15 East Johnson, VT 05656	1908 & 1980 VT Rte 15 E	100 ac Plant DWL
136236- 02-12	S.R. Miller PO Box 600 Johnson, VT 05656	2146 VT Rte 15 E	2.3 ac office
136236 02-13	Christopher Tillotson 49 Currier Dr Johnson, VT 05656		1 ac & DWL
136236 02-14	Ship Seven II, LLC 334 Tamarack Shores Shelburne, VT 05482	Katy Win Rd	0.69 acres DWL
136236 02-17-01	David & Lauren Trautman 334 Collins Hill Rd Johnson VT 05656		10 ac & DWL
136236 02-18 (02-19)	Michael & Lorenda Dunham PO Box 332 Johnson, VT 05656	1140 Vt Rte 15 East	99 ac DWL

GRAVEL WELL A – SOURCE 003 (updated October 2008, July 2015, and August 2018)

Parcel ID	Name	Mailing Address	Physical Address	Type	WHPA Zones
136236-01-74	Camille & Pauline Lehouillier	453 VT Rte. 15 W Johnson, VT 05656	452 & 625 VT Route 15 West	279 acres 2 DWLS	3
136236-01-76	Laraway Farm Inc	PO Box 621 Johnson, VT 05656	275 VT Route 15 West	39 acres Family Services	2,3
13626-01-76-01	Ben & Stacey Waterman	242 VT Rte. 15W Johnson, VT 05656		39 ac DWL	3
13626-01-78	Linda Jones	134 VT Rte. 15 W Johnson, VT 05656		1.1 ac DWL	3
13626-01-79	Rebecca Hess Trevor Hess Jeffrey Hess	124 VT Rte. 15 W Johnson, VT 05656	98 VT Route 15 West	0.8 ac	3
136236-01-80	Town of Johnson	PO Box 383 Johnson, VT 05656	VT Route 15 West	20 ac	3
136236-01-81	Jolley Associates	P.O. Box 671 St. Albans, VT 05478	25 VT Route 15 West	0.95 ac Store	3
136236-01-81-01	Valley Ridge Properties	12 Bolger Hill Rd Jericho, VT 05465	36 VT Route 15 West	0.81 ac 2 DWLS	3
136236-01-83	Vincent & June Vespo Trust	18 Richard Ln, Huntington, NY 11743	193 VT Route 15 West	1.5 ac DWL	3

136236-01-84	Gary & Alice Foote	P.O. Box 202 Bakersfield, VT 05441	161 VT Route 15 West	1 ac Office Duplex	3
136236-01-85	Gary & Alice Foote	P.O. Box 202 Bakersfield, VT 05441	163 VT Route 15 West	0.65 ac 2 Apt Bldg	3
136236-01-86	Vermont Electric Coop Inc.	42 Wescom Rd Johnson, VT 05656		7.4 ac Offices Warehouse	3
136236-01-87	Kenneth & Martha Harvey	270-1 Harrel St Morrisville, VT 05661	Lower Main W	8.5 ac MH Park	3
136236-01-88	Joyce Ann Cleveland	420 Wescom Rd. Johnson, VT 05656		1.17 ac MH	2
136236-01-88.01	Kenneth & Martha Harvey	270-1 Harrel St Morrisville, VT 05661			3
136236-01-88.02	Shelia & Jeffrey White	262 Wescom Rd. Johnson, VT 05656		1.7 ac DWL	3
136236-01-88.03	Shelia & Jeffrey White	262 Wescom Rd. Johnson, VT 05656		0.48 ac	3
136236-01-88.04	Wilmer Davis	289 Wescom Rd Johnson, VT 05656		1 ac DWL	3
136236-01-88.05	Angela Osgood & David Lamell	425 Wescom Rd. Johnson, VT 05656		1.22 ac DWL	2
136236-01-88.06	Kyley May Osgood	295 Wescom Rd. Johnson, VT 05656		1.31 ac MH	3

136236-01-88.07	Stacey & Mark Ferriman	460 Wescom Rd. Johnson, VT 05656		2.33 ac DWL	2,3
136236-01-88.08	Town Of Johnson	293 Lower Main St. W Johnson, VT 05656			3
136236-01-89(partial)	Sheldon & Beverly Osgood	437 Wescom Rd. Johnson, VT 05656		6.4 ac DWL	2,3
136236-01-89(partial)	Subject Property-Village of Johnson	P.O. Box 383 Johnson, VT 05656			1,2

List of Local, Regional and State Agencies**
(to receive letter and Source Protection Area Map)

Johnson Town Clerk Rosemary Audibert P.O. Box 383 Johnson, VT 05656	**Johnson Health Officer** Sharon Duffy 93-14 Riverview W Johnson, VT 05656
Johnson Planning Commission Chair David Butler P.O. Box 383 Johnson, VT 05656	**Johnson Village Trustees** Gordon Smith P.O. Box 383 Johnson, VT 05656
Johnson Select Board Chair Eric Osgood P.O. Box 383 Johnson, VT 05656	**Johnson Road Commissioner** P.O. Box 383 Johnson, VT 05656
Lamoille County Planning Commission PO Box 1637 Morrisville, VT 05661	**District 5 Commission – Act 250** 5 Perry Street, Suite 60 Barre, VT 05641-4267
Vermont State Police Troop A 2777 St. George Road Williston, VT 05495	**VT Drinking Water and Groundwater Protection Division** Dept of Environmental Conservation 1 National Life Drive, Main 2 Montpelier VT 05620-3521

**This list may be revised at the discretion of the Johnson Village Water System.

Appendix C. Preparing a Source Protection Plan Update

PREPARING A SOURCE PROTECTION PLAN UPDATE

Guidance for Public Community and Non-Transient-Non Community Water Systems

With the adoption of the new Water Supply Rule on December 29, 2000, all public community and non-transient, non-community water systems must update their approved Source Protection Plans *every three years*. Prior to this Rule, the updates were required annually. Source Protection Plan (SPP) Updates are also required for all water systems applying for Phase II/V monitoring waivers and waiver renewals. This information sheet gives guidance on how to prepare a Source Protection Plan Update.

Summary of Steps for Updating a Source Protection Plan

- ✔ Inspect the Source Protection Area and Update PSOC Maps and Inventory
- ✔ Weigh Risks from New PSOCs and Identify Risk Management Measures
- ✔ Update Landowner List
- ✔ Communicate with Relevant Landowners and Town/County/State Officials
- ✔ Make sure your Contingency Plan Information is Current
- ✔ Summarize Progress in Reducing Threats to your Source

Inspect the Source Protection Area and Update Your PSOC Maps and Inventory
Visually inspect the Source Protection Area and review the potential sources of contamination (PSOCs) identified in your original Source Protection Plan or most recent SPP Update. Note any key changes. Is the local farmer still using the same pesticides and fertilizers on crop land? Check for any evidence of new land uses or activities that may threaten the water source. Has a new residence been constructed? If so, does it have a septic system? What fuel is used for heating the home? Discuss any important changes you have discovered. Modify your PSOC Inventory and PSOC map to reflect your observations.

Weigh the Risks from New PSOCs and Identify Risk Management Measures
Determine the risk level posed by any new potential source of contamination you have found. Then outline the management measure you intend to use to reduce the risk. In many cases the management measure can be as simple as communicating with the landowner and asking for assistance in protecting the water supply. If you think of a new way to manage the risk from a previously identified PSOC, take the time to outline your ideas and plans in the update.

Update Your Landowner List
Visit your town clerk's office to determine whether any land or land rights within your Source Protection Area have changed hands. Add any new landowners to your list and remove anyone that no longer owns property in your SPA.

Communicate with Relevant Landowners and Town/County/State Officials
Send out letters to regulatory agencies to remind them that you are concerned about land use activities in your SPA. Also, send letters to newly identified landowners who may not know about your water source. Although not required, it's a good idea to contact the other landowners within your SPA with a positive message about actions they can take to help protect your supply, and to thank them for any efforts they have made since your last letter.

Make Sure Your Contingency Plan Information is Current
Check the emergency contact information in your contingency plan and make sure all of the information is up-to-date. Make sure any new water system personnel have the information they need to make good decisions in an emergency situation.

Summarize Progress in Reducing Threats to Your Source
Look back over the last three years and think about what actions you have taken to make your source of water less vulnerable to contamination. Have you worked with a local farmer to reduce pesticide and fertilizer use in your SPA? Have you purchased development rights for land in your SPA? Have you posted signs at key locations to notify people when they enter your SPA? Have you responded swiftly and appropriately to an emergency situation? Use the SPP Update as an opportunity to boast about the progress you have made.

Source Protection Plan Update Checklist~

Your SPP Update may be as simple as a short letter or it may be an elaborate revision of your original SPP. The format you choose will depend on what you discovered in following the steps outlined above. However, regardless of the format, please be sure you have included the relevant items from the following checklist when you submit the SPP Update:

_____ Text describing your PSOC inspection and any changes and additions you are making to the Source Protection Plan. If there are no changes, please state clearly that you have performed an SPA inspection and found no changes in land use, land ownership, risk levels, etc.
_____ Text describing the progress you have made in implementing risk management measures since your original SPP (or last update) was prepared.
_____ Updated PSOC Inventory (if applicable)
_____ Updated PSOC Map (if applicable)
_____ Updated Management Plan (if applicable)
_____ Updated Landowner List (if applicable)
_____ Updated Contingency Plan information (if applicable)
_____ Copy of letter sent to ongoing SPA landowners (optional)
_____ Copy of letter sent to new SPA landowners (if applicable)
_____ Copy of letter to town/county/state officials

Please send your Source Protection Plan Update to:

Water Resources Section
VT-DEC, Drinking Water & Groundwater Protection Division
1 National Life Drive, 2 Main, Montpelier, VT 05620-3521