Appendix F: Groundwater Reports

Hy-Geo Consulting
www.hy-geo.com

File: 2205191

March 27, 2024

Totangi Properties Ltd
Jordan River BC

Attention: [redacted]

Re: Assessment of February 2024 Pumping Test on Well, WID 69081 (WTN 128906)

As requested, Hy-Geo Consulting has completed an assessment of the quantity and quality of well WID 69081 (WTN 128906) on your property, based on a 24.25 hour pumping test conducted by Independent Pump & Mechanical Ltd., from February 14 to February 15, 2024. The well was investigated as a potential water supply source to support a proposed brewery on the property at 12036 West Coast Road, Jordan River.

It is estimated that the proposed brewery for the subject property would initially need 350,000 L/year (959 L/day) of potable water potentially growing to 3,000,000 L/year (8219 L/day) over 10 years (Totangi Properties, 2024). This would be equivalent to an initial well production rate of 0.18 USgpm growing to 1.51 USgpm, from the well.

This report summarizes the results of pump testing the well and monitoring of potential effects on neighbouring wells. A groundwater assessment report on the southern portion of the property was previously completed by Hy-Geo Consulting (Kohut, 2023).

WELL LOCATION

Well WID 69081 is situated at an elevation just under 55 m, along the southern boundary of PID 9573356 on the north side of West Coast Road at Jordan River (Figure 1). There are numerous existing wells in the general region directly south and west of the property (Figure 1). First Creek lies approximately 360 m west of the well site at an elevation between 45 and 50 m. Another well, WID 18153 (WTN 95648) situated approximately 165 m northeast of WID 69081 was utilized as an observation well during the test pumping of WID 69081.

PUMPED WELL WID 69081 (WTN 128906)

Well WID 69081 is a 6 inch (15.24 cm) diameter well drilled in 2023 by Drillwell Enterprises Ltd., to a depth of 111 feet (33.83 m) and completed with 10 feet (3.05 m) of a screen assembly consisting of 5 feet (1.52 m) of 5 inch (12.7 cm) diameter 50 slot stainless steel well screen set at a depth from 106.5 to 111 feet (32.46 to 33.83 m) in

grey sandy gravel and a 2 foot (0.61 m) length of riser pipe with K packer from 104.5 to 106.5 feet (31.85 to 32.46 m). A copy of the well driller's log is provided in Appendix A.

The driller rated the well at 30 USgpm based on a brief 3 hour bailing test. Non-pumping water level recorded in October 2023 was 71 feet (21.64 m) below top of casing with a stickup of 22 inches (55.9 cm) above ground level. The well lies on a glacial-fluvial terrace that slopes gently southwesterly towards the ocean and is completed in a confined glacio-fluvial sand and gravel aquifer system designated as Aquifer 944 under the *BC Aquifer Classification System* (Bernardinucci and Ronneseth, 2002). The aquifer is classified as a IIB aquifer with a moderate level of demand and moderate vulnerability to contamination from surface sources.

Figure 1. Location of pump tested well WID 69081, Observation Well WID 18153 and neighbouring reported wells. Base map from Province of British Columbia (2024a).

OBSERVATION WELL WID 18153 (WTN 95648)

Well WID 18153 is a 6 inch (15.24 cm) diameter well drilled in 2006 by Drillwell Enterprises Ltd., to a depth of 114 feet (34.75 m) and completed open bottom without a screen. The well encountered coarse gravel to 56 feet (17.07 m), and grey sand from 56 to 59 feet (17.07 to 17.98 m) underlain by gravel with sand and cobbles to 114 feet (34.75 m). A copy of the well driller's log is provided in Appendix A. The absence of any reported fine-grained deposits suggests that the aquifer may be unconfined at this location.

The driller rated the well at 10 USgpm based on a brief 1.5 hour air lifting test. Non-pumping water level recorded in July 2006 was 71 feet (21.64 m) below top of casing with a stickup of 18 inches (45.7 cm) above ground level.

CLIMATE

The region is situated in the *Coastal Western Hemlock Biogeoclimatic Zone* with long, mild, and wet winters, and relatively sunny and dry summers. While a long-term climate station for Jordan River is not available, monthly normal precipitation for the Sooke Lake North climate weather station for the 1981-2010 period has been reported by the Government of Canada (2024) for climate station 1017563 as shown in Figure 2. The region receives about 1497 mm of precipitation on an annual basis (Government of Canada, 2024). Precipitation normally follows a seasonal cycle, with highest rainfall during the fall, winter and early spring months while the summer months are subject to drought conditions.

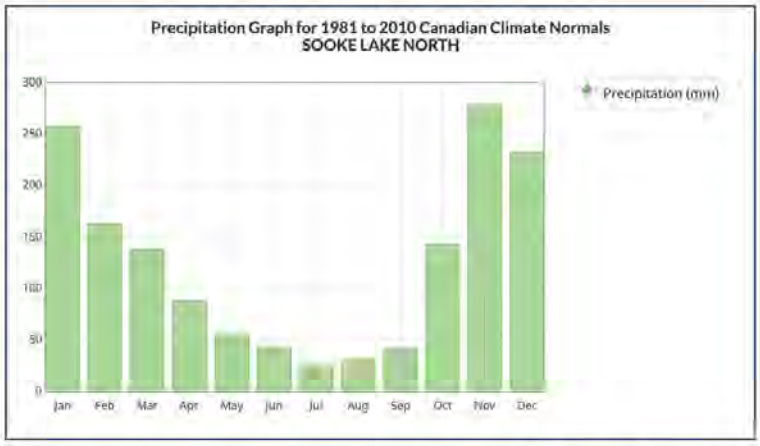

Figure 2. Graph of monthly normal precipitation for Sooke Lake North station (Climate ID. 1017563). Graph from Government of Canada (2024).

REGIONAL WATER LEVEL FLUCTUATIONS

From historic observation well data in unconsolidated deposits on southern Vancouver Island, groundwater levels in surficial wells generally rise and fall with the seasons in response to available precipitation, becoming highest during the late fall, winter and spring months and declining during the May to September period (Kohut *et al.*, 1984). Historic data from the closest provincial Observation Well 469 at Sooke, shows long-term water levels fluctuating over a narrow range of about 2.5 m with highest water levels during the winter months. Similar natural fluctuations might be expected for Aquifer 944 in the Jordan River area with water levels seasonally high in January and February.

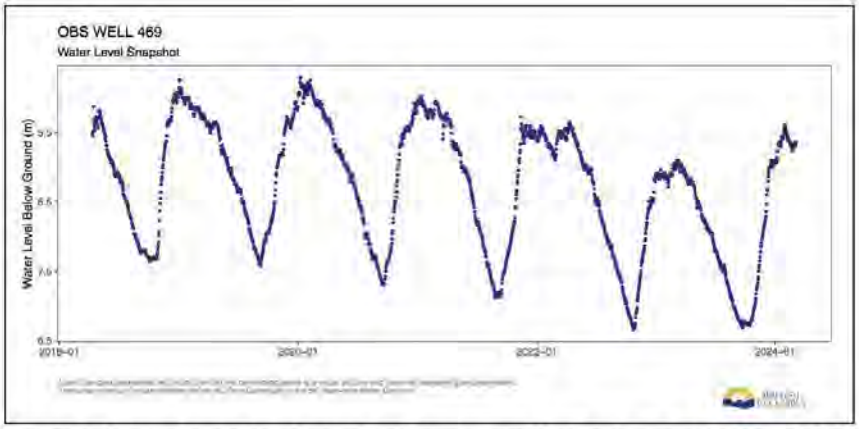

Figure 3. Groundwater level trend in Observation Well 469 at Sooke from 2018 to 2024. Adapted from Province of British Columbia (2024b).

PUMPING TEST OF WELL WID 69081 (WTN 128906)

A minimum 24 hour pumping test is the recommended standard for assessing wells completed in unconsolidated aquifers (Ministry of Environment, 2010). The project well WID 69081 was subsequently pump tested by Independent Pump & Mechanical Ltd., at a near constant rate, averaging 45.07 L/min (11.91 USgpm) for 24.25 hours from 8:00 am February 14 to 8:15 am, February 15, 2024. The pumping rate was determined from a totalizing flow metre and periodic measurements by filling of a 45 gallon drum.

Pumped water was discharged into a drainage ditch 200 feet (61 m) down slope away from the wellhead towards the west. Manual water level readings were taken in the project well during the test at prescribed intervals (Ministry of Environment, 2010) and a *Solinst Levelogger® 5* datalogger set in the well also recorded water levels at ten minute intervals. A *Solinst Barologger® 5* barometric data logger was also employed on site during the test.

Water levels in the neighbouring Observation well WID 18153 (WTN 95648) were also monitored during the pumping test with a *Solinst Levelogger® 5* datalogger at ten minute intervals. Upon pump shutdown, recovery water levels in the pumped well WID 69081 were manually taken at prescribed intervals for 7.75 hours. Limited recovery water levels were also taken in Observation well WID 18153 for 5 hours. Recovery water levels were also recorded by the *Solinst Levelogger® 5* dataloggers in both wells.

Water samples were taken from the pumped well near the end of the test and delivered within 20 hours of sampling with ice packs to the Bureau Veritas laboratory in Esquimalt for analysis of chemical and bacteriological parameters. One of the samples was also field filtered by A. Kohut for determination of dissolved metals. All samples were unadulterated and taken from the pumped well and delivered to the laboratory by A. Kohut.

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PUMP TESTING RESULTS

Pumped Well WID 69081

Well test drawdown and recovery data for the pumped well are provided in Appendix B. Appendix C contains a copy of the water quality analytical laboratory report from Bureau Veritas.

The pumping test was started at 8:00 am on February 14 and ended at 8:15 am on February 15, 2024. Figure 4 shows the drawdown in the pumped well during pumping.

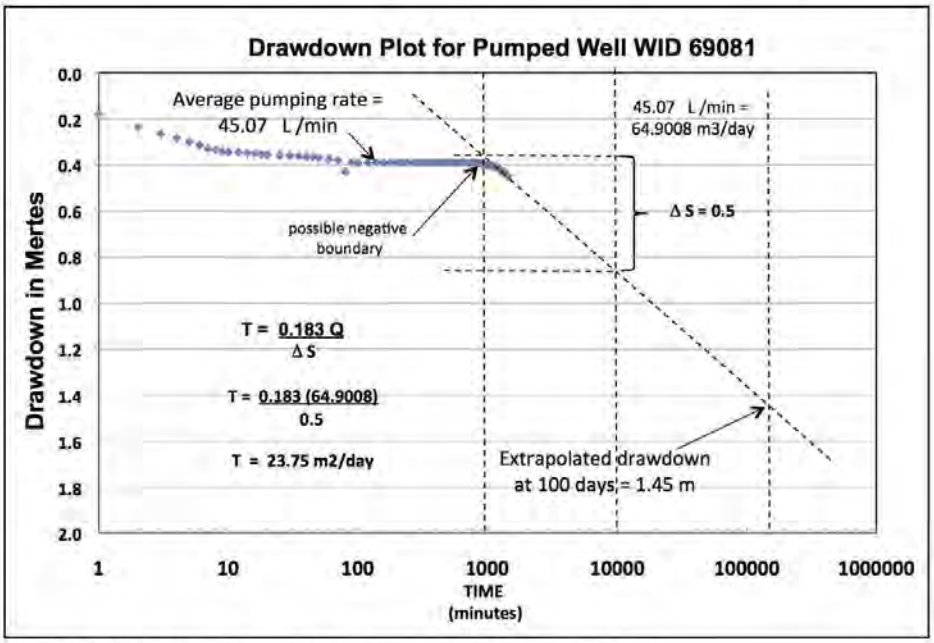

Figure 4. Semi-logarithmic drawdown graph for pumping well.

Drawdown at the end of the test reached 0.45 m below the initial non-pumping water level of 19.12 m below the top of casing at 0.56 m above ground utilizing only 3.5% of the available drawdown of (12.73 m) to the top of the well screen assembly at a depth of 31.85 m (106.5 feet). The water level reached relatively stabilized conditions within 100 minutes of the start of pumping but continued to drawdown slightly as the test progressed. A possible negative boundary condition appears to have been encountered at about 840 minutes into the test (Figure 4}. Transmissivity of the aquifer was calculated at 23.75 m^2/day based on the latter portion of the test.

Figure 5 shows the water level in the well, prior to during and after the pump test as recorded by the datalogger. Prior to the test the water level in the well was rising gradually (Figure 5). Initially on pumping the well drew down very quickly, becoming relatively stable and then drawing down slightly. Minor fluctuations in water level during the test may be related to pumping effects from nearby wells and possibly tidal effects. Upon shutdown the well recovered almost instantaneously but 0.1 m short of a full recovery. Water levels then continued to fall slowly. Figure 6 shows a semi-logarithmic plot of the recovery plot for the well. Recovery was not 100% complete as water levels were gradually falling slightly during and after the test.

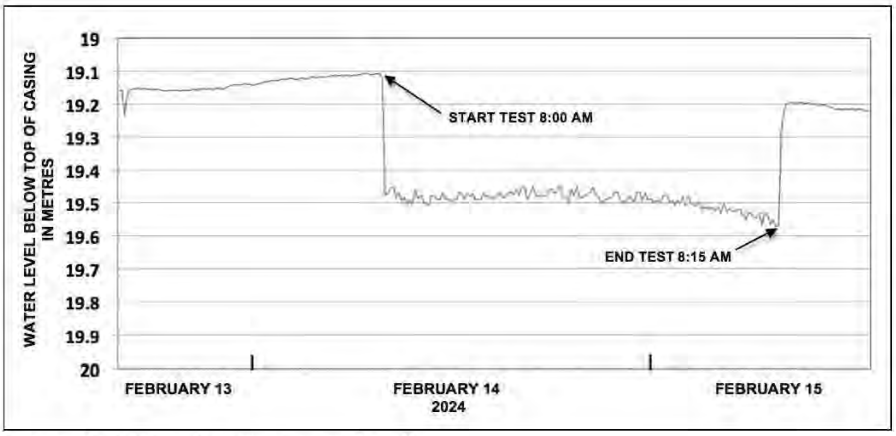

Figure 5. Water level in pumped well.

Given that the well was tested during the wettest time of the year, water levels during the late summer could be much lower reducing the available drawdown in the well by 3.0 metres. Extrapolation of the drawdown in the well to 100 days of continuous pumping as shown in Figure 4, indicates the drawdown would reach 1.45 m. Specific capacity of the well after 100 days would be 46.52 L/min per metre of drawdown. Utilizing this specific capacity and 70 percent of the available summer drawdown of 9.73 m in the well would suggest a long term yield of about 317 L/min or 84 USgpm. It is obvious that the well is capable of supplying much more than the rate at which it was pumped. The ultimate capacity of the well however, would be much less than 317 L/min (84 USgpm) and limited by the well diameter and screen design. Additional pump testing at higher rates would also be required to assess the maximum well capacity. Based on the current test, a well capacity twice that at which it was pumped or 90 L/min (24 USgpm) would be most possible without considering potential well interference effects. The well is therefore, entirely capable of meeting the maximum anticipated projected demand of the brewery for 3,000,00 L/year (8219 L/day). after 10 years. This would be equivalent to a well production rate of 1.51 USgpm (5.72 L/min), from the well.

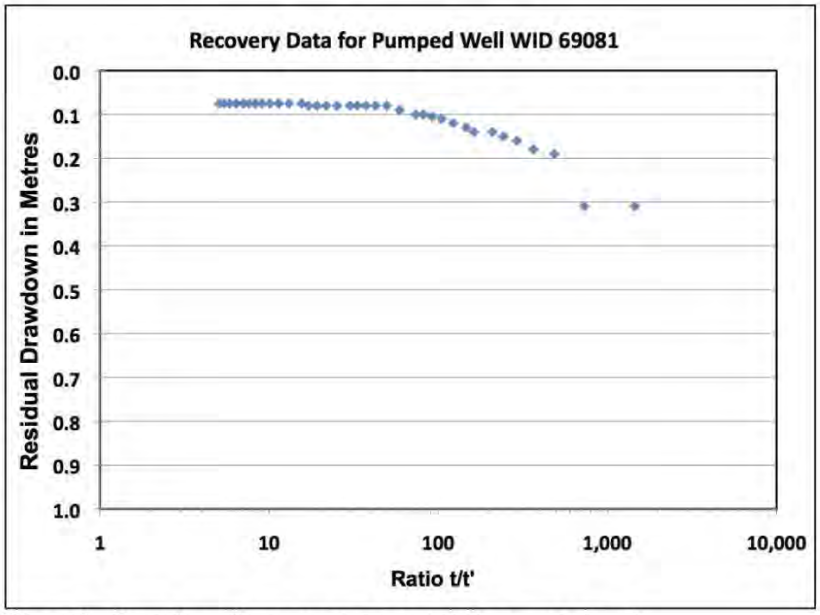

Figure 6. Semi-logarithmic recovery graph for pumped well.

Observation Well WID 18153

Figure 7 shows the water level in the observation well, prior to, during and after the pumping test. The water level in the observation well mirrors the water level response of the pumped well except when the pump is shut down. There is only a very minor water level recovery response in the observation well. This suggests that some dewatering of the aquifer has occurred during the pumping test.

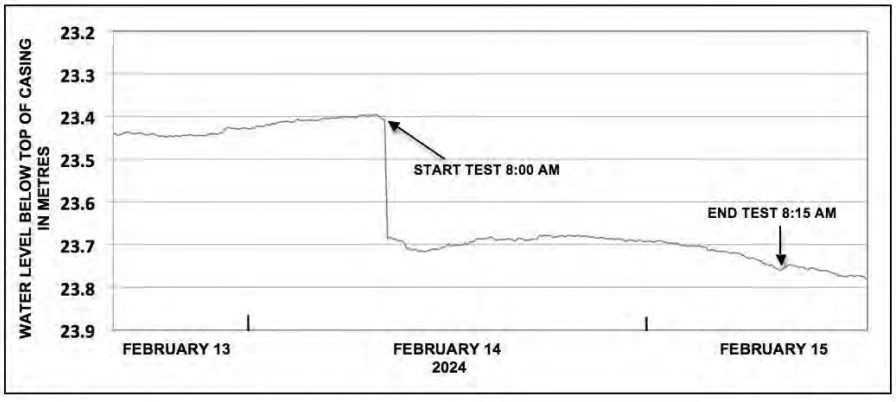

Figure 7. Water level in observation well.

Figure 8 shows the drawdown date for the observation well extracted from the datalogger as the manually taken readings were compromised during the test. Extrapolation of the drawdown data to 100 days indicates that the drawdown would be similar to the extrapolated drawdown in the pumped well.

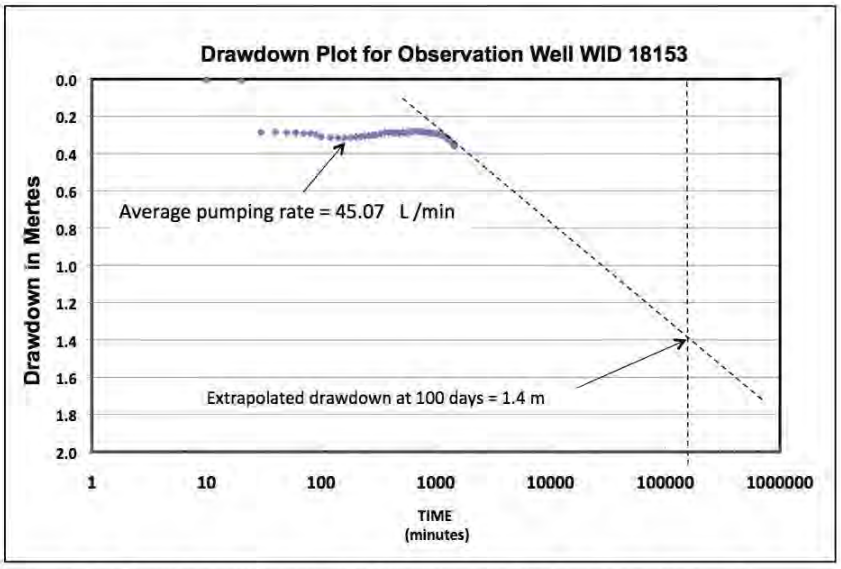

Figure 8. Semi-logarithmic plot of drawdown data in observation well.

Figure 9, indicates the lateral extent of the drawdown cone during the pumping test and after 100 days pumping at a rate of 45.07 L/min (11.91 USgpm). Assuming the aquifer is isotropic, Figure 9 indicates that the pumping test would have affected an area within a radius of 350 m from the pumping well. After 100 days pumping the radius of influence would theoretically extend to 4000 m.

While the radius of the cone of influence of pumping well WID 69801 at a rate of 45.07 L/min (11.91 USgpm) was relatively large (350 m) during the test, the amount of well interference was relatively small at <0.5 m. Similarly, while the radius of the cone of influence pumping well WID 69801 for 100 days would be quite large, again the degree of interference anticipated would also be relatively small at < 1.5m. This degree of well interference would not likely have any significant effect on the safe available drawdown in neighbouring domestic wells.

At a maximum continuous pumping rate of 5.72 L/min or (1.51 USgpm) the projected interference drawdowns would be proportionally much less and only 0.18 m in the observation well after 100 days of pumping. The cone of influence after 100 days, would also not extend to more than 300 m from the pumping well.

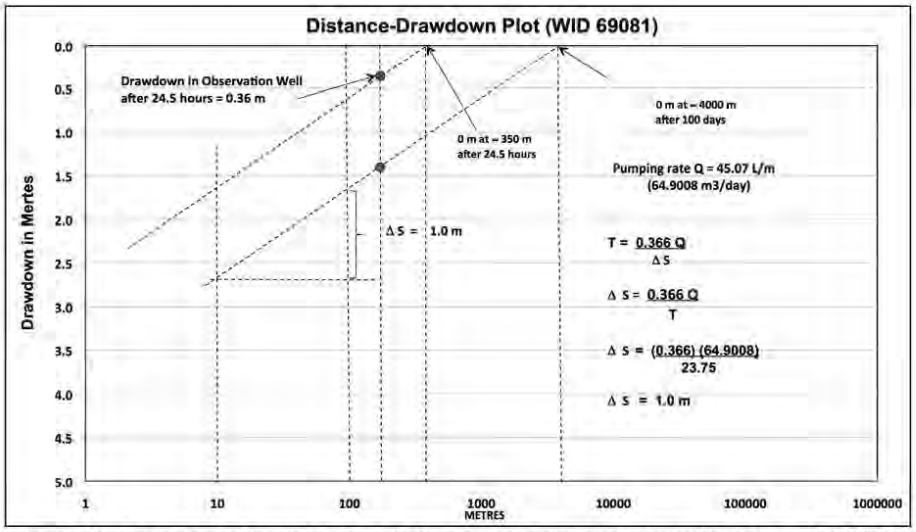

Figure 9. Semi-logarithmic plot of distance versus drawdown with well WID 69081 pumping up to 100 days.

Figure 10 shows the minimum size of the up gradient area that could be contributing recharge to the upper reaches of Aquifer 944 and well WID 69081. Recharge sources would include infiltration of a portion of precipitation falling on the northern portion of Aquifer 944, infiltration from runoff upslope of the aquifer, infiltration from First Creek and from other small creeks up slope. Based on a conservative estimate, for example, of only 2 percent of the annual normal rainfall (1497 mm) over the minimum recharge area, direct infiltration of precipitation, estimated to be 69.54 L/min in itself, would be more than enough to sustain a pumping rate for well WID 69081 at 5.72 L/min or (1.51 USgpm).

Based on the potential extent of the cone of influence of the well up to 300 m after 100 days pumping at 5.72 L/min or (1.51 USgpm) an examination of the location of licensed springs in the vicinity of well WID 69081 was undertaken. Figure 11 indicates that there is one licensed spring, namely Bliss Spring situated within 300 meters of the well.

Bliss Spring is licensed for a total quantity of 29.55 m^3/day or equivalent to 20.52 L/min (Table 2). While currently unknown, there is a possibility that continuous pumping of well WID 69801 at a rate of 5.72 L/min or (1.51 USgpm) could have a minor effect on the flow of Bliss Spring.

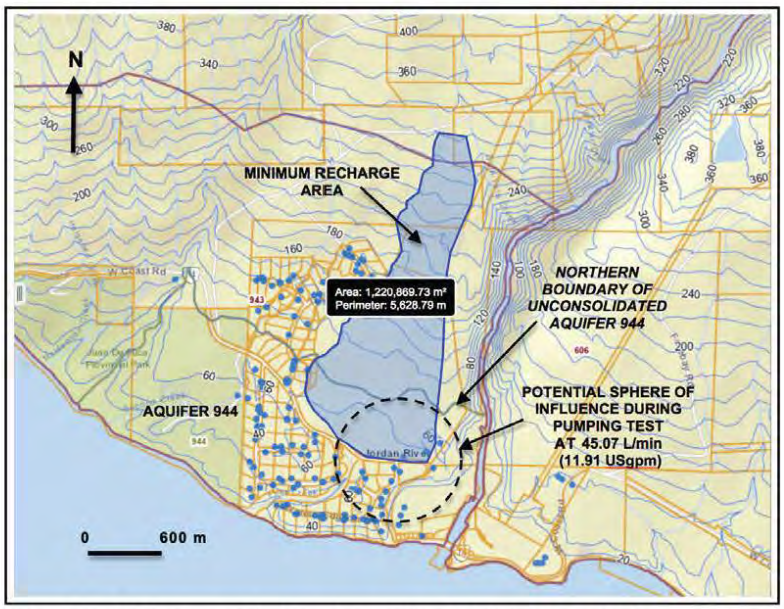

Figure 10. Minimum recharge area and potential cone of influence during pumping test of well WID 69081. Base map from Province of British Columbia (2024a).

Figure 11. Location of licensed springs in the vicinity of well WID 69801. Base map from Province of British Columbia (2024a).

Table 2. Licensed springs in vicinity of well WID 69081.

Licence Number	Priority Date	Stream Name	Purpose	Quantity (MD)
F014458	19430909	Bliss Spring	DOMESTIC	2.273
C123888	20080430	Bliss Spring	DOMESTIC	2.273
F011450	19380816	Bliss Spring	DOMESTIC	4.546
F127744	19410616	Bliss Spring	DOMESTIC	2.273
C061320	19840224	Bliss Spring	DOMESTIC	2.273
C110196	19950825	Bliss Spring	COMM. ENTERPRISE: ENTERPR	2.273
F012739	19380816	Bliss Spring	DOMESTIC	4.546
F014742	19491013	Bliss Spring	DOMESTIC	4.546
F110384	19380816	Bliss Spring	DOMESTIC	2.273
F014458	19430909	Bliss Spring	COMM. ENTERPRISE: ENTERPR	2.273
C110715	19960219	Rudd Spring	COMM. ENTERPRISE: ENTERPR	22.73
C110876	19960401	Rudd Spring	CAMPS & PUB FACIL: PUBLIC	2.273
			Total:	54.552

Data from Province of British Columbia (2024a).

WATER QUALITY RESULTS

Laboratory results of the February 15, 2024 sampling (Table 1), indicate that the water quality of the project well met or exceeded the *Guidelines for Canadian Drinking Water* (Health Canada, 2022) for all parameters tested except for pH at 6.47, True Colour at 128 TCU, Turbidity at 9.9 TU, Total and Dissolved Iron at 9220 and 9560 µg/L respectively and Total and Dissolved Manganese at 202 and 198 µg/L respectively. **No detectable total coliforms or E.coli., bacteria were reported.**

Manganese levels above 20 µg/L and total iron above 300 µg/L are of aesthetic concern and may result in staining of laundry and/or toilet fixtures. Manganese above 120 µg/L is also a health risk for infants consuming the water if it is used to prepare baby formula as it can have can effects on neurological development and behaviour; deficits in memory, attention, and motor skills.

The overall mineralization of the water is very low with a total dissolved solids (TDS) content of 90 mg/L. The Langelier Index @ 4.4ºC is very low at -2.60 indicating the water is aggressive and corrosive for metal piping.

While bacteriologically potable, the presence of elevated levels of iron, manganese, colour, turbidity and low pH would require treatment for commercial purposes. Elevated levels of these parameters could also lead to potential corrosion issues, staining and deposits in the water system.

Table 1. Summary of water quality analyses.

Parameters/Site and Sampling Date	WELL WID 69081 Jordan River Well Feb 15/24	WELL WID 69081 Jordan River Well Feb 15/24		Canadian DWGuideline 2022	Units
PHYSICAL TESTS					
True Colour	128			< or =15	TCU
Transmittance at 254nm	18				%T/cm
Conductivity	110				µS/cm
Total Hardness ($CaCO_3$)	30.9				mg/L
pH	6.47			7.0-10.5	pH units
Total Dissolved solids (TDS)	90			< or = 500	mg/L
Turbidity	9.9			<1.0	NTU
ANIONS					
Alkalinity (Total as $CaCO_3$)	41				mg/L
Alkalinity (PP as $CaCO_3$)	<1.0				mg/L
Bicarbonate	50				mg/L
Carbonate	<1.0				mg/L
Hydroxide	<1.0				mg/L
Chloride	4.4			< or = 250	mg/L
Fluoride	<0.050			1.5	mg/L
Nitrate (N)	<0.020			10	mg/L
Nitrite (N)	<0.0050			1	mg/L
Total Organic Nitrogen (N)	0.589				mg/L
Total Ammonia (N)	0.29				mg/L
Nitrate plus Nitrite (N)	<0.020				mg/L
Total Nitrogen (N)	0.877				mg/L
Total Organic Carbon (C)	1.5				mg/L
Total Phosphorus (P)					mg/L
Total Sulphide	0.0058			0.05	mg/L
Sulphide (as H2S)	0.0062			0.05	mg/L
Sulphate	<1.0			< or =500	mg/L
TOTAL METALS		**DISSOLVED METALS**			
Aluminum	13.3	5.1		100 and 2900	µg/L
Antimony	<0.50	<0.50		6	µg/L
Arsenic	8.03	7.78		10	µg/L
Barium	7.0	6.7		2000	µg/L
Beryllium	<0.10	<0.10			µg/L
Bismuth	<1.0	<1.0			
Boron	<50	<50		5000	µg/L
Cadmium	0.031	<0.010		7	µg/L
Chromium	<1.0	<1.0		50	µg/L
Cobalt	<0.20	<0.20			µg/L
Copper	2.30	0.81		1000 and 2000	µg/L
Iron	9220	9560		< or = 300	µg/L
Lead	0.20	<0.20		5	µg/L
Manganese	202	198		20 and 120	µg/L
Mercury	<0.0019			1	µg/L
Molybdenum	<1.0	<1.0			µg/L
Nickel	<1.0	<1.0			µg/L
Selenium	<0.10	<0.10		50	µg/L
Silicon	17200	16000			µg/L
Silver	<0.020	<0.020			µg/L
Strontium	25.5	26.6		7000	µg/L
Thallium	<0.010	<0.010			
Tin	<5.0	<5.0			µg/L
Titanium	<5.0	<5.0			µg/L
Uranium	<0.10	<0.10		20	µg/L
Vanadium	<5.0	<5.0			µg/L
Zinc	41.9	26.9		< or = 5000	µg/L
Zirconium	<0.10	<0.10			µg/L
Calcium	7.86	8.07			mg/L
Magnesium	2.74	2.84			mg/L
Potassium	0.786	0.786			mg/L
Sodium	6.47	6.32		< or = 200	mg/L
Sulphur	<3.0	<3.0			mg/L
MICROBIOLOGICAL					
Total coliforms	0			ND	CFU/100mL
Escherichia coli (E. coli)	0			ND	CFU/100mL

* Turbidity guideline applies to a surface water source or a groundwater source under the direct influence of surface water.

ND means none detectable.
Exceedances shown in red font.

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The following conclusions on the available water quantity and water quality of well WID 69081 can be made:

1. Well WID 69081 was pump tested for 24.25 hours between February 14 and February 15, 2024 by Independent Pump & Mechanical Ltd., at a near constant rate, averaging 45.07 L/min (11.91 USgpm). The maximum well capacity could be as much as 90 L/min (24 USgpm) without considering potential well interference effects. The well is therefore, entirely capable of meeting the initial demand of 350,000 L/year (959 L/day) and potentially growing to 3,000,000 L/year (8219 L/day) over 10 years. This would be equivalent to an initial well production rate of 0.18 USgpm growing to 1.51 USgpm (5.72 L/min).

2. Analysis of observation well date indicates that during the pumping test, the drawdown cone likely extended over an affected area with a radius of 350 m surrounding the pumping well.

3. While the radius of the cone of influence of the pumping well during the test was relatively large (350 m), the amount of well interference was relatively small at <0.5 m.

4. One licensed spring, namely Bliss Spring is situated within 300 meters of well WID 69081. There is a possibility that eventual pumping of well WID 69081 at 5.72 L/min or (1.51 USgpm) could have some minor effect on this water source after 100 days of continuous pumping. Further investigations of this water source may be warranted as part of a water licence application for the well.

5. Water samples collected at the end of the pumping test and submitted for laboratory testing indicate the water is of potable quality, with no detectable coliform or E.coli bacteria. The presence of Total Iron, Dissolved Iron, Total Manganese and Dissolved Manganese exceeding the aesthetic levels under *Guidelines for Canadian Drinking Water Quality* (Health Canada, 2022) will require treatment for commercial purposes. Elevated levels of these elements could also lead to potential corrosion issues, staining and deposits in the water system. Elevated manganese at or above 120 µg/L is also a health risk for infants consuming the water if it is used to prepare baby formula as it can have can effects on neurological development and behaviour; deficits in memory, attention, and motor skills.

RECOMMENDATIONS

1. Consideration should be given to equipping the discharge line from the well with a totalizing water flow meter to monitor and record the well use with time and installing a water level sounding tube in the well for taking periodic water level measurements.

2. Further water quality sampling should be undertaken to assist with the design of an appropriate water treatment system that will be effective and economical for the intended use of the water for commercial purposes.

3. Under the *Water Sustainability Act* a water licence would be required to operate the well for commercial purposes. An application for use would need to be submitted to FrontCounter BC in Nanaimo through the website https://portal.nrs.gov.bc.ca/web/client/home

5. Investigate and assess the conditions surrounding Bliss Spring and any potential for well interference by pumping of well WID 69081.

CLOSURE

This report was prepared in accordance with generally accepted engineering, hydrogeological and consulting practices. It is intended for the prime use of Totangi Properties Ltd., in connection with its purpose as outlined under the scope of work for this project. This report is based on data and information available to the author from various sources at the time of its preparation and the findings of this report may therefore be subject to revision. Data and information supplied by others has not been independently confirmed or verified to be correct or accurate in all cases. Any errors, omissions or issues requiring clarification should be brought to the attention of the author. The author retains full copyright of the material contained in the report. The author and Hy-Geo Consulting accepts no responsibility for damages suffered by any third party as a result of any unauthorized use of this report.

Respectfully submitted,

Alan P. Kohut PEng.
Principal and Senior Hydrogeologist

HY-GEO CONSULTING
Permit to Practice Number: 1001034

REFERENCES

Berardinucci, J. and K. Ronneseth. 2002. *Guide to Using the BC Aquifer Classification Maps for the Protection and Management of Groundwater.* Water, Air and Climate Change Branch. BC Ministry of Water, Land and Air Protection. Victoria, BC. 54 pp.

Government of Canada. 2024. *Canadian Climate Normals*. 1981-2010 Climate Normals & Averages. Internet website https://climate.weather.gc.ca/climate_normals/index_e.html

Health Canada. 2022. *Guidelines for Canadian Drinking Water Quality—Summary Tables*. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch, Health Canada, Ottawa, Ontario. Internet website https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/alt_formats/pdf/pubs/water-eau/sum_guide-res_recom/summary-tables-sept-2022-eng.pdf

Kohut, A.P., W.S. Hodge, D.A. Johanson, and D. Kalyn. 1984. *Natural Seasonal Response of Groundwater Levels in Fractured Bedrock Aquifers of the Southern Coastal Region of British Columbia*. Proceedings of International Groundwater Symposium on Groundwater Utilization and Contaminant Hydrogeology, Montreal, Quebec. International Association of Hydrogeologists/Canadian National Chapter.

Kohut, A.P. 2023. *Preliminary Groundwater Assessment for Wildwood Terrace Neighbourhood Commercial Zone C-1A at Jordan River*. Report prepared for [redacted], Totangi Properties Ltd. Hy-Geo Consulting, Victoria, British Columbia. File 2205191, March 15.

Ministry of Environment. 2010. *Guide to Conducting Well Pumping Tests*. Water Stewardship Information Series. ISBN 978-0-7726-7033-5.

Province of British Columbia. 2024a. *British Columbia Water Resources Atlas*. Internet website: https://maps.gov.bc.ca/ess/hm/wrbc/

Province of British Columbia. 2024b. *Groundwater Observation Well Network*. Internet website: https://bcmoe-prod.aquaticinformatics.net/Report/Show/Groundwater.OW469.GWGraphAllData/

Totangi Properties. 2024. *Jordan River Well Test Report*. E-mail dated March 27, 2024 from [redacted] to Alan Kohut.

APPENDIX A

Well Records

WID 69081 (WTN 128906)

WID 18153 (WTN 95648)

BRITISH COLUMBIA The Best Place on Earth | Ministry of Environment

☒ Well Construction Report ☐ Well Closure Report ☐ Well Alteration Report

DRILLWELL ENTERPRISES LTD.
4994 Polkey Road
Duncan, B.C. V9L 6W3
Phone: 250-746-5268

Ministry Well ID Plate Number: 68081
Ministry Well Tag Number:
☐ Confirmation/alternative specs. attached
☐ Original well construction report attached

Red lettering indicates minimum mandatory information. See reverse for notes & definitions of abbreviations.

Owner name: Totangi Properties Ltd.
Mailing address: Victoria Main PO Box 904 Town Victoria Prov. BC Postal Code V8W2R9
Well Location: Address: Street no. 12036 Street name West Coast Road Town Jordan River
(or) Legal description: Lot Plan D.L. Block Sec. Twp. Rg. Land District
(or) PID: 009-573-356 (and) Description of well location (attach sketch, if nec.):

NAD 83: Zone: 10 (see note 2) (and) UTM Easting: 0421647 m UTM Northing: 5364372 m (or) Latitude (see note 3): Longitude:
Method of drilling: ☒ air rotary ☐ cable tool ☐ mud rotary ☐ auger ☐ driving ☐ jetting ☐ excavating ☐ other (specify): Dual Rotary
Orientation of well: ☒ vertical ☐ horizontal Ground elevation: 185 ft (asl) Method (see note 4): GPS
Class of well (see note 5): Water Supply Sub-class of well: Domestic
Water supply wells: indicate intended water use: ☑ private domestic ☐ water supply system ☐ irrigation ☐ commercial or industrial ☐ other (specify):

Lithologic description (see notes 7-14) **or closure description** (see notes 15 and 16)

From ft (bgl)	To ft (bgl)	Relative Hardness	Colour	Material Description (Use recommended terms on reverse. List in order of decreasing amount, if applicable)	Water-bearing Estimated Flow (USgpm)	Observations (e.g., fractured, weathered, well sorted, silty wash), closure details
0	26'	Hard	Brn	Gravel + Cobbles		
26'	71'	Med	Grey	Till + Very silty gravel		
71'	111'	Loose	Grey	Gravel, Sandy, grey color	WB	
111'	111'	Hard	Grey	till		

Casing details

From ft (bgl)	To ft (bgl)	Dia in	Casing Material / Open Hole	Wall Thickness in	Drive Shoe
0	17'	10"	Steel / Removed	—	—
0	111'	6"	Steel	.219	DR

Screen details

From ft (bgl)	To ft (bgl)	Dia in	Type (see note 18)	Slot Size
104'6"	106'6"	5"	K Packer + Riser	—
106'6"	111'	5"	SS Screen	.050"

Surface seal: Type: Bentonite Depth: 17' ft
Method of installation: ☒ Poured ☐ Pumped Thickness: 2" in
Backfill: Type: Depth: ft
Liner: ☐ PVC ☐ Other (specify):
Diameter: in Thickness: in
From: ft (bgl) To: ft (bgl) Perforated: From: ft (bgl) To: ft (bgl)

Intake: ☒ Screen ☐ Open bottom ☐ Uncased hole
Screen type: ☒ Telescope ☐ Pipe size
Screen material: ☒ Stainless steel ☐ Plastic ☐ Other (specify):
Screen opening: ☒ Continuous slot ☐ Slotted ☐ Perforated pipe
Screen bottom: ☐ Bail ☒ Plug ☐ Plate ☐ Other (specify):
Filter pack: From: ft To: ft Thickness: in
Type and size of material:

Developed by:
☒ Air lifting ☐ Surging ☐ Jetting ☐ Pumping ☒ Bailing
☐ Other (specify): Total duration: 3 hrs
Notes:

Well yield estimated by:
☐ Pumping ☒ Air lifting ☐ Bailing ☐ Other (specify):
Rate: 30 USgpm Duration: 3 hrs
SWL before test: ft (btoc) Pumping water level: ft (btoc)

Obvious water quality characteristics:
☒ Fresh ☐ Salty ☐ Clear ☒ Cloudy ☐ Sediment ☐ Gas
Colour/odour: Water sample collected: ☐

Well driller (print clearly):
Name (first, last) (see note 19): Scott Burrows
Registration no. (see note 20): WD0412407
Consultant (if applicable; name and company): ALAN KOHUT C HY GEO

DECLARATION: Well construction, well alteration or well closure, as the case may be, has been done in accordance with the requirements in the *Water Act* and the Ground Water Protection Regulation.
Signature of Driller Responsible

Final well completion data:
Total depth drilled: 111' ft Finished well depth: 111' ft (bgl)
Final stick up: 22" in Depth to bedrock: NA ft (bgl)
SWL: 71' ft (btoc) Estimated well yield: 30 USgpm
Artesian flow: USgpm, or Artesian pressure: ft
Type of well cap: Welded lid Well disinfected: ☒ Yes ☐ No
Where well ID plate is attached: On well casing

Well closure information:
Reason for closure:
Method of closure: ☐ Poured ☐ Pumped
Sealant material: Backfill material:
Details of closure (see note 17):

Date of work (YYYY/MM/DD):
Started: 2023/09/29 Completed: 2023/10/02
Comments:

PPSS-3

PLEASE NOTE: The information recorded in this well report describes the works and hydrogeologic conditions at the time of construction, alteration or closure, as the case may be. Well yield, well performance and water quality are not guaranteed as they are influenced by a number of factors, including natural variability, human activities and condition of the works, which may change over time.

white: Customer copy canary: Driller copy pink: Ministry copy | Sheet 1 of 1

ZONE 10 N: 5364407 E 421804

BRITISH COLUMBIA Ministry of Environment

☒ Well Construction Report ☐ Well Closure Report ☐ Well Alteration Report

DRILLWELL ENTERPRISES LTD.
DRILLWELL ENTERPRISES LTD.
4994 Polley Road
Duncan, B.C. V9L 6W3
Phone: 250-746-5268

Ministry Well ID Plate Number: 18153
Ministry Well Tag Number: 95648
☐ Confirmation/alternative specs. attached
☐ Original well construction report attached

Red lettering indicates minimum mandatory information. See reverse for notes & definitions of abbreviations.

Owner name: Totaqi Forestry Ltd.
Mailing address: PO Box 904 Town Victoria Prov. BC Postal Code V8W 2R4
Well Location: Address: Street no. Street name Town Jordan River
(or) **Legal description:** Lot Plan 42718 D.L. Block Sec. 4 Twp. Rg. Land District Nelson
(or) **PID:** (and) **Description of well location (attach sketch, if nec.):** except those parts in plans: 42718, 23879, VIP68644, VIP79233, & VIP80549 well near pit.
NAD 83: Zone: 10 (see note 2) (and) **UTM Northing:** 5364407 m **UTM Easting:** 0421804 m (or) **Latitude (see note 3):** **Longitude:**
Method of drilling: ☒ air rotary ☐ cable tool ☐ mud rotary ☐ auger ☐ driving ☐ jetting ☐ excavating ☐ other (specify): Dual Rotary
Orientation of well: ☒ vertical ☐ horizontal Ground elevation: 194' ft (asl) Method (see note 4):
Class of well (see note 5): Water Supply **Sub-class of well:** Domestic
Water supply wells: indicate intended water use: ☒ private domestic ☐ water supply system ☐ irrigation ☐ commercial or industrial ☐ other (specify):

Lithologic description (see notes 7-14) or closure description (see notes 15 and 16)

From ft (bgl)	To ft (bgl)	Relative Hardness	Colour	Material Description (Use recommended terms on reverse. List in order of decreasing amount, if applicable)	Water-bearing Estimated Flow (USgpm)	Observations (e.g., fractured, weathered, well sorted, silty wash), closure details
0	56		Brown	gravel, coarse		
56'	59'		Grey	Sand	WB	
59'	114'		Brown	Gravel sand cobbles	WB	
				Did Not Bottom gravel		

Casing details

From ft (bgl)	To ft (bgl)	Dia in	Casing Material / Open Hole	Wall Thickness in	Drive Shoe
0	15'	10"	Steel Rolled		
0	114'	6"	Steel	.219	DR

Screen details

From ft (bgl)	To ft (bgl)	Dia in	Type (see note 18)	Slot Size
	No	Screen		
		Natural gravel Pack		

Surface seal: Type: Bentonite Depth: 15 ft
Method of installation: ☐ Poured ☐ Pumped Thickness: 0-15 in
Backfill: Type: Depth: ft
Liner: ☐ PVC ☐ Other (specify):
Diameter: in Thickness: in
From: ft (bgl) To: ft (bgl) Perforated: From: ft (bgl) To: ft (bgl)

Intake: ☐ Screen ☒ Open bottom ☐ Uncased hole
Screen type: ☐ Telescope ☐ Pipe size
Screen material: ☐ Stainless steel ☐ Plastic ☐ Other (specify): Natural
Screen opening: ☐ Continuous slot ☐ Slotted ☐ Perforated pipe
Screen bottom: ☐ Bail ☐ Plug ☐ Plate ☐ Other (specify):
Filter pack: From: ft To: ft Thickness: in
Type and size of material:

Developed by:

☒ Air lifting ☐ Surging ☐ Jetting ☐ Pumping ☐ Bailing
☐ Other (specify): Total duration: 1.5 hrs
Notes:

Well yield estimated by:

☐ Pumping ☒ Air lifting ☐ Bailing ☐ Other (specify):
Rate: 20 USgpm Duration: 1.5 hrs
SWL before test: ft (btoc) Pumping water level: ft (btoc)

Obvious water quality characteristics:

☒ Fresh ☐ Salty ☐ Clear ☒ Cloudy ☐ Sediment ☐ Gas
Colour/odour: Brown colour Water sample collected: ☐

Final well completion data:

Total depth drilled: 114' ft Finished well depth: 114' ft (bgl)
Final stick up: 18 in Depth to bedrock: ft (bgl)
SWL: 71' ft (btoc) Estimated well yield: 10 USgpm
Artesian flow: USgpm, or Artesian pressure: ft
Type of well cap: welded cap Well disinfected: ☒ Yes ☐ No
Where well ID plate is attached: on well

Well closure information:

Reason for closure:
Method of closure: ☐ Poured ☐ Pumped
Sealant material: Backfill material:
Details of closure (see note 17):

Well driller (print clearly):

Name (first, last) (see note 19): Scott Burrows
Registration no. (see note 20): WD04121407
Consultant (if applicable; name and company):

DECLARATION: Well construction, well alteration or well closure, as the case may be, has been done in accordance with the requirements in the *Water Act* and the Ground Water Protection Regulation.

Signature of Driller Responsible S Burrows

Date of work (YYYY/MM/DD):

Started: July 18, 2006 **Completed:** July 19, 2006
Comments:

PLEASE NOTE: The information recorded in this well report describes the works and hydrogeologic conditions at the time of construction, alteration or closure, as the case may be. Well yield, well performance and water quality are not guaranteed as they are influenced by a number of factors, including natural variability, human activities and condition of the works, which may change over time.

white: Customer copy
canary: Driller copy
pink: Ministry copy

Sheet ____ of ____

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APPENDIX B

PUMPING TEST DATA

B1: Pumped Well WID 69081(WTN 128906)

B2: Observation Well WID 18153 (WTN 95648)

APPENDIX B1

Pumping Test Data for Subject Well

Project: Well WID 69081 (WTN 128906)
Client: [redacted]
Location: 12036 West Coast Rd., Jordan River
Date of Test: Wednesday February 14, 2024
Test Conducted by: Independent Pump & Mechanical Ltd.

Reference: all readings from top of sounding tube at top of csing
Stick up: 0.56 m (22")
Observation Wells: WID 18153 (WTN 95648)

Pumped Well: 33.83 m deep (111 feet)
Pumping Rate: 45.07 L/min (11.91 USgpm)
Static Water Level: 19.12 m

Pump Start Time: 8:00 AM Feb. 14, 2024
Pump End Time: 8:15 AM Feb. 15, 2024
Analysis by: A. Kohut, P.Eng.

Drawdown Data: Recovery Data:

Time (minutes)	Water Level (m)	Drawdown (m)	Time t (minutes)	Time t' (minutes)	Water Level (m)	t/t'	Residual Drawdown (m)
1	19.300	0.180	1456	1	19.430	1456.0	0.310
2	19.360	0.240	1457	2	19.430	728.5	0.310
3	19.385	0.265	1458	3	19.310	486.0	0.190
4	19.405	0.285	1459	4	19.300	364.8	0.180
5	19.420	0.300	1460	5	19.280	292.0	0.160
6	19.435	0.315	1461	6	19.270	243.5	0.150
7	19.450	0.330	1462	7	19.260	208.9	0.140
8	19.455	0.335	1464	9	19.260	162.7	0.140
9	19.460	0.340	1465	10	19.250	146.5	0.130
10	19.465	0.345	1467	12	19.240	122.3	0.120
12	19.465	0.345	1469	14	19.230	104.9	0.110
14	19.470	0.350	1471	16	19.225	91.9	0.105
16	19.470	0.350	1473	18	19.220	81.8	0.100
18	19.475	0.355	1475	20	19.220	73.8	0.100
20	19.475	0.355	1480	25	19.210	59.2	0.090
25	19.480	0.360	1485	30	19.200	49.5	0.080
30	19.480	0.360	1490	35	19.200	42.6	0.080
35	19.482	0.362	1495	40	19.200	37.4	0.080
40	19.485	0.365	1500	45	19.200	33.3	0.080
45	19.485	0.365	1505	50	19.200	30.1	0.080
50	19.490	0.370	1515	60	19.200	25.3	0.080
60	19.495	0.375	1525	70	19.200	21.8	0.080
70	19.500	0.380	1535	80	19.200	19.2	0.080
80	19.550	0.430	1545	90	19.200	17.2	0.080
90	19.510	0.390	1555	100	19.195	15.6	0.075
100	19.510	0.390	1575	120	19.195	13.1	0.075
120	19.510	0.390	1595	140	19.195	11.4	0.075
140	19.510	0.390	1615	160	19.195	10.1	0.075
160	19.510	0.390	1635	180	19.195	9.1	0.075
180	19.510	0.390	1655	200	19.195	8.3	0.075
200	19.510	0.390	1675	220	19.195	7.6	0.075
220	19.510	0.390	1695	240	19.195	7.1	0.075
240	19.510	0.390	1725	270	19.195	6.4	0.075
270	19.510	0.390	1755	300	19.195	5.9	0.075
300	19.510	0.390	1785	330	19.195	5.4	0.075
330	19.510	0.390	1815	360	19.195	5.0	0.075
360	19.510	0.390					
390	19.510	0.390					
420	19.510	0.390					
450	19.510	0.390					
480	19.510	0.390					
510	19.510	0.390					
540	19.510	0.390					
570	19.510	0.390					
600	19.510	0.390					
630	19.510	0.390					
660	19.510	0.390					

Drawdown Data: **Recovery Data:**

Time (minutes)	Water Level (m)	Drawdown (m)	Time t (minutes)	Time t' (minutes)	Water Level (m)	t/t'	Residual Drawdown (m)
690	19.510	0.390					
720	19.510	0.390					
750	19.510	0.390					
780	19.510	0.390					
810	19.510	0.390					
840	19.510	0.390					
870	19.515	0.395					
900	19.515	0.395					
930	19.520	0.400					
960	19.520	0.400					
990	19.520	0.400					
1020	19.525	0.405					
1050	19.525	0.405					
1080	19.525	0.405					
1110	19.525	0.405					
1140	19.530	0.410					
1170	19.530	0.410					
1200	19.530	0.410					
1230	19.540	0.420					
1260	19.540	0.420					
1290	19.550	0.430					
1320	19.550	0.430					
1350	19.550	0.430					
1380	19.560	0.440					
1410	19.565	0.445					
1440	19.570	0.450					
1455	19.570	0.450					

APPENDIX B2

Pumping Test Data for Observation Well WID 18153

Project: Well WID 69081 (WTN 128906)
Client: [redacted]
Location: 12036 West Coast Rd., Jordan River
Date of Test: Wednesday February 14, 2024
Test Conducted by: Independent Pump & Mechanical Ltd.

Reference: all readings from top of sounding tube at top of csing
Obs Well Stick up: 0.30 m (12")
Pumped Well: WID 69081 (WTN 128906)

Observation Well: 34.75 m deep (114 feet)
Pumping Rate: 45.07 L/min (11.91 USgpm)
Static Water Level: 23.400

Pump Start Time: 8:00 AM Feb. 14, 2024
Pump End Time: 8:15 AM Feb. 15, 2024
Analysis by: A. Kohut, P.Eng.

Drawdown Data: **Recovery Data:**

Time (minutes)	Water Level (m)	Drawdown (m)	Time t (minutes)	Time t' (minutes)	Water Level (m)	t/t'	Residual Drawdown (m)
10	23.406	0.006					
20	23.411	0.011					
30	23.686	0.286					
40	23.683	0.283					
50	23.687	0.287					
60	23.687	0.287					
70	23.692	0.292					
80	23.690	0.290					
90	23.696	0.296					
100	23.710	0.310					
120	23.714	0.314					
140	23.716	0.316					
160	23.717	0.317					
180	23.714	0.314					
200	23.710	0.310					
220	23.709	0.309					
240	23.705	0.305					
260	23.703	0.303					
280	23.701	0.301					
300	23.702	0.302					
330	23.694	0.294					
360	23.686	0.286					
390	23.687	0.287					
420	23.690	0.290					
450	23.688	0.288					
480	23.689	0.289					
510	23.685	0.285					
540	23.689	0.289					
570	23.688	0.288					
600	23.678	0.278					
630	23.684	0.284					
680	23.680	0.280					
730	23.682	0.282					
780	23.684	0.284					
830	23.687	0.287					
880	23.689	0.289					
930	23.693	0.293					
980	23.692	0.292					
1030	23.694	0.294					
1080	23.697	0.297					
1130	23.703	0.303					
1180	23.705	0.305					
1230	23.715	0.315					
1280	23.719	0.319					
1330	23.731	0.331					
1380	23.738	0.338	Note: All readings during pumping extracted from datalogger.				
1440	23.757	0.357					
1450	23.760	0.360					

APPENDIX C

LABORATORY WATER QUALITY ANALYSES

FOR WID 69081 (WTN 128906)

February 15, 2024

Your Project #: TOTANGI
Your C.O.C. #: WI034487

Attention: AL KOHUT

HY-GEO CONSULTING
4470 Arsens Place
VICTORIA, BC
Canada V8Z 2M9

Report Date: 2024/02/26
Report #: R3467520
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C410716
Received: 2024/02/15, 11:29

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity @25C (pp, total), CO3,HCO3,OH	1	N/A	2024/02/16	BBY6SOP-00026	SM 24 2320 B m
Chloride/Sulphate by Auto Colourimetry	1	N/A	2024/02/21	BBY6SOP-00011 / BBY6SOP-00017	SM24-4500-Cl/SO4-E m
Color (True) by Automated Analyzer	1	N/A	2024/02/16	BBY6SOP-00057	SM 24 2120 C m
Conductivity @25C	1	N/A	2024/02/16	BBY6SOP-00026	SM 24 2510 B m
Fluoride	1	N/A	2024/02/21	BBY6SOP-00037	SM 24 4500-F C m
Sulphide (as H2S) (1)	1	N/A	2024/02/21		Auto Calc
Hardness Total (calculated as CaCO3) (3)	1	N/A	2024/02/22	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO3)	1	N/A	2024/02/22	BBY WI-00033	Auto Calc
Mercury (Total) by CV	1	2024/02/16	2024/02/16	AB SOP-00084	BCMOE BCLM Oct2013 m
Heterotropic Plate Count (MF) in Water	1	N/A	2024/02/16	BBY4SOP-00003	SM 24 9215D
Iron Related Bacteria (4)	1	N/A	2024/02/16	BBY4SOP-00004	BI BART User Manual
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	1	N/A	2024/02/22	BBY WI-00033	Auto Calc
Elements by CRC ICPMS (dissolved) (5)	1	N/A	2024/02/21	BBY7SOP-00002	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total)	1	N/A	2024/02/22	BBY WI-00033	Auto Calc
Elements by CRC ICPMS (total)	1	N/A	2024/02/21	BBY7SOP-00003 / BBY7SOP-00002	EPA 6020b R2 m
Nitrogen (Total)	1	N/A	2024/02/22	BBY6SOP-00016	SM 24 4500-N C m
Ammonia-N (Total)	1	N/A	2024/02/21	AB SOP-00007	SM 24 4500 NH3 A G m
Nitrate + Nitrite (N)	1	N/A	2024/02/16	BBY6SOP-00010	SM 24 4500-NO3- H m
Nitrite (N) Regular Level Water	1	N/A	2024/02/16	BBY6SOP-00010	SM 24 4500-NO2- m
Nitrogen - Nitrate (as N)	1	N/A	2024/02/17	BBY WI-00033	Auto Calc
Nitrogen (Tot. Organic) Calculation	1	N/A	2024/02/22	BBY WI-00033	Auto Calc
pH @25°C (6)	1	N/A	2024/02/16	BBY6SOP-00026	SM 24 4500-H+ B m
Sat. pH and Langelier Index (@ 4.4C)	1	N/A	2024/02/22	BBY WI-00033	Auto Calc
Sat. pH and Langelier Index (@ 60C)	1	N/A	2024/02/22	BBY WI-00033	Auto Calc
Total Sulphide (1)	1	N/A	2024/02/21	AB SOP-00080	SM 24 4500 S2-A D Fm
Sulphate Reducing Bacteria (4)	1	N/A	2024/02/16	BBY4SOP-00004	BI BART User Manual
Total Dissolved Solids (Filt. Residue)	1	2024/02/21	2024/02/22	BBY6SOP-00033	SM 24 2540 C m
Total Coliform & E.Coli by MF-Chromocult	1	N/A	2024/02/16	BBY4SOP-00143	Merck KGaA Version 1
Carbon (Total Organic) (7)	1	N/A	2024/02/16	BBY6SOP-00053	SM 24 5310 B m
Turbidity	1	N/A	2024/02/16	BBY6SOP-00027	SM 24 2130 B m

Bureau Veritas Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

Your Project #: TOTANGI
Your C.O.C. #: WI034487

Attention: AL KOHUT

HY-GEO CONSULTING
4470 Arsens Place
VICTORIA, BC
Canada V8Z 2M9

Report Date: 2024/02/26
Report #: R3467520
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C410716
Received: 2024/02/15, 11:29

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
UV Transmittance (2)	1	2024/02/23	2024/02/23	CAM SOP-00459	SM 24 5910 m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, EPA, APHA or the Quebec Ministry of Environment.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Bureau Veritas Calgary, 4000 - 19 St. , Calgary, AB, T2E 6P8
(2) This test was performed by Bureau Veritas Campobello, 6740 Campobello Road , Mississauga, ON, L5N 2L8
(3) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).
(4) Presence/Absence Method. Number is an estimate.
(5) Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.
(6) The CCME method requires pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the CCME holding time. Bureau Veritas endeavours to analyze samples as soon as possible after receipt.
(7) TOC present in the sample should be considered as non-purgeable TOC.

Bureau Veritas Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

Your Project #: TOTANGI
Your C.O.C. #: WI034487

Attention: AL KOHUT

HY-GEO CONSULTING
4470 Arsens Place
VICTORIA, BC
Canada V8Z 2M9

Report Date: 2024/02/26
Report #: R3467520
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C410716
Received: 2024/02/15, 11:29

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Michelle Rivest (Hospedales), B.Sc., Customer Solutions Representative
Email: michelle.rivest@bureauveritas.com
Phone# (604) 734 7276

This report has been generated and distributed using a secure automated process.
Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Raphael Kwan, Senior Manager, BC and Yukon Regions responsible for British Columbia Environmental laboratory operations.

Bureau Veritas Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

Bureau Veritas Job #: C410716
Report Date: 2024/02/26

HY-GEO CONSULTING
Client Project #: TOTANGI

VIHA PKG, WELLS/SPRINGS - BURNABY (WATER)

Bureau Veritas ID		CJG147		
Sampling Date		2024/02/15 08:20		
COC Number		WI034487		
	UNITS	JORDAN R. WELL	RDL	QC Batch
ANIONS				
Nitrite (N)	mg/L	<0.0050	0.0050	B287596
Calculated Parameters				
Total Hardness (CaCO3)	mg/L	30.9	0.50	B285428
Nitrate (N)	mg/L	<0.020	0.020	B285468
Total Organic Nitrogen (N)	mg/L	0.589	0.020	B286395
Sulphide (as H2S)	mg/L	0.0062	0.0020	B285763
Misc. Inorganics				
Conductivity	uS/cm	110	2.0	B287440
pH	pH	6.47	N/A	B287434
Total Organic Carbon (C)	mg/L	1.5	0.50	B287657
Total Dissolved Solids	mg/L	90	10	B290422
Anions				
Alkalinity (PP as CaCO3)	mg/L	<1.0	1.0	B287437
Alkalinity (Total as CaCO3)	mg/L	41	1.0	B287437
Bicarbonate (HCO3)	mg/L	50	1.0	B287437
Carbonate (CO3)	mg/L	<1.0	1.0	B287437
Dissolved Fluoride (F)	mg/L	<0.050	0.050	B290280
Hydroxide (OH)	mg/L	<1.0	1.0	B287437
Total Sulphide	mg/L	0.0058	0.0018	B289796
Chloride (Cl)	mg/L	4.4	1.0	B290536
Sulphate (SO4)	mg/L	<1.0	1.0	B290536
MISCELLANEOUS				
True Colour	Col. Unit	128	10	B287165
Transmittance at 254nm	%T/cm	18	N/A	B293309
Nutrients				
Total Ammonia (N)	mg/L	0.29	0.015	B290458
Nitrate plus Nitrite (N)	mg/L	<0.020	0.020	B287592
Total Nitrogen (N)	mg/L	0.877	0.020	B290418
Physical Properties				
Turbidity	NTU	9.9	0.10	B287002

RDL = Reportable Detection Limit
N/A = Not Applicable

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HY-GEO CONSULTING
Client Project #: TOTANGI

VIHA PKG, WELLS/SPRINGS - BURNABY (WATER)

Bureau Veritas ID		CJG147		
Sampling Date		2024/02/15 08:20		
COC Number		WI034487		
	UNITS	JORDAN R. WELL	RDL	QC Batch
Elements				
Total Mercury (Hg)	ug/L	<0.0019	0.0019	B287581
Total Metals by ICPMS				
Total Aluminum (Al)	ug/L	13.3	3.0	B290301
Total Antimony (Sb)	ug/L	<0.50	0.50	B290301
Total Arsenic (As)	ug/L	8.03	0.10	B290301
Total Barium (Ba)	ug/L	7.0	1.0	B290301
Total Beryllium (Be)	ug/L	<0.10	0.10	B290301
Total Bismuth (Bi)	ug/L	<1.0	1.0	B290301
Total Boron (B)	ug/L	<50	50	B290301
Total Cadmium (Cd)	ug/L	0.031	0.010	B290301
Total Chromium (Cr)	ug/L	<1.0	1.0	B290301
Total Cobalt (Co)	ug/L	<0.20	0.20	B290301
Total Copper (Cu)	ug/L	2.30	0.20	B290301
Total Iron (Fe)	ug/L	9220	5.0	B290301
Total Lead (Pb)	ug/L	0.20	0.20	B290301
Total Manganese (Mn)	ug/L	202	1.0	B290301
Total Molybdenum (Mo)	ug/L	<1.0	1.0	B290301
Total Nickel (Ni)	ug/L	<1.0	1.0	B290301
Total Selenium (Se)	ug/L	<0.10	0.10	B290301
Total Silicon (Si)	ug/L	17200	100	B290301
Total Silver (Ag)	ug/L	<0.020	0.020	B290301
Total Strontium (Sr)	ug/L	25.5	1.0	B290301
Total Thallium (Tl)	ug/L	<0.010	0.010	B290301
Total Tin (Sn)	ug/L	<5.0	5.0	B290301
Total Titanium (Ti)	ug/L	<5.0	5.0	B290301
Total Uranium (U)	ug/L	<0.10	0.10	B290301
Total Vanadium (V)	ug/L	<5.0	5.0	B290301
Total Zinc (Zn)	ug/L	41.9	5.0	B290301
Total Zirconium (Zr)	ug/L	<0.10	0.10	B290301
Total Calcium (Ca)	mg/L	7.86	0.050	B285820
Total Magnesium (Mg)	mg/L	2.74	0.050	B285820
Total Potassium (K)	mg/L	0.786	0.050	B285820
Total Sodium (Na)	mg/L	6.47	0.050	B285820
RDL = Reportable Detection Limit				

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Bureau Veritas Job #: C410716
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HY-GEO CONSULTING
Client Project #: TOTANGI

VIHA PKG, WELLS/SPRINGS - BURNABY (WATER)

Bureau Veritas ID		CJG147		
Sampling Date		2024/02/15 08:20		
COC Number		WI034487		
	UNITS	JORDAN R. WELL	RDL	QC Batch
Total Sulphur (S)	mg/L	<3.0	3.0	B285820
Microbiological Param.				
Heterotrophic Plate Count	CFU/mL	<1	1	B287355
Iron Bacteria	CFU/mL	25	25	B287353
Sulphate reducing bacteria	CFU/mL	<75	75	B287354
Total Coliforms	CFU/100mL	0	N/A	B287351
E. coli	CFU/100mL	0	N/A	B287351
Calculated Parameters				
Langelier Index (@ 4.4C)	N/A	-2.60	N/A	B286396
Langelier Index (@ 60C)	N/A	-1.82	N/A	B286397
Saturation pH (@ 4.4C)	N/A	9.06	N/A	B286396
Saturation pH (@ 60C)	N/A	8.29	N/A	B286397

RDL = Reportable Detection Limit
N/A = Not Applicable

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HY-GEO CONSULTING
Client Project #: TOTANGI

CSR D. METALS (NO CV-HG)-DISS

Bureau Veritas ID		CIG147		
Sampling Date		2024/02/15 08:20		
COC Number		WI034487		
	UNITS	JORDAN R. WELL	RDL	QC Batch
Calculated Parameters				
Dissolved Hardness (CaCO3)	mg/L	31.8	0.50	B285810
Dissolved Metals by ICPMS				
Dissolved Aluminum (Al)	ug/L	5.1	3.0	B287484
Dissolved Antimony (Sb)	ug/L	<0.50	0.50	B287484
Dissolved Arsenic (As)	ug/L	7.78	0.10	B287484
Dissolved Barium (Ba)	ug/L	6.7	1.0	B287484
Dissolved Beryllium (Be)	ug/L	<0.10	0.10	B287484
Dissolved Bismuth (Bi)	ug/L	<1.0	1.0	B287484
Dissolved Boron (B)	ug/L	<50	50	B287484
Dissolved Cadmium (Cd)	ug/L	<0.010	0.010	B287484
Dissolved Chromium (Cr)	ug/L	<1.0	1.0	B287484
Dissolved Cobalt (Co)	ug/L	<0.20	0.20	B287484
Dissolved Copper (Cu)	ug/L	0.81	0.20	B287484
Dissolved Iron (Fe)	ug/L	9560	5.0	B287484
Dissolved Lead (Pb)	ug/L	<0.20	0.20	B287484
Dissolved Lithium (Li)	ug/L	<2.0	2.0	B287484
Dissolved Manganese (Mn)	ug/L	198	1.0	B287484
Dissolved Molybdenum (Mo)	ug/L	<1.0	1.0	B287484
Dissolved Nickel (Ni)	ug/L	<1.0	1.0	B287484
Dissolved Selenium (Se)	ug/L	<0.10	0.10	B287484
Dissolved Silicon (Si)	ug/L	16000	100	B287484
Dissolved Silver (Ag)	ug/L	<0.020	0.020	B287484
Dissolved Strontium (Sr)	ug/L	26.6	1.0	B287484
Dissolved Thallium (Tl)	ug/L	<0.010	0.010	B287484
Dissolved Tin (Sn)	ug/L	<5.0	5.0	B287484
Dissolved Titanium (Ti)	ug/L	<5.0	5.0	B287484
Dissolved Uranium (U)	ug/L	<0.10	0.10	B287484
Dissolved Vanadium (V)	ug/L	<5.0	5.0	B287484
Dissolved Zinc (Zn)	ug/L	26.9	5.0	B287484
Dissolved Zirconium (Zr)	ug/L	<0.10	0.10	B287484
Dissolved Calcium (Ca)	mg/L	8.07	0.050	B285811
Dissolved Magnesium (Mg)	mg/L	2.84	0.050	B285811
RDL = Reportable Detection Limit				

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HY-GEO CONSULTING
Client Project #: TOTANGI

CSR D. METALS (NO CV-HG)-DISS

Bureau Veritas ID		CJG147		
Sampling Date		2024/02/15 08:20		
COC Number		WI034487		
	UNITS	JORDAN R. WELL	RDL	QC Batch
Dissolved Potassium (K)	mg/L	0.786	0.050	B285811
Dissolved Sodium (Na)	mg/L	6.32	0.050	B285811
Dissolved Sulphur (S)	mg/L	<3.0	3.0	B285811
RDL = Reportable Detection Limit				

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HY-GEO CONSULTING
Client Project #: TOTANGI

GENERAL COMMENTS

Sample CJG147 [JORDAN R. WELL] : Sample was analyzed past recommended hold time for Heterotropic Plate Count (MF) in Water. Sample was analyzed past recommended hold time for Iron Related Bacteria. Sample was analyzed past recommended hold time for Sulphate Reducing Bacteria. UVT Analysis: Sample received at the analyzing laboratory past the recommended holding time. Analysis performed with client's consent.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

HY-GEO CONSULTING
Client Project #: TOTANGI

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
8287002	Turbidity	2024/02/16			101	80 - 120	<0.10	NTU	NC	20
8287165	True Colour	2024/02/16			103	80 - 120	<2.0	Col. Unit	NC	20
8287434	pH	2024/02/16			100	97 - 103			0.33	N/A
8287437	Alkalinity (PP as CaCO3)	2024/02/16					<1.0	mg/L	NC	20
8287437	Alkalinity (Total as CaCO3)	2024/02/16			97	80 - 120	<1.0	mg/L	0.43	20
8287437	Bicarbonate (HCO3)	2024/02/16					<1.0	mg/L	0.43	20
8287437	Carbonate (CO3)	2024/02/16					<1.0	mg/L	NC	20
8287437	Hydroxide (OH)	2024/02/16					<1.0	mg/L	NC	20
8287440	Conductivity	2024/02/16			100	90 - 110	<2.0	uS/cm		
8287484	Dissolved Aluminum (Al)	2024/02/21	104	80 - 120	106	80 - 120	<3.0	ug/L	15	20
8287484	Dissolved Antimony (Sb)	2024/02/21	103	80 - 120	104	80 - 120	<0.50	ug/L	1.4	20
8287484	Dissolved Arsenic (As)	2024/02/21	108	80 - 120	108	80 - 120	<0.10	ug/L	0.96	20
8287484	Dissolved Barium (Ba)	2024/02/21	100	80 - 120	103	80 - 120	<1.0	ug/L	0.39	20
8287484	Dissolved Beryllium (Be)	2024/02/21	105	80 - 120	105	80 - 120	<0.10	ug/L	NC	20
8287484	Dissolved Bismuth (Bi)	2024/02/21	99	80 - 120	101	80 - 120	<1.0	ug/L	NC	20
8287484	Dissolved Boron (B)	2024/02/21	105	80 - 120	106	80 - 120	<50	ug/L	NC	20
8287484	Dissolved Cadmium (Cd)	2024/02/21	104	80 - 120	104	80 - 120	<0.010	ug/L	NC	20
8287484	Dissolved Chromium (Cr)	2024/02/21	101	80 - 120	104	80 - 120	<1.0	ug/L	NC	20
8287484	Dissolved Cobalt (Co)	2024/02/21	99	80 - 120	102	80 - 120	<0.20	ug/L	NC	20
8287484	Dissolved Copper (Cu)	2024/02/21	96	80 - 120	101	80 - 120	<0.20	ug/L	0.46	20
8287484	Dissolved Iron (Fe)	2024/02/21	105	80 - 120	105	80 - 120	<5.0	ug/L	15	20
8287484	Dissolved Lead (Pb)	2024/02/21	99	80 - 120	101	80 - 120	<0.20	ug/L	NC	20
8287484	Dissolved Lithium (Li)	2024/02/21	101	80 - 120	103	80 - 120	<2.0	ug/L	NC	20
8287484	Dissolved Manganese (Mn)	2024/02/21	99	80 - 120	102	80 - 120	<1.0	ug/L	0.60	20
8287484	Dissolved Molybdenum (Mo)	2024/02/21	NC	80 - 120	108	80 - 120	<1.0	ug/L	1.5	20
8287484	Dissolved Nickel (Ni)	2024/02/21	98	80 - 120	102	80 - 120	<1.0	ug/L	NC	20
8287484	Dissolved Selenium (Se)	2024/02/21	102	80 - 120	105	80 - 120	<0.10	ug/L	9.3	20
8287484	Dissolved Silicon (Si)	2024/02/21	NC	80 - 120	111	80 - 120	<100	ug/L	0.14	20
8287484	Dissolved Silver (Ag)	2024/02/21	103	80 - 120	103	80 - 120	<0.020	ug/L	NC	20
8287484	Dissolved Strontium (Sr)	2024/02/21	NC	80 - 120	103	80 - 120	<1.0	ug/L	2.6	20
8287484	Dissolved Thallium (Tl)	2024/02/21	100	80 - 120	102	80 - 120	<0.010	ug/L	NC	20
8287484	Dissolved Tin (Sn)	2024/02/21	102	80 - 120	104	80 - 120	<5.0	ug/L	NC	20
8287484	Dissolved Titanium (Ti)	2024/02/21	98	80 - 120	103	80 - 120	<5.0	ug/L	NC	20

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QUALITY ASSURANCE REPORT(CONT'D)

HY-GEO CONSULTING
Client Project #: TOTANGI

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
8287484	Dissolved Uranium (U)	2024/02/21	103	80 - 120	102	80 - 120	<0.10	ug/L	0.83	20
8287484	Dissolved Vanadium (V)	2024/02/21	102	80 - 120	103	80 - 120	<5.0	ug/L	NC	20
8287484	Dissolved Zinc (Zn)	2024/02/21	99	80 - 120	103	80 - 120	<5.0	ug/L	NC	20
8287484	Dissolved Zirconium (Zr)	2024/02/21	101	80 - 120	97	80 - 120	<0.10	ug/L	NC	20
8287581	Total Mercury (Hg)	2024/02/16	87	80 - 120	91	80 - 120	<0.0019	ug/L	NC	20
8287592	Nitrate plus Nitrite (N)	2024/02/16	113	80 - 120	106	80 - 120	<0.020	mg/L	NC	25
8287596	Nitrite (N)	2024/02/16	106	80 - 120	105	80 - 120	<0.0050	mg/L	NC	20
8287657	Total Organic Carbon (C)	2024/02/16			105	80 - 120	<0.50	mg/L		
8289796	Total Sulphide	2024/02/21	97	80 - 120	94	80 - 120	<0.0018	mg/L	NC	20
8290280	Dissolved Fluoride (F)	2024/02/21	105	80 - 120	102	80 - 120	<0.050	mg/L	NC	20
8290301	Total Aluminum (Al)	2024/02/21	99	80 - 120	103	80 - 120	<3.0	ug/L	4.2	20
8290301	Total Antimony (Sb)	2024/02/21	103	80 - 120	103	80 - 120	<0.50	ug/L	NC	20
8290301	Total Arsenic (As)	2024/02/21	106	80 - 120	109	80 - 120	<0.10	ug/L	0.24	20
8290301	Total Barium (Ba)	2024/02/21	100	80 - 120	102	80 - 120	<1.0	ug/L	NC	20
8290301	Total Beryllium (Be)	2024/02/21	97	80 - 120	100	80 - 120	<0.10	ug/L	NC	20
8290301	Total Bismuth (Bi)	2024/02/21	95	80 - 120	103	80 - 120	<1.0	ug/L	NC	20
8290301	Total Boron (B)	2024/02/21	110	80 - 120	112	80 - 120	<50	ug/L	3.5	20
8290301	Total Cadmium (Cd)	2024/02/21	100	80 - 120	103	80 - 120	<0.010	ug/L	7.6	20
8290301	Total Chromium (Cr)	2024/02/21	96	80 - 120	101	80 - 120	<1.0	ug/L	NC	20
8290301	Total Cobalt (Co)	2024/02/21	97	80 - 120	100	80 - 120	<0.20	ug/L	NC	20
8290301	Total Copper (Cu)	2024/02/21	93	80 - 120	100	80 - 120	<0.20	ug/L	1.6	20
8290301	Total Iron (Fe)	2024/02/21	100	80 - 120	104	80 - 120	<5.0	ug/L	0.66	20
8290301	Total Lead (Pb)	2024/02/21	97	80 - 120	102	80 - 120	<0.20	ug/L	0.90	20
8290301	Total Manganese (Mn)	2024/02/21	94	80 - 120	98	80 - 120	<1.0	ug/L	0.28	20
8290301	Total Molybdenum (Mo)	2024/02/21	108	80 - 120	105	80 - 120	<1.0	ug/L	0.031	20
8290301	Total Nickel (Ni)	2024/02/21	95	80 - 120	101	80 - 120	<1.0	ug/L	NC	20
8290301	Total Selenium (Se)	2024/02/21	100	80 - 120	104	80 - 120	<0.10	ug/L	NC	20
8290301	Total Silicon (Si)	2024/02/21	NC	80 - 120	116	80 - 120	<100	ug/L	0.48	20
8290301	Total Silver (Ag)	2024/02/21	99	80 - 120	103	80 - 120	<0.020	ug/L	NC	20
8290301	Total Strontium (Sr)	2024/02/21	NC	80 - 120	98	80 - 120	<1.0	ug/L	1.3	20
8290301	Total Thallium (Tl)	2024/02/21	99	80 - 120	104	80 - 120	<0.010	ug/L	NC	20
8290301	Total Tin (Sn)	2024/02/21	102	80 - 120	105	80 - 120	<5.0	ug/L	NC	20
8290301	Total Titanium (Ti)	2024/02/21	100	80 - 120	102	80 - 120	<5.0	ug/L	NC	20

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QUALITY ASSURANCE REPORT(CONT'D)

HY-GEO CONSULTING
Client Project #: TOTANG

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
8290301	Total Uranium (U)	2024/02/21	103	80 - 120	105	80 - 120	<0.10	ug/L	3.5	20
8290301	Total Vanadium (V)	2024/02/21	98	80 - 120	99	80 - 120	<5.0	ug/L	NC	20
8290301	Total Zinc (Zn)	2024/02/21	95	80 - 120	102	80 - 120	<5.0	ug/L	0.40	20
8290301	Total Zirconium (Zr)	2024/02/21	106	80 - 120	103	80 - 120	<0.10	ug/L	NC	20
8290418	Total Nitrogen (N)	2024/02/22			103	80 - 120	<0.020	mg/L	NC	20
8290422	Total Dissolved Solids	2024/02/22	103	80 - 120	101	80 - 120	<10	mg/L	3.0	20
8290438	Total Ammonia (N)	2024/02/21	105	80 - 120	100	80 - 120	<0.015	mg/L	1.7	20
8290536	Chloride (Cl)	2024/02/21	107	80 - 120	100	80 - 120	<1.0	mg/L	3.4	20
8290536	Sulphate (SO4)	2024/02/21	92	80 - 120	99	80 - 120	<1.0	mg/L	NC	20
8293309	Transmittance at 254nm	2024/02/23			99	97 - 103			1.5	25

N/A = Not Applicable.

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

Bureau Veritas Burnaby 4606 Canada Way V5G 1K5 Telephone (604) 734-7276 Telefax (604) 731-2386

Bureau Veritas Job #: C410716
Report Date: 2024/02/26

HY-GEO CONSULTING
Client Project #: TOTANGI

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

David Huang, M.Sc., P.Chem., QP, Scientific Services Manager

Anastassia Hamanov, Scientific Specialist

Suwan (Sze Yeung) Fock, B.Sc., Scientific Specialist

Automated Statchk

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Raphael Kwan, Senior Manager, BC and Yukon Regions responsible for British Columbia Environmental laboratory operations.

Bureau Veritas Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

BRITISH COLUMBIA The Best Place on Earth — Ministry of Environment

☒ Well Construction Report ☐ Well Closure Report ☐ Well Alteration Report

DRILLWELL ENTERPRISES LTD.
4994 Polkey Road
Duncan, B.C. V9L 6W3
Phone: 250-746-5268

Ministry Well ID Plate Number: 68081
Ministry Well Tag Number:
☐ Confirmation/alternative specs. attached
☐ Original well construction report attached

Red lettering indicates minimum mandatory information. See reverse for notes & definitions of abbreviations.

Owner name: Totangi Properties Ltd.
Mailing address: Victoria Main PO Box 904 Town Victoria Prov. BC Postal Code V8W2R9
Well Location: Address: Street no. 12036 Street name West Coast Road Town Jordan River
(or) Legal description: Lot Plan D.L. Block Sec. Twp. Rg. Land District
(or) PID: 009-573-356 (and) Description of well location (attach sketch, if nec.):

NAD 83: Zone: 10 (see note 2) (and) UTM Easting: 0421647 m UTM Northing: 5364372 m (or) Latitude (see note 3): Longitude:

Method of drilling: ☒ air rotary ☐ cable tool ☐ mud rotary ☐ auger ☐ driving ☐ jetting ☐ excavating ☐ other (specify): Dual Rotary
Orientation of well: ☒ vertical ☐ horizontal Ground elevation: 185 ft (asl) Method (see note 4): GPS
Class of well (see note 5): Water Supply Sub-class of well: Domestic
Water supply wells: indicate intended water use: ☑ private domestic ☐ water supply system ☐ irrigation ☐ commercial or industrial ☐ other (specify):

Lithologic description (see notes 7-14) **or closure description** (see notes 15 and 16)

From ft (bgl)	To ft (bgl)	Relative Hardness	Colour	Material Description (Use recommended terms on reverse. List in order of decreasing amount, if applicable)	Water-bearing Estimated Flow (USgpm)	Observations (e.g., fractured, weathered, well sorted, silty wash), closure details
0	26'	Hard	Brn	Gravel + Cobbles		
26'	71'	Med	Grey	Till + Very silty gravel		
71'	111'	Loose	Grey	Gravel, Sandy, grey color	WB	
111'	111'	Hard	Grey	till		

Casing details

From ft (bgl)	To ft (bgl)	Dia in	Casing Material / Open Hole	Wall Thickness in	Drive Shoe
0	17'	10"	Steel / Removed	—	—
0	111'	6"	Steel	.219	DR

Screen details

From ft (bgl)	To ft (bgl)	Dia in	Type (see note 18)	Slot Size
106'	106'	5"	K Packer + Riser	—
106'6"	111'	5"	SS Screen	.050"

Surface seal: Type: Bentonite Depth: 17' ft
Method of installation: ☒ Poured ☐ Pumped Thickness: 2" in
Backfill: Type: Depth: ft
Liner: ☐ PVC ☐ Other (specify):
Diameter: in Thickness: in
From: ft (bgl) To: ft (bgl) Perforated: From: ft (bgl) To: ft (bgl)

Intake: ☒ Screen ☐ Open bottom ☐ Uncased hole
Screen type: ☒ Telescope ☐ Pipe size
Screen material: ☒ Stainless steel ☐ Plastic ☐ Other (specify):
Screen opening: ☒ Continuous slot ☐ Slotted ☐ Perforated pipe
Screen bottom: ☐ Bail ☒ Plug ☐ Plate ☐ Other (specify):
Filter pack: From: ft To: ft Thickness: in
Type and size of material:

Developed by:
☒ Air lifting ☐ Surging ☐ Jetting ☐ Pumping ☒ Bailing
☐ Other (specify): Total duration: 3 hrs
Notes:

Well yield estimated by:
☐ Pumping ☒ Air lifting ☐ Bailing ☐ Other (specify):
Rate: 30 USgpm Duration: 3 hrs
SWL before test: ft (btoc) Pumping water level: ft (btoc)

Obvious water quality characteristics:
☒ Fresh ☐ Salty ☐ Clear ☒ Cloudy ☐ Sediment ☐ Gas
Colour/odour: Water sample collected: ☐

Final well completion data:
Total depth drilled: 111' ft Finished well depth: 111' ft (bgl)
Final stick up: 22" in Depth to bedrock: NA ft (bgl)
SWL: 71' ft (btoc) Estimated well yield: 30 USgpm
Artesian flow: USgpm, or Artesian pressure: ft
Type of well cap: Welded Lid Well disinfected: ☒ Yes ☐ No
Where well ID plate is attached: On well casing

Well closure information:
Reason for closure:
Method of closure: ☐ Poured ☐ Pumped
Sealant material: Backfill material:
Details of closure (see note 17):

Well driller (print clearly):
Name (first, last) (see note 19): Scott Burrows
Registration no. (see note 20): WD0412407
Consultant (if applicable; name and company): ALAN KOHUT C HY GEO

Date of work (YYYY/MM/DD):
Started: 2023/09/29 Completed: 2023/10/02
Comments:

DECLARATION: Well construction, well alteration or well closure, as the case may be, has been done in accordance with the requirements in the *Water Act* and the Ground Water Protection Regulation.
Signature of Driller Responsible

PPSS-3 **PLEASE NOTE:** The information recorded in this well report describes the works and hydrogeologic conditions at the time of construction, alteration or closure, as the case may be. Well yield, well performance and water quality are not guaranteed as they are influenced by a number of factors, including natural variability, human activities and condition of the works, which may change over time.

white: Customer copy canary: Driller copy pink: Ministry copy | Sheet 1 of 1

ZONE 10 N: 5364407 E 421804

BRITISH COLUMBIA
Ministry of Environment

☒ Well Construction Report
☐ Well Closure Report
☐ Well Alteration Report

DRILLWELL ENTERPRISES LTD.
Stamp company name/address/phone/fax/email here, if desired
DRILLWELL ENTERPRISES LTD.
4994 Polkey Road
Duncan, B.C. V9L 6W3
Phone: 250-746-5268

Ministry Well ID Plate Number: 18153
Ministry Well Tag Number: 95648
☐ Confirmation/alternative specs. attached
☐ Original well construction report attached

Red lettering indicates minimum mandatory information. See reverse for notes & definitions of abbreviations.

Owner name: Totangi forestry ltd.
Mailing address: PO Box 964 Town Victoria Prov. BC Postal Code V8W 2R4
Well Location: Address: Street no. ______ Street name ______ Town Jordan River
(or) Legal description: Lot ______ Plan 427R D.L. ______ Block ______ Sec. 4 Twp. ______ Rg. ______ Land District Renfrew
(or) PID: ______ (and) Description of well location (attach sketch, if nec.): except those parts in plans: 427R, 23879, VIP 68644, VIP 79323, 3 VIP 80549 Well near Pit.
NAD 83: Zone: 10 (see note 2) (and) UTM Northing: 5364407 m UTM Easting: 10 0421804 m (or) Latitude (see note 3): ______ Longitude: ______
Method of drilling: ☒ air rotary ☐ cable tool ☐ mud rotary ☐ auger ☐ driving ☐ jetting ☐ excavating ☐ other (specify): Dual Rotary
Orientation of well: ☒ vertical ☐ horizontal Ground elevation: 194' ft (asl) Method (see note 4): ______
Class of well (see note 5): Water Supply Sub-class of well: Domestic
Water supply wells: indicate intended water use: ☒ private domestic ☐ water supply system ☐ irrigation ☐ commercial or industrial ☐ other (specify): ______

Lithologic description (see notes 7-14) or closure description (see notes 15 and 16)

From ft (bgl)	To ft (bgl)	Relative Hardness	Colour	Material Description (Use recommended terms on reverse. List in order of decreasing amount, if applicable)	Water-bearing Estimated Flow (USgpm)	Observations (e.g., fractured, weathered, well sorted, silty wash), closure details
0	56		Brown	Gravel, coarse		
56'	59'		Gray	Sand	WB	
59'	114'		Brown	Gravel sand cobbles	WB	
				Did Not Bottom gravel		

Casing details

From ft (bgl)	To ft (bgl)	Dia in	Casing Material / Open Hole	Wall Thickness in	Drive Shoe
0	15	10"	Steel Pulledout		
0	114	6	Steel	.219	DR

Screen details

From ft (bgl)	To ft (bgl)	Dia in	Type (see note 18)	Slot Size
			No Screen Natural gravel Pack	

Surface seal: Type: Bentonite Depth: 15 ft
Method of installation: ☐ Poured ☐ Pumped Thickness: 0-15 in
Backfill: Type: ______ Depth: ______ ft
Liner: ☐ PVC ☐ Other (specify): ______
Diameter: ______ in Thickness: ______ in
From: ____ ft (bgl) To: ____ ft (bgl) Perforated: From: ____ ft (bgl) To: ____ ft (bgl)

Intake: ☐ Screen ☒ Open bottom ☐ Uncased hole
Screen type: ☐ Telescope ☐ Pipe size
Screen material: ☐ Stainless steel ☐ Plastic ☐ Other (specify): Natural
Screen opening: ☐ Continuous slot ☐ Slotted ☐ Perforated pipe
Screen bottom: ☐ Bail ☐ Plug ☐ Plate ☐ Other (specify): ______
Filter pack: From: ____ ft To: ____ ft Thickness: ______ in
Type and size of material: ______

Developed by:

☒ Air lifting ☐ Surging ☐ Jetting ☐ Pumping ☐ Bailing
☐ Other (specify): ______ Total duration: 1.5 hrs
Notes: ______

Well yield estimated by:

☐ Pumping ☒ Air lifting ☐ Bailing ☐ Other (specify): ______
Rate: 30 USgpm Duration: 1.5 hrs
SWL before test: ______ ft (btoc) Pumping water level: ______ ft (btoc)

Obvious water quality characteristics:

☒ Fresh ☐ Salty ☐ Clear ☒ Cloudy ☐ Sediment ☐ Gas
Colour/odour: Brown Color Water sample collected: ☐

Well driller (print clearly):

Name (first, last) (see note 19): Scott Burrows
Registration no. (see note 20): WD 04121407
Consultant (if applicable; name and company): ______

DECLARATION: Well construction, well alteration or well closure, as the case may be, has been done in accordance with the requirements in the *Water Act* and the Ground Water Protection Regulation.

Signature of Driller Responsible [signature]

Final well completion data:

Total depth drilled: 114 ft Finished well depth: 114' ft (bgl)
Final stick up: 18 in Depth to bedrock: ______ ft (bgl)
SWL: 71' ft (btoc) Estimated well yield: 10 USgpm
Artesian flow: ______ USgpm, or Artesian pressure: ______ ft
Type of well cap: welded lid Well disinfected: ☒ Yes ☐ No
Where well ID plate is attached: on well

Well closure information:

Reason for closure: ______
Method of closure: ☐ Poured ☐ Pumped
Sealant material: ______ Backfill material: ______
Details of closure (see note 17): ______

Date of work (YYYY/MM/DD):

Started: July 18, 2006 Completed: July 19, 2006
Comments: ______

PLEASE NOTE: The information recorded in this well report describes the works and hydrogeologic conditions at the time of construction, alteration or closure, as the case may be. Well yield, well performance and water quality are not guaranteed as they are influenced by a number of factors, including natural variability, human activities and condition of the works, which may change over time.

white: Customer copy canary: Driller copy pink: Ministry copy Sheet ____ of ____

PPSS-3

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APPENDIX B

PUMPING TEST DATA

B1: Pumped Well WID 69081(WTN 128906)

B2: Observation Well WID 18153 (WTN 95648)

APPENDIX B1

Pumping Test Data for Subject Well

Project: Well WID 69081 (WTN 128906)
Client: Blair Robertson
Location: 12036 West Coast Rd., Jordan River
Date of Test: Wednesday February 14, 2024
Test Conducted by: Independent Pump & Mechanical Ltd.

Reference: all readings from top of sounding tube at top of csing
Stick up: 0.56 m (22")
Observation Wells: WID 18153 (WTN 95648)

Pumped Well: 33.83 m deep (111 feet)
Pumping Rate: 45.07 L/min (11.91 USgpm)
Static Water Level: 19.12 m

Pump Start Time: 8:00 AM Feb. 14, 2024
Pump End Time: 8:15 AM Feb. 15, 2024
Analysis by: A. Kohut, P.Eng.

Drawdown Data: **Recovery Data:**

Time (minutes)	Water Level (m)	Drawdown (m)	Time t (minutes)	Time t' (minutes)	Water Level (m)	t/t'	Residual Drawdown (m)
1	19.300	0.180	1456	1	19.430	1456.0	0.310
2	19.360	0.240	1457	2	19.430	728.5	0.310
3	19.385	0.265	1458	3	19.310	486.0	0.190
4	19.405	0.285	1459	4	19.300	364.8	0.180
5	19.420	0.300	1460	5	19.280	292.0	0.160
6	19.435	0.315	1461	6	19.270	243.5	0.150
7	19.450	0.330	1462	7	19.260	208.9	0.140
8	19.455	0.335	1464	9	19.260	162.7	0.140
9	19.460	0.340	1465	10	19.250	146.5	0.130
10	19.465	0.345	1467	12	19.240	122.3	0.120
12	19.465	0.345	1469	14	19.230	104.9	0.110
14	19.470	0.350	1471	16	19.225	91.9	0.105
16	19.470	0.350	1473	18	19.220	81.8	0.100
18	19.475	0.355	1475	20	19.220	73.8	0.100
20	19.475	0.355	1480	25	19.210	59.2	0.090
25	19.480	0.360	1485	30	19.200	49.5	0.080
30	19.480	0.360	1490	35	19.200	42.6	0.080
35	19.482	0.362	1495	40	19.200	37.4	0.080
40	19.485	0.365	1500	45	19.200	33.3	0.080
45	19.485	0.365	1505	50	19.200	30.1	0.080
50	19.490	0.370	1515	60	19.200	25.3	0.080
60	19.495	0.375	1525	70	19.200	21.8	0.080
70	19.500	0.380	1535	80	19.200	19.2	0.080
80	19.550	0.430	1545	90	19.200	17.2	0.080
90	19.510	0.390	1555	100	19.195	15.6	0.075
100	19.510	0.390	1575	120	19.195	13.1	0.075
120	19.510	0.390	1595	140	19.195	11.4	0.075
140	19.510	0.390	1615	160	19.195	10.1	0.075
160	19.510	0.390	1635	180	19.195	9.1	0.075
180	19.510	0.390	1655	200	19.195	8.3	0.075
200	19.510	0.390	1675	220	19.195	7.6	0.075
220	19.510	0.390	1695	240	19.195	7.1	0.075
240	19.510	0.390	1725	270	19.195	6.4	0.075
270	19.510	0.390	1755	300	19.195	5.9	0.075
300	19.510	0.390	1785	330	19.195	5.4	0.075
330	19.510	0.390	1815	360	19.195	5.0	0.075
360	19.510	0.390					
390	19.510	0.390					
420	19.510	0.390					
450	19.510	0.390					
480	19.510	0.390					
510	19.510	0.390					
540	19.510	0.390					
570	19.510	0.390					
600	19.510	0.390					
630	19.510	0.390					
660	19.510	0.390					

Drawdown Data:			Recovery Data:				
Time (minutes)	Water Level (m)	Drawdown (m)	Time t (minutes)	Time t' (minutes)	Water Level (m)	t/t'	Residual Drawdown (m)
690	19.510	0.390					
720	19.510	0.390					
750	19.510	0.390					
780	19.510	0.390					
810	19.510	0.390					
840	19.510	0.390					
870	19.515	0.395					
900	19.515	0.395					
930	19.520	0.400					
960	19.520	0.400					
990	19.520	0.400					
1020	19.525	0.405					
1050	19.525	0.405					
1080	19.525	0.405					
1110	19.525	0.405					
1140	19.530	0.410					
1170	19.530	0.410					
1200	19.530	0.410					
1230	19.540	0.420					
1260	19.540	0.420					
1290	19.550	0.430					
1320	19.550	0.430					
1350	19.550	0.430					
1380	19.560	0.440					
1410	19.565	0.445					
1440	19.570	0.450					
1455	19.570	0.450					

APPENDIX B2

Pumping Test Data for Observation Well WID 18153

Project: Well WID 69081 (WTN 128906)
Client: Blair Robertson
Location: 12036 West Coast Rd., Jordan River
Date of Test: Wednesday February 14, 2024
Test Conducted by: Independent Pump & Mechanical Ltd.

Reference: all readings from top of sounding tube at top of csing
Obs Well Stick up: 0.30 m (12")
Pumped Well: WID 69081 (WTN 128906)

Observation Well: 34.75 m deep (114 feet)
Pumping Rate: 45.07 L/min (11.91 USgpm)
Static Water Level: 23.400

Pump Start Time: 8:00 AM Feb. 14, 2024
Pump End Time: 8:15 AM Feb. 15, 2024
Analysis by: A. Kohut, P.Eng.

Drawdown Data: **Recovery Data:**

Time (minutes)	Water Level (m)	Drawdown (m)	Time t (minutes)	Time t' (minutes)	Water Level (m)	t/t'	Residual Drawdown (m)
10	23.406	0.006					
20	23.411	0.011					
30	23.686	0.286					
40	23.683	0.283					
50	23.687	0.287					
60	23.687	0.287					
70	23.692	0.292					
80	23.690	0.290					
90	23.696	0.296					
100	23.710	0.310					
120	23.714	0.314					
140	23.716	0.316					
160	23.717	0.317					
180	23.714	0.314					
200	23.710	0.310					
220	23.709	0.309					
240	23.705	0.305					
260	23.703	0.303					
280	23.701	0.301					
300	23.702	0.302					
330	23.694	0.294					
360	23.686	0.286					
390	23.687	0.287					
420	23.690	0.290					
450	23.688	0.288					
480	23.689	0.289					
510	23.685	0.285					
540	23.689	0.289					
570	23.688	0.288					
600	23.678	0.278					
630	23.684	0.284					
680	23.680	0.280					
730	23.682	0.282					
780	23.684	0.284					
830	23.687	0.287					
880	23.689	0.289					
930	23.693	0.293					
980	23.692	0.292					
1030	23.694	0.294					
1080	23.697	0.297					
1130	23.703	0.303					
1180	23.705	0.305					
1230	23.715	0.315					
1280	23.719	0.319					
1330	23.731	0.331					
1380	23.738	0.338	Note: All readings during pumping extracted from datalogger.				
1440	23.757	0.357					
1450	23.760	0.360					

APPENDIX C

LABORATORY WATER QUALITY ANALYSES

FOR WID 69081 (WTN 128906)

February 15, 2024

Your Project #: TOTANGI
Your C.O.C. #: WI034487

Attention: AL KOHUT

HY-GEO CONSULTING
4470 Arsens Place
VICTORIA, BC
Canada V8Z 2M9

Report Date: 2024/02/26
Report #: R3467520
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C410716
Received: 2024/02/15, 11:29

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity @25C (pp, total), CO3,HCO3,OH	1	N/A	2024/02/16	BBY6SOP-00026	SM 24 2320 B m
Chloride/Sulphate by Auto Colourimetry	1	N/A	2024/02/21	BBY6SOP-00011 / BBY6SOP-00017	SM24-4500-Cl/SO4-E m
Color (True) by Automated Analyzer	1	N/A	2024/02/16	BBY6SOP-00057	SM 24 2120 C m
Conductivity @25C	1	N/A	2024/02/16	BBY6SOP-00026	SM 24 2510 B m
Fluoride	1	N/A	2024/02/21	BBY6SOP-00037	SM 24 4500-F C m
Sulphide (as H2S) (1)	1	N/A	2024/02/21		Auto Calc
Hardness Total (calculated as CaCO3) (3)	1	N/A	2024/02/22	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO3)	1	N/A	2024/02/22	BBY WI-00033	Auto Calc
Mercury (Total) by CV	1	2024/02/16	2024/02/16	AB SOP-00084	BCMOE BCLM Oct2013 m
Heterotropic Plate Count (MF) in Water	1	N/A	2024/02/16	BBY4SOP-00003	SM 24 9215D
Iron Related Bacteria (4)	1	N/A	2024/02/16	BBY4SOP-00004	BI BART User Manual
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	1	N/A	2024/02/22	BBY WI-00033	Auto Calc
Elements by CRC ICPMS (dissolved) (5)	1	N/A	2024/02/21	BBY7SOP-00002	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total)	1	N/A	2024/02/22	BBY WI-00033	Auto Calc
Elements by CRC ICPMS (total)	1	N/A	2024/02/21	BBY7SOP-00003 / BBY7SOP-00002	EPA 6020b R2 m
Nitrogen (Total)	1	N/A	2024/02/22	BBY6SOP-00016	SM 24 4500-N C m
Ammonia-N (Total)	1	N/A	2024/02/21	AB SOP-00007	SM 24 4500 NH3 A G m
Nitrate + Nitrite (N)	1	N/A	2024/02/16	BBY6SOP-00010	SM 24 4500-NO3- H m
Nitrite (N) Regular Level Water	1	N/A	2024/02/16	BBY6SOP-00010	SM 24 4500-NO2- m
Nitrogen - Nitrate (as N)	1	N/A	2024/02/17	BBY WI-00033	Auto Calc
Nitrogen (Tot. Organic) Calculation	1	N/A	2024/02/22	BBY WI-00033	Auto Calc
pH @25°C (6)	1	N/A	2024/02/16	BBY6SOP-00026	SM 24 4500-H+ B m
Sat. pH and Langelier Index (@ 4.4C)	1	N/A	2024/02/22	BBY WI-00033	Auto Calc
Sat. pH and Langelier Index (@ 60C)	1	N/A	2024/02/22	BBY WI-00033	Auto Calc
Total Sulphide (1)	1	N/A	2024/02/21	AB SOP-00080	SM 24 4500 S2-A D Fm
Sulphate Reducing Bacteria (4)	1	N/A	2024/02/16	BBY4SOP-00004	BI BART User Manual
Total Dissolved Solids (Filt. Residue)	1	2024/02/21	2024/02/22	BBY6SOP-00033	SM 24 2540 C m
Total Coliform & E.Coli by MF-Chromocult	1	N/A	2024/02/16	BBY4SOP-00143	Merck KGaA Version 1
Carbon (Total Organic) (7)	1	N/A	2024/02/16	BBY6SOP-00053	SM 24 5310 B m
Turbidity	1	N/A	2024/02/16	BBY6SOP-00027	SM 24 2130 B m

Bureau Veritas Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

Your Project #: TOTANGI
Your C.O.C. #: WI034487

Attention: AL KOHUT

HY-GEO CONSULTING
4470 Arsens Place
VICTORIA, BC
Canada V8Z 2M9

Report Date: 2024/02/26
Report #: R3467520
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C410716
Received: 2024/02/15, 11:29

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
UV Transmittance (2)	1	2024/02/23	2024/02/23	CAM SOP-00459	SM 24 5910 m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, EPA, APHA or the Quebec Ministry of Environment.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Bureau Veritas Calgary, 4000 - 19 St. , Calgary, AB, T2E 6P8
(2) This test was performed by Bureau Veritas Campobello, 6740 Campobello Road , Mississauga, ON, L5N 2L8
(3) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).
(4) Presence/Absence Method. Number is an estimate.
(5) Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.
(6) The CCME method requires pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the CCME holding time. Bureau Veritas endeavours to analyze samples as soon as possible after receipt.
(7) TOC present in the sample should be considered as non-purgeable TOC.

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CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C410716
Received: 2024/02/15, 11:29

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Michelle Rivest (Hospedales), B.Sc., Customer Solutions Representative
Email: michelle.rivest@bureauveritas.com
Phone# (604) 734 7276

This report has been generated and distributed using a secure automated process.
Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Raphael Kwan, Senior Manager, BC and Yukon Regions responsible for British Columbia Environmental laboratory operations.

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Bureau Veritas Job #: C410716
Report Date: 2024/02/26

HY-GEO CONSULTING
Client Project #: TOTANGI

VIHA PKG, WELLS/SPRINGS - BURNABY (WATER)

Bureau Veritas ID		CJG147		
Sampling Date		2024/02/15 08:20		
COC Number		WI034487		
	UNITS	JORDAN R. WELL	RDL	QC Batch
ANIONS				
Nitrite (N)	mg/L	<0.0050	0.0050	B287596
Calculated Parameters				
Total Hardness (CaCO3)	mg/L	30.9	0.50	B285428
Nitrate (N)	mg/L	<0.020	0.020	B285468
Total Organic Nitrogen (N)	mg/L	0.589	0.020	B286395
Sulphide (as H2S)	mg/L	0.0062	0.0020	B285763
Misc. Inorganics				
Conductivity	uS/cm	110	2.0	B287440
pH	pH	6.47	N/A	B287434
Total Organic Carbon (C)	mg/L	1.5	0.50	B287657
Total Dissolved Solids	mg/L	90	10	B290422
Anions				
Alkalinity (PP as CaCO3)	mg/L	<1.0	1.0	B287437
Alkalinity (Total as CaCO3)	mg/L	41	1.0	B287437
Bicarbonate (HCO3)	mg/L	50	1.0	B287437
Carbonate (CO3)	mg/L	<1.0	1.0	B287437
Dissolved Fluoride (F)	mg/L	<0.050	0.050	B290280
Hydroxide (OH)	mg/L	<1.0	1.0	B287437
Total Sulphide	mg/L	0.0058	0.0018	B289796
Chloride (Cl)	mg/L	4.4	1.0	B290536
Sulphate (SO4)	mg/L	<1.0	1.0	B290536
MISCELLANEOUS				
True Colour	Col. Unit	128	10	B287165
Transmittance at 254nm	%T/cm	18	N/A	B293309
Nutrients				
Total Ammonia (N)	mg/L	0.29	0.015	B290458
Nitrate plus Nitrite (N)	mg/L	<0.020	0.020	B287592
Total Nitrogen (N)	mg/L	0.877	0.020	B290418
Physical Properties				
Turbidity	NTU	9.9	0.10	B287002

RDL = Reportable Detection Limit
N/A = Not Applicable

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HY-GEO CONSULTING
Client Project #: TOTANGI

VIHA PKG, WELLS/SPRINGS - BURNABY (WATER)

Bureau Veritas ID		CJG147		
Sampling Date		2024/02/15 08:20		
COC Number		WI034487		
	UNITS	JORDAN R. WELL	RDL	QC Batch
Elements				
Total Mercury (Hg)	ug/L	<0.0019	0.0019	B287581
Total Metals by ICPMS				
Total Aluminum (Al)	ug/L	13.3	3.0	B290301
Total Antimony (Sb)	ug/L	<0.50	0.50	B290301
Total Arsenic (As)	ug/L	8.03	0.10	B290301
Total Barium (Ba)	ug/L	7.0	1.0	B290301
Total Beryllium (Be)	ug/L	<0.10	0.10	B290301
Total Bismuth (Bi)	ug/L	<1.0	1.0	B290301
Total Boron (B)	ug/L	<50	50	B290301
Total Cadmium (Cd)	ug/L	0.031	0.010	B290301
Total Chromium (Cr)	ug/L	<1.0	1.0	B290301
Total Cobalt (Co)	ug/L	<0.20	0.20	B290301
Total Copper (Cu)	ug/L	2.30	0.20	B290301
Total Iron (Fe)	ug/L	9220	5.0	B290301
Total Lead (Pb)	ug/L	0.20	0.20	B290301
Total Manganese (Mn)	ug/L	202	1.0	B290301
Total Molybdenum (Mo)	ug/L	<1.0	1.0	B290301
Total Nickel (Ni)	ug/L	<1.0	1.0	B290301
Total Selenium (Se)	ug/L	<0.10	0.10	B290301
Total Silicon (Si)	ug/L	17200	100	B290301
Total Silver (Ag)	ug/L	<0.020	0.020	B290301
Total Strontium (Sr)	ug/L	25.5	1.0	B290301
Total Thallium (Tl)	ug/L	<0.010	0.010	B290301
Total Tin (Sn)	ug/L	<5.0	5.0	B290301
Total Titanium (Ti)	ug/L	<5.0	5.0	B290301
Total Uranium (U)	ug/L	<0.10	0.10	B290301
Total Vanadium (V)	ug/L	<5.0	5.0	B290301
Total Zinc (Zn)	ug/L	41.9	5.0	B290301
Total Zirconium (Zr)	ug/L	<0.10	0.10	B290301
Total Calcium (Ca)	mg/L	7.86	0.050	B285820
Total Magnesium (Mg)	mg/L	2.74	0.050	B285820
Total Potassium (K)	mg/L	0.786	0.050	B285820
Total Sodium (Na)	mg/L	6.47	0.050	B285820
RDL = Reportable Detection Limit				

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Bureau Veritas Job #: C410716
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HY-GEO CONSULTING
Client Project #: TOTANGI

VIHA PKG, WELLS/SPRINGS - BURNABY (WATER)

Bureau Veritas ID		CJG147		
Sampling Date		2024/02/15 08:20		
COC Number		WI034487		
	UNITS	**JORDAN R. WELL**	**RDL**	**QC Batch**
Total Sulphur (S)	mg/L	<3.0	3.0	B285820
Microbiological Param.				
Heterotrophic Plate Count	CFU/mL	<1	1	B287355
Iron Bacteria	CFU/mL	25	25	B287353
Sulphate reducing bacteria	CFU/mL	<75	75	B287354
Total Coliforms	CFU/100mL	0	N/A	B287351
E. coli	CFU/100mL	0	N/A	B287351
Calculated Parameters				
Langelier Index (@ 4.4C)	N/A	-2.60	N/A	B286396
Langelier Index (@ 60C)	N/A	-1.82	N/A	B286397
Saturation pH (@ 4.4C)	N/A	9.06	N/A	B286396
Saturation pH (@ 60C)	N/A	8.29	N/A	B286397

RDL = Reportable Detection Limit
N/A = Not Applicable

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HY-GEO CONSULTING
Client Project #: TOTANGI

CSR D. METALS (NO CV-HG)-DISS

Bureau Veritas ID		CJG147		
Sampling Date		2024/02/15 08:20		
COC Number		WI034487		
	UNITS	JORDAN R. WELL	RDL	QC Batch
Calculated Parameters				
Dissolved Hardness (CaCO3)	mg/L	31.8	0.50	B285810
Dissolved Metals by ICPMS				
Dissolved Aluminum (Al)	ug/L	5.1	3.0	B287484
Dissolved Antimony (Sb)	ug/L	<0.50	0.50	B287484
Dissolved Arsenic (As)	ug/L	7.78	0.10	B287484
Dissolved Barium (Ba)	ug/L	6.7	1.0	B287484
Dissolved Beryllium (Be)	ug/L	<0.10	0.10	B287484
Dissolved Bismuth (Bi)	ug/L	<1.0	1.0	B287484
Dissolved Boron (B)	ug/L	<50	50	B287484
Dissolved Cadmium (Cd)	ug/L	<0.010	0.010	B287484
Dissolved Chromium (Cr)	ug/L	<1.0	1.0	B287484
Dissolved Cobalt (Co)	ug/L	<0.20	0.20	B287484
Dissolved Copper (Cu)	ug/L	0.81	0.20	B287484
Dissolved Iron (Fe)	ug/L	9560	5.0	B287484
Dissolved Lead (Pb)	ug/L	<0.20	0.20	B287484
Dissolved Lithium (Li)	ug/L	<2.0	2.0	B287484
Dissolved Manganese (Mn)	ug/L	198	1.0	B287484
Dissolved Molybdenum (Mo)	ug/L	<1.0	1.0	B287484
Dissolved Nickel (Ni)	ug/L	<1.0	1.0	B287484
Dissolved Selenium (Se)	ug/L	<0.10	0.10	B287484
Dissolved Silicon (Si)	ug/L	16000	100	B287484
Dissolved Silver (Ag)	ug/L	<0.020	0.020	B287484
Dissolved Strontium (Sr)	ug/L	26.6	1.0	B287484
Dissolved Thallium (Tl)	ug/L	<0.010	0.010	B287484
Dissolved Tin (Sn)	ug/L	<5.0	5.0	B287484
Dissolved Titanium (Ti)	ug/L	<5.0	5.0	B287484
Dissolved Uranium (U)	ug/L	<0.10	0.10	B287484
Dissolved Vanadium (V)	ug/L	<5.0	5.0	B287484
Dissolved Zinc (Zn)	ug/L	26.9	5.0	B287484
Dissolved Zirconium (Zr)	ug/L	<0.10	0.10	B287484
Dissolved Calcium (Ca)	mg/L	8.07	0.050	B285811
Dissolved Magnesium (Mg)	mg/L	2.84	0.050	B285811
RDL = Reportable Detection Limit				

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HY-GEO CONSULTING
Client Project #: TOTANGI

CSR D. METALS (NO CV-HG)-DISS

Bureau Veritas ID		CJG147		
Sampling Date		2024/02/15 08:20		
COC Number		WI034487		
	UNITS	JORDAN R. WELL	RDL	QC Batch
Dissolved Potassium (K)	mg/L	0.786	0.050	B285811
Dissolved Sodium (Na)	mg/L	6.32	0.050	B285811
Dissolved Sulphur (S)	mg/L	<3.0	3.0	B285811
RDL = Reportable Detection Limit				

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Bureau Veritas Job #: C410716
Report Date: 2024/02/26

HY-GEO CONSULTING
Client Project #: TOTANGI

GENERAL COMMENTS

Sample CJG147 [JORDAN R. WELL] : Sample was analyzed past recommended hold time for Heterotropic Plate Count (MF) in Water. Sample was analyzed past recommended hold time for Iron Related Bacteria. Sample was analyzed past recommended hold time for Sulphate Reducing Bacteria. UVT Analysis: Sample received at the analyzing laboratory past the recommended holding time. Analysis performed with client's consent.

Results relate only to the items tested.

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Bureau Veritas Job #: C410716
Report Date: 2024/02/26

QUALITY ASSURANCE REPORT

HY-GEO CONSULTING
Client Project #: TOTANGI

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
B287002	Turbidity	2024/02/16			101	80 - 120	<0.10	NTU	NC	20
B287165	True Colour	2024/02/16			103	80 - 120	<2.0	Col. Unit	NC	20
B287434	pH	2024/02/16			100	97 - 103			0.33	N/A
B287437	Alkalinity (PP as CaCO3)	2024/02/16					<1.0	mg/L	NC	20
B287437	Alkalinity (Total as CaCO3)	2024/02/16			97	80 - 120	<1.0	mg/L	0.43	20
B287437	Bicarbonate (HCO3)	2024/02/16					<1.0	mg/L	0.43	20
B287437	Carbonate (CO3)	2024/02/16					<1.0	mg/L	NC	20
B287437	Hydroxide (OH)	2024/02/16					<1.0	mg/L	NC	20
B287440	Conductivity	2024/02/16			100	90 - 110	<2.0	uS/cm		
B287484	Dissolved Aluminum (Al)	2024/02/21	104	80 - 120	106	80 - 120	<3.0	ug/L	15	20
B287484	Dissolved Antimony (Sb)	2024/02/21	103	80 - 120	104	80 - 120	<0.50	ug/L	1.4	20
B287484	Dissolved Arsenic (As)	2024/02/21	108	80 - 120	108	80 - 120	<0.10	ug/L	0.96	20
B287484	Dissolved Barium (Ba)	2024/02/21	100	80 - 120	103	80 - 120	<1.0	ug/L	0.39	20
B287484	Dissolved Beryllium (Be)	2024/02/21	105	80 - 120	105	80 - 120	<0.10	ug/L	NC	20
B287484	Dissolved Bismuth (Bi)	2024/02/21	99	80 - 120	101	80 - 120	<1.0	ug/L	NC	20
B287484	Dissolved Boron (B)	2024/02/21	105	80 - 120	106	80 - 120	<50	ug/L	NC	20
B287484	Dissolved Cadmium (Cd)	2024/02/21	104	80 - 120	104	80 - 120	<0.010	ug/L	NC	20
B287484	Dissolved Chromium (Cr)	2024/02/21	101	80 - 120	104	80 - 120	<1.0	ug/L	NC	20
B287484	Dissolved Cobalt (Co)	2024/02/21	99	80 - 120	102	80 - 120	<0.20	ug/L	NC	20
B287484	Dissolved Copper (Cu)	2024/02/21	96	80 - 120	101	80 - 120	<0.20	ug/L	0.46	20
B287484	Dissolved Iron (Fe)	2024/02/21	105	80 - 120	105	80 - 120	<5.0	ug/L	15	20
B287484	Dissolved Lead (Pb)	2024/02/21	99	80 - 120	101	80 - 120	<0.20	ug/L	NC	20
B287484	Dissolved Lithium (Li)	2024/02/21	101	80 - 120	103	80 - 120	<2.0	ug/L	NC	20
B287484	Dissolved Manganese (Mn)	2024/02/21	99	80 - 120	102	80 - 120	<1.0	ug/L	0.60	20
B287484	Dissolved Molybdenum (Mo)	2024/02/21	NC	80 - 120	108	80 - 120	<1.0	ug/L	1.5	20
B287484	Dissolved Nickel (Ni)	2024/02/21	98	80 - 120	102	80 - 120	<1.0	ug/L	NC	20
B287484	Dissolved Selenium (Se)	2024/02/21	102	80 - 120	105	80 - 120	<0.10	ug/L	9.3	20
B287484	Dissolved Silicon (Si)	2024/02/21	NC	80 - 120	111	80 - 120	<100	ug/L	0.14	20
B287484	Dissolved Silver (Ag)	2024/02/21	103	80 - 120	103	80 - 120	<0.020	ug/L	NC	20
B287484	Dissolved Strontium (Sr)	2024/02/21	NC	80 - 120	103	80 - 120	<1.0	ug/L	2.6	20
B287484	Dissolved Thallium (Tl)	2024/02/21	100	80 - 120	102	80 - 120	<0.010	ug/L	NC	20
B287484	Dissolved Tin (Sn)	2024/02/21	102	80 - 120	104	80 - 120	<5.0	ug/L	NC	20
B287484	Dissolved Titanium (Ti)	2024/02/21	98	80 - 120	103	80 - 120	<5.0	ug/L	NC	20

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QUALITY ASSURANCE REPORT(CONT'D)

HY-GEO CONSULTING
Client Project #: TOTANGI

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
B287484	Dissolved Uranium (U)	2024/02/21	103	80 - 120	102	80 - 120	<0.10	ug/L	0.33	20
B287484	Dissolved Vanadium (V)	2024/02/21	102	80 - 120	103	80 - 120	<5.0	ug/L	NC	20
B287484	Dissolved Zinc (Zn)	2024/02/21	99	80 - 120	103	80 - 120	<5.0	ug/L	NC	20
B287484	Dissolved Zirconium (Zr)	2024/02/21	101	80 - 120	97	80 - 120	<0.10	ug/L	NC	20
B287581	Total Mercury (Hg)	2024/02/16	87	80 - 120	91	80 - 120	<0.0019	ug/L	NC	20
B287592	Nitrate plus Nitrite (N)	2024/02/16	113	80 - 120	106	80 - 120	<0.020	mg/L	NC	25
B287596	Nitrite (N)	2024/02/16	106	80 - 120	105	80 - 120	<0.0050	mg/L	NC	20
B287657	Total Organic Carbon (C)	2024/02/16			105	80 - 120	<0.50	mg/L		
B289796	Total Sulphide	2024/02/21	97	80 - 120	94	80 - 120	<0.0018	mg/L	NC	20
B290280	Dissolved Fluoride (F)	2024/02/21	105	80 - 120	102	80 - 120	<0.050	mg/L	NC	20
B290301	Total Aluminum (Al)	2024/02/21	99	80 - 120	103	80 - 120	<3.0	ug/L	4.2	20
B290301	Total Antimony (Sb)	2024/02/21	103	80 - 120	103	80 - 120	<0.50	ug/L	NC	20
B290301	Total Arsenic (As)	2024/02/21	106	80 - 120	109	80 - 120	<0.10	ug/L	0.24	20
B290301	Total Barium (Ba)	2024/02/21	100	80 - 120	102	80 - 120	<1.0	ug/L	NC	20
B290301	Total Beryllium (Be)	2024/02/21	97	80 - 120	100	80 - 120	<0.10	ug/L	NC	20
B290301	Total Bismuth (Bi)	2024/02/21	95	80 - 120	103	80 - 120	<1.0	ug/L	NC	20
B290301	Total Boron (B)	2024/02/21	110	80 - 120	112	80 - 120	<50	ug/L	3.5	20
B290301	Total Cadmium (Cd)	2024/02/21	100	80 - 120	103	80 - 120	<0.010	ug/L	7.6	20
B290301	Total Chromium (Cr)	2024/02/21	96	80 - 120	101	80 - 120	<1.0	ug/L	NC	20
B290301	Total Cobalt (Co)	2024/02/21	97	80 - 120	100	80 - 120	<0.20	ug/L	NC	20
B290301	Total Copper (Cu)	2024/02/21	93	80 - 120	100	80 - 120	<0.20	ug/L	1.6	20
B290301	Total Iron (Fe)	2024/02/21	100	80 - 120	104	80 - 120	<5.0	ug/L	0.66	20
B290301	Total Lead (Pb)	2024/02/21	97	80 - 120	102	80 - 120	<0.20	ug/L	0.90	20
B290301	Total Manganese (Mn)	2024/02/21	94	80 - 120	98	80 - 120	<1.0	ug/L	0.28	20
B290301	Total Molybdenum (Mo)	2024/02/21	108	80 - 120	105	80 - 120	<1.0	ug/L	0.031	20
B290301	Total Nickel (Ni)	2024/02/21	95	80 - 120	101	80 - 120	<1.0	ug/L	NC	20
B290301	Total Selenium (Se)	2024/02/21	100	80 - 120	104	80 - 120	<0.10	ug/L	NC	20
B290301	Total Silicon (Si)	2024/02/21	NC	80 - 120	116	80 - 120	<100	ug/L	0.48	20
B290301	Total Silver (Ag)	2024/02/21	99	80 - 120	103	80 - 120	<0.020	ug/L	NC	20
B290301	Total Strontium (Sr)	2024/02/21	NC	80 - 120	98	80 - 120	<1.0	ug/L	1.3	20
B290301	Total Thallium (Tl)	2024/02/21	99	80 - 120	104	80 - 120	<0.010	ug/L	NC	20
B290301	Total Tin (Sn)	2024/02/21	102	80 - 120	105	80 - 120	<5.0	ug/L	NC	20
B290301	Total Titanium (Ti)	2024/02/21	100	80 - 120	102	80 - 120	<5.0	ug/L	NC	20

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Bureau Veritas Job #: C410716
Report Date: 2024/02/26

QUALITY ASSURANCE REPORT(CONT'D)

HY-GEO CONSULTING
Client Project #: TOTANGI

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
B290301	Total Uranium (U)	2024/02/21	103	80 - 120	105	80 - 120	<0.10	ug/L	3.5	20
B290301	Total Vanadium (V)	2024/02/21	98	80 - 120	99	80 - 120	<5.0	ug/L	NC	20
B290301	Total Zinc (Zn)	2024/02/21	95	80 - 120	102	80 - 120	<5.0	ug/L	0.40	20
B290301	Total Zirconium (Zr)	2024/02/21	106	80 - 120	103	80 - 120	<0.10	ug/L	NC	20
B290418	Total Nitrogen (N)	2024/02/22			103	80 - 120	<0.020	mg/L	NC	20
B290422	Total Dissolved Solids	2024/02/22	103	80 - 120	101	80 - 120	<10	mg/L	3.0	20
B290458	Total Ammonia (N)	2024/02/21	105	80 - 120	100	80 - 120	<0.015	mg/L	1.7	20
B290536	Chloride (Cl)	2024/02/21	107	80 - 120	100	80 - 120	<1.0	mg/L	3.4	20
B290536	Sulphate (SO4)	2024/02/21	92	80 - 120	99	80 - 120	<1.0	mg/L	NC	20
B293309	Transmittance at 254nm	2024/02/23			99	97 - 103			1.5	25

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

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HY-GEO CONSULTING
Client Project #: TOTANGI

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

David Huang, M.Sc., P.Chem., QP, Scientific Services Manager

Anastassia Hamanov, Scientific Specialist

Suwan (Sze Yeung) Fock, B.Sc., Scientific Specialist

Automated Statchk

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Raphael Kwan, Senior Manager, BC and Yukon Regions responsible for British Columbia Environmental laboratory operations.

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Hy-Geo Consulting
www.hy-geo.com
Tel: (250) 744-7859 Victoria, British Columbia, Canada V9E 2M3

File: 2205191

March 15, 2023

Totangi Properties Ltd
Jordan River BC

Attention: [redacted]

Re: Preliminary Groundwater Assessment for Wildwood Terrace Neighbourhood Commercial Zone, C-1A at Jordan River

As requested, Hy-Geo Consulting has completed a desktop assessment of the feasibility of obtaining a sufficient supply of potable groundwater involving up to 10 individual water supply wells for the proposed subject property development at Jordan River (Figure 1). Potential impacts of the proposed groundwater use on neighbouring properties and existing water sources including wells and nearby streams has also been assessed. My understanding is that drilling and testing of an initial production well for a proposed brewery on one of the proposed parcels is currently being planned.

Site Location

The subject property is situated along the north side of the West Coast Road at Jordan River (Figure 1) and currently zoned as Wildwood Terrace Neighbourhood Commercial Zone, C-1A under Bylaw No. 2040, "Juan de Fuca Land Use Bylaw, 1992" (CRD, 2023a). In 2021 an amendment to Bylaw No. 2040 under Bylaw No. 4381 included added potential water uses for food and beverage processing and country market (CRD, 2021). The current proposal for the property includes 10 commercial use parcels ranging in size from 0.20 to 0.46 hectares in size (Figure 2). There are numerous existing wells in the general region directly south and west of the property (Figure 3). First Creek lies approximately 175 m (574 feet) west of the western boundary of the property. The site is situated at an elevation of about 55 m (180.4 feet) on a glacial-fluvial terrace that slopes gently southwesterly towards the ocean. Towards the southeast, elevations drop abruptly from the site towards the mouth of the Jordan River.

Climate

The region is situated in the *Coastal Western Hemlock Biogeoclimatic Zone* with long, mild, and wet winters, and relatively sunny and dry summers. While a long-term climate station for Jordan River is not available, monthly normal precipitation for the Sooke Lake North climate weather station for the 1981-2010 period has been reported
by the Government of Canada (2023) for climate station 1017563 as shown in Figure 4. The region receives about 1497 mm of precipitation on an annual basis (Government of Canada, 2023). Precipitation normally follows a seasonal cycle, with highest rainfall during the fall, winter and early spring months while the summer months are subject to drought conditions.

Figure 1. Location of subject property at Jordan River. Basemap from Province of British Columbia (2022a).

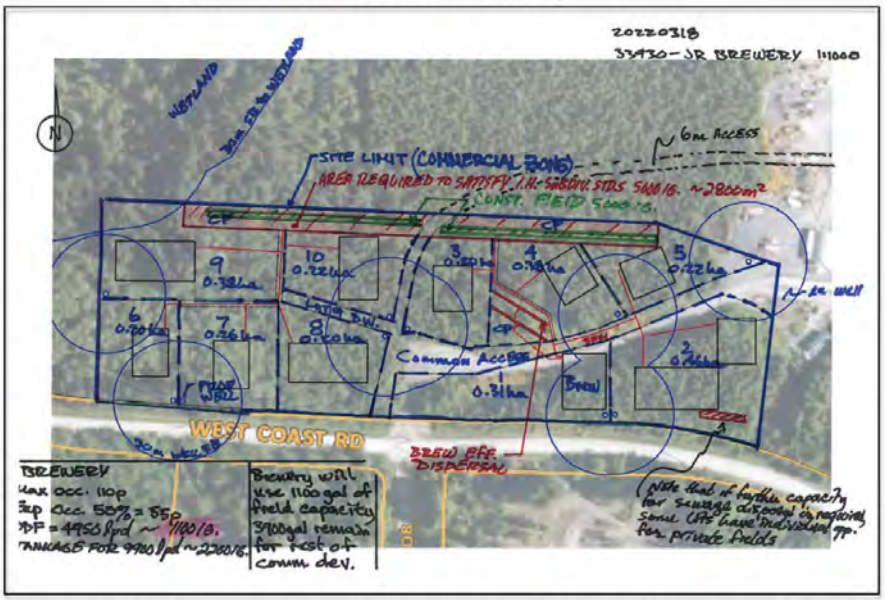

Figure 2. Draft proposed parcel plan for property. Figure from Totangi Properties Ltd., July 14, 2022.

Figure 3. Location of neighbouring water wells and streams. Basemap from CRD (2022b).

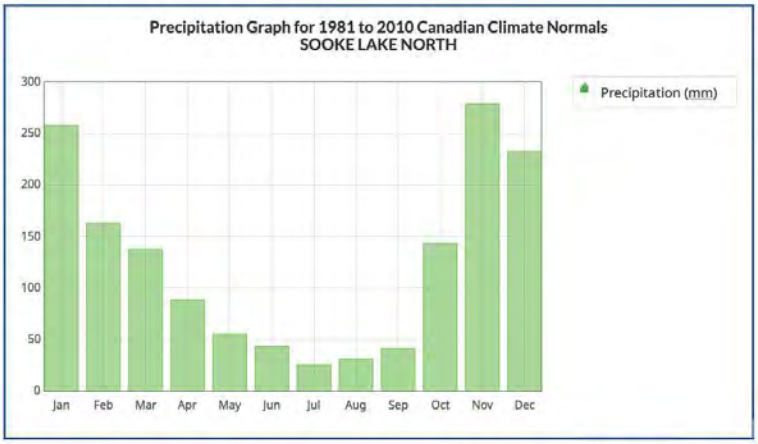

Figure 4. Graph of monthly normal precipitation for Sooke Lake North station (Climate ID. 1017563). Graph from Government of Canada (2023).

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Geology and Hydrogeological Setting

The subject property is underlain by a confined glacio-fluvial sand and gravel aquifer system, designated Aquifer 944 under the *BC Aquifer Classification System* (Bernardinucci and Ronneseth, 2002). The aquifer is also classified as a moderately productive and moderately vulnerable IIB aquifer. More detailed descriptions of the aquifer can be found at the *British Columbia Water Resources Atlas* (Province of British Columbia, 2022a).

The *British Columbia Water Resources Atlas* also shows a fractured crystalline aquifer, (Aquifer 943) comprised of igneous intrusive or metamorphic, meta-sedimentary, and meta-volcanic rocks underlying the unconsolidated deposits of Aquifer 944.

Examination of drilling records in the region carried out under this assessment also indicated descriptions of sedimentary sandstone, conglomerate and siltstone underlying the unconsolidated deposits locally. These latter bedrock units may belong to the Sooke Formation that has been reported to be comprised of cross-bedded sandstone, interbedded with lesser amounts of siltstone, and conglomerate containing cemented pebble to boulder sized clasts (Massey, 1994; Yorath and Nasmith, 1995).

Groundwater occurs within the pore spaces of the unconsolidated deposits and in open fractures in the underlying bedrock as they are encountered during drilling of water wells. Groundwater is likely recharged by infiltration of precipitation and runoff from the upland area north of the aquifer with groundwater moving southerly towards lower elevations and ultimately discharging to the ocean.

Reported Wells

Figure 5 shows the location of reported wells in the vicinity of the subject property. The majority of these are situated south and west of the property. A summary of the wells shown in Figure 5 is provided in Table 1. Wells are identified with a unique, computer generated WTN (well tag number) in the provincial WELLS database (Province of British Columbia, 2022a and 2022b). The wells shown do not necessarily comprise all existing wells in the area and all well locations have not been necessarily verified in the field.

Well records for the region shown in Figure 5 indicate that the unconsolidated deposits comprise a heterogeneous array of materials ranging from glacial till, cobbles and boulders, fine sand and silt to coarse-grained gravels. The unconsolidated deposits range from 33 to 418 feet (10.06 to 127.41 m) in thickness. Most wells are completed in sand and gravel units with or without well screens. Reported well yields range from 2 to 80 USgpm (7.57 to 302.83 L/min) with a median of 10 USgpm (37.85 L/min). About 20 percent of the wells shown in Figure 5 are completed in bedrock at depths ranging from 280 to 598 feet (85.34 to 182.27 m) with well yields in the range 1 to 7 USgpm (3.78 to 26.50 l/min) with a median of 5 USgpm (18.93 L/min).

Groundwater Prospects on the Subject Property

Based on the records of wells situated closest to the subject property (Figure 6), the geologic conditions appear very favourable for constructing relatively shallow wells within the unconsolidated aquifer unit. Figure 7 shows that there may be up to 10 m (32.81 feet) of saturated sand and gravel underlying the site with individual wells potentially yielding 5 to 10 USgpm (18.93 to 37.85 L/min) each.

Potential Water Demands for Future Commercial Uses

CRD Bylaws No. 2040 and Bylaw No. 4381 permit the following principle land uses in the commercial zoned property namely:

(a) Convenience Store;
(b) Retail Store, excluding gas bars, gas stations or bulk fuel sales, auto repair or car wash, or any use for which a permit is required under the *Environmental Management Act or Regulation*;
(c) Civic Uses;
(d) Food and beverage processing;
(e) Country Market.

It is estimated that the proposed brewery for the subject property would initially need 350,000 L/year (959 L/day) of potable water potentially growing to 2,000,00 L/year (5480 L/day) after 5 years (Totangi Properties, 2023). This would be equivalent to an initial well production rate of 0.18 USgpm growing to 1.01 USgpm, from a well on the property. Other parcels at the site would unlikely require as much water for their needs compared to the brewery requirements. While the specific individual business water needs are not currently known, the maximum total potential water use from 10 wells on the site would not likely be more than 3 to 5 USgpm (11.36 to 18.93 L/min). Geological and groundwater conditions based on neighbouring wells indicates this quantity of water could be readily obtained from properly designed and constructed wells on the subject property.

Potential Impacts on Neighbouring Wells and Surface Water Sources

Based on a relatively low, continuous water demand of 3 to 5 USgpm (11.36 to 18.93 L/min) from the commercial site, it is unlikely that groundwater use at this rate would have any significant effect on neighbouring wells or the flows of First Creek. Potential wells used for commercial purposes would also need to be adequately tested to support an application for a water licence under the *Water Sustainability Act* and meet provincial guidelines for testing and monitoring (Todd *et al.*, 2016 and 2020) to assess any potential impacts on neighbouring wells or nearby surface water sources.

Figure 5. Reported wells in the vicinity of the subject property. Well locations and basemap from Province of British Columbia (2022a).

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Table 1. Summary of water wells at and in vicinity of subject property.

Well Tag No. (WTN)	Well Identification Plate No. (WID)	Depth Drilled or Dug (feet)	Depth Well Drilled (m)	Diameter (inches)	Diameter (cm)	Driller's Estimated Yield Value(Usgpm)	Water Depth (feet)	Water Depth (m)	Depth to Bedrock (feet)	Depth to Bedrock (m)	Construction Completion Date	General Remarks	Legal District Lot	Legal Plan	Lot No.	Section	Owner When Constructed	Well Purpose
85062		39	11.89	6	15.24	3	14	4.27	39	11.89	03/29/2005	5.5 inch screen set 34.3 to 39 ft, 18 slot, sand and gravel			1	4	[redacted]	Private Domestic
85063		280	85.34	6	15.24	5	165	50.29	40	12.19	04/13/2005	sandstone 40-70 ft, conglomerate 70 to 280 ft, 1 gpm at 240, 3 gpm at 260 and 6 gpm at 280 ft			2		[redacted]	Private Domestic
85065		280	85.34	6	15.24	6	174	53.04	40	12.19	04/04/2005	sandstone 40-73 ft, conglomerate 73 to 280 ft, 0.5 gpm at 220, 2 gpm at 240 and 4 gpm at 260 ft, 6 gpm at 280 ft			3	4	[redacted]	Private Domestic
85066		50.5	15.39	6	15.24	5	28	8.53			04/01/2005	6.6 inch screen set 43 10" to 50.5 ft, 10 slot, sand and gravel			4	4	[redacted]	Private Domestic
85067		280	85.34	6	15.24	5	150	45.72	35	10.67	03/30/2005	sandstone 35 -55 ft, conglomerate 55 to 280 ft, 0.5 gpm at 220, 2 gpm at 240 and 4 gpm at 260 ft, 5 gpm at 280 ft			5		[redacted]	Private Domestic
85068		280	85.34	6	15.24	5	187	57.00	33	10.06	04/12/2005	sandstone 33 -65 ft, conglomerate 65 to 280 ft, 0.75 gpm at 220, 1.5 gpm at 240 and 4 gpm at 260 ft, 5 gpm at 280 ft			1	4	[redacted]	Private Domestic
85069		285	86.87	6	15.24	3	213	64.92	54	16.46	04/08/2005	sandstone 54 -72 ft, conglomerate 72 to 285 ft			7	4	[redacted]	Private Domestic
85071		280	85.34	6	15.24	7	200	60.96	42	12.80	04/07/2005	sandstone 54 -76 ft, conglomerate 76 to 280 ft, 0.5 gpm at 240, 3 gpm at 260 and 7 gpm at 280 ft			9	4	[redacted]	Private Domestic
85073		300	91.44	6	15.24	6	160	48.77	33	10.06	03/23/2005	sandstone 33 -70 ft, shale 70 - 98, mudstone? 98-130, conglomerate 130 to 240 ft, sandstone 240-275, conglomerate 275-300, 1.5 gpm at 240, 2 gpm at 260, 5 at 280, and 6 at 300 feet			11	4	[redacted]	Private Domestic
85074		280	85.34	6	15.24	6	150	45.72	34	10.36	03/29/2005	sandstone 34 -90 ft, conglomerate 90 to 95 ft, sandstone 95-120, conglomerate 120-280, 1.5 gpm at 240, 4 gpm at 260, 6 at 280			12	4	[redacted]	Private Domestic
85075		44	13.41	6	15.24	10	19	5.79			03/22/2005	drilled to 62 feet, sand and gravel with boulders, open bottom			14	4	[redacted]	Private Domestic
86071	18003	130	39.62	6	15.24	2	70	21.34			10/17/2006	drilled to 137 ft, sand with little gravel, screen set 123.5 to 130 ft, 18 slot		68644	21	4	[redacted]	Private Domestic
86072	18004	120	36.58	6	15.24	15	66	20.02			12/07/2006	gravel and sand, screen set 113.5 to 120 ft, 25 slot		68644	45	4	[redacted]	Private Domestic
86074	18009	120	36.58	6	15.24	10	88	26.82			12/20/2006	gravel with boulders, open hole		68644	36	4	[redacted]	Unknown Well Use
86076	18161	100	30.48	6	15.24	10	69	21.03			12/11/2006	gravel with boulders, open hole		68644	46	4	[redacted]	Private Domestic
86077	18070	134.5	41.00	6	15.24	15	91	27.74			12/06/2006	gravel and sand, screen set 128 to134.5 ft, 18 slot		68644	41	4	[redacted]	Unknown Well Use
86081	18002	154.9	47.21	6	15.24	3	125	38.10			10/21/2006	sand and gravel, screen set 149 to 154.6 ft, 25 slot		68644	62	4	[redacted]	Private Domestic
86082	18007	151	46.02	6	15.24	2	115	35.05			10/19/2006	sand and gravel, screen set 144.26 to 151, 18 slot		68644	20	4	[redacted]	Private Domestic
86093	18157	518	157.89	6	15.24	2			418	127.41	09/23/2006	completed in sandstone. overlain by silty sand, till and clay		68644	6	4	[redacted]	Private Domestic
86094	18006	132	40.23	6	15.24	5	70	21.34			10/11/2006	gravel with sand, screen set 125.25 to 13 ft2, 12 slot		68644	10	4	[redacted]	Private Domestic
86095	18196	153	46.63	6	15.24	2	134	40.84			10/24/2006	sand with gravel, open hole		68644	18	4	[redacted]	Private Domestic
86096	18067	129	39.32	6	15.24	10	77	23.47			11/16/2006	sand with gravel, open hole		68644	33	4	[redacted]	Private Domestic
86097	18158	147	44.81	6	15.24	2	108	32.92			11/09/2006	gravel with sand, screen set 140.3 to 147 ft, 12 slot		68644	26	4	[redacted]	Private Domestic
86098	18160	149	45.42	6	15.24	7	108	32.92			11/14/2006	gravel with sand, open hole		68644	23	4	[redacted]	Private Domestic
86099	18159	298.5	90.98	6	15.24	2.5	160	48.77	314	95.71	11/07/2006	sand, screen set 291 to 298.5 ft, 18 slot		68644	16	4	[redacted]	Private Domestic

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Well Tag No. (WTN)	Well Identification Plate No. (WID)	Depth Drilled or Dug (feet)	Depth Well Drilled (m)	Diameter (inches)	Diameter (cm)	Driller's Estimated Yield Value(Usgpm)	Water Depth (feet)	Water Depth (m)	Depth to Bedrock (feet)	Depth to Bedrock (m)	Construction Completion Date	General Remarks	Legal District Lot	Legal Plan	Lot No.	Section	Owner When Constructed	Well Purpose
86100	18001	305	92.96	6	15.24	6	160	48.77			11/01/2006	sand, screen set 298.5 to 305 ft, 18 slot		68644	1	4		Private Domestic
86127	18162	149	45.42	6	15.24	8	111	33.83			10/06/2006	sand and gravel, screen set 142.25 to 149 ft, 20 slot		68644	7	4		Private Domestic
86128	18199	598	182.27	6	15.24	1	159	45.72	408	124.36	10/04/2006	sandstone bedrock, 0.75 gpm at 520 ft, 1 gpm at 598 ft		68644	8	4		Private Domestic
86129	18198	427	130.15	6	15.24	10	150	45.72			09/27/2006	sand and gravel, open hole		68644	9	4		Private Domestic
86130	18004	219	66.75	6	15.24	20	154	46.94			09/04/2006	gravel and sand, open hole		68644	15	4		Private Domestic
86145	18196	150	45.72	6	15.24	10	121	36.88			09/14/2006	gravel, open hole		68644	4	4		Private Domestic
86146	18109	157	47.85	6	15.24	8	100	30.48			09/12/2006	gravel and sand, silty, screen set 150.3 to 157 ft, 25 slot		68644	3	4		Private Domestic
86147	18197	187	57.00	6	15.24	10	144	43.89			09/18/2006	sandy gravel, open hole		68644	5	4		Private Domestic
86150	18200	310	94.49	6	15.24	25+	150	45.72			09/11/2006	sand and gravel, screen set 303.3 to 310 ft, 20 slot		68644	2	4		Private Domestic
87054		60	18.29	6	15.24	60 to 100					02/08/2005	sand with gravel, screen set 56 to 60 ft, 12 slot		4194	6	2		Unknown Well Use
88320	18055	56	17.07	6	15.24	10	20	6.10			01/16/2007	boulders and gravel, open hole		68644	47	4		Private Domestic
88322	18049	121	36.88	6	15.24	12	55	16.76			01/05/2007	gravel and sand, open hole		68644	38	4		Private Domestic
90202	18081	96	29.26	6	15.24	10	45	13.72			01/03/2007	sand and gravel, open hole		68644	29	4		Unknown Well Use
90203	18082	127	38.71	6	15.24	10	68	20.73			01/04/2007	gravel, open hole		68644	28	4		Unknown Well Use
90204	18084	118	35.97	6	15.24	8	77	23.47			01/11/2007	sand, little gravel, screen set 111.5 to 118, 12 slot		68644	30	4		Unknown Well Use
90205	18086	59	17.98	6	15.24	10	16	4.88			01/15/2007	gravel, open hole		68644	50	4		Unknown Well Use
90207	18087	59	17.96	6	15.24	10	18	5.49			01/16/2007	coarse gravel, open hole		68644	48	4		Unknown Well Use
90532	18572	138	42.06	6.625	16.83	12					12/21/2006	coarse gravel, open hole		VID83339	34	2		Private Domestic
90536	18570	110	33.53	6.625	16.83	12	55	16.76			12/20/2006	coarse gravel, open hole		VID83339	32	2		Private Domestic
90541	18592	238	72.54	6.625	16.83	30	35	10.67			12/16/2006	gravel, open hole		VID83339	35	2		Private Domestic
90544	18561	146	44.50	6.625	16.83	6	112	34.14			12/09/2006	gravel and sand, open hole		VID83339	40	2		Private Domestic
90545	18580	155	47.24	6.625	16.83	20	110	33.53			12/06/2006	coarse gravel, open hole		VID83339	39	2		Private Domestic
90548	18562	154	46.94	6.625	16.83	19	109	33.22			12/08/2006	gravel and sand, open hole		VID83339	43	2		Private Domestic
90553	18581	150	45.72	6.625	16.83	6	87	26.52			11/14/2006	coarse sand and gravel, screen set 146 to 150, 10 slot		VID83339	22	2		Private Domestic
90554	18596	149	45.42	6.625	16.83	18	78	23.77			11/10/2006	coarse sand and gravel, open hole		VID83339	24	2		Private Domestic
90555	18588	134	40.84	6.625	16.83	8	86	26.21			11/08/2006	coarse sand and gravel, open hole		VID83339	25	2		Private Domestic
90557	18597	142	43.28	6.625	16.83	18	87	26.52			11/02/2006	gravel, coarse sand, open hole		VID83339	11	2		Private Domestic
90558	18596	157	47.85	6.625	16.83	6	117	35.66			10/31/2006	gravel and sand, open hole		VID83339	17	2		Private Domestic
90560	18599	119	36.27	6.625	16.83	4	92	28.04			10/26/2006	gravel and sand, screen set 115 to 119, 20 slot		VID83339	14	2		Private Domestic
90561	18560	70	21.34	6.625	16.83	20					10/25/2006	gravel and sand, screen set 66 to 70, 18 slot		VID83339	13	2		Private Domestic
90628	18579	194	46.94	6.625	16.83	3	112	34.14			12/08/2006	gravel and sand, open hole		VID83339	44	2		Private Domestic
93815	18595	113	34.44	6.625	16.83	6					11/15/2006	gravel and sand		VID83339	27	2		Private Domestic
95648	18153	114	34.75	6	15.24	10	71	21.64			07/19/2006	gravel , open hole		427R, 23675		4		Private Domestic
104168	19818	120	36.58	6.125	15.56	15	98	29.87			04/19/2019	gravel and sand, open hole			26			Private Domestic
112330	34474	300	91.44	6.125	15.56	3			170	51.82	10/29/2014	siltstone, open hole 178.5 to 300 ft		VIP68644	48			Private Domestic
113801	52111	96	29.26	6	15.24	4	77	23.47			10/20/2017	coarse sand with boulders, water-bearing 78 to 96 feet		427 R				Private Domestic
114754	52189	280	85.34	4	10.16	2.5	166	50.60	35	10.67	03/01/2018	gray rock, fracture at 262 feet, perforated liner from 160 to 280 feet		VIP79213	7	4		Private Domestic
118154	53598	114	34.75	6	15.24	10	85	25.91			06/22/2019	gravel, screen set 108 to 114 ft, 40 slot		VIP83894	43	4		Private Domestic

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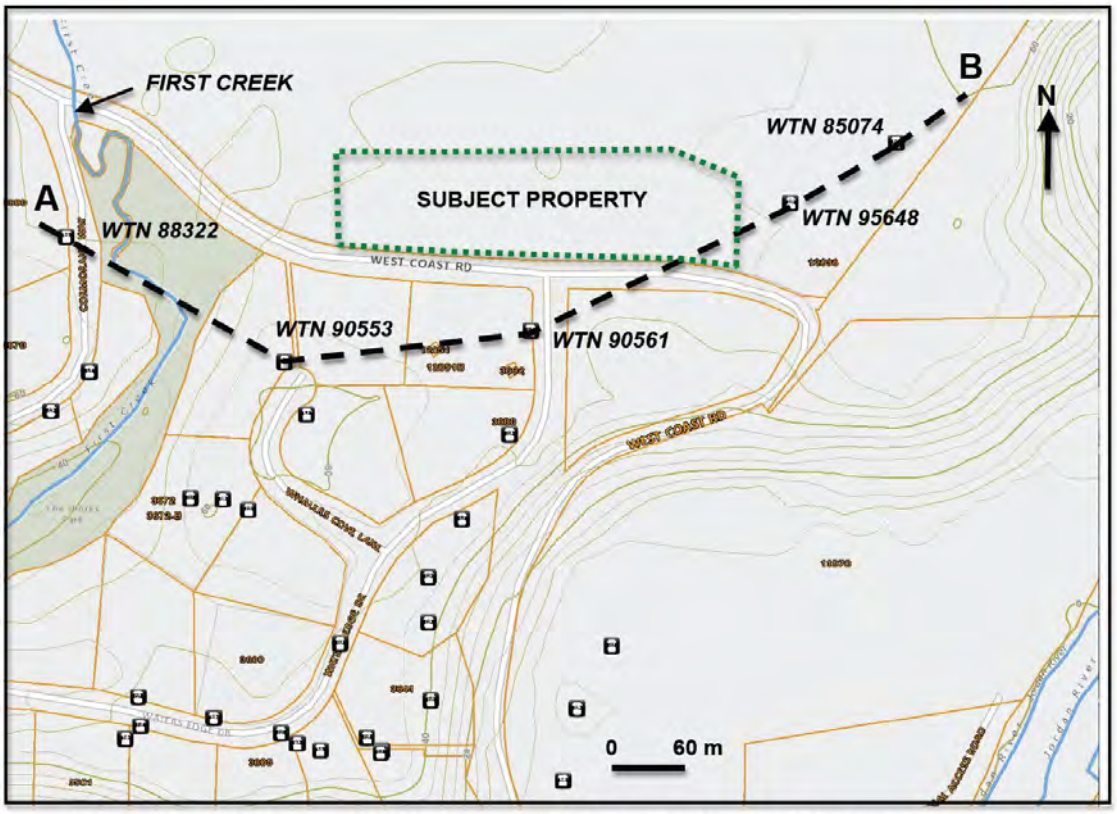

Figure 6. Location of geologic cross section A-B in relation to subject property. Basemap from CRD, 2022a.

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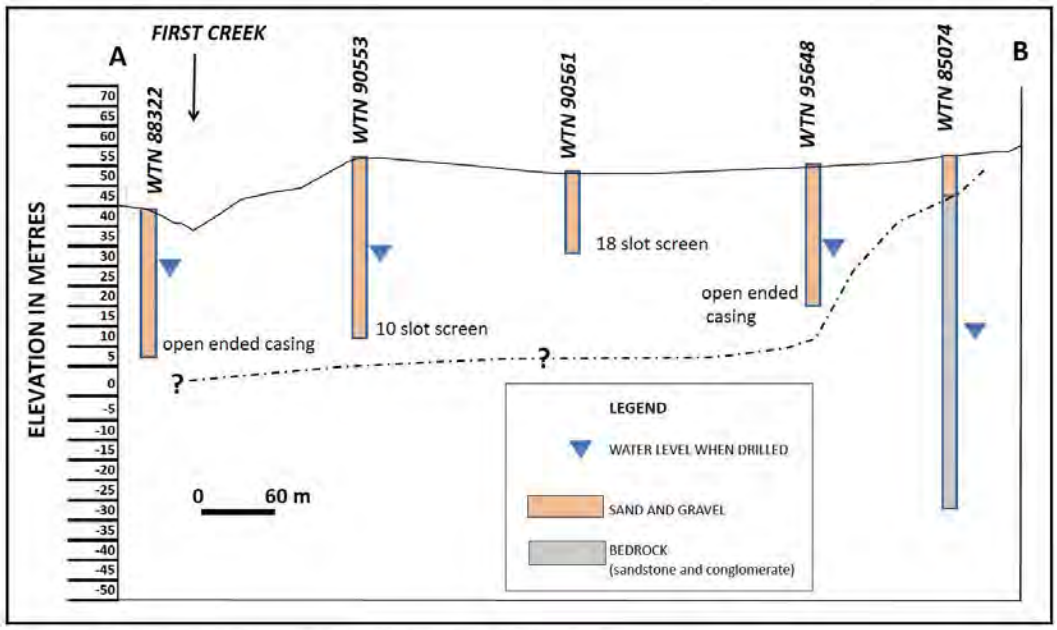

Figure 7. Geologic cross section A-B looking northerly towards subject property.

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On-site waste water disposal may pose some minor risk to the aquifer and would require properly designed and constructed waste water treatment systems to minimize any potential impacts on the groundwater resource and neighbouring wells. Wells would need to be constructed in compliance with the *Groundwater Protection Regulation* under the *Water Sustainability Act*. The presence of glacial till near the surface in some wells and relatively deep water levels ranging from 55 to 87 feet (16.76 to 26.52 m) as shown in Figure 7 would minimize any potential risks of aquifer contamination.

Conclusions

Based on examination of available geological and groundwater information in the vicinity of the Wildwood Terrace Neighbourhood Commercial Zone, the prospects for constructing individual wells on each of the ten proposed land parcels are very encouraging. There may be up to 10 m (32.81 feet) of saturated sand and gravel underlying the site with individual wells potentially yielding 5 to 10 USgpm (18.93 to 37.85 L/min) each.

The maximum total water demand for ten parcels is estimated to not likely exceed 3 to 5 USgpm (11.36 to 18.94 L/min) on a continuous basis. The proposed brewery on the property would likely be the largest user of water initially at 350,000 L/year (959 L/day) increasing to 2,000,00 L/year (5480 L/day) after 5 years. It is unlikely that groundwater use at a continuous rate up to 3 to 5 USgpm (11.36 to 18.94 L/min) would have any significant effect on neighbouring wells or the flows of First Creek.

On-site waste water disposal may pose some minor risk to the aquifer and would require properly designed and constructed waste water treatment systems to minimize any potential impacts on the groundwater resource and neighbouring wells. The presence of glacial till near the surface and relatively deep water levels ranging from 55 to 87 feet (16.76 to 26.52 m) would also minimize potential risks of aquifer contamination.

Recommendations

The following recommendations are provided for consideration:

1. Proceed with the design and construction of a water supply well for the proposed brewery and pump test the well to evaluate the aquifer parameters and to support a water licence application.

2. Monitor water levels in a neighbouring well during the pump testing of the proposed brewery well and sample the brewery well for laboratory water quality analysis.

3. Develop a *Well Protection Plan* for the brewery well to minimize any potential risks to water quantity depletion or water quality degradation.

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Closure

This report was prepared in accordance with generally accepted engineering, hydrogeological and consulting practices. It is intended for the prime use by Totangi Properties in connection with its purpose as outlined under the scope of work for this project. This report is based on data and information available to the author from various sources at the time of its preparation and the findings of this report may therefore be subject to revision. Data and information supplied by others has not been independently confirmed or verified to be correct or accurate in all cases. The author retains full copyright of the material contained in this report. The author and Hy-Geo Consulting accepts no responsibility for damages suffered by any third party as a result of any unauthorized use of this report. Any errors, omissions or issues requiring clarification should be brought to the attention of the author.

Respectfully submitted,

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References

Bernardinucci J. and K. Ronneseth. 2002. *Guide to Using the BC Aquifer Classification Maps for the Protection and Management of Groundwater*. BC Ministry of Water, Land and Air Protection, Water Air and Climate Change Branch, Water Protection Section.

CRD. 2021. *Capital Regional District, Bylaw No. 4381.* Capital Regional District, Victoria, British Columbia.

CRD. 2022a. *Capital Regional District, Bylaw No. 2040, Juan de Fuca Land Use Bylaw, 1992.* Capital Regional District, Victoria, British Columbia. Internet website https://www.crd.bc.ca/about/document-library/Documents/bylaws/juandefucaelectoralarea

CRD. 2022b. *CRD Regional Map*. Internet website https://maps.crd.bc.ca/Html5Viewer/?viewer=public

Government of Canada. 2023. *Canadian Climate Normals*. 1981-2010 Climate Normals & Averages. Internet website https://climate.weather.gc.ca/climate_normals/index_e.html

Massey, N.W.D. 1994. *Geological Compilation, Vancouver Island, British Columbia (NTS 92 B, C, E, F, G, K, L, 102 I) (1:250,000)*. Map. Victoria, BC: B.C. Ministry of Energy, Mines and Petroleum Resources, Open File 1994-6, digital files and legend.

Province of British Columbia. 2022a. *British Columbia Water Resources Atlas*. Internet website: https://maps.gov.bc.ca/ess/hm/wrbc/

Province of British Columbia. 2022b. *Groundwater Wells and Aquifers*. Internet website: https://apps.nrs.gov.bc.ca/gwells/

Todd, J., M. Wei, M. Lepitre, 2016. *Guidance for Technical Assessment Requirements in Support of an Application for Groundwater Use in British Columbia, Version 1*. Water Science Series, WSS2016-08. Prov. B.C., Victoria B.C.

Todd, J., M. Lepitre, D. Thomson, J.A. Ishikawa, M. Wade, C. Beebe, 2020. *Guidance for Technical Assessments in Support of an Application for Groundwater Use in British Columbia, Version 2*. Water Science Series 2020-01, Province of British Columbia, Victoria. https://a100.gov.bc.ca/pub/acat/public/viewReport.do?reportId=50847

Totangi Properties. 2022. *Jordan River wells*. E-mail dated July 14, 2022 from [redacted].

Totangi Properties. 2023. *Draft Jordan River Groundwater Assessment*. E-mail dated January 28, 2023 from [redacted].

Yorath, C.J. and Nasmith, H.W. 1995. *The geology of Southern Vancouver Island – A field guide*. Victoria, BC: Orca Book Publishers.