

ENVIRONMENTAL IMPACT ASSESSMENT

VILLA SORMANY INC. WATER SUPPLY

ROBERTVILLE, NB

Our File No.: 544-18-C

November 2018

Prepared for:

Villa Sormany Inc.

Prepared by:



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EXECUTIVE SUMMARY

Villa Sormany is a private nursing home located in Robertville, New Brunswick. The Villa, which houses approximately 61 residents and has 90 employees, is a full-service nursing home including laundry, kitchens and a nursing station. The Villa is licensed and approved by the New Brunswick Department of Social Development, and is located in a rural, residential area approximately 10 kilometres from the City of Bathurst, with forested parcels neighbouring to the south and east of the Villa.

In 2017, the Villa experienced water quality and quantity problems in their existing water supply wells, and installed water storage tanks. In 2018, the Villa management approached Roy Consultants to conduct a video inspection of the wells which determined that water quality was being impacted by micro-organisms within the production well and water quantity was insufficient to meet the requirements of the facility. As such, Villa management approved the drilling of a new water supply and cleaning of their existing production well.

As per Item (s) of Schedule A of the *Environmental Impact Assessment Regulation* “all waterworks with a capacity greater than fifty cubic metres of water daily,” must undergo review to identify and if necessary, mitigate potential environmental impacts. Based on the current and estimated additional water consumption for the Villa, the water supply requirement will exceed 50 cubic metres daily; therefore, a Water Supply Source Assessment (WSSA) will be conducted as part of this Environmental Impact Assessment.

As no additional construction, expansion, renovation or decommissioning of the facility is required, and the proposed well target is within a grassed area already cleared of vegetation, and due to the timing of the pump test (winter 2018), no Valued Environmental Components were identified other than those to be assessed through the WSSA, and no adverse environmental impacts were identified for the project.

1. THE PROPONENT

1.1 NAME OF PROPONENT

The proponent is Villa Sormany Inc.

1.2 ADDRESS OF PROPONENT

**Villa Sormany Inc.
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Robertville, NB E8K 2V9**

1.3 CHIEF EXECUTIVE OFFICERS

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1.5 PROPERTY OWNERSHIP

The project is located on private property owned by the proponent.

2. THE UNDERTAKING

2.1 NAME OF THE UNDERTAKING

The name of the undertaking is *Villa Sormany Inc. Water Supply Expansion*.

2.2 BACKGROUND

Villa Sormany Inc., established in 2010, operates a nursing home (the “Villa” hereafter) in Robertville, New Brunswick. The Villa houses approximately 61 residents and has 90 employees, and is a full-service nursing home including laundry, kitchens and a nursing station. The Villa is a licensed nursing home approved by the New Brunswick Department of Social Development.

The facility is located in a rural, residential area approximately 10 kilometres from the City of Bathurst, with forested parcels neighbouring to the south and east of the Villa.

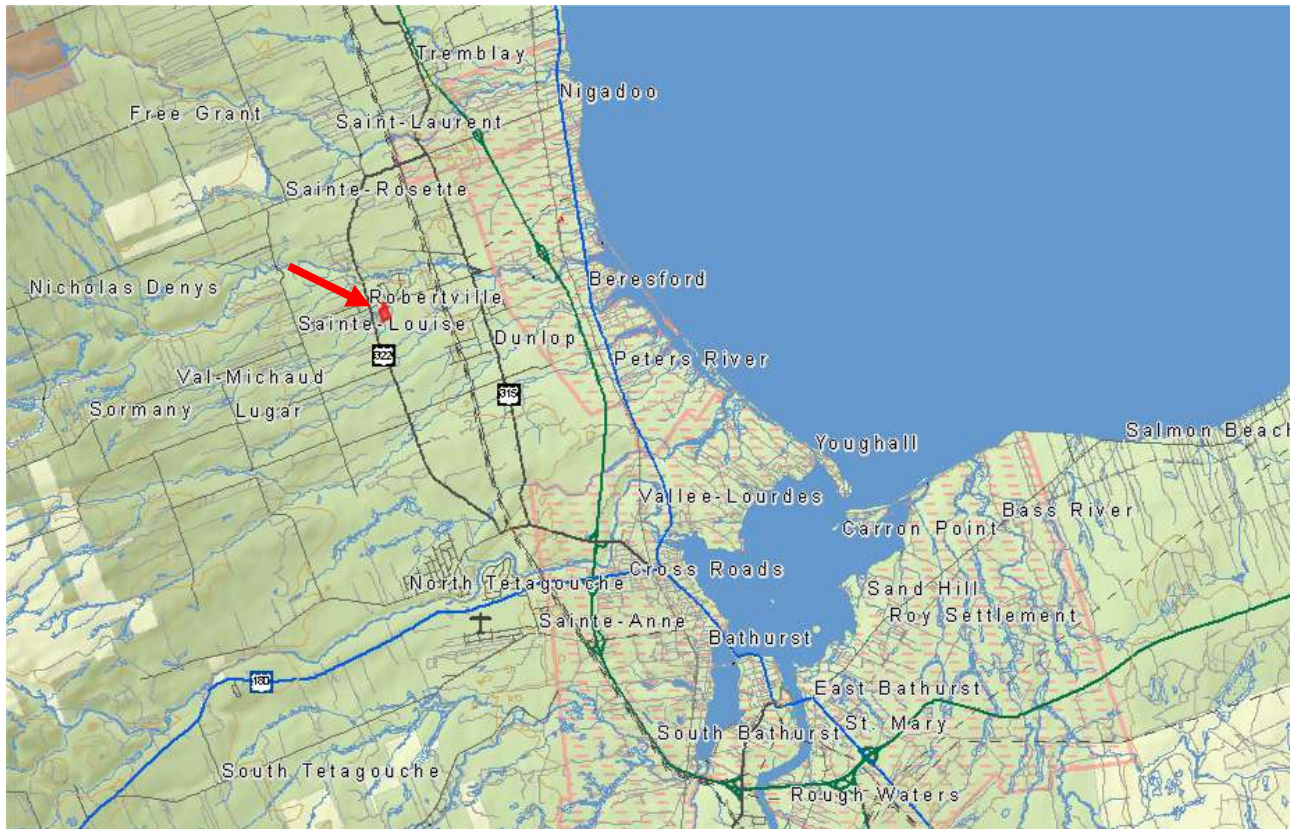


Figure No. 1: Project Location (GeoNB, 2018)



Figure No. 2: Villa Sormany Aerial View (Google Maps, 2018)

2.3 PROJECT OVERVIEW

Villa Sormany Inc. is conducting an Environmental Impact Assessment (EIA) of the proposed expansion of their groundwater supply, as required by the *Environmental Impact Assessment Regulation*, to determine if any potential environmental impacts may result from the proposed project. The proposed project includes drilling a production well, conducting a 36-hour pump test and, if successful, connecting the new water supply to the Villa's water system.

At present, the Villa's water supply consists of three (3) on-site water wells; however, only one of these wells produces potable water, production Well No. 3 (PW-3). PW-3 provides water to the storage tank, and is cycled to prevent the well from pumping below the water-bearing fracture. The Villa requires approximately 2.6 IGPM (Imperial Gallons per Minute) to 2.9 IGPM, or 17,000 Litres per day to 19,000 Litres per day (LPD), to sustainably meet the needs of its 61 residents.

No municipal water supply is available for the area, and as such the Villa is proposing to drill the additional groundwater supply well. Without adequate water quantity and quality, the health of its residents may be jeopardized.



Figure No. 3: General View of Subject Site (GeoNB, 2018)

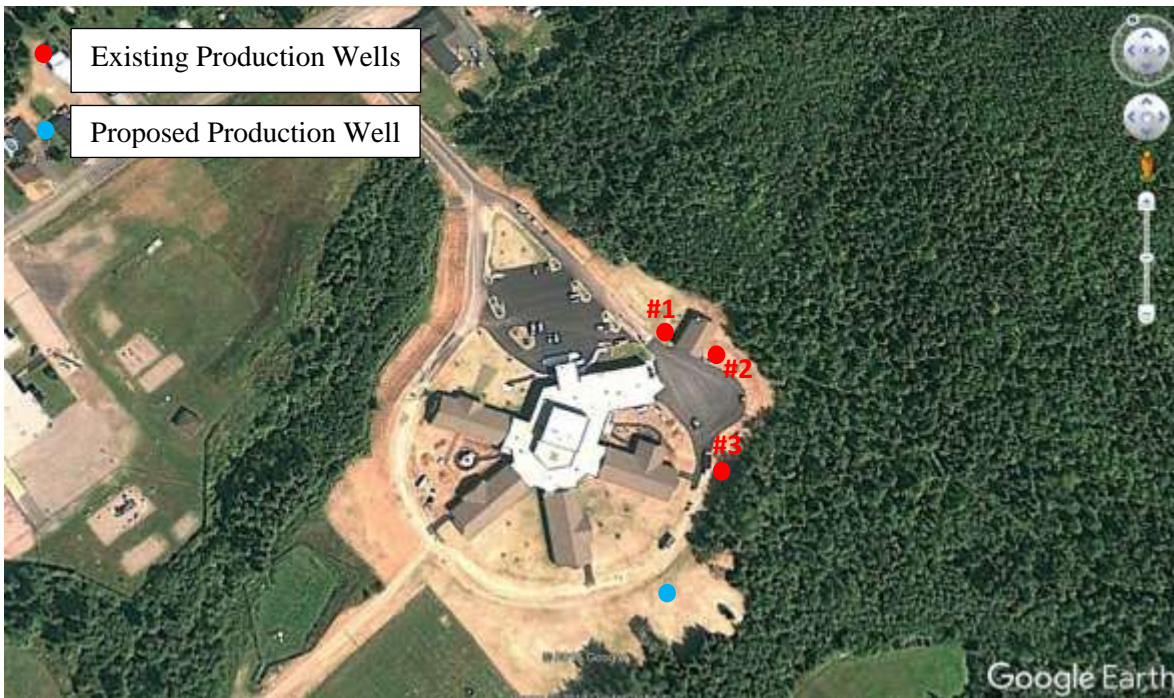


Figure No. 4: Existing Production Well and Proposed Production Well Locations

2.4 PURPOSE/RATIONALE/NEED FOR THE UNDERTAKING

Villa Sormany is a full-service nursing home including laundry, kitchens and a nursing station. Villa Sormany provides care to approximately 61 residents and operates a full-service kitchen in a facility which requires an adequate, dependable and constant water supply for the health and safety of its residents. The Villa's existing production well is not presently meeting this requirement.

The null, or "do-nothing" alternative was reviewed and rejected. There is no municipal supply within proximity of the Villa which could replace its groundwater supply. The potential for an expansion of any municipal water supply to Robertville is not planned at this time. The Villa is operating its current water supply above its sustainable yield and, even with its storage tank system, this water supply is not sufficient for the operation of the Villa. As such, a new potable groundwater supply is necessary.

2.5 PROJECT LOCATION

The proposed project is located at civic address 1289 chemin Robertville, Robertville, NB (Gloucester County). The nursing home property consists of one parcel owned by the proponent, identified by Service New Brunswick (SNB) as PID No. 20844544. According to SNB, the subject property is 5.34 hectares in area.

The parcel is located within the Dunlop-Robertville Planning Area Rural Plan Regulation – Community Planning Act and is zoned as "R1-1 (residential type 1 zone)".

The centre of the site is geo-referenced at LAT 47°41'42.10"N, LONG 65°46'07.24"W.

The property is bordered to the north by residential and some light commercial development, primarily along Robertville Road, and a vacant hay field. One branch of Duguay Brook is located between the Villa and the above land uses and flows 1.2 km northeast to its confluence with the Millstream River; another branch of the brook flows south of the Villa. The École La Croisée School is located northwest of the site, at the corner of Robertville Road and Route 322. Immediately west of the Villa, there is a small park (Veteran's Park), the Robertville Volunteer Fire Department and Sainte-Thérèse Catholic Church and cemetery. The Villa is bordered to the south and east by large forested parcels.

The area is relatively flat, with surface and groundwater assumed to flow to the north and south, toward the two branches of Duguay Brook.

A regulated wetland is located in the northern portion of the subject site (Figure 5) along Duguay Brook.



Figure No. 5: Regulated Wetland in Proximity to the Subject Site (GeoNB, 2018)

2.6 SITING CONSIDERATIONS

The site is beneficial from a water supply development standpoint as there is existing infrastructure already in place at Well No. 3. Any additional well installed on the subject site would tie in to Well No. 3. Additionally, the project site has a number of favourable elements:

- a. The subject property is owned by the proponent;
- b. The property is correctly zoned for the intended use;
- c. There are no potential sources of groundwater contamination in proximity to the drill target;
- d. The site is located outside of any municipal water supply area, and
- e. The proposed drill target is located in a field, is easily accessible, does not contain sensitive environmental features or habitats and will not require vegetation clearing.

2.7 PHYSICAL COMPONENTS AND DIMENSIONS OF THE UNDERTAKING

The following sections describe the existing, as well as the proposed, components of the project and projected timelines for completion of the WSSA.

2.7.1 Existing Nursing Home

- A. Main Building – The existing building consists of a single story, slab-on-grade, wood-framed structure approximately 53,000 ft² in size. The facility contains a full-service nursing home including laundry, kitchens and nursing station;
- B. Parking Lot – The existing facility has an approximately 4000 m² asphalt parking lot;
- C. A 250 m² garage – A separate garage contains dry storage, water treatment equipment and a generator with 2 x 900 Litre diesel steel tanks;
- D. Water Supplies – Table 1 provides information on the existing water wells;
- E. Wastewater Treatment/Effluent Discharge – The nursing home is connected to the Town of Beresford’s municipal sewer system.

Table No. 1: Existing Water Wells

WELL NO.	TYPE	DEPTH ¹	DIAMETER	PUMP ²	APPROXIMATE PUMPING CAPACITY
1	Potable	301 feet	6 inches	Flow Range 1.2 US gpm to 7.5 US gpm (½ to 2 HP)	0.25 IGPM
2	Potable	295 feet	6 inches		0.55 IGPM
3	Potable	298 feet	6 inches		5.5 IGPM

‘1’: Based on downhole videos completed on October 17, 2018.

‘2’: The same model and size submersible pump is installed in all three wells.

2.8 CONSTRUCTION, OPERATION AND MAINTENANCE DETAILS

The proposed installation of the new production well is to occur in the fall of 2018 and will consist of the following activities:

2.8.1 Water Supply Source Assessment

The Water Supply Source Assessment will consist of drilling one (1) new production well and conducting a 3-step Step-test and a 36-hour pump test as per the requirements of the New Brunswick Department of Environment and Local Government *Water Supply Source Assessment Guidelines*. Drilling and pump testing are scheduled to take place during the fall of 2018, upon approval of the Step 1 Application, by a licensed well driller under the supervision of Roy Consultants.

A detailed description and schedule of the WSSA is included in the Step 1 WSSA application in Appendix B.

2.8.2 Site Preparation

- Snow clearing by truck/plow (if necessary);
- Temporary placement of clean fill in existing roadway ditch, to allow drill rig access to the proposed target site (drill location).

No vegetation clearing is required – the site was previously cleared and contains only ground cover vegetation. The footprint of the project will be small, consisting of drilling a 6-inch diameter production

well and the completion of a trench to install an estimated 200 feet to 250 foot water line to connect the new production well to existing production Well No. 3.

2.8.3 Well Construction and Pump Test

Refer to the WSSA Step 1 Application in Appendix B for further details.

2.8.5 Hazardous Materials Handling/Storage

The nursing home stores small quantities of household cleaning supplies. Heating for the building is fuel oil contained in a 9,000-Litre fuel oil tank located on site, near the loading dock. Refer to site photos in Appendix A. The tank is licensed under the New Brunswick Department of Environment and Local Government's *Petroleum Product Storage and Handling Regulation*.

Additionally, the detached garage contains a diesel generator with two (2), 900 L aboveground storage tanks.

2.9 REGULATORY APPROVALS

- i. Item (s), Schedule A of the *Environmental Impact Assessment (EIA) Regulation* states: “*all waterworks with a capacity greater than fifty cubic metres of water daily*”. The existing Villa Sormany Inc. nursing home has never undergone an assessment of its water supply. With the proposed expansion, the water supply and nursing home requires registration and review under the EIA process.
- ii. The operation of a nursing home is a permitted use within the “R1-1” (residential type 1 zone) of the Dunlop-Robertville Planning Area Rural Plan Regulation – Community Planning Act. No municipal permit or authorization is required.
- iii. The project does not require federal authorization or permits.

3. DESCRIPTION OF THE EXISTING ENVIRONMENT

The subject site consists of one parcel, PID 20844544, privately owned by Villa Sormany Inc. It houses a one-storey building (the nursing home), a garage, a storage shed, an asphalted parking lot and driveway, water supply wells and infrastructure.

The Villa burns oil for domestic hot water; the fuel oil is located in an Aboveground Storage Tank (AST) double-walled steel tank located more than 60 m from the drill target site. The Villa uses a closed loop geothermal glycol-based heating system. The wells for this system are in the front of the building near the main parking lot. A generator and two 900-Litre steel diesel tanks are also stored in the garage.

The site is located in a low-density, mixed residential, light commercial and institutional rural area, and is adjacent to large forested parcels to the east, south and southwest.

The Villa is located approximately 10 kilometres northwest of the nearest large municipality, the City of Bathurst.

3.1 PHYSICAL AND NATURAL FEATURES

3.1.1 GENERAL

The proposed well location will be located southwest of the existing nursing home within a clearing containing native grasses and wildflower species. This area was cleared prior to 2009 by the proponent. Photo No. 7 in Appendix A shows the proposed drill target location.

3.1.2 TOPOGRAPHY

The area in question is, in general terms, flat. The property is situated between two branches of Duguay Brook to the north and south; surface and groundwater on the property is therefore assumed to be divided and flow north and south, accordingly.

3.1.3 GEOLOGY

The subject site is underlain by Middle to Late Ordovician-aged sedimentary rocks of the Sormany Group consisting of dark grey shale and siltstone, and light to dark grey or greenish grey, fine-to coarse-grained, thick-bedded feldspathic or lithic wacke; rare conglomerate (Wilson, 2013). Surficial geology of the site is comprised of Late Wisconsinan and/or Early Holocene-aged marine sediments consisting of sand, silt, some gravel and clay; generally 0.5 to 3 m thick (Rampton, 1984). Based on a well log search of the area within 500 metres of PID 20844544, the local aquifer is comprised primarily of fractured shale bedrock. From a review of 22 well logs, well depths range between 60 feet and 300 feet. Well yields ranged from 0 IGPM to 10 IGPM (0 m³/day to 65 m³/day).

3.1.4 GROUNDWATER

There are no municipal or industrial water supplies in proximity to the subject site. Commercial and residential buildings in the area obtain their potable water from individual private wells. A review of the DELG Online Well Log System (OWLS) identified 21 domestic water supplies and one (1) drinking water well (abandoned) within 500 metres of the subject site. For more detailed information, please refer to the Step 1 Water Supply Source Assessment application in Appendix B.

3.1.5 SURFACE WATER - WATERCOURSES

Two (2) branches of Duguay Brook cross the subject property north and south of the drill target. One branch of the watercourse is located approximately 170 metres north, and the second branch is located approximately 70 metres south of the proposed drill target. The nearest wetland is a regulated wetland located approximately 150 metres northwest of the drill target. Duguay Brook enters Millstream River approximately 1.6 km north of the drill target site. Due to the nature of the project and the distance to each watercourse, interaction between the project and the watercourses is not anticipated.



Figure No. 6: Watercourses Identified on GeoNB

3.1.6 SURFACE WATER – WETLANDS

As shown in Figure 5, one (1) regulated wetland is located in proximity to the drill target site, approximately 170m to the north. No Provincially Significant Wetlands (PSWs) are located in proximity to the site. No unmapped wetlands are located within 30 metres of the drill target site. Due to the nature of the project and the distance to the wetland, no interaction between the project and any wetland is anticipated.

3.1.7 VEGETATION

The drill target site, a field, contains no mature tree or shrub species. Predominant vegetation is ground cover, consisting of native grasses and wildflowers. Due to the disturbed nature of the site, the timing of the work and the pump test, and small footprint of the project, no detailed vegetation survey was conducted; vegetation is not anticipated to be significantly impacted by the project.

3.1.8 WILDLIFE AND WILDLIFE HABITAT

The drill target area, which was cleared prior to 2009 by the proponent, contains ground cover vegetation and is considered suitable habitat for common small mammal and invertebrate species. Some medium and larger species may pass through the field, but in general the site is not considered significant wildlife habitat.

Due to the temporary nature of the project, the timing of the pump test, the location of the drill target (adjacent to the Villa) and the small spatial and temporal footprint required for the drilling, no wildlife survey was conducted for this project and no interaction between the project and wildlife or wildlife habitat is anticipated.

3.1.9 MIGRATORY BIRDS

Villa Sormany Inc. recognizes that migratory birds are an important consideration in any project. Environment Canada regulates the protection of migratory birds through the Migratory Birds Convention Act (MBCA), which protects migratory birds, their eggs, nests and their young through the *Migratory Birds Regulations* (MBR).

“Under Section 6 of the *Migratory Birds Regulations* (MBR), no person shall disturb, destroy or take a nest or egg of a migratory bird; or to be in possession of a live migratory bird, or its carcass, skin, nest or egg, except under authority of a permit. It is important to note that under the current MBR, no permits can be issued for the incidental take of migratory birds caused by development projects or other economic activities. Furthermore, Section 5.1 of the MBCA describes prohibitions related to deposit of substances harmful to migratory birds:

Migratory birds protected by the MBCA include all seabirds except cormorants and pelicans, all waterfowl, all shorebirds and most land birds (birds with principally terrestrial life cycles). Most of these birds are specifically named in the Environment Canada publication, *Birds Protected in Canada under the Migratory Birds Convention Act*, Canadian Wildlife Service Occasional Paper No. 1.

“5.1 (1) No person or vessel shall deposit a substance that is harmful to migratory birds, or permit such a substance to be deposited, in waters or an area frequented by migratory birds or in a place from which the substance may enter such waters or such an area.

(2) No person or vessel shall deposit a substance or permit a substance to be deposited in any place if the substance, in combination with one or more substances, results in a substance — in waters or an area

frequented by migratory birds or in a place from which it may enter such waters or such an area — that is harmful to migratory birds.”

Due to the timing of the proposed drilling (late fall/winter), the temporary nature of any disturbance and the small project footprint, no interaction between the project and migratory birds is anticipated.

3.1.10 SPECIES AT RISK

Canada’s Species at Risk Act (SARA) is one of three (3) major components in the Government of Canada Strategy for the Protection of Species at Risk. It is designed as a key tool for the conservation and protection of Canada’s biological diversity and fulfills an important commitment under the United Nations Convention on Biological Diversity. New Brunswick also has a Species at Risk Act, which complements the federal Act.

The purpose of **SARA** is to:

- Prevent wildlife species from becoming extinct or extirpated (lost from the wild in Canada);
- Help in the recovery of extirpated, endangered or threatened species; and
- Ensure that species of special concern do not become endangered or threatened.

Due to the timing of the proposed drilling (late fall/winter), the temporary nature of any disturbance and the small project footprint, no interaction between the project and species at risk is anticipated.

3.1.11 Atmospheric

The Villa Sormany is located in a residential/light commercial, predominantly rural, area. There is no industrial emission source within 10 kilometres of the site. Based on the absence of industry, the rural nature of Robertville and surrounding areas and the distance to the nearest potential source of air pollution, the air quality at the site is considered very good.

Due to the nature of the project and temporary nature of the drilling, no interaction between the project and atmospheric quality is anticipated.

3.1.12.1 Environmentally Significant Areas

A review of the Nature Trust NB Environmentally Significant Area (ESA) database found one (1) ESA within a 5-kilometre radius of the subject site:

- **ESA No. 160 Millstream River:** “This river is supplied with plenty of cold water from groundwater, making it one of the 10 best Trout streams in New Brunswick”.

The proposed drill target is approximately 140 metres and 70 metres from both branches of Duguay Brook (to the north and south), which enters the Millstream River approximately 1.6 km to the northeast. The water from the pump test will be discharged into a catch basin connected to the Villa’s existing storm water management system. The well drilling itself will be located more than 70m from the nearest watercourse.

Based on the use of the catch basin and the distance from the well site to Duguay Brook, no interaction between the project and Duguay Brook or Millstream River is anticipated.

3.1.12.2 Important Bird Areas

IBACanada.ca was consulted to determine which, if any, Important Bird Areas (IBA) were located near the proposed project. The site is not located within an IBA; the nearest in proximity to the project is IBA number NB005: Pokeshaw Rock, located approximately 40 kilometres east of the project site. Due to the nature and location of the project, no interaction between the project and the IBA is anticipated.

3.1.13 Archaeological Resources

At this time, no information on archaeological resources at this site has been obtained. A request for archaeological resources information and probability mapping has been submitted to the Department of Tourism, Heritage and Culture's Archaeological Services Unit, and will be provided to the DELG Project Manager upon receipt.

3.1.14 Land Use

The project is on private land owned by the proponent; the property is zoned as "R1-1 (residential type 1 zone)" and a nursing home is a permitted use in this area. A Land Gazette environmental property flag for petroleum storage was identified for the subject property. Land Gazette environmental property flags for petroleum storage and contaminated sites were identified on several properties within 500 m of the subject site. For more detailed information, please refer to the Step 1 Water Supply Source Assessment application in Appendix B.

3.2 SOCIOECONOMIC CONDITIONS

3.2.1 Population and Economy

According to the Canada Census Bureau, the 2016 population of the Local Service District of Robertville was 937, up from 895 in 2011. Of these, 420 people of working age (15 and over) were employed in 2015.

The primary local economic drivers in Robertville are light commercial developments, nursing homes and the school. According to the Canada Census Bureau, of the 420 employed people, 31% of workers are employed in the sales and service occupations, 23% are employed in the trades, transport and equipment operator category and 14% are employed in business, finance and administrative occupations. Many occupants of Robertville commute to Bathurst for work.

The majority of residential development is ribbon development along the two (2) major roadways, Robertville Road and Route 322.

At present, Villa Sormany Inc. employs 90 full-time employees.

3.2.2 Heritage Sites

A review of information provided by www.Historicplaces.ca and the New Brunswick Register of Historic Sites' Website shows there are no heritage sites in proximity to the proposed project.

3.2.3 Transportation

The project site is located on Robertville Road, near its intersection with provincial route number 322. No increase in traffic will be required or will result from the construction or operation of the water supply.

4. ENVIRONMENTAL ASSESSMENT OF POTENTIAL IMPACTS

Based on the project description and the existing environment, the following potential Valued Environmental Components (VECs) were identified and assessed for the proposed project:

- a) Groundwater Quality;
- b) Archaeological and Heritage Resources.

A qualitative rating system is used to evaluate the potential for interactions between the project and the VECs above. A rating was given to each Valued Environmental Component (VEC) based on the potential interaction between the project and each VEC, and a rating was applied to each according to the information gathered and the professional judgment and experience of the consultant.

0 = No interaction anticipated.

1 = Interaction occurs; however, it is unlikely to result in a significant environmental effect even without mitigation, or it is unlikely to be significant because of mitigation measures.

2 = Interaction could potentially result in an environmental effect.

Where there is a potential for project-VEC interaction (ratings of 1 or 2), further discussion is provided in the following sections. For issues where there is limited interaction (ratings 0 or 1), a rationale is provided and the issue is not discussed further in the present report. Potential project-environment interactions are presented in Table 6.

The potential VECs that have a rating of zero for all activities indicate that particular VEC is not present within or in proximity to the project's footprint. The rationales for excluding these VECs from further assessment are discussed in the present report.

Significance of potential environmental effects is also evaluated in this section, based on a consideration of four (4) characteristics of the project-VEC interaction:

Likelihood: What is the likelihood of the impact on the VEC?

Severity of the Impact (Spatial and Temporal Scale), and

Mitigation: What mitigation measures can be employed to minimize the impact and how efficient are they?

Table No. 6: Potential Project-Environment Interactions Matrix

Potential VEC \ Activities	Construction/ Installation of the Physical Work	Operation/ Maintenance of the Physical Work	Decommissioning/ Abandonment of the Physical Work	Accidents and Unplanned Events
Biophysical				
Groundwater	1	1	0	0
Socio-Economic				
Archaeology and Heritage Resources	Unknown	0	0	0

4.1 GROUNDWATER

Existing Conditions:

The existing nursing home has a groundwater supply consisting of three (3) wells. Well logs are available (refer to the Step 1 Water Supply Source Assessment application in Appendix B).

Well details are as follows:

- **Well No. 1:** Production well No. 1; estimated yield is 0.25 IGPM;
- **Well No. 2:** Production well No. 2; estimated yield is 0.55 IGPM;
- **Well No. 3:** Production well No. 3; estimated yield is 5.5 IGPM.

The purpose of this project is to develop an additional production well that can be operated on a cycle basis with existing production Well No. 3 to ensure a reliable water supply for the nursing home.

There are over 60 buildings within 500 metres of the subject site which are serviced with private wells. The nearest building is located approximately 250 metres north of Well No. 3 at 1277 Robertville Road (apartments and salon). All properties in the area are serviced by private wells. There is no municipal water system for Robertville. The nearest municipal supply is in the Town of Beresford, approximately 5 kilometres east of the site. From a review of 22 well logs, well depths range between 60 feet and 300 feet. Well yields ranged from 0 IGPM to 10 IGPM (0 m³/day to 65 m³/day).

Refer to Appendix B for the well log search results (within 500 metres of PID No. 20844544).

Project-VEC Interactions, Potential Environmental Effects:

A production well can adversely impact nearby water supplies' quality and quantity if pumped at an unsustainable rate. The proponent has submitted a Step 1 application to conduct a Water Supply Source Assessment (Appendix E) this fall. Upon approval from the DELG, the WSSA will be conducted under

the supervision of Roy Consultants' hydrogeologist and will adhere to the DELG's WSSA guidelines and requirements.

Upon completion, the results of the WSSA will be submitted to the DELG for review and approval. In addition to a recommended maximum sustainable pumping rate for each well, the proponent will adhere to all conditions in the EIA or Approval to Operate.

4.2 ARCHAEOLOGY AND HERITAGE RESOURCES

Given the small footprint of the project and its location, the likelihood of interaction with archaeological resources is considered low for this project. However, a request has been made to the Archaeological Services Branch of the Department of Tourism, Heritage and Culture for the probability of any unknown or mapped archaeological resources occurring in proximity to the subject site. The information will be forwarded to DELG upon receipt.

In the event that, during drilling or excavation for the water line, suspected archaeological resources or human remains are discovered, work will immediately cease and the Archeological Services Branch will be contacted at (506) 453-2738.

5. ACCIDENTS AND UNPLANNED EVENTS

Drilling of the drill target will be performed by an experienced, licensed water well driller. The drill rig uses water for drilling, but also contains petroleum products such as hydraulic fluid and diesel in the truck's fuel tank. There is a potential for a petroleum spill if there is a malfunction of the drill rig, such as a rupture in a hydraulic hose.

The well driller will visually inspect his equipment prior to beginning the operation and will maintain a spill kit on site at all times. In the event of an unplanned release, drilling operations will cease, the leak will be stopped and the petroleum product cleaned up using the spill kit. The Bathurst Department of Environment and Local Government will be contacted and advised of the spill, regardless of the volume spilled. In the event that the spill occurs after normal business hours, the 24-hour emergency reporting number will be called at 1-800-565-1633.

Based on the minimal amount of petroleum products used during the drilling process, the experience of the drilling company, and the presence of an adequate spill kit, accidents and unplanned events are considered **not likely**, and therefore **not significant**.

6. CUMULATIVE EFFECTS

The proposed development will withdraw groundwater from the local aquifer which may put stress on available groundwater resources in an area with noted low well yields. The potential cumulative effect of withdrawing groundwater from the local aquifer is an adverse impact to water quantity and water quality. The WSSA proposed herein will identify the maximum sustainable yield for the new production well, taking into account the proximity of neighbouring water supplies and aquifer characteristics, and will recommend a safe pumping rate for the new well. The results of the WSSA, including a recommended sustainable pumping rate, will be submitted under separate cover upon completion of the pump test report.

7. PUBLIC INVOLVEMENT

The public involvement activities proposed for this project registration will be conducted as per the requirements of Schedule C of the *Guide to Environmental Impact Assessment in New Brunswick (2012)*, and will involve the following public involvement activities, based on a program submitted to and approved by the DELG project manager:

1. The proponent shall communicate directly with elected officials (i.e. the MLA and mayor), local service districts, community groups, environmental groups, other key stakeholder groups (companies, agencies, interest groups, etc.) and First Nations as appropriate, enabling them to become familiar with the proposed project and ask questions and/or raise concerns.
2. The proponent shall provide direct, written notification (letter, information flyer, etc.) about the project and its location to potentially affected area residents, landowners and individuals (to be determined in consultation with Sustainable Development, Planning and Impact Evaluation Branch). The notification must include the following:
 - a. A brief description of the proposed project;
 - b. Information on how to view the Registration Document;
 - c. A description of proposed location (map is desirable);
 - d. The status of the Provincial approvals process (i.e.: “The project is currently registered for review with the Department of Environment and Local Government under the Environmental Impact Assessment Regulation, Clean Environment Act”);
 - e. A statement indicating that people can ask questions or raise concerns with the proponent regarding the environmental impacts; Proponent contact information (name, address, phone number, E-mail); and
 - f. The date by which comments must be received (See Section 6.0 of the Registration Guide).
3. Once the EIA report is completed, it will be submitted to DELG and placed on the DELG Website at <http://www.gnb.ca/0009/0377/0002/0016-e.pdf> and the Registration Document (and any subsequent submissions in response to issues raised by the Technical Review Committee) shall be made available for public review at 20 McGloin Street, 2nd Floor, Fredericton, NB.
4. The proponent shall make copies of the project registration document (and any subsequent submissions in response to issues raised by the Technical Review Committee) available to any interested member of the public, stakeholder or First Nation and shall deposit a copy of this document along with any subsequent revision with the Bathurst DELG regional office, where it will be available for public review.
5. The proponent shall make the project registration document (and any subsequent submissions in response to issues raised by the Technical Review Committee) available in at least two (2) locations local to the project area (e.g.: the proponent’s offices, a public library, a municipal office, another public location).
6. Within 60 days of project registration, the proponent shall prepare and submit to the Department of Environment and Local Government a report documenting the above public involvement activities and shall make this report available for public review.

The public involvement strategy will be submitted separately to the DELG Project Manager for approval, and a summary report outlining the strategy and its results will be submitted for review within 60 days of the date of registration.

8. FIRST NATIONS

The project is the expansion of the water supply of an existing nursing home located on private property. The nearest Mi'kmaq First Nation at Pabineau is located approximately 20 kilometres from the site.

Based on the ownership and current use of the site, and the lack of anticipated adverse environmental impacts both on and off site, it is not anticipated that the project will infringe on Aboriginal Rights or traditional land use by a First Nation.

If any additional information on the potential for archaeological resources or First Nations Traditional Use in the area of the project is discovered, that information will be forwarded to DELG at that time.

9. APPROVAL OF THE UNDERTAKING

The following permits, approvals and authorizations are anticipated for the project to include, but not be limited to:

Provincial

- Certificate of Determination – DELG;
- Approval to Operate – DELG.

10. FUNDING

The project is a privately funded venture by the proponent, Villa Sormany Inc.

11. CLOSING STATEMENT

This environmental impact assessment identified Valued Environmental Components which may potentially be impacted by the water supply expansion of the existing Villa Sormany Inc. nursing home in Robertville, New Brunswick. Significance was determined based on the criteria of *likelihood, scale, duration* and proposed *mitigation*.

Potential VECs were identified and assessed as either not potentially impacted by the project, or potential impacts were not considered significant based on the above criteria.

This report was prepared by Roy Consultants for the exclusive use of the proponent. The information contained herein may not be republished or relied upon for any other purpose or by any other third party without the express written notice of the author.

12. REFERENCES CITED

Important Bird Areas Canada. www.ibacanada.com. Bird Studies Canada.

New Brunswick, 1987. *Environmental Impact Assessment Regulation* (87-83) O.C. 87-558.

New Brunswick, 2012. *A Guide to Environmental Impact Assessment in New Brunswick*. Environment and Local Government. April 2012.

New Brunswick, 2017. *Water Supply Source Assessment Guidelines*. Department of Environment and Local Government. April 2017.

New Brunswick, 2004. *Additional Information Requirements for Waterworks and Water Supply Projects*. Version 05-01-04. Environment and Local Government.

New Brunswick, 1973. Clean Environment Act. R.S.N.B. 1973, c. C-6.

New Brunswick, 2017. *New Brunswick Register of Historic Places*. <https://www.rhp-rlp.gnb.ca/PublicSearch.aspx?blnLanguageEnglish=True>. Department of Tourism, Heritage and Culture.

New Brunswick. Service New Brunswick. NBGIC Parcel Data, 2009. Real Property Information PID number 20844544.

Rampton, V.N. 1984. Generalized surficial geology map of New Brunswick. New Brunswick Department of Natural Resources and Energy. Minerals, Policy and Planning Division, NR-8 (scale 1:500 000).

Wilson, R.A. (Compiler). 2013. *Geology of the Bathurst area (NTS 21 P/12)*, Gloucester County, New Brunswick. New Brunswick Department of Energy and Mines. Geological Surveys Branch. Plate 2013-17 (revised 2015).

APPENDIX A:

Site Photos



Photo 1: General View of Nursing Home Building Looking South (November 22, 2018)



Photo 2: View of Well No. 1 (November 22, 2018)



Photo 3: View of Petroleum Storage Tank (November 22, 2018)



Photo 4: View of Back Parking Area. Location of Well No. 3 is behind the white shed shown at left (November 22, 2018).



Photo 5: Submersible Pump Installed in Well No. 3 (October 17, 2018)



Photo 6: View of Well No. 3 (October 17, 2018)



Photo 7: Site of Proposed Drill Location Looking Southwest (November 6, 2018)



Photo 8: View of Proposed Drill Location (Clearing at Right) in Relation to Well No. 3 (Shed at Left) (November 6, 2018)

APPENDIX B:

Water Supply Source Assessment Step 1 Application

WSSA STEP 1 APPLICATION

Roy File No. 544-18

Villa Sormany Inc. Nursing Home, 1289 Chemin Robertville, Robertville, NB

1. Name of proponent

Mr. Wayne McWilliams, General Director
Villa Sormany Inc.

2. Location of drill targets (including property PID) and purposes of the proposed water supply

The drill target is located on PID No. 20844544, located at 1289 Chemin Robertville, Robertville, New Brunswick. It is proposed to drill and install a new production well (Well No. 4) to an approximate depth of 300 feet (same depth as existing production well, Well No. 3). Refer to Figure 1 herein.

The area is located within the Dunlop-Robertville Planning Area Rural Plan Regulation – Community Planning Act and is zoned R1-1 (residential type 1 zone). Refer to enclosed zoning map.

Three production wells were already drilled (Well No. 1, Well No. 2 and Well No. 3). Based on downhole videos and assessment work completed in October 2018, it was determined that Well No. 1 and Well No. 2 do not produce sufficient water to be used as back-up wells. It was recommended that a new back-up well (Well No. 4) be installed to be operated on a cycle with Well No. 3. Well logs for Well No. 1, Well No. 2 and Well No. 3 are enclosed in attachment A.

Wells will be referred to as follows:

- **Well No. 1:** Production well No. 1. The estimated yield of Well #1 is 0.25 Imperial gallons per minute (IGPM).
- **Well No. 2:** Production well No. 2. The estimated yield of Well #2 is 0.55 IGPM.
- **Well No. 3:** Production well No. 3. Well No. 3 is the main production well and has an estimated yield of 5.5 IGPM.

The purpose of this water supply assessment is to develop an additional production well that can be operated on a cycle basis with existing production Well No. 3 to ensure a reliable water supply for the nursing home.

The Villa also uses a closed loop geothermal glycol-based heating system. The wells for this system are in the front of the building near the main parking lot. The amount of groundwater withdrawn by this system is unknown.



Figure 1: General View of Subject Site PID No. 20844544 (GeoNB, 2018)

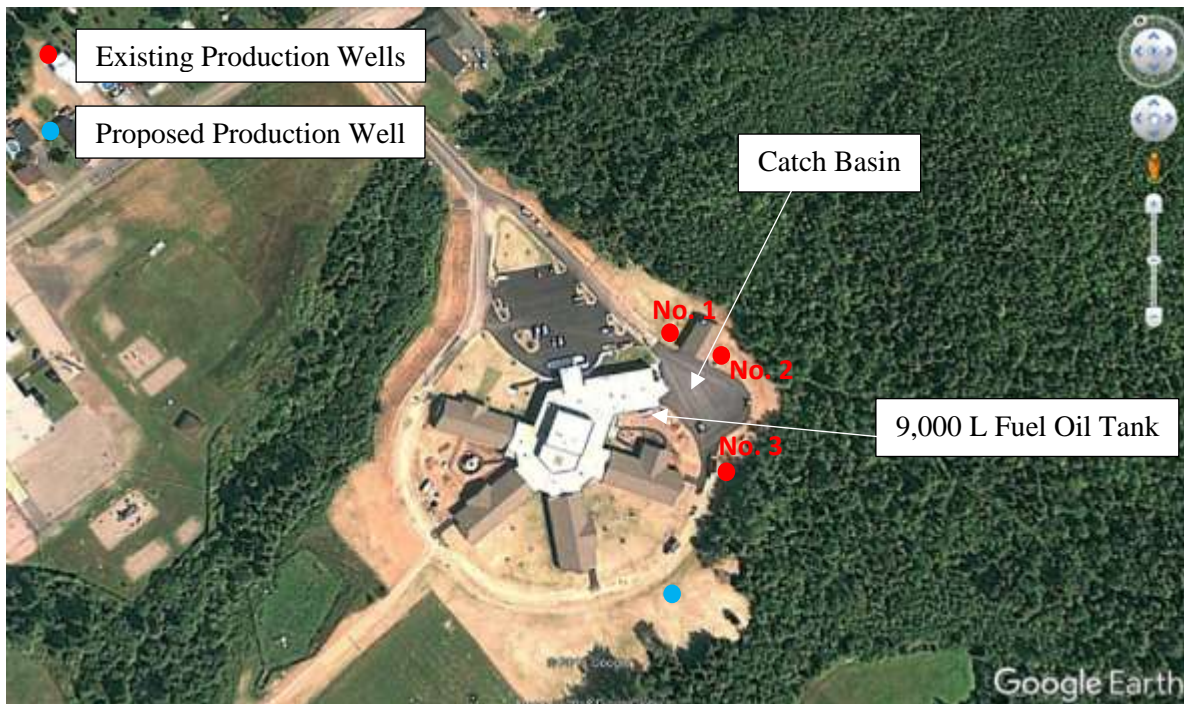


Figure 2: Existing Production Well and Proposed Production Well Locations

3. Required water quantity (in m^3/day) and/or required pumping rate

The current water demand of the nursing home is 17,000 Litres to 19,000 Litres per day (L/day). Well No. 3 is operated at a maximum pumping rate of 5.5 IGPM. Currently, Well No. 3 is operated for two (2) hours continuously and then shut off for a period of one (1) hour to allow for water level

recovery. Based on water level measurements collected during a brief pumping period, the water level is drawn below the first water-bearing fracture at 136 feet within one (1) hour of starting the pump. The concern with drawing the pumping water level past major water-bearing fractures is the dewatering of fractures which could result in permanent loss of yield to the well. To keep the pumping water level above the 136-foot fracture, Well No. 3 could only be operated for one (1) hour continuously. Pumping at this schedule will not meet the water demands of the facility. A reliable additional production well is required to operate alternately with Well No. 3.

4. List alternate water supply sources in area (including municipal systems)

All properties in the area are serviced by private wells. The closest municipal water system is in the Town of Beresford, approximately 5 kilometres east of the site.

5. Discuss area hydrogeology as it relates to the project requirements

The bedrock underlying the subject property is comprised of Middle to Late Ordovician-aged rocks comprised of Sormany Group, Millstream Formation, consisting of dark grey shale and siltstone, and light to dark grey or greenish grey, fine-to coarse-grained, thick-bedded feldspathic or lithic wacke; rare conglomerate (Wilson, 2013). From a review of 22 well logs, well depths range between 60 feet and 300 feet. Well yields ranged from 0 IGPM to 10 IGPM (0 m³/day to 65 m³/day).

Refer to Appendix B: Well Log Search Results (Within 500 metres of PID No. 20844544).

6. Outline the proposed hydrogeological testing and work schedule

It is proposed to drill one production well (well No. 4) in the fall of 2018. A three-step step test, 36-hour pump test with 18-hour recovery period is proposed. **As the operation will consist of one production well operating at a time; Well No. 3 will be used as an observation well during the pump test. The new production well (Well No. 4) will be pumped at rate to be determined based on the results of the step test.** Manual and digital water level measurements will be taken from the new production well (Well No. 4) and one (1) observation well (Well No. 3) throughout the duration of the pumping and recovery portions of the pump test. During the pumping portion of the test, discharged water will be directed to an on-site catch basin, which discharges into the municipal storm sewer system. The catch basin is shown in Figure 2. Aboveground piping will be used to direct pumped water to the catch basin to ensure no artificial recharge of the wells during the pump test. A pump test report is anticipated for submission by January 2019.

7. Identify any existing pollution or contamination hazards within a minimum radius of 500 m from the proposed drill targets. Historical land use that might pose a contamination hazard (i.e. tannery, industrial, waste disposal, etc.) should also be discussed.

A search of Service New Brunswick's Land Gazette identified several properties with notices for contaminated site and/or petroleum storage within 500 metres of the proposed drill target; see Figure 3. A petroleum storage flag was noted on the subject site (PID 20844544), see below for further details. The Villa uses a closed loop geothermal glycol-based heating system. Other potential contamination hazards include household quantities of petroleum and chemical products.

The nursing home and surrounding properties are connected to the Town of Beresford's municipal sewer system; therefore, there is no potential hazard from private septic systems.

Properties with "New Brunswick's Remediation Sites Management Program Report" Flag (Contaminated Sites):

- PID 20424313 – Arcadia Sites Limited, In Trust, Robertville Road (Vacant Commercial Land);
- PID 20253985 – N.B. Education, École la Croisée, 1341 Robertville Road (School);
- PID 20423844 – N.B. Education, École la Croisée, 1341 Robertville Road (School);
- PID 20533758 – Residence, [REDACTED].

Properties with "Petroleum Storage Site Report" Flag:

- PID 20403838 – Residential Lot, [REDACTED];
- PID 20424313 – Arcadia Sites Limited, In Trust, Robertville Road (Vacant Commercial Land);
- PID 20254207 – Arcadia Sites Limited, Robertville Road (Vacant Commercial Land);
- PID 20253985 – N.B. Education, École de la Croisée, 1341 Robertville Road (School);
- PID 20253969 – Évêque Catholique Romain de Bathurst, Route 322 Robertville (Church);
- PID 20844544 – Villa Sormany Inc., 1289 Robertville Road (Nursing Home). A 9,000-Litre double wall steel fuel oil tank is located on site, near the loading dock. The Villa burns oil for domestic hot water. A diesel generator with 2 x 900 Litre diesel storage tanks are also located in the outbuilding.



Figure 3: Existing Pollution or Contamination Hazards within 500 metres of the Drill Target

8. Identify any groundwater use problems (quantity or quality) that have occurred in the area.

Groundwater quantity problems are known in the area. Over the years, Villa Sormany personnel have noted a reduction in well capacity and an inability for the wells to recharge overnight. A review of well water quality data from 14 wells within 500 metres of the subject site was completed. Fluoride exceeded the New Brunswick Drinking Water Guidelines (NBDWG) in one (1) well. The basis for the NBDWG guideline for fluoride is moderate dental fluorosis, based on cosmetic effect, not health. Fluoride is often added to municipal drinking water systems to reduce tooth decay. Commercial treatment systems may be installed to reduce fluoride levels to below the acceptable guideline. Iron exceeded the NBDWG guideline in three (3) wells. Manganese exceeded the NBDWG guideline in 10 wells. Both iron and manganese exceeded aesthetic guidelines and are not considered to pose a health risk. Elevated iron and manganese levels may stain plumbing and laundry. Commercial treatment systems may be installed to reduce iron and manganese to within acceptable levels. Eight (8) wells had a presence of total coliforms and exceed the NBDWG of none detectable (0 count) per 100 mL. The presence of total coliforms can be addressed by shock chlorinating the well and re-sampling. If the presence of total coliforms persists, commercial treatment systems may be installed. Eleven (11) wells exceeded the New Brunswick Drinking Water Guideline for turbidity. Elevated turbidity may be related to new well construction and is a parameter that is expected to decrease with increased well use. If elevated turbidity levels persist,

commercial treatment systems may be installed to reduce turbidity levels to below the acceptable guideline. Refer to Appendix B: Well Log Search Results and a figure showing wells within 500 metres of PID 20844544.

Overall, water quality in the surrounding area is good with most parameters meeting New Brunswick Drinking Water Guidelines. Water quality samples were collected from Well No. 3 on October 17, 2018, and analyzed for general chemistry, trace metals and microbiological parameters. All general chemistry and trace metal concentrations were below applicable NBDWG guidelines with the exception of turbidity. A turbidity level of 1.3 NTU was reported which slightly exceeds the NBDWG guideline of 1.0 NTU. The turbidity level is attributed to the pump being removed in the well the day of sampling, which may have mobilized sediments. Turbidity is expected to decrease over time with continued well use. No detection of total coliforms and E. Coli was reported. Refer to the laboratory certificates in Appendix D.

9. Identify any watercourses (stream, brook, river, wetland, etc.) within 60 m of the proposed drill targets.

Two branches of Duguay Brook cross the subject site north and south of the drill target. One branch of the watercourse crosses the subject site approximately 170 metres north and the second branch is located approximately 70 metres south of the proposed drill target. The nearest wetland is a regulated wetland located approximately 150 metres northwest of the drill target. Refer to Figure 4.



Figure 4: Watercourses and Wetlands in Proximity to the Subject Site

10. Identify site supervisory personnel involved in the source development (municipal officials, consultants, drillers).

Modern Well Drilling (1993) Ltd will complete the well drilling and pump testing under the supervision of Roy Consultants' personnel.

11. Attach a 1:10 000 map and/or recent air photo clearly identifying the following:

- **Proposed location of drill targets and property PID** – see Figures 1 and 2;
- **Domestic or production wells within a 500 m radius from the drill target (s)** – see enclosed figure in Appendix B;
- **Any potential hazards identify in question 7.** – see Figure 3.

12. Attach a land use/zoning map of the area (if any). Superimpose drill targets on this map.

Please refer to zoning map enclosed in Appendix C.

13. Contingency plan for open loop earth energy systems (see Section 2.3).

Not applicable to this project.

References:

- L'Explorateur GeoNB Map Viewer. <http://geonb.snb.ca/geonb/>
- Guidelines for Canadian Drinking Water Quality, Summary Table (February 2017) https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/alt_formats/pdf/pubs/water-eau/sum_guide-res_recom/sum_guide-res_recom-eng.pdf
- Wilson, R.A. (Compiler). 2013. Geology of the Bathurst Area (NTS 21 P/12), Gloucester County, New Brunswick. New Brunswick Department of Energy and Mines. Geological Surveys Branch. Plate 2013-17 (revised 2015).

Attachments:

- A. Subject Site Production Well Logs;
- B. Well Logs and Location Plan of Wells Within 500 metres of Subject Site;
- C. Zoning Map of the Planning Area of Dunlop-Robertville;
- D. Laboratory Certificates for Well No. 3.

Attachment A:

Subject Site Production Well Logs

RESERVE AU BUREAU N° DE CHAMP		CODE SANITAIRE	LAB N°	DATE DE RECEPTION DE L'ECHANTILLON	ECHANTILLONS RECUS PAR	
		BUREAU SANITAIRE	N° ORG	AN M JOUR		
INFORMATION SUR LE BORDEREAU D'ANALYSE DE L'EAU OBLIGATOIRE POUR L'ANALYSE DE L'EAU. L'INFORMATION INCLUSE DANS CET ESPACE DEVAIT VISER LE PROPRIETAIRE DU PUIS AU MOMENT DE L'ECHANTILLONNAGE.				NID	N° D'IDENTIFICATION DU PUIS	
PRENOM NOM DE FAMILLE				L'INFORMATION SUR LE PROPRIETAIRE DU PUIS L'INFORMATION INCLUSE DANS CET ESPACE DEVAIT VISER LE PROPRIETAIRE DU PUIS AU MOMENT DU FORAGE		
ADRESSE (ENVOYEZ LES RESULTATS A)				PRENOM NOM DE FAMILLE		
VILLE/VILLAGE PROV. CODE POSTAL				ADRESSE		
N° DE TELEPHONE DE JOUR		N° DE TELECOPIEUR		VILLE/VILLAGE PROVINCE CODE POSTAL		
N° DE TELEPHONE		ECHANTILLON PRELEVE		EMPLACEMENT DU PUIS MEME QUE CI-DESSUS		
		AN M JOUR HEURE MIN AM PM		N° DE VOIRIE NOM DE RUE		
AVEZ-VOUS BESOIN D'UN ECHANTILLON POUR VOTRE HYPOTHEQUE? SI VOUS VOULEZ QUE LES RESULTATS SOIENT DIVULGUES A L'INSTITUTION HYPOTHECAIRE, VEUILLEZ INCLURE L'INFORMATION SUIVANTE.				VILLE/VILLAGE PUIS PRE PAR LE MINISTERE PROVINCIAL DU		
ATTENTION DE				PUITS SUR RESERVE? PUIS DEJA ETIQUETE? IDENTIFICATION DE L'ANCIEN PUIS		
N° DE TELEPHONE		N° DE TELECOPIEUR		OUI NON OUI NON		
SIGNATURE DU PROPRIETAIRE DU PUIS				RAPPORT DE FORAGE		
LE COÛT DE CE PUIS A-T-IL ETE PAYE PAR HABITATION NOUVEAU-BRUNSWICK? OUI NON				DE (pieds)	A (pieds)	COULEUR
UTILISATION DU PUIS OU DE L'EAU: INDUSTRIELLE ABANDONNE DOMESTIQUE EXPLORATION USAGE MUNICIPAL SURVEILLANCE THERMOPOMPE OBSERVATION AUTRE				Niveau du sol		TYPE DE ROCHE
TYPE DE TRAVAUX EFFECTUES: NOUVEAU PUIS PLUS PROFOND				14	30	Rock
AUTRE METHODE: OUTIL AU CABLE ROTATIF AUTRES						
INSTALLATION DE TUBAGE: LONGUEUR DU TUBAGE AU-DESSUS DU SOL ACIER PO DIAMETRE DE PVC PO DIAMETRE DE OUVERTURE PO DIAMETRE DE						
CRÉPINES: TYPE Grosseur des ouvertures EN DIAMETRE DE PIEDS A PIEDS						
RETRAITS: DÉTAILS AU VERSO Fosse Septique (1) pieds Fosse septique (2) pieds Champs (2) pieds Champs (1) pieds Emprise d'une route publique (1) Route (2)						
RETRAITS MESURES (nouvelle construction) RETRAITS APPROXIMATIFS INDICUES PAR LE PROPRIETAIRE (construction actuelle)						
PUITS JAILLISSANT? OUI NON SI OUI: TAUX: g/min (approx.)						
ESSAI DE POMPAGE: METHODE: Gouette pneumatique Bailier Pompe						
NIVEAU D'EAU INITIAL: PIEDS/M SOUS LE DESSUS DU TUBAGE TAUX DE POMPAGE g/min DUREE h min NIVEAU D'EAU FINAL: PIEDS SOUS LE DESSUS DU TUBAGE DÉBIT DE PRODUCTION ASSURE: g/min				AJOUTER DES FEUILLES AU BESOIN		
COLMATAGE DU PUIS: OUI NON				Profondeur totale du puits: 300' pieds	Profondeur à la roche-mère: 14' pieds	
				Aquifère 1: g/min à 2' pieds	2: g/min à 6' pieds	
				Zones de fracture: 3: g/min à	4: g/min à	
				INSTALLATION DE LA POMPE: INSTALLEE NON INSTALLEE		
				Installation de la prise d'eau de la pompe: 27' 290' pieds sous le dessus du tubage		
				TYPE DE POMPE: SUBMERSIBLE JET TURBINE		

Report Number **34368**
Well Tag ID **0048368**
PID **20810222**
Latitude **N/A**
Longitude **N/A**

New Well (No. 3)

Date printed **26-Nov-2015**

Well Owner(s)	
Villa Sormany Inc.	Address 1289 Robertville Street
Telephone Nbr (506) -	Fax Nbr (506) -
	Robertville, NB
	E8K 2V9

Well Location	1289 Robertville Street, Robertville, NB, E8K 2V9		
Drilled by	DESCHENES DRILLING LTD., Lic 1 (GILLES DESCHENES, Lic. 244)		
Well Use	Work Type	Drill Method	Work Completed
Drinking Water, Domestic	New Well	Rotary	29-Jan-2013

Casing Information		Casing above ground 0ft			Drive Shoe Used? No
Well Log	Casing Type	Diameter	From	To	Slotted?
34368	Steel	6 inch (6.in)	0ft	20ft	

Aquifer Test/Yield							
Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	21ft	9.0 igpm	0hr 01min	21ft	9.0 igpm	No	0.0 igpm
	<i>(BTC - Below top of casing)</i>						

Well Grouting	Drilling Fluids Used	Disinfectant	Pump Installed
There is no Grout information.	None	Bleach (Javex)	N/A
		Qty 0.0 igal	Intake Setting (BTC) 290ft

Driller's Log				
Well Log	From	To	Colour	Rock Type
34368	0ft	14ft	Brown	Gravel
34368	14ft	27ft	Grey	Rock
34368	27ft	28ft	Grey	Rock
34368	28ft	36ft	Grey	Rock
34368	36ft	37ft	Grey	Rock
34368	37ft	145ft	Grey	Rock
34368	145ft	146ft	Grey	Rock
34368	146ft	248ft	Grey	Rock
34368	248ft	250ft	Grey	Rock
34368	250ft	300ft	Grey	Rock

Overall Well Depth
300ft
Bedrock Level
0ft

Water Bearing Fracture Zone		
Well Log	Depth ?	Rate
34368	1ft	37.0 igpm
34368	3ft	146.0 igpm
34368	6ft	250.0 igpm

Setbacks		
Well Log Id	Distance	Setback from
34368	350ft	Right of any Public Way Road

Sample Information
There is no related sample information.

The information shown was entered using the Groundwater Information Management System (GWIMS)

Driller's Comments
no septic or field

don't make sense

Well Driller's Report

Report Number **14806**
Well Tag ID **0042269**
PID **20810222**
Latitude **N/A**

Well No. 2

Longitude **N/A**

Date printed **26-Nov-2015**

Well Owner(s)	
La Villa Sormany Inc.	Address 1730 Route 322 Robertville, NB E8K 2V8
Telephone Nbr (506) -	Fax Nbr (506) -

Well Location	1289 Chemin Robertville, Robertville, NB, E8K 2V9		
Drilled by	DESCHENES DRILLING LTD., Lic 1 (REGIS BERUBE, Lic. 169)		
Well Use	Work Type	Drill Method	Work Completed
Non-Drinking Water, Industrial	New Well	Rotary	01-Jul-2009

Casing Information		Casing above ground 2ft			Drive Shoe Used? Yes
Well Log	Casing Type	Diameter	From	To	Slotted?
14806	Steel	6 inch (6.in)	0ft	20ft	

Aquifer Test/Yield							
Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	15ft	6.0 igpm	2hrs 30min	90ft	6.0 igpm	No	0.0 igpm
<i>(BTC - Below top of casing)</i>							

Well Grouting	Drilling Fluids Used	Disinfectant	Pump Installed
There is no Grout information.	None	N/A	N/A
		Qty 0.0 igal	Intake Setting (BTC) 0ft

Driller's Log				
Well Log	From	To	Colour	Rock Type
14806	0ft	12ft	Brown	Topsoil
14806	12ft	16ft	Brown	Fractured Rock
14806	16ft	26ft	Brown	Rock
14806	26ft	73ft	Black	Rock
14806	73ft	143ft	Grey	Rock
14806	143ft	144ft	White	Rock
14806	144ft	300ft	Grey	Rock

Overall Well Depth
300ft
Bedrock Level
0ft

Water Bearing Fracture Zone		
Well Log	Depth	Rate
14806	2ft	143.0 igpm
14806	37ft	4.0 igpm

Setbacks		
Well Log Id	Distance	Setback from
14806	500ft	Right of any Public Way Road
14806	200ft	Septic Tank
14806	100ft	Leach Field

Sample Information	
LIMS ID	Sample Date
201100232	11-Jan-2011

The information shown was entered using the Groundwater Information Management System (GWIMS)

don't make sense

Driller's Comments

**Test du puits
6=GPM**

Attachment B:

Well Logs and Location Plan of Wells within 500 m of Subject Site



16

Well Driller's Report

Date printed **2018/11/16**

Drilled by	Work Type	Drill Method	Work Completed
Well Use Drinking Water, Domestic	New Well	Rotary	09/21/2004

Casing Information		Casing above ground			Drive Shoe Used?
Well Log	Casing Type	Diameter	From	End	Slotted?
3726	Steel	6 inch	0ft	19ft	

Aquifer Test/Yield						
Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well? Rate
Air	0ft	0.5 igpm	0hr 20min	0ft	0.5 igpm	No 0 igpm
<i>(BTC - Below top of casina)</i>						

Well Grouting	Drilling Fluids Used	Disinfectant	Pump Installed
There is no Grout information.	None	Bleach (Javex)	Submersible
		Qty 0 ig	Intake Setting (BTC) 235ft

Driller's Log				
Well Log	From	End	Colour	Rock Type
3726	0ft	1ft	Brown	Topsoil
3726	1ft	4ft	Brown	Gravel
3726	4ft	6ft	Grey	Slate and Clay
3726	6ft	14ft	Brown	Till
3726	14ft	97ft	Grey	Slate
3726	97ft	101ft	Red	Slate
3726	101ft	195ft	Grey	Slate
3726	195ft	240ft	Brown	Quartz

Overall Well Depth
240ft

Bedrock Level
0ft

Water Bearing Fracture Zone		
Well Log	Depth	Rate
3726	48ft	0.5 igpm

Setbacks		
Well Log	Distance	Setback From
3726	70ft	Septic Tank
3726	95ft	Leach Field
3726	200ft	Right of any Public Way Road

Well Driller's Report

Date printed **2018/11/16**

Drilled by	Work Type	Drill Method	Work Completed
Well Use Drinking Water, Domestic	New Well	Rotary	09/19/2002

Casing Information		Casing above ground			Drive Shoe Used?
Well Log	Casing Type	Diameter	From	End	Slotted?
3770	Steel	6 inch	0ft	20ft	

Aquifer Test/Yield						
Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well? Rate
Air	16ft	2 igpm	4hrs 30min	115ft	0 igpm	No 0 igpm
<i>(BTC - Below top of casing)</i>						

Well Grouting	Drilling Fluids Used	Disinfectant	Pump Installed
There is no Grout information.	None	N/A	N/A
		Qty 0 ig	Intake Setting (BTC) 0ft

Driller's Log					Overall Well Depth
Well Log	From	End	Colour	Rock Type	131ft
3770	0ft	10ft	Brown	Topsoil	Bedrock Level 0ft
3770	10ft	16ft	Brown	Rock	
3770	16ft	24ft	Red	Granite	
3770	24ft	33ft	Grey	Granite and Rock	
3770	33ft	59ft	Grey	Soft Rock	
3770	59ft	68ft	Brown	Rock	
3770	68ft	69ft	Grey	Rock	
3770	69ft	93ft	Brown	Rock	
3770	93ft	96ft	Grey	Rock	
3770	96ft	123ft	Brown	Rock	
3770	123ft	131ft	Grey	Rock	

Water Bearing Fracture Zone		
Well Log	Depth	Rate
3770	21ft	51 lgpm

Setbacks		
Well Log	Distance	Setback From
3770	75ft	Septic Tank
3770	300ft	Septic Tank
3770	400ft	Leach Field
3770	100ft	Leach Field

Well Driller's Report

Date printed **2018/11/16**

Drilled by	Work Type	Drill Method	Work Completed
Well Use Drinking Water, Domestic	Deepened	Rotary	08/08/2005

Casing Information		Casing above ground			Drive Shoe Used?
Well Log	Casing Type	Diameter	From	End	Slotted?
5303	Steel	6 inch	0ft	20ft	

Aquifer Test/Yield							
Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	12ft	1.5 igpm	2hrs 30min	0ft	1.5 igpm	No	0 igpm
<i>(BTC - Below top of casing)</i>							

Well Grouting	Drilling Fluids Used	Disinfectant	Pump Installed
There is no Grout information.	None	N/A	Submersible
		Qty 0 ig	Intake Setting (BTC) 190ft

Driller's Log					Overall Well Depth 203ft
Well Log	From	End	Colour	Rock Type	
5303	0ft	103ft	Unknown Rock Colour	Unknown	Bedrock Level 0ft
5303	103ft	143ft	Grey	Rock	
5303	143ft	144ft	Brown	Rock	
5303	144ft	203ft	Grey	Rock	

Water Bearing Fracture Zone		
Well Log	Depth	Rate
5303	143ft	1.5 igpm

Setbacks		
Well Log	Distance	Setback From
5303	65ft	Septic Tank
5303	85ft	Leach Field
5303	115ft	Septic Tank
5303	165ft	Leach Field
5303	125ft	Right of any Public Way Road

Well Driller's Report

Date printed **2018/11/16**

Drilled by	Work Type	Drill Method	Work Completed
Well Use Drinking Water, Abandoned	New Well	Rotary	11/11/2005

Casing Information		Casing above ground			Drive Shoe Used?
Well Log	Casing Type	Diameter	From	End	Slotted?
5323	Steel	6 inch	0ft	20ft	

Aquifer Test/Yield							
Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	21ft	1.5 igpm	1hr 30min	140ft	1.5 igpm	No	0 igpm
<i>(BTC - Below top of casing)</i>							

Well Grouting	Drilling Fluids Used	Disinfectant	Pump Installed
There is no Grout information.	Other	N/A	N/A
		Qty 0 ig	Intake Setting (BTC) 0ft

Driller's Log				
Well Log	From	End	Colour	Rock Type
5323	0ft	9ft	Brown	Topsoil
5323	9ft	17ft	Brown	Fractured Rock
5323	17ft	26ft	Grey	Rock
5323	26ft	26ft	Brown	Rock
5323	26ft	59ft	Grey	Rock
5323	59ft	62ft	Grey	Rock
5323	62ft	93ft	Grey	Rock
5323	93ft	108ft	Black	Rock
5323	108ft	118ft	Grey	Rock
5323	118ft	133ft	Black	Rock
5323	133ft	144ft	Grey	Rock
5323	144ft	149ft	Black	Rock
5323	149ft	153ft	Grey	Rock

Overall Well Depth
153ft

Bedrock Level
0ft

Water Bearing Fracture Zone		
Well Log	Depth	Rate
5323	27ft	0.5 igpm
5323	60ft	0.5 igpm
5323	95ft	0.5 igpm

Setbacks		
Well Log	Distance	Setback From
5323	60ft	Septic Tank
5323	100ft	Leach Field
5323	130ft	Septic Tank
5323	150ft	Leach Field
5323	50ft	Right of any Public Way Road

Well Driller's Report

Date printed **2018/11/16**

Drilled by	Work Type	Drill Method	Work Completed
Well Use Drinking Water, Domestic	New Well	Rotary	07/06/2006

Casing Information		Casing above ground			Drive Shoe Used?
Well Log	Casing Type	Diameter	From	End	Slotted?
8712	Steel	6 inch	0ft	40ft	

Aquifer Test/Yield							
Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	140ft	1.5 igpm	0hr 30min	25ft	1.5 igpm	No	0 igpm
<i>(BTC - Below top of casing)</i>							

Well Grouting	Drilling Fluids Used	Disinfectant	Pump Installed
There is no Grout information.	None	Bleach (Javex)	N/A
		Qty 0 ig	Intake Setting (BTC) 0ft

Driller's Log					Overall Well Depth
Well Log	From	End	Colour	Rock Type	
8712	0ft	2ft	Brown	Topsoil	140ft
8712	2ft	9ft	Brown	Clay	
8712	9ft	115ft	Grey and white	Quartz	Bedrock Level
8712	115ft	120ft	Grey	Quartz	0ft
8712	120ft	140ft	Grey	Slate	

Water Bearing Fracture Zone		
Well Log	Depth	Rate
8712	115ft	1.5 igpm

Setbacks		
Well Log	Distance	Setback From
8712	50ft	Right of any Public Way Road
8712	300ft	Septic Tank
8712	300ft	Leach Field

Well Driller's Report

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Drilled by	Work Type	Drill Method	Work Completed
Well Use Drinking Water, Domestic	New Well	Rotary	11/19/2013

Casing Information		Casing above ground			Drive Shoe Used?
Well Log	Casing Type	Diameter	From	End	Slotted?
15968	Steel	6 inch	0ft	20ft	

Aquifer Test/Yield							
Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	50ft	0.5 igpm	0hr 45min	50ft	0.75 igpm	No	0 igpm
<i>(BTC - Below top of casing)</i>							

Well Grouting	Drilling Fluids Used	Disinfectant	Pump Installed
There is no Grout information.	None	Bleach (Javex)	N/A
		Qty 0 ig	Intake Setting (BTC)
			0ft

Driller's Log					Overall Well Depth
Well Log	From	End	Colour	Rock Type	280ft
15968	0ft	12ft	Grey	Gravel	Bedrock Level 0ft
15968	12ft	19ft	Red	Rock	
15968	50ft	54ft	Grey	Rock	
15968	54ft	75ft	Red	Rock	
15968	92ft	122ft	Grey	Rock	
15968	122ft	140ft	Red	Rock	
15968	140ft	182ft	Red	Rock	
15968	182ft	191ft	Grey	Rock	
15968	191ft	214ft	Grey	Rock	
15968	214ft	228ft	Red	Rock	
15968	228ft	280ft	Grey	Rock	
15968	19ft	50ft	Red	Rock	
15968	75ft	92ft	Grey	Rock	

Water Bearing Fracture Zone		
Well Log	Depth	Rate
15968	220ft	30 igpm

Setbacks		
Well Log	Distance	Setback From
15968	80ft	Right of any Public Way Road
15968	250ft	Septic Tank
15968	250ft	Leach Field

Well Driller's Report

Date printed **2018/11/16**

Drilled by	Work Type	Drill Method	Work Completed
Well Use Drinking Water, Domestic	New Well	Rotary	12/01/2014

Casing Information		Casing above ground			Drive Shoe Used?
Well Log	Casing Type	Diameter	From	End	Slotted?
18907	Steel	6 inch	0ft	20ft	

Aquifer Test/Yield						
Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well? Rate
Air	110ft	3 igpm	0hr 30min	130ft	3 igpm	No 0 igpm
<i>(BTC - Below top of casing)</i>						

Well Grouting	Drilling Fluids Used	Disinfectant	Pump Installed
There is no Grout information.	None	Bleach (Javex)	N/A
		Qty 0 ig	Intake Setting (BTC)
			0ft

Driller's Log					Overall Well Depth
Well Log	From	End	Colour	Rock Type	
18907	0ft	5ft	Brown	Earth	155ft
18907	5ft	10ft	Brown	Gravel	
18907	10ft	22ft	Brown	Rock	Bedrock Level
18907	22ft	24ft	Red	Rock	5ft
18907	24ft	30ft	Brown	Rock	
18907	30ft	58ft	Brown	Rock	
18907	58ft	67ft	Grey	Rock	
18907	67ft	69ft	Brown	Rock	
18907	69ft	97ft	Grey	Rock	
18907	97ft	101ft	Brown	Rock	
18907	101ft	155ft	Grey	Rock	

Water Bearing Fracture Zone		
Well Log	Depth	Rate
18907	23ft	1 igpm
18907	68ft	1 igpm
18907	98ft	1 igpm

Setbacks		
Well Log	Distance	Setback From
18907	65ft	Septic Tank
18907	168ft	Right of any Public Way Road

Well Driller's Report

Date printed **2018/11/16**

Drilled by	Work Type	Drill Method	Work Completed
Well Use Drinking Water, Domestic	New Well	Rotary	10/17/2007

Casing Information		Casing above ground			Drive Shoe Used?
Well Log	Casing Type	Diameter	From	End	Slotted?
18983	Steel	6 inch	0ft	19ft	

Aquifer Test/Yield							
Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	160ft	1.25 igpm	0hr 30min	18ft	1.25 igpm	No	0 igpm
<i>(BTC - Below top of casing)</i>							

Well Grouting				Drilling Fluids Used	Disinfectant	Pump Installed
Well Log	Grout Type	From	End	Water	12% NaOCl	Submersible
18983	Bentonite	10ft	13ft		Qty 0 ig	Intake Setting (BTC) 150ft

Driller's Log					Overall Well Depth
Well Log	From	End	Colour	Rock Type	160ft
18983	0ft	1ft	Brown	Topsoil	Bedrock Level 6ft
18983	1ft	6ft	Brown	Fill	
18983	6ft	95ft	Grey	Slate	
18983	95ft	160ft	Grey	Quartz	

Water Bearing Fracture Zone		
Well Log	Depth	Rate
18983	150ft	1.25 igpm

Setbacks		
Well Log	Distance	Setback From
18983	95ft	Septic Tank
18983	95ft	Leach Field
18983	94ft	Right of any Public Way Road

Well Driller's Report

Date printed **2018/11/16**

Drilled by	Work Type	Drill Method	Work Completed
Well Use Drinking Water, Domestic	New Well	Rotary	05/18/2012

Casing Information		Casing above ground			Drive Shoe Used?
Well Log	Casing Type	Diameter	From	End	Slotted?
19201	Steel	6 inch	0ft	19ft	

Aquifer Test/Yield						
Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well? Rate
Air	60ft	8 igpm	0hr 30min	5ft	8 igpm	No 0 igpm
<i>(BTC - Below top of casing)</i>						

Well Grouting				Drilling Fluids Used	Disinfectant	Pump Installed
Well Log	Grout Type	From	End	Water	Bleach (Javex)	Submersible
19201	Bentonite	12ft	15ft		Qty 0 ig	Intake Setting (BTC) 50ft

Driller's Log					Overall Well Depth
Well Log	From	End	Colour	Rock Type	60ft
19201	0ft	1ft	Grey	Fill	Bedrock Level 0ft
19201	1ft	15ft	Brown	Till	
19201	15ft	35ft	Grey	Quartz	
19201	35ft	45ft	Grey	Shale	
19201	45ft	60ft	Grey	Quartz	

Water Bearing Fracture Zone		
Well Log	Depth	Rate
19201	22ft	8 igpm

Setbacks		
Well Log	Distance	Setback From
19201	125ft	Right of any Public Way Road

Well Driller's Report

Date printed **2018/11/16**

Drilled by	Work Type	Drill Method	Work Completed
Well Use Drinking Water, Domestic	Deepened		08/07/2006

Casing Information		Casing above ground			Drive Shoe Used?
Well Log	Casing Type	Diameter	From	End	Slotted?
19801	Steel	6 inch	0ft	4ft	

Aquifer Test/Yield							
Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	6ft	1.5 igpm	1hr 30min	140ft	1.5 igpm	No	0 igpm
<i>(BTC - Below top of casing)</i>							

Well Grouting	Drilling Fluids Used	Disinfectant	Pump Installed
There is no Grout information.	None	N/A	Turbine
		Qty 0 ig	Intake Setting (BTC)
			0ft

Driller's Log					Overall Well Depth
Well Log	From	End	Colour	Rock Type	
19801	0ft	86ft	Grey	Granite	153ft
19801	86ft	153ft	Grey	Granite	Bedrock Level
					0ft

Water Bearing Fracture Zone		
Well Log	Depth	Rate
19801	18ft	1.5 igpm

Setbacks		
Well Log	Distance	Setback From
19801	65ft	Septic Tank
19801	90ft	Septic Tank
19801	85ft	Leach Field
19801	125ft	Leach Field
19801	71ft	Right of any Public Way Road

Well Driller's Report

Date printed **2018/11/16**

Drilled by	Work Type	Drill Method	Work Completed
Well Use Drinking Water, Domestic	New Well	Rotary	08/08/2017

Casing Information		Casing above ground			Drive Shoe Used?
Well Log	Casing Type	Diameter	From	End	Slotted?
22782	Steel	6 inch	0ft	20ft	

Aquifer Test/Yield						
Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well? Rate
Air	30ft	1 igpm	0hr 40min	17ft	1 igpm	No 0 igpm
<i>(BTC - Below top of casing)</i>						

Well Grouting	Drilling Fluids Used	Disinfectant	Pump Installed
There is no Grout information.	None	Bleach (Javex)	N/A
		Qty 0 ig	Intake Setting (BTC)
			0ft

Driller's Log					Overall Well Depth
Well Log	From	End	Colour	Rock Type	255ft
22782	0ft	3ft	Brown	Earth	Bedrock Level 3ft
22782	3ft	6ft	Brown	Gravel	
22782	6ft	60ft	Grey	Rock	
22782	60ft	63ft	Grey	Sand and Rocks	
22782	63ft	95ft	Grey	Rock	
22782	95ft	98ft	Grey	Sand and Rocks	
22782	98ft	202ft	Grey	Rock	
22782	202ft	206ft	Brown	Rock	
22782	206ft	210ft	Grey	Rock	
22782	210ft	213ft	Grey	Sand and Rocks	
22782	213ft	215ft	Grey	Rock	
22782	215ft	217ft	Grey	Sand and Rocks	
22782	217ft	255ft	Grey	Rock	

Water Bearing Fracture Zone		
Well Log	Depth	Rate
22782	96ft	0.5 igpm
22782	214ft	0.5 igpm

Setbacks		
Well Log	Distance	Setback From
22782	109ft	Septic Tank
22782	168ft	Right of any Public Way Road

Well Driller's Report

Date printed **2018/11/16**

Drilled by	Work Type	Drill Method	Work Completed
Well Use Drinking Water, Domestic	New Well	Rotary	09/17/2015

Casing Information		Casing above ground			Drive Shoe Used?
Well Log	Casing Type	Diameter	From	End	Slotted?
23212	Steel	6 inch	0ft	20ft	

Aquifer Test/Yield						
Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well? Rate
Air	80ft	3 igpm	0hr 30min	100ft	3 igpm	No 0 igpm
<i>(BTC - Below top of casing)</i>						

Well Grouting	Drilling Fluids Used	Disinfectant	Pump Installed
There is no Grout information.	None	Bleach (Javex)	N/A
		Qty 0 ig	Intake Setting (BTC) 0ft

Driller's Log					Overall Well Depth
Well Log	From	End	Colour	Rock Type	
23212	0ft	5ft	Red	Earth	155ft
23212	5ft	8ft	Red	Clay	
23212	8ft	10ft	Red	Earth and Gravel	Bedrock Level
23212	10ft	155ft	Grey	Rock	10ft

Water Bearing Fracture Zone		
Well Log	Depth	Rate
23212	70ft	1 igpm
23212	101ft	1 igpm
23212	137ft	1 igpm

Setbacks		
Well Log	Distance	Setback From
23212	90ft	Right of any Public Way Road

Well Driller's Report

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Drilled by	Work Type	Drill Method	Work Completed
Well Use Drinking Water, Domestic	New Well	Rotary	10/11/2012

Casing Information		Casing above ground			Drive Shoe Used?
Well Log	Casing Type	Diameter	From	End	Slotted?
31384	Steel	6 inch	0ft	19ft	

Aquifer Test/Yield							
Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	200ft	0.5 igpm	0hr 30min	15ft	0.5 igpm	No	0 igpm
<i>(BTC - Below top of casing)</i>							

Well Grouting				Drilling Fluids Used	Disinfectant	Pump Installed
Well Log	Grout Type	From	End	None	Bleach (Javex)	Submersible
31384	Bentonite	12ft	15ft		Qty 0 ig	Intake Setting (BTC) 190ft

Driller's Log						Overall Well Depth
Well Log	From	End	Colour	Rock Type		200ft
31384	0ft	1ft	Brown	Topsoil		
31384	1ft	8ft	Brown	Till and Gravel		
31384	8ft	12ft	Grey	Slate		Bedrock Level 0ft
31384	12ft	14ft	Red	Slate		
31384	14ft	200ft	Grey	Slate		

Water Bearing Fracture Zone		
Well Log	Depth	Rate
31384	40ft	0.5 igpm

Setbacks		
Well Log	Distance	Setback From
31384	56ft	Septic Tank
31384	77ft	Leach Field
31384	103ft	Right of any Public Way Road

Well Driller's Report

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Drilled by	Work Type	Drill Method	Work Completed
Well Use Drinking Water, Domestic	New Well	Rotary	06/08/2013

Casing Information		Casing above ground			Drive Shoe Used?
Well Log	Casing Type	Diameter	From	End	Slotted?
34188	Steel	6 inch	0ft	19ft	

Aquifer Test/Yield							
Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	140ft	1 igpm	0hr 30min	10ft	1 igpm	No	0 igpm
<i>(BTC - Below top of casing)</i>							

Well Grouting				Drilling Fluids Used	Disinfectant	Pump Installed
Well Log	Grout Type	From	End	Water	Bleach (Javex)	N/A
34188	Bentonite	12ft	14ft		Qty 0 ig	Intake Setting (BTC) 0ft

Driller's Log					Overall Well Depth
Well Log	From	End	Colour	Rock Type	140ft
34188	0ft	5ft	Brown	Fill Rock	Bedrock Level 0ft
34188	5ft	14ft	Brown	Clay and Gravel	
34188	14ft	60ft	Grey	Slate	
34188	60ft	102ft	Red	Slate	
34188	102ft	140ft	Grey	Slate	

Water Bearing Fracture Zone		
Well Log	Depth	Rate
34188	90ft	1 igpm

Setbacks		
Well Log	Distance	Setback From
34188	200ft	Center of road

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Drilled by	Work Type	Drill Method	Work Completed
Well Use Drinking Water, Domestic	New Well	Rotary	08/01/1998

Casing Information		Casing above ground			Drive Shoe Used?
Well Log	Casing Type	Diameter	From	End	Slotted?
90010282	Steel	6 inch	0ft	20ft	

Aquifer Test/Yield						
Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well? Rate
Air	0ft	5 igpm	1hr 30min	15ft	4 igpm	No 0 igpm
<i>(BTC - Below top of casing)</i>						

Well Grouting	Drilling Fluids Used	Disinfectant	Pump Installed
There is no Grout information.	Other	N/A	Submersible
		Qty 0 ig	Intake Setting (BTC)
			70ft

Driller's Log					Overall Well Depth
Well Log	From	End	Colour	Rock Type	
90010282	0ft	5ft	Brown	Rock	78ft
90010282	5ft	64ft	Grey	Granite and Rock	Bedrock Level
90010282	64ft	67ft	Red	Rock	0ft
90010282	67ft	73ft	Grey	Rock	
90010282	73ft	75ft	Red	Rock	
90010282	75ft	78ft	Grey	Rock	

Water Bearing Fracture Zone		
Well Log	Depth	Rate
90010282	65ft	4 igpm

Setbacks
There is no Setback information.

Well Driller's Report

Date printed **2018/11/16**

Drilled by	Work Type	Drill Method	Work Completed
Well Use Drinking Water, Domestic	New Well (NEW WELL)	Rotary (ROTARY)	10/27/1994

Casing Information		Casing above ground			Drive Shoe Used?
Well Log	Casing Type	Diameter	From	End	Slotted?
90199200	Steel	6 inch	0ft	20ft	

Aquifer Test/Yield							
Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	0ft	4 igpm	0hr 25min	80ft	4 igpm	No	0 igpm
<i>(BTC - Below top of casing)</i>							

Well Grouting	Drilling Fluids Used	Disinfectant	Pump Installed
There is no Grout information.	None	Other	N/A
		Qty 0 ig	Intake Setting (BTC) 75ft

Driller's Log					Overall Well Depth
Well Log	From	End	Colour	Rock Type	
90199200	0ft	2ft	Brown	Gravel	85ft
90199200	2ft	5ft	Black	Topsoll	
90199200	5ft	17ft	Brown	Gravel	Bedrock Level
90199200	17ft	85ft	Grey	Slate	0ft

Water Bearing Fracture Zone		
Well Log	Depth	Rate
90199200	30ft	1 igpm
90199200	75ft	3 igpm

Setbacks
There is no Setback information.

Well Driller's Report

Date printed **2018/11/16**

Drilled by	Work Type	Drill Method	Work Completed
Well Use Drinking Water, Domestic	New Well (NEW WELL)	Rotary (ROTARY)	08/23/1995

Casing Information		Casing above ground			Drive Shoe Used?
Well Log	Casing Type	Diameter	From	End	Slotted?
90369600	Steel	6 inch	0ft	20ft	

Aquifer Test/Yield							
Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	0ft	75 igpm	0hr 30min	0ft	75 igpm	No	0 igpm
<i>(BTC - Below top of casing)</i>							

Well Grouting	Drilling Fluids Used	Disinfectant	Pump Installed
There is no Grout information.	Water	N/A	N/A
		Qty 0 ig	Intake Setting (BTC) 200ft

Driller's Log					Overall Well Depth
Well Log	From	End	Colour	Rock Type	
90369600	0ft	2ft	Brown	Topsoil	205ft
90369600	2ft	17ft	Brown	Clay and Gravel	Bedrock Level
90369600	17ft	205ft	Grey	Slate	0ft

Water Bearing Fracture Zone		
Well Log	Depth	Rate
90369600	90ft	75 igpm

Setbacks
There is no Setback information.

Well Driller's Report

Date printed **2018/11/16**

Drilled by	Work Type	Drill Method	Work Completed
Well Use Drinking Water, Domestic	New Well (NEW WELL)	Rotary (ROTARY)	12/03/1997

Casing Information		Casing above ground			Drive Shoe Used?
Well Log	Casing Type	Diameter	From	End	Slotted?
90901100	Steel	6 inch	0ft	22ft	

Aquifer Test/Yield							
Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	15ft	10 igpm	1hr	250ft	10 igpm	No	0 igpm
<i>(BTC - Below top of casing)</i>							

Well Grouting	Drilling Fluids Used	Disinfectant	Pump Installed
There is no Grout information.	Water	Bleach (Javex)	N/A
		Qty 2.0 ig	Intake Setting (BTC)
			290ft

Driller's Log					Overall Well Depth
Well Log	From	End	Colour	Rock Type	
90901100	0ft	14ft	Brown	Gravel	300ft
90901100	14ft	300ft	Grey	Rock	Bedrock Level
					0ft

Water Bearing Fracture Zone		
Well Log	Depth	Rate
90901100	50ft	10 lgpm

Setbacks
There is no Setback information.

Well Driller's Report

Date printed **2018/11/16**

Drilled by	Work Type	Drill Method	Work Completed
Well Use Drinking Water, Domestic	New Well (NEW WELL)	Cable Tool (CABLE TOOL)	08/01/1998

Casing Information	Casing above ground	Drive Shoe Used?
There is no casing information.		

Aquifer Test/Yield							
Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
	0ft	0 igpm	0hr	0ft	0 igpm	No	0 igpm
<i>(BTC - Below top of casing)</i>							

Well Grouting	Drilling Fluids Used	Disinfectant	Pump Installed
There is no Grout information.	None	N/A	N/A
		Qty 0 ig	Intake Setting (BTC) 0ft

Driller's Log	Overall Well Depth
There is no rock layer information.	78ft
	Bedrock Level 0ft

Water Bearing Fracture Zone
There is no water bearing fracture zone information.

Setbacks
There is no Setback information.

Well Driller's Report

Date printed **2018/11/16**

Drilled by	Work Type	Drill Method	Work Completed
Well Use Drinking Water, Domestic	New Well (NEW WELL)	Rotary (ROTARY)	12/20/1999

Casing Information		Casing above ground			Drive Shoe Used?
Well Log	Casing Type	Diameter	From	End	Slotted?
91515000	Steel	6 inch	0ft	20ft	

Aquifer Test/Yield							
Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	5ft	2 igpm	1hr 30min	120ft	2 igpm	No	0 igpm
<i>(BTC - Below top of casing)</i>							

Well Grouting	Drilling Fluids Used	Disinfectant	Pump Installed
There is no Grout information.	None	N/A	N/A
		Qty 0 ig	Intake Setting (BTC) 115ft

Driller's Log				
Well Log	From	End	Colour	Rock Type
91515000	0ft	14ft	Brown	Gravel
91515000	14ft	36ft	Grey	Rock
91515000	36ft	41ft	Black	Rock
91515000	41ft	47ft	Grey	Rock
91515000	47ft	51ft	Black	Rock
91515000	51ft	77ft	Black	Rock
91515000	77ft	86ft	Grey	Rock
91515000	86ft	128ft	Black	Rock

Overall Well Depth
128ft

Bedrock Level
0ft

Water Bearing Fracture Zone		
Well Log	Depth	Rate
91515000	41ft	0.5 igpm
91515000	79ft	1 igpm
91515000	118ft	0.5 igpm

Setbacks
There is no Setback information.

Well Driller's Report

Date printed **2018/11/16**

Drilled by	Work Type	Drill Method	Work Completed
Well Use Drinking Water, Domestic	Deepened (DEEPENED)	Rotary (ROTARY)	09/28/1999

Casing Information	Casing above ground	Drive Shoe Used?
There is no casing information.		

Aquifer Test/Yield							
Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	10ft	1 igpm	1hr	250ft	1 igpm	No	0 igpm
<i>(BTC - Below top of casing)</i>							

Well Grouting	Drilling Fluids Used	Disinfectant	Pump Installed
There is no Grout information.	Water	Bleach (Javex)	N/A
		Qty 2.0 ig	Intake Setting (BTC) 285ft

Driller's Log					Overall Well Depth
Well Log	From	End	Colour	Rock Type	
91618400	100ft	300ft	Grey	Rock	300ft
					Bedrock Level 100ft

Water Bearing Fracture Zone		
Well Log	Depth	Rate
91618400	150ft	1 igpm

Setbacks
There is no Setback information.

Well Driller's Report

Date printed **2018/11/16**

Drilled by	Work Type	Drill Method	Work Completed
Well Use Drinking Water, Domestic	New Well (NEW WELL)	Rotary (ROTARY)	10/21/2000

Casing Information		Casing above ground			Drive Shoe Used?
Well Log	Casing Type	Diameter	From	End	Slotted?
91676000	Steel	6 inch	0ft	20ft	

Aquifer Test/Yield							
Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	0ft	0 igpm	1hr 30min	0ft	0 igpm	No	0 igpm
<i>(BTC - Below top of casing)</i>							

Well Grouting	Drilling Fluids Used	Disinfectant	Pump Installed
There is no Grout information.	None	Bleach (Javex)	N/A
		Qty 4.0 ig	Intake Setting (BTC) 95ft

Driller's Log					Overall Well Depth
Well Log	From	End	Colour	Rock Type	
91676000	0ft	6ft	Brown	Topsoil	84ft
91676000	6ft	11ft	Brown	Gravel	Bedrock Level
91676000	11ft	24ft	Grey	Rock	0ft
91676000	24ft	26ft	Brown	Rock	
91676000	26ft	55ft	Grey	Rock	
91676000	55ft	58ft	Grey	Soft Rock	
91676000	58ft	82ft	Grey	Rock	
91676000	82ft	84ft	White	Rock	

Water Bearing Fracture Zone		
Well Log	Depth	Rate
91676000	26ft	2 igpm
91676000	55ft	1 igpm

Setbacks
There is no Setback information.

Attachment C:

Zoning Map of the Planning Area of Dunlop-Robertville

Attachment D:

Laboratory Certificates for Well No. 3

Report ID: 293312-IAS
 Report Date: 24-Oct-18
 Date Received: 18-Oct-18

CERTIFICATE OF ANALYSIS

for
 Roy Consultants Group
 364 York Street, Suite 102
 Fredericton, NB E3B 3P7



921 College Hill Rd
 Fredericton NB
 Canada E3B 6Z9
 Tel: 506.452.1212
 Fax: 506.452.0594
 www.rpc.ca

Attention: Gina Burt

Project #: 500-18

Location: Robertville

Analysis of Water

RPC Sample ID:		293312-1	
Client Sample ID:		Well No.3	
Date Sampled:		17-Oct-18	
Analytes	Units	RL	
Sodium	mg/L	0.05	112.
Potassium	mg/L	0.02	0.53
Calcium	mg/L	0.05	17.4
Magnesium	mg/L	0.01	4.00
Iron	mg/L	0.02	0.07
Manganese	mg/L	0.001	0.148
Copper	mg/L	0.001	< 0.001
Zinc	mg/L	0.001	0.001
Ammonia (as N)	mg/L	0.05	< 0.05
pH	units	-	8.3
Alkalinity (as CaCO ₃)	mg/L	2	200
Chloride	mg/L	0.5	81.3
Sulfate	mg/L	1	11
Nitrate + Nitrite (as N)	mg/L	0.05	< 0.05
o-Phosphate (as P)	mg/L	0.01	< 0.01
r-Silica (as SiO ₂)	mg/L	0.1	9.5
Carbon - Total Organic	mg/L	0.5	0.8
Turbidity	NTU	0.1	1.3
Conductivity	µS/cm	1	669
Calculated Parameters			
Bicarbonate (as CaCO ₃)	mg/L	-	196.
Carbonate (as CaCO ₃)	mg/L	-	3.68
Hydroxide (as CaCO ₃)	mg/L	-	0.100
Cation Sum	meq/L	-	6.09
Anion Sum	meq/L	-	6.52
Percent Difference	%	-	-3.39
Theoretical Conductivity	µS/cm	-	578
Hardness (as CaCO ₃)	mg/L	0.2	59.9
Ion Sum	mg/L	-	358
Saturation pH (5°C)	units	-	8.1
Langelier Index (5°C)	-	-	0.19

This report relates only to the sample(s) and information provided to the laboratory.

RL = Reporting Limit; Organic Carbon and ion chemistries for turbid samples are determined on filtered aliquots.

Ross Kean

Brannen Burhoe

Ross Kean
 Department Head
 Inorganic Analytical Chemistry

Brannen Burhoe
 Chemical Technician
 Inorganic Analytical Services

Report ID: 293312-IAS
 Report Date: 24-Oct-18
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921 College Hill Rd
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 Tel: 506.452.1212
 Fax: 506.452.0594
 www.rpc.ca

Attention: Gina Burt

Project #: 500-18

Location: Robertville

Analysis of Metals in Water

RPC Sample ID:			293312-1
Client Sample ID:			Well No.3
Date Sampled:			17-Oct-18
Analytes	Units	RL	
Aluminum	µg/L	1	13
Antimony	µg/L	0.1	0.3
Arsenic	µg/L	1	< 1
Barium	µg/L	1	145
Beryllium	µg/L	0.1	< 0.1
Bismuth	µg/L	1	< 1
Boron	µg/L	1	48
Cadmium	µg/L	0.01	0.01
Calcium	µg/L	50	17400
Chromium	µg/L	1	1
Cobalt	µg/L	0.1	< 0.1
Copper	µg/L	1	< 1
Iron	µg/L	20	70
Lead	µg/L	0.1	< 0.1
Lithium	µg/L	0.1	20.3
Magnesium	µg/L	10	4000
Manganese	µg/L	1	148
Molybdenum	µg/L	0.1	0.3
Nickel	µg/L	1	< 1
Potassium	µg/L	20	530
Rubidium	µg/L	0.1	0.3
Selenium	µg/L	1	< 1
Silver	µg/L	0.1	< 0.1
Sodium	µg/L	50	112000
Strontium	µg/L	1	487
Tellurium	µg/L	0.1	< 0.1
Thallium	µg/L	0.1	< 0.1
Tin	µg/L	0.1	< 0.1
Uranium	µg/L	0.1	0.3
Vanadium	µg/L	1	< 1
Zinc	µg/L	1	1

Report ID: 293312-IAS
Report Date: 24-Oct-18
Date Received: 18-Oct-18

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Methods

<u>Analyte</u>	<u>RPC SOP #</u>	<u>Method Reference</u>	<u>Method Principle</u>
Ammonia	4.M47	APHA 4500-NH ₃ G	Phenate Colourimetry
pH	4.M03	APHA 4500-H ⁺ B	pH Electrode - Electrometric
Alkalinity (as CaCO ₃)	4.M43	EPA 310.2	Methyl Orange Colourimetry
Chloride	4.M44	APHA 4500-CL E	Ferricyanide Colourimetry
Sulfate	4.M45	APHA 4500-SO ₄ E	Turbidimetry
Nitrate + Nitrite (as N)	4.M48	APHA 4500-NO ₃ H	Hydrazine Red., Derivatization, Colourimetry
o-Phosphate (as P)	4.M50	APHA 4500-P F	Molybdate/Ascorbic Acid Colourimetry
r-Silica (as SiO ₂)	4.M46	APHA 4500-SI F	Heteropoly Blue Colourimetry
Carbon - Total Organic	4.M38	APHA 5310 C	UV-Persulfate Digestion, NDIR Detection
Turbidity	4.M06	APHA 2130 B	Nephelometry
Conductivity	4.M04	APHA 2510 B	Conductivity Meter, Pt Electrode
Trace Metals	4.M01/4.M29	EPA 200.8/EPA 200.7	ICP-MS/ICP-ES

CERTIFICATE OF ANALYSIS / CERTIFICAT D'ANALYSE

for/pour
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Attention: Gina Burt

Project/Job #: 500-18

Client Location: Robertville

Microbiological Examination of Water/Qualité microbiologique de l'eau potable

RPC Sample ID/No. d'échantillon de RPC:				293312-1
Client Sample ID/ID d'échantillon du client:				Well No.3
Date collected/Date du prélèvement				17-Oct-18
Time sampled/Heure du prélèvement				4:22:00 PM
Analytes/Paramètre(s)	Method/Méthode	Date Analyzed Date Analysé	Units Unités	
Total Coliforms/Coliformes totaux	FFA10	18-Oct-18	MPN/100mL	0
E. coli	FFA10	18-Oct-18	MPN/100mL	0

This report relates only to the sample(s) and information provided to the laboratory.

Le présent rapport ne s'applique qu'aux échantillons et à l'information transmis au laboratoire.

Cathy Hay
Microbiology Supervisor
Food, Fisheries & Aquaculture

Gillian Travis
Microbiology Technician
Food, Fisheries & Aquaculture