8 Groundwater Resources

Groundwater Resources was selected as a valued component (VC) because of its importance to ecosystem function, potential Project-related interactions and provisions of the Newfoundland and Labrador (NL) *Water Resources Act*. Groundwater resources are critical for maintaining baseflow to streams for ecological habitat, and for supplying fresh water for human and industrial / commercial uses. Activities associated with the construction, operation, rehabilitation, and closure of the Project could influence groundwater quality and quantity, which in turn may influence surface water and fish habitat. For this assessment, the Groundwater Resources VC is defined as the value and function of groundwater resources in maintaining baseflow to streams for ecological habitat, and in supplying fresh water for human and industrial / commercial uses.

The federal guidelines for potable water, Guidelines for Canadian Drinking Water Quality (GCDWQ; Health Canada 2025), are applicable as aesthetic and health-based guidelines for a variety of chemical parameters for potable water sources at the site (e.g., administration and safety offices). The *Metal and Diamond Mining Effluent Regulations* (MDMER), pursuant to the federal *Fisheries Act,* set out the maximum allowable limits for concentrations of specific metals and compounds in discharge resulting from the Project. MDMER also requires extensive environmental effects monitoring criteria to be implemented during the operational phase of a project. Provincially, the *Water Resources Act* gives Water Resource Management Division of the NL Department of Environment, Conservation and Climate Change (NLDECCC) the responsibility and legislative power for the management of water resources in NL. The *Environmental Control Water and Sewer Regulations*, under the provincial *Water Resources Act*, which incorporate the limits imposed by the MDMER, will also apply to discharge of water and effluent from the Project.

As shown on Figure 8.1, Project spatial boundaries for Groundwater Resources include the Project Area and the Local Assessment Area (LAA), which is based on the surface watersheds that represent the possible extent of drawdown dewatering of the mine workings, and changes to flow or groundwater quality due to recharge from the waste rock storage facility (WRSF). The Regional Assessment Area (RAA) is the same as the LAA because the aquifers that interact with the Project are limited in extent due to groundwater flow divides coinciding with surface water sub-watershed boundaries. The LAA and RAA are therefore considered together as the LAA/RAA in the remainder of the assessment.

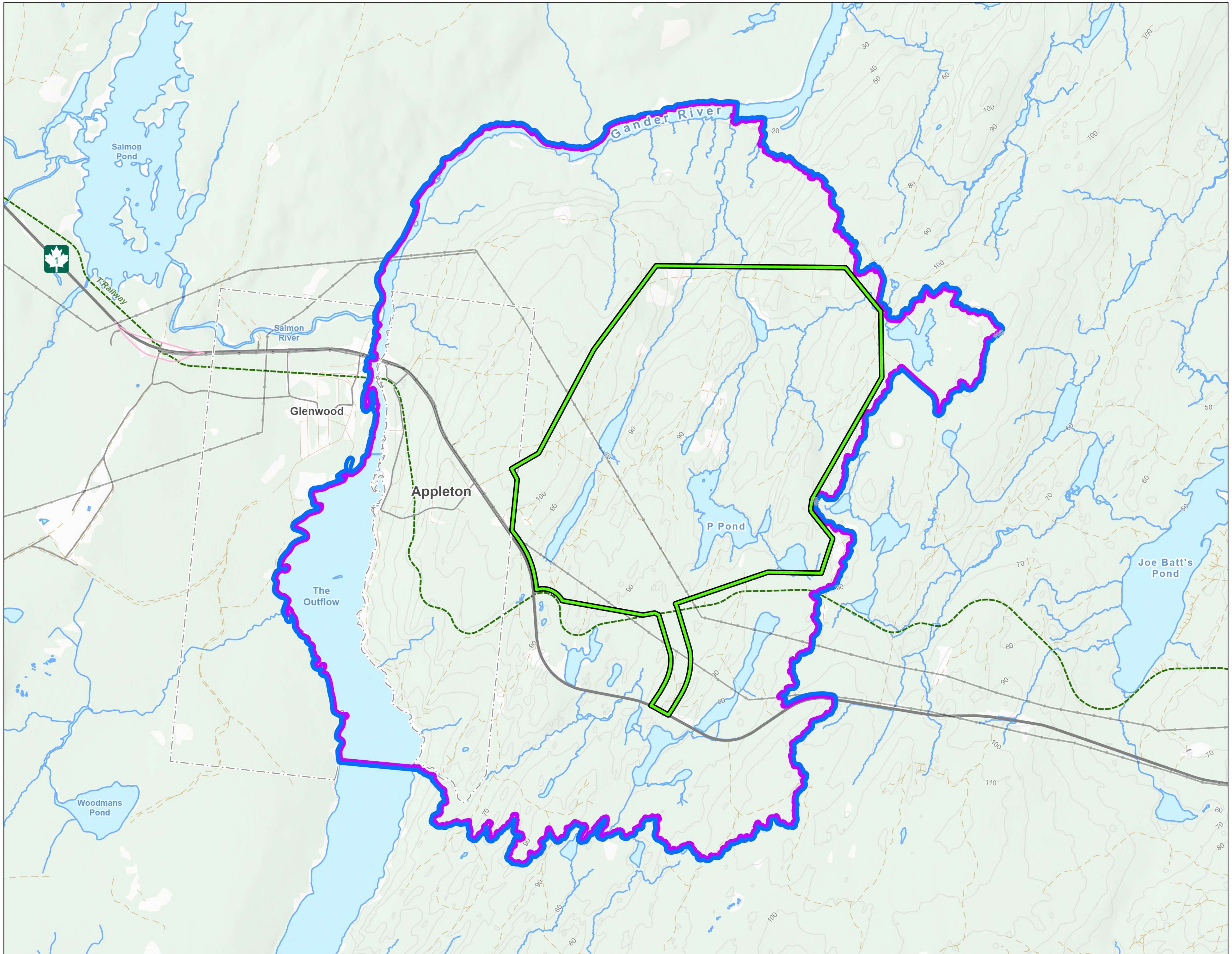


Figure No.
8.1

Title
Groundwater Resources Spatial Boundaries

Client/Project 121418510_400

New Found Gold Corp.
Queensway Gold Project

Project Location
North Gander Lake
Newfoundland and Labrador

Prepared by NW on 2025-11-14
Revised by NW on 2026-03-23
TR by AF on 2026-03-18

N

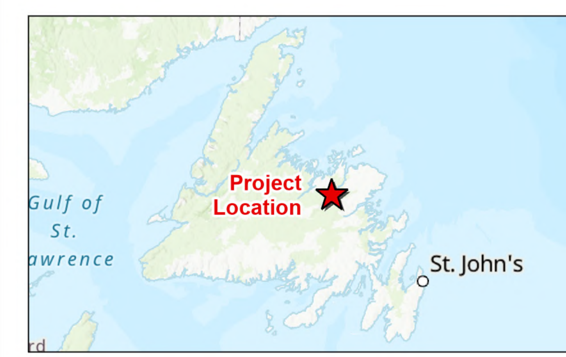
0 250 500 1,000 m
(At original document size of 11x17)
1:40,000

Project Area
Local Assessment Area
Regional Assessment Area

Watersheds and Waterways
Watercourse
Waterbody

Existing Infrastructure
Transmission Line
Highway
Collector
Local / Street
Ramp
Resource Road / Trail
NL T'Railway Provincial Park

Other Features
Contour (10 m)
Municipal Boundaries



Notes
1. Coordinate System: NAD 1983 CSRS MTM 2
2. Data Sources: New Found Gold Corp.; Stantec; Government of Newfoundland and Labrador, Department of Environment, Conservation and Climate Change, Department of Forestry, Agriculture and Lands - Land Use Atlas Mapping Service, Department of Municipal and Community Affairs; National Road Network, Statistics Canada.
3. Background: Government of Newfoundland and Labrador, Department of Forestry, Agriculture and Lands - Land Use Atlas Mapping. Esri, NASA, NGA, USGS, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community, Esri, USGS

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A significant residual adverse effect on Groundwater Resources for the Project is defined as any of the following:

- Decrease in the yield from an existing and otherwise adequate groundwater supply well within the LAA/RAA to the point where it is inadequate for its intended use
- Change in groundwater quality, such that the quality of groundwater from an otherwise adequate water supply well within the LAA/RAA that meets applicable guidelines deteriorates to the point where it becomes non-potable or cannot meet the GCDWQ (Health Canada 2025) for a consecutive period exceeding 30 days
- Physical or chemical alteration to an aquifer within the LAA/RAA to the extent that interaction with local surface water results in streamflow or surface water chemistry changes that adversely affect aquatic life or a down-stream surface water supply

8.1 Existing Conditions

8.1.1 Approach and Methods

Information regarding existing conditions of groundwater resources in the Project Area are derived from data collected between 2021 and 2025 for the baseline characterization studies in support of Project development. Existing publicly available regional hydrogeological information from 2023 through to 2025 was also referenced.

The following data and reports were reviewed to characterize existing conditions for groundwater resources for the Project:

- Preliminary Baseline Hydrogeology Study of New Found Gold Corp. Queensway North Project (GEMTEC 2023)
- 2023 Baseline Geotechnical and Hydrogeological Studies, Queensway North Project (GEMTEC 2024)
- 2024 Groundwater Monitoring Program (Stantec 2025)
- Queensway Gold Project – Groundwater Modelling Report (Appendix 8.A)

Additional information used in support of baseline water resource characterization was derived from:

- Geological / hydrogeological mapping information from Geoscience Online Atlas (Newfoundland and Labrador Department of Energy and Mines 2013)
- Drilled Water Well Database (NLDECCC 2025)
- Canadian Climate Normals (Environment and Climate Change Canada [ECCC] 2025)
- Hydrogeology of Central Newfoundland (AMEC 2013)

Historical information and groundwater data were used to characterize baseline groundwater conditions to assess potential changes in groundwater quantity and quality through pathways described in Section 8.2. Physiographic setting, water levels, groundwater chemistry, hydraulic properties, groundwater flow direction, and groundwater users were considered to develop an understanding of how groundwater may interact with the Project, and how the Project may in turn interact with the natural hydrogeological-hydrologic cycle.

Current groundwater data is being collected in accordance with an ongoing monitoring program that began in July 2023. Twenty-one new monitoring wells, including five sets of paired monitoring wells (i.e., a shallow and a deep monitoring well), were installed throughout the LAA/RAA between July 2023 and October 2025. The monitoring wells were strategically placed near proposed workings to be used for long-term monitoring. Monitoring wells 23MW-01 and 23MW-05 are located outside the boundary of the LAA/RAA, to the northeast and east of the boundary, respectively. Further information on well construction and sampling methods and well locations is provided in Section 8.1.2.2.1. Measurements of groundwater levels and groundwater samples for chemical analysis have been collected on a near quarterly basis from July 2023 to December 2025 and will proceed on a quarterly basis. Project-specific baseline reports will be provided to applicable regulators pre-construction. A summary of the baseline information collected to date is provided in Section 8.1.2.

8.1.2 Description of Existing Conditions

8.1.2.1 Physiographic Setting

An overview of the data and analysis used to characterize the existing conditions for the groundwater environment include climate, detailed in Section 7.1.3.1, and surficial geology, bedrock geology, and regional hydrogeology, which are provided below.

8.1.2.1.1 Topography

The site is characterized by broad, northeast-trending ridges separated by valleys containing linear bogs, brooks, and ponds/lakes, which also follow a northeast alignment. Based on a review of topographic maps for the area, elevations in the Project Area range from approximately 25 metres above sea level (masl) near the Gander River on the western portion of the site to approximately 120 masl south of the Trans-Canada Highway (TCH), on the southern portion of the site, and approximately 2.5 kilometres (km) west of Joe Batts Pond (north of the TCH) (Figure 8.1).

8.1.2.1.2 Surficial Geology

Based on a review of surficial geology maps (Liverman and Taylor 1990; Batterson 2000; Scott and Taylor 2012), the LAA/RAA generally consists of bedrock concealed by vegetation in areas along the north coast of Gander Lake, glacial till veneers, lineated glacial tills, areas of poorly drained accumulations of organic matter (i.e., bogs), and glaciofluvial sand and gravel in areas along Joe Batts Pond and the outflow of Gander River. Surficial geology is shown in Figure 8.2.

Using a subset of borehole logs for the Project (GEMTEC 2024; Stantec 2025), the thickness of soil, which includes both mineral and organic soils, ranged from 0.1 m to 32 m.

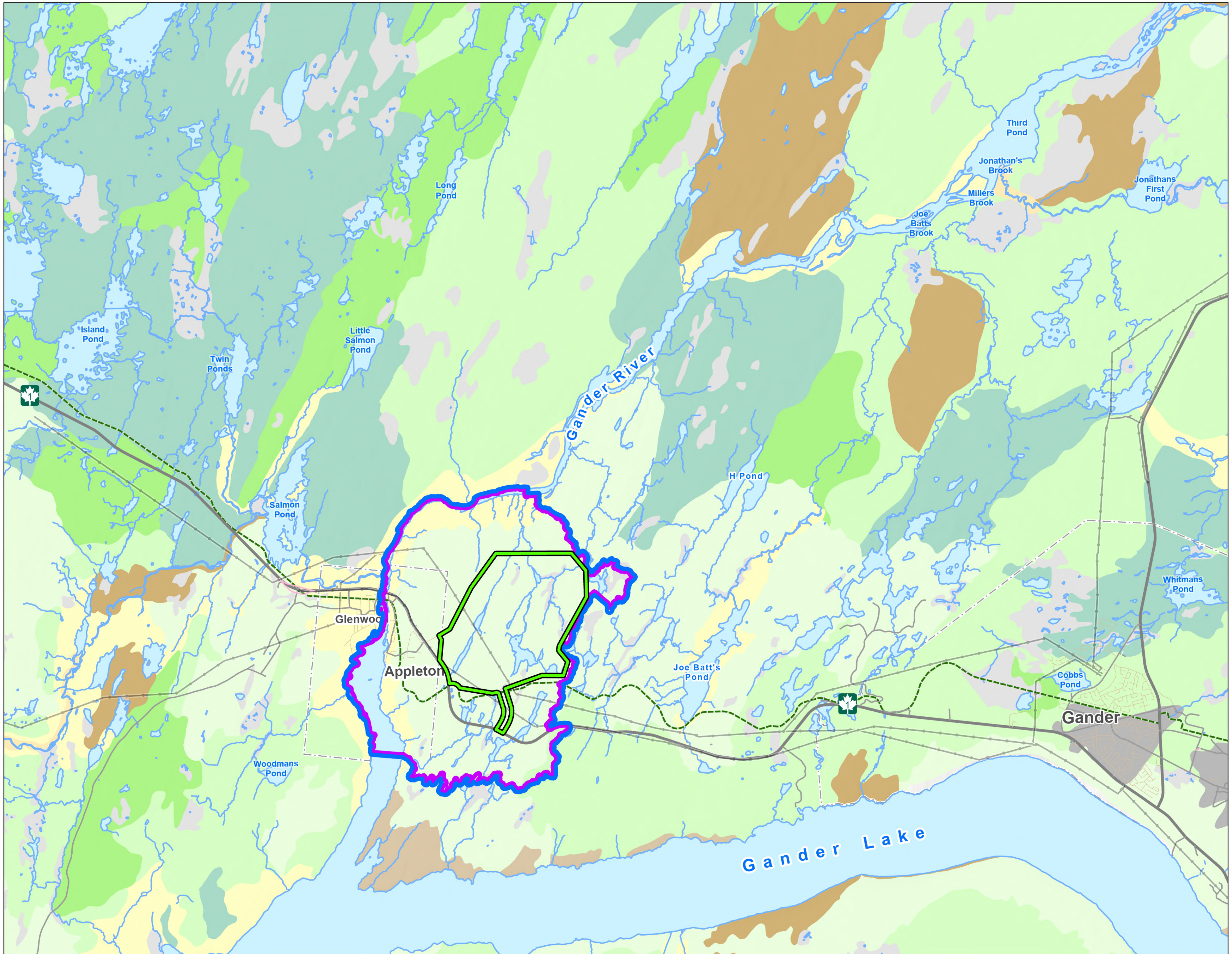


Figure No.
8.2

Title
Surficial Geology

Client/Project 121418510_414

New Found Gold Corp.
Queensway Gold Project
Groundwater Modelling

Project Location
North Gander Lake,
Newfoundland and Labrador

Prepared by AC on 2024-12-12
Revised by RT on 2026-01-30
TR by AF on 2026-03-17

N

0 1 2 4 km

(At original document size of 11x17)
1:100,000

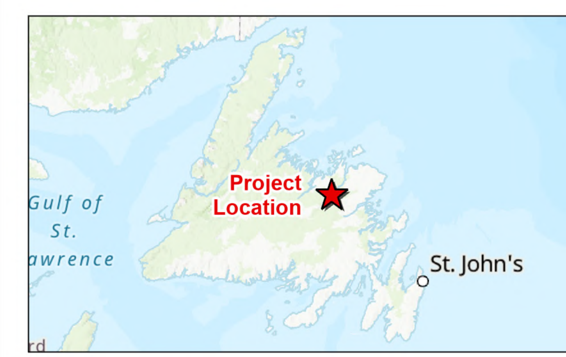
- Project Area
- Local Assessment Area
- Regional Assessment Area

Surficial Geology
- Municipality
- Organics
- Fluvial
- Glaciofluvial
- Rock
- Rock Concealed
- Till Veneer
- Thick Till
- Lineated Till
- Hummocky Till

Existing Infrastructure
- Transmission Line
- Highway
- Collector
- Local / Street
- Local / Unknown
- Ramp
- NL T'Railway Provincial Park

Administrative Boundaries
- Municipal Boundary

Wetlands and Waterways
- Watercourse
- Waterbody



Notes
1. Coordinate System: NAD 1983 CSRS UTM Zone 21N
2. Data Sources: New Found Gold Corp.; Stantec.
3. Background: Government of Newfoundland and Labrador, Department of Energy and Mines - Geosciences Atlas; Department of Environment, Conservation, and Climate Change; Department of Forestry, Agriculture and Lands - Land Use Atlas Mapping Service; Department of Municipal and Community Affairs; Additional topographic basemapping from Esri, NASA, NGA, USGS, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community, Esri, USGS

Stantec

8.1.2.1.3 Bedrock Geology

Below the overburden, bedrock of the LAA/RAA generally consists of mudstones, siltstones, and sandstones of the Davidsville Group that is located within the Exploits subzone of the Dunnage technostratigraphic zone (Blackwood 1982; Currie 1995). The Davidsville Group is subdivided into the Outflow and Hunt's Cove Formations. The Outflow Formation is described as sandstone interbedded with siltstone and shale (Currie 1995). Within the LAA/RAA, this formation is mapped along the eastern side of the Gander River that discharges to Gander Lake. Overlying the Outflow Formation, the Hunt's Cove Formation is described as thinly bedded rhythmites of siltstone and mudstone and mudstone and shale (Currie 1995). This formation comprises a majority of the LAA/RAA.

The Davidsville Group is separated from the Indian Island Group by a fault system known as the Dog Bay Line, which is located to the west of Gander River (Currie 1995). Two prominent northeast-striking fault zones traverse the LAA/RAA: the Appleton Fault Zone and the Joe Batt's Pond Fault Zone. These two fault zones are the major gold-bearing geological structures for the Project (GEMTEC 2024).

Bedrock geology is shown in Figure 8.3.

8.1.2.1.4 Regional Hydrogeology

Regional hydrogeological data was obtained from Hydrogeology of Central Newfoundland (AMEC 2013). The Project Area is located in Hydrostratigraphic Unit 2, which consists of siltstone, conglomerate, argillite, greywacke, with minor volcanic flows and tuff. Yields of wells drilled in Unit 2 are typically low to moderate, ranging from 0.1 litres per minute (L/min) to 491 L/min, with a median sustainable pumping rate of 7 L/min.

On the regional scale, groundwater recharge areas are expected at higher elevations, while discharge is anticipated in the lower elevations, corresponding to surface water features. Given the thickness of the overburden, described in Section 8.1.2.1.2, the regional groundwater flow mechanism is expected to occur through both the overburden aquifer, where flow occurs through pore spaces between gravel, sand, silt, clay, and organic grains of material, and the bedrock aquifer, which is expected to occur mainly through secondary openings, such as fractures and joints, and will vary depending on the frequency and interconnection of these structures. Due to the fault zones located within the LAA/RAA, fault gouge may occur in the bedrock resulting in low hydraulic conductivity. However, if fault gouge is removed or washed out, the resulting open fractures can lead to higher hydraulic conductivity in these zones. Since many of the zones with fault gouge are near vertical in orientation, the effects on hydraulic conductivity may be localized and short-lived. The regional hydrogeology is shown in Figure 8.4.

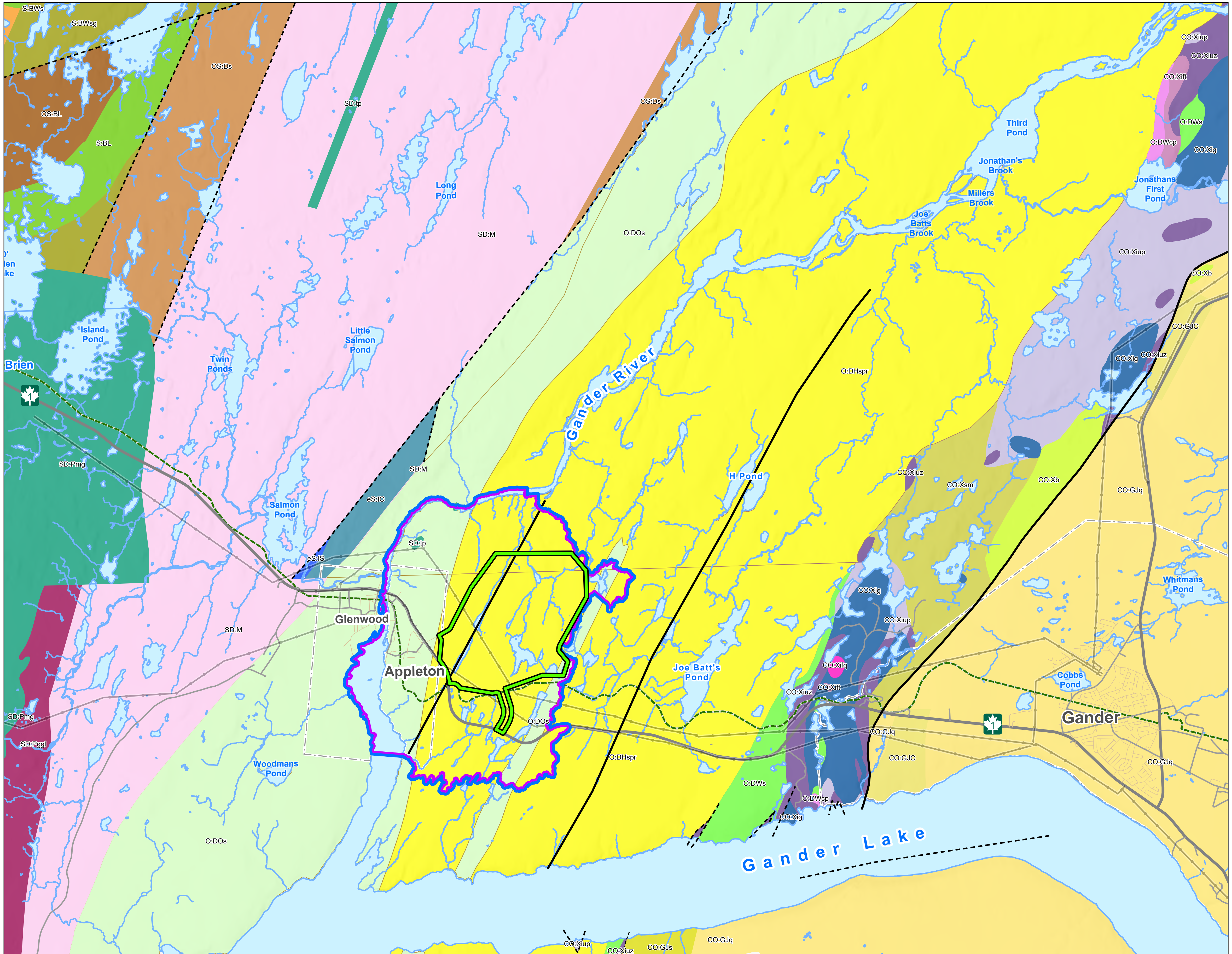


Figure No.
8.3

Title
Bedrock Geology

Client/Project 121418510_415
New Found Gold Corp.
Queensway Gold Project
Groundwater Modelling

Project Location
North Gander Lake,
Newfoundland and Labrador

Prepared by AC on 2024-12-12
Revised by RT on 2026-01-30
TR by AF on 2026-03-18

N

0 1 2 4 km
(At original document size of 11x17)
1:100,000

Project Area
Local Assessment Area
Regional Assessment Area

Bedrock Geology

Fault, defined
Fault, approximate
Fault, assumed
Thrust, approximate (barbs on the upthrust side)
Thrust, assumed (barbs on the upthrust side)

Jonathan's Pond Formation
CO:GJC
CO:GJq
CO:GJs

Gander River Complex
CO:Xb
CO:Xifq
CO:Xift
CO:Xig
CO:Xiup
CO:Xiuz
CO:Xsm

Hunts Cove Formation
O:DHspr

Outflow Formation
O:DOs

Weir's Pond Formation
O:DWcp
O:DWs

Lewisporte Conglomerate
OS:BL

Duder Group
OS:Ds

Lawrenceton Formation
S:BL

Wigwam Formation
S:BWs
S:BWsg

Ten Mile Lake Formation
SD:M

Mount Peyton Intrusive Suite
SD:Pggl
SD:Pmg
SD:tp

Charles Cove Formation
eS:IC

Seal Island Formation
eS:IS

Existing Infrastructure

Transmission Line
Highway
Collector
Local / Street
NL T'Railway Provincial Park

Wetlands and Waterways

Watercourse
Waterbody

Administrative Boundaries

Municipal Boundary

Notes
1. Coordinate System: NAD 1983 CSRS UTM Zone 21N
2. Data Sources: New Found Gold Corp.; Stantec.
3. Background: Government of Newfoundland and Labrador, Department of Energy and Mines - Geosciences Atlas; Department of Environment, Conservation, and Climate Change; Department of Forestry, Agriculture and Lands - Land Use Atlas Mapping Service; Department of Municipal and Community Affairs; Additional topographic basemapping from Esri, NASA, NGA, USGS, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community, Esri, USGS

Figure No.
8.4

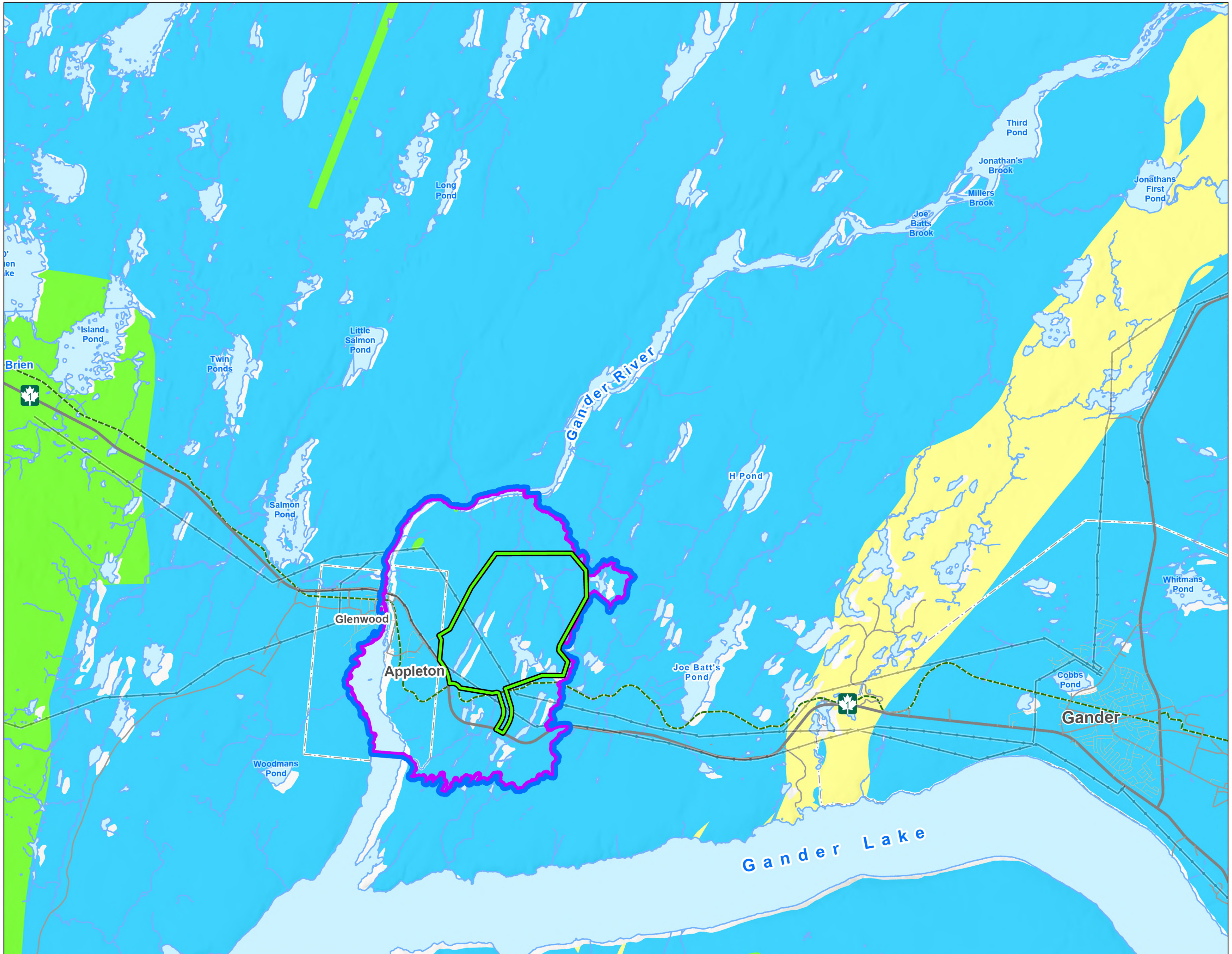
Title
Regional Hydrogeology

Client/Project — 121418510_416

New Found Gold Corp.
Queensway Gold Project
Groundwater Modelling

Project Location
North Gander Lake,
Newfoundland and Labrador

Prepared by AC on 2026-03-11
QR by NW on 2026-03-12
TR by AF on 2026-03-18



N

0 1 2 4 km
(At original document size of 11x17)
1:100,000

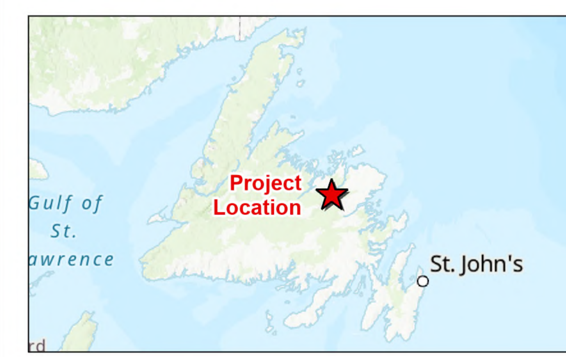
- Project Area
- Local Assessment Area
- Regional Assessment Area

Hydrogeological Unit
- Unit 2 - Moderate Yield Sedimentary Rocks
- Unit 4 - Low Yield Igneous Rocks
- Unit 5 - Low to Moderate Yield Igneous Rocks

Existing Infrastructure
- Transmission Line
- Highway
- Collector
- Local / Street
- NL T'Railway Provincial Park

Wetlands and Waterways
- Watercourse
- Waterbody

Administrative Boundaries
- Municipal Boundary



Notes
1. Coordinate System: NAD 1983 CSRS UTM Zone 21N
2. Data Sources: Stantec; Government of Newfoundland and Labrador, Department of Environment, Conservation and Climate Change - Water Resources Portal.
3. Background: Government of Newfoundland and Labrador, Department of Environment, Conservation, and Climate Change; Department of Forestry, Agriculture and Lands - Land Use Atlas Mapping Service; Department of Municipal and Community Affairs; Additional topographic basemapping from Esri, NASA, NGA, USGS, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community, Esri, USGS

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Based on the NLDECCC Drilled Water Well Database, there are 12 drilled water wells within the LAA/ RAA (NLDECCC 2025) that may be used as potable water sources for residences and/or cabins. The wells were drilled between 1966 and 1981 to depths ranging from 30.5 m below ground surface (mbgs) to 76.2 mbgs and the reported yield from airlift tests ranged from 2.3 to 10.5 L/min. Table 8.1 summarizes the construction details of the drilled wells within the LAA/RAA.

Table 8.1 Well Construction Details for Existing Water Wells within the LAA/RAA

Well ID	Coordinates		Static Water Level (m)	Well Depth (m)	Casing Length (m)	Date Drilled (mm/dd/yyyy)	Yield (L/min)
	Lat (DD)	Long (DD)					
6805	48.9831	-54.8669	4	-	-	-	2.3
6806	48.9831	-54.8669	4	51.2	-	-	10.5
6807	48.9831	-54.8669	2	-	-	-	9.1
6808	48.9831	-54.8669	-	42.7	-	05/15/1966	-
6809	48.9831	-54.8669	-	30.5	-	06/15/1966	-
6810	48.9831	-54.8669	-	51.8	-	06/15/1966	-
6811	48.9831	-54.8669	2	-	-	-	4.5
6812	48.9831	-54.8669	15	76.2	6.7	08/15/1977	2.3
6813	48.9831	-54.8669	-	32	9.4	06/15/1978	4.5
6814	48.9831	-54.8669	-	32	3.7	06/01/1981	2.3
6815	48.9831	-54.8669	-	39.6	-	11/23/1978	-
6816	48.9831	-54.8669	-	33.5	-	11/23/1978	-

Notes:
"-" no data available
DD – decimal degrees; m – metre(s); L/min – litre(s) per minute
Source: NLDECCC (2025)

One private drilled water well, located in Appleton, NL, participated in the pre-construction water survey program for the Project. A water sample was collected from this well and results for parameters analyzed were in compliance with the GCDWQ (Health Canada 2025).

8.1.2.2 Groundwater Monitoring Network

8.1.2.2.1 Borehole and Monitoring Well Summary

A total of 21 monitoring wells comprise the groundwater monitoring network for the Project. Ten monitoring wells (23MW-01 to 23MW-09) were constructed in 2023; four monitoring wells (23MW-10 to 23MW-12S/D) were constructed in 2024 (GEMTEC 2024); and seven monitoring wells (25-MW01S/D to 25MW-03S/D and 25MW-08D) were constructed in 2025. Monitoring well locations were selected in consultation with New Found Gold and were installed throughout the LAA/RAA. Locations were selected based on the spatial coverage of the LAA/RAA, with two locations situated outside of the LAA/RAA to monitor background locations. Monitoring well locations are shown in Figure 8.5 and partial construction details are presented in Table 8.2.

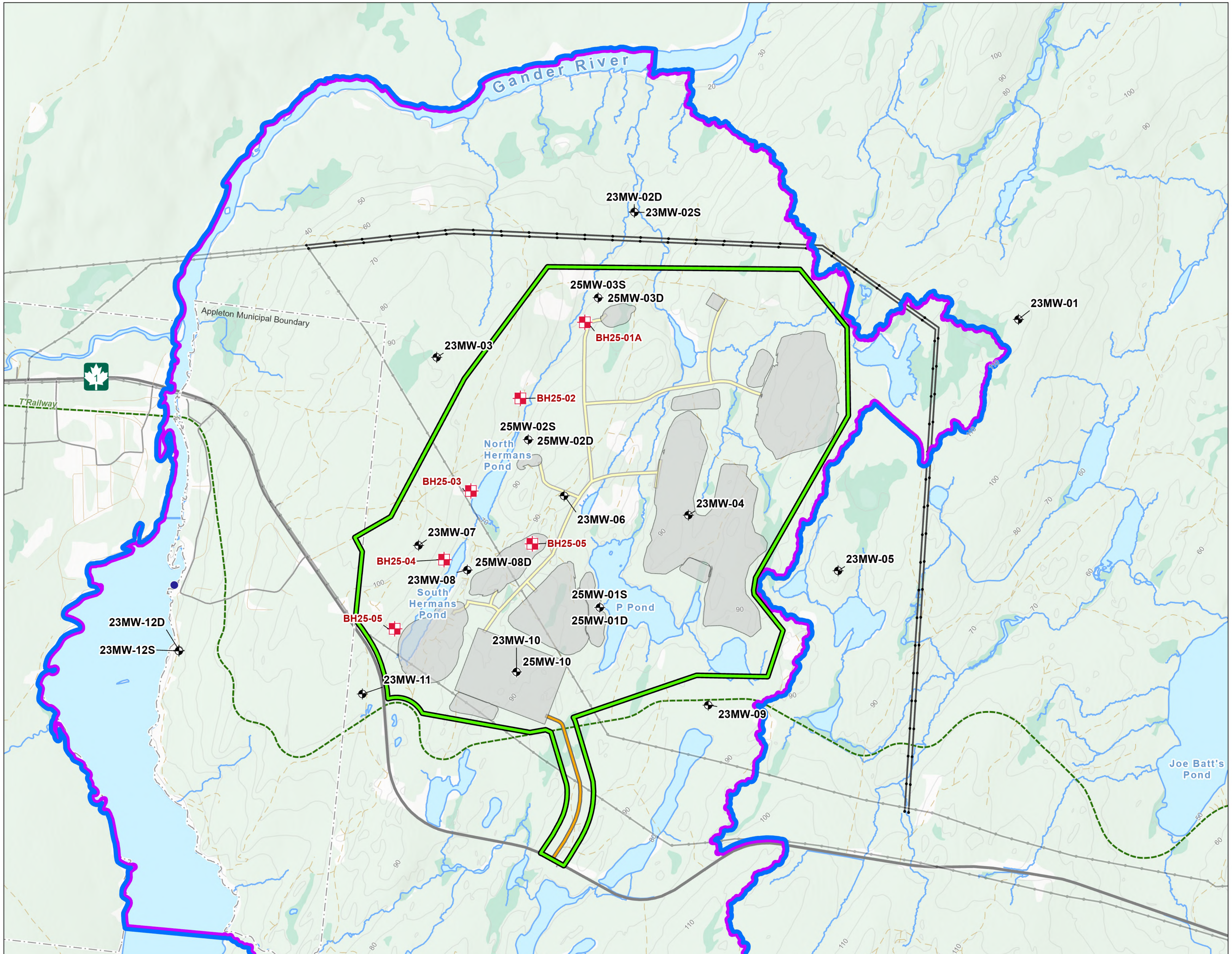


Figure No.

8.5

Title

Groundwater Monitoring Well Locations, Borehole Locations, and Existing Well Users

Client/Project 121418510_412

New Found Gold Corp.
Queensway Gold Project
Groundwater Modelling

Project Location
North Gander Lake
Newfoundland and Labrador

Prepared by NW on 2026-01-02
Revised by AC on 2026-03-23
TR by AF on 2023-03-18

N

0 250 500 1,000 m
(At original document size of 11x17)
1:30,000

- Project Area
- Local Assessment Area
- Regional Assessment Area
- Well Location (Existing users, 12 different wells)

Monitoring Well and Borehole Locations

- Monitoring Well
- Borehole

Proposed Project Layout

- Haul Road
- Access Road
- Proposed Site Features

Existing Infrastructure

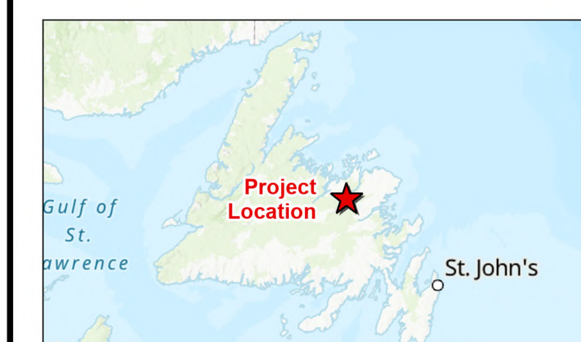
- Transmission Line
- Proposed Transmission Line (Re-routing)
- Highway
- Collector
- Local / Street
- Resource Road / Trail
- NL T'Railway Provincial Park

Wetlands and Waterways

- Watercourse
- Waterbody
- Wetland

Other Features

- Contour (10 m)
- Municipal Boundaries



Notes

1. Coordinate System: NAD 1983 CSRS MTM 2
2. Data Sources: New Found Gold Corp.; Stantec; Government of Newfoundland and Labrador, Department of Environment, Conservation and Climate Change, Department of Forestry, Agriculture and Lands - Land Use Atlas Mapping Service, Department of Municipal and Community Affairs; National Road Network, Statistics Canada.
3. Background: Government of Newfoundland and Labrador, Department of Forestry, Agriculture and Lands - Land Use Atlas Mapping. Esri, NASA, NGA, USGS, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community, Esri, USGS

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Table 8.2 Partial Well Construction Details, Groundwater Monitoring Wells

Monitoring Well ID	Coordinates		Date Drilled (mm/dd/yyyy)	Monitoring Well Depth (mbgs)	Depth to Bedrock (mbgs)	Stickup Length (m)	Surface Elevation (masl)	Screen Interval (mbgs)		Screened Lithology
	Easting (m)	Northing (m)						From	To	
23MW-01	662450.12	5429865.74	06/21/2023	7.77	0.51	0.94	114.32	4.57	7.62	Bedrock
23MW-02S	659522.98	5430640.14	06/18/2023	3.96	-	0.73	36.95	1.22	2.74	Till
23MW-02D	659521.32	5430643.14	06/17/2023	30.2	5.79	0.72	36.84	28.35	29.87	Bedrock
23MW-03	658036.27	5429519.54	06/19/2023	10.57	4.22	0.77	88.66	2.13	3.66	Till
23MW-04	659962.70	5428346.44	06/21/2023	9.27	3.35	0.87	86.54	6.22	9.27	Bedrock
23MW-05	661105.83	5427939.03	06/20/2023	6.07	0.15	0.96	100.95	2.74	5.79	Bedrock
23MW-06	659017.70	5428480.44	06/17/2023	7.75	3.02	0.83	93.85	4.57	7.62	Bedrock
23MW-07	657916.68	5428089.09	06/15/2023	11.56	1.98	0.86	98.85	3.66	6.71	Bedrock
23MW-08	658290.61	5427907.55	06/15/2023	15.16	10.67	0.83	78.56	5.79	8.84	Till
23MW-09	660133.01	5426906.52	06/20/2023	10.77	5.36	0.78	83.89	2.74	4.27	Till
23MW-10	658672.90	5427138.23	02/01/2024	7.67	0.00	0.84	102.57	4.57	7.62	Bedrock
23MW-11	657505.57	5426956.16	01/29/2024	8.63	5.64	0.78	84.37	2.74	4.27	Till
23MW-12S	656107.42	5427264.77	01/27/2024	6.15	2.74	0.87	33.32	4.57	6.1	Bedrock
23MW-12D	656107.89	5427269.67	01/25/2024	30.00	2.39	0.84	33.28	28.35	29.87	Bedrock
25MW-01S	659297.20	5427636.00	09/26/2025	9.32	1.2	0.76	79.691	4.6	7.6	Bedrock
25MW-01D	659297.50	5427634.00	09/26/2025	30.33	1.2	0.87	79.772	24.4	30.3	Bedrock
25MW-02S	658735.20	5428902.00	10/01/2025	6.43	1.2	0.6	76.759	3.4	6.4	Bedrock
25MW-02D	658735.60	5428900.00	09/30/2025	30.45	2.0	0.46	76.653	24.4	30.4	Bedrock
25MW-03S	659257.70	5429986.00	10/04/2025	7.77	1.8	0.84	50.681	3.2	7.8	Bedrock
25MW-03D	659259.70	5429986.00	10/04/2025	28.85	1.6	0.82	50.791	19.8	25.9	Bedrock
25MW-08D	658290.60	5427910.00	09/28/2025	27.3	10.8	0.69	79.366	21.3	27.3	Bedrock

Notes:
"-" – No data available
mbgs – metre(s) below ground surface
masl – metre(s) above sea level

Monitoring wells were constructed by drilling boreholes using a track mounted geotechnical drilling rig capable of augering soils and coring bedrock, which was operated by Logan Geotech of Stewiacke, Nova Scotia. Bedrock drilling was completed using HW/HQ 100-millimetre (mm) diameter diamond drilling coring equipment.

Up to two soil samples were collected using the split spoon method from each borehole. Rock core was placed in wooden core boxes, which were labelled and photographed in the field. Rock quality designation (RQD) and the number of observed fractures were logged in the field.

Following drilling, monitoring wells were installed in the boreholes. The monitoring wells consisted of 50 mm diameter, flush-threaded, Schedule 40 polyvinyl chloride casing and No. 10 slot screen. The screened section was 3.0 m long and placed in bedrock below the water table. Silica sand was placed around the screened section to inhibit silt intrusion into the well and facilitate well development. A bentonite seal was placed above the sand pack in each well, followed by backfill sand and gravel to the surface. A standard steel stick-up well cover was installed at each monitoring well location.

GEMTEC (in 2023 and 2024) and Stantec (in 2025) personnel observed drilling and monitoring well installation activities, maintained detailed records of the subsurface and drilling conditions encountered, and obtained representative samples of soil strata encountered to log overburden geology.

In addition to the monitoring wells, in 2021, GEMTEC selected 56 exploration boreholes for preliminary baseline groundwater monitoring (GEMTEC 2023). The locations of boreholes included in the groundwater monitoring network are shown in Figure 8.5.

8.1.2.2.2 Subsurface Conditions

During the GEMTEC (2024) and Stantec drilling programs, bedrock was encountered at depths ranging from ground surface (23MW-10 and BH25-05) to 32 mbgs (BH25-03A). The bedrock stratigraphy in the boreholes generally consisted of siltstone interbedded with mudstone, graphitic siltstone, greywacke, and greywacke interbedded with siltstone. The bedrock is generally moderately to highly fractured with veins of quartz and iron staining.

Rock quality designation was generally variable, with no strong spatial correlation between monitoring wells. The quality of the bedrock logged as part of the GEMTEC (2024) and Stantec drilling programs ranged from very poor to excellent with RQD values ranging from 0% to 100%. A summary of the RQD values for each bedrock type is presented in Table 8.3.

Table 8.3 Summary of Bedrock RQD Value

Bedrock Type	RQD (%)			Record Count
	Minimum	Maximum	Mean	
GEMTEC Drilling Program				
Graphitic siltstone	0	100	62	27
Greywacke with siltstone interbeds	0	19	8	4
Siltstone	39	100	64	7
Siltstone with mudstone interbeds	0	95	41	43
Stantec Drilling Program				
Greywacke	30	92	59	9
Greywacke with siltstone interbeds	58	68	63	2
Siltstone	0	100	43	69

Note:
RQD – rock quality designation
Source: GEMTEC (2024); Stantec (2025)

8.1.2.2.3 Hydraulic Properties

Single Well Response Testing

Single well response testing (e.g., slug tests) was conducted on the 21 monitoring wells within LAA/RAA between July 2023 and December 2025 as rising and falling head tests. The purpose of slug testing is to determine the hydraulic conductivity adjacent to the screened interval of the monitoring well. The Bouwer-Rice method (Bouwer and Rice 1976) was used to calculate hydraulic conductivities for each well. Table 8.4 presents the results of the rising and falling head hydraulic testing completed between 2023 and 2025. Rising and falling head tests results in hydraulic conductivity measurements ranging from 4.5×10^{-8} metres per second (m/s) to 2.1×10^{-4} m/s with a geometric mean of 2.2×10^{-6} m/s.

Table 8.4 Summary of Single Well Response Testing

Monitoring Well ID	Test Date	Coordinates		Falling Head (m/s)	Rising Head (m/s)	Geometric Mean (m/s)
		Northing (m)	Easting (m)			
23MW-01	7/15/2023	5429866	662450	3.7×10^{-7}	3.9×10^{-7}	3.8×10^{-7}
23MW-02S	7/13/2023	5430640	659523	7.0×10^{-7}	6.2×10^{-7}	6.6×10^{-7}
23MW-02D	7/14/2023	5430643	659521	1.5×10^{-5}	1.7×10^{-5}	1.6×10^{-5}
23MW-03	7/14/2023	5429520	658036	1.7×10^{-5}	1.4×10^{-5}	1.5×10^{-5}
23MW-04	7/14/2023	5428346	659963	2.0×10^{-4}	2.1×10^{-4}	2.1×10^{-4}
23MW-05	7/15/2023	5427939	661106	2.6×10^{-6}	3.1×10^{-6}	2.8×10^{-6}
23MW-06	7/13/2023	5428480	659018	5.1×10^{-6}	4.8×10^{-6}	4.9×10^{-6}
23MW-07	7/13/2023	5428089	657917	8.4×10^{-6}	6.7×10^{-6}	7.5×10^{-6}
23MW-08	7/14/2023	5427908	658291	6.1×10^{-8}	4.5×10^{-8}	5.3×10^{-8}
23MW-09	7/15/2023	5426907	660133	4.8×10^{-7}	6.0×10^{-7}	5.4×10^{-7}

Table 8.4 Summary of Single Well Response Testing

Monitoring Well ID	Test Date	Coordinates		Falling Head (m/s)	Rising Head (m/s)	Geometric Mean (m/s)
		Northing (m)	Easting (m)			
23MW-10	12/10/2025	5427138	658673	2.0×10^{-6}	2.0×10^{-6}	2.0×10^{-6}
23MW-11	2/4/2024	5426941	657501	1.0×10^{-4}	9.5×10^{-5}	9.9×10^{-5}
23MW-12S	1/31/2024	5427265	656107	1.3×10^{-6}	1.0×10^{-6}	1.1×10^{-6}
23MW-12D	2/3/2024	5427270	656108	7.8×10^{-7}	7.4×10^{-7}	7.6×10^{-7}
25MW-01S	10/29/2025	5427636	659297	3.0×10^{-6}	3.0×10^{-6}	3.0×10^{-6}
25MW-01D	12/13/2025	5427634	659297	1.0×10^{-6}	1.0×10^{-6}	1.0×10^{-6}
25MW-02S	12/10/2025	5428902	658735	2.0×10^{-6}	2.0×10^{-6}	2.0×10^{-6}
25MW-02D	12/10/2025	5428900	658736	3.0×10^{-7}	5.0×10^{-7}	3.9×10^{-7}
25MW-03S	12/11/2025	5429986	659258	5.0×10^{-6}	5.0×10^{-6}	5.0×10^{-6}
25MW-03D	12/11/2025	5429986	659260	5.0×10^{-8}	2.0×10^{-7}	1.0×10^{-7}
25MW-08D	12/11/2025	5427910	658291	-	7.0×10^{-6}	-

Hydraulic Testing Using Packers

Hydraulic testing using packers (e.g., packer testing) was conducted at three monitoring wells (23MW-09, 23MW-10, and 23MW-12D) by GEMTEC in 2024 and at six boreholes (BH25-01A, BH25-02, BH25-03A, BH25-04, BH25-05, and BH25-06) by Stantec in 2025 using a constant head packer injection method. The purpose of packer testing is to determine the hydraulic conductivity of isolated sections of the bedrock within each borehole.

The results of the packer testing indicate the hydraulic conductivity of the tested intervals ranged from 1.00×10^{-9} m/s to 1.02×10^{-5} m/s. A summary of hydraulic conductivity calculated during packer testing for the isolated intervals for each borehole / monitoring well is presented in Table 8.5.

Table 8.5 Summary of Packer Testing

Borehole / Monitoring Well ID	Coordinates		Overburden Depth (mbgs)	Borehole / Well Total Depth (mbgs)	Inclination (°)	Azimuth	Test No.	Test Interval Depth		Hydraulic Conductivity (m/s)	Geometric Mean (m/s)
	Easting (m)	Northing (m)						To (mbgs)	From (mbgs)		
BH25-01A	659156	5429800	9.47	181.4	-45	300	1	11.1	32.1	2.93×10^{-7}	1.46×10^{-8}
							2	32.1	77.1	2.34×10^{-7}	
							3	77.1	110.1	3.82×10^{-9}	
							4	110.1	134.1	1.00×10^{-9}	
							5	134.1	181.4	2.50×10^{-9}	
BH25-02	658675	5429215	10.5	172.8	-45	140	1	56.8	95.4	4.80×10^{-8}	2.41×10^{-8}
							2	95.4	130.8	2.65×10^{-8}	
							3	134.1	173.8	1.10×10^{-8}	
BH25-03A	658121	5427970	32	226.9	-45	160	1	32.9	52.9	3.49×10^{-8}	1.72×10^{-9}
							2	52.9	86.5	1.30×10^{-9}	
							3	86.5	102	1.00×10^{-9}	
							4	100.9	139.9	1.00×10^{-9}	
							5	139.9	178.9	1.00×10^{-9}	
							6	178.9	194.5	1.00×10^{-9}	
							7	194.5	226.9	1.00×10^{-9}	
BH25-04	658121	5427970	11.5	145.9	-45	-	1	14.5	58.9	1.12×10^{-6}	8.28×10^{-9}
							2	58.9	67.9	2.50×10^{-8}	
							3	67.9	88.9	1.00×10^{-9}	
							4	88.9	107.5	1.00×10^{-9}	
							5	107.5	122.5	1.00×10^{-9}	
							6	122.5	146	1.15×10^{-8}	
BH25-05	658780	5428112	0.00	44	-90	-	1	3.5	7.6	2.27×10^{-7}	1.16×10^{-7}
							2	7.6	15.5	4.91×10^{-7}	
							3	15.5	44	1.40×10^{-8}	

Table 8.5 Summary of Packer Testing

Borehole / Monitoring Well ID	Coordinates		Overburden Depth (mbgs)	Borehole / Well Total Depth (mbgs)	Inclination (°)	Azimuth	Test No.	Test Interval Depth		Hydraulic Conductivity (m/s)	Geometric Mean (m/s)
	Easting (m)	Northing (m)						To (mbgs)	From (mbgs)		
BH25-06	657743	5427453	14.6	230.6	-45	-	1	26.6	38.6	1.02×10^{-5}	1.38×10^{-8}
							2	38.6	67.0	1.44×10^{-9}	
							3	67.0	129.4	4.35×10^{-9}	
							4	129.4	156.6	5.44×10^{-9}	
							5	156.6	176.6	1.11×10^{-7}	
							6	176.6	194.6	1.00×10^{-9}	
							7	194.6	230.6	2.52×10^{-9}	
23MW-09	660133.01	5426906.52	5.36	10.77	n/a	n/a	1	6.8	10.8	7.47×10^{-7}	7.47×10^{-7}
23MW-10	658672.90	5427138.23	0.00	7.67	n/a	n/a	1	4.1	7.6	1.22×10^{-6}	1.22×10^{-6}
23MW-12D	656107.89	5427269.67	2.39	30.00	n/a	n/a	1	21.0	30.0	2.65×10^{-8}	2.89×10^{-8}
							2	9.0	30.0	3.15×10^{-8}	

Notes:
m – metre(s)
mbgs – metre(s) below ground surface
m/s – metre(s) per second
"-" – no data available

Short-Term Pumping Tests

In 2021, GEMTEC completed short-term pumping tests on four existing exploration boreholes at the site (NFGC-21-110, NFGC-21-129, NFGC-21-167, and NFGC-21-261) to estimate a bulk hydraulic conductivity value for each borehole (GEMTEC 2023). The pumping tests were conducted using an average pumping rate of 0.92 L/min for a duration of 45 minutes, except for the pumping test at NGFC-21-261 which was conducted for 40 minutes. Pumping test data were analyzed using AQTESOLV® computer software using Cooper-Jacob (1946) and Theis (1935) methods for confined/unconfined aquifers (GEMTEC 2023). The results of the short-term pumping tests indicate the hydraulic conductivity of boreholes ranged from 1.29×10^{-8} m/s (NFGC-21-129) to 7.27×10^{-8} m/s (NFGC-21-167) A summary of the hydraulic conductivities calculated for the four exploration boreholes is presented in Table 8.6.

A plot of hydraulic conductivity calculated from isolated intervals from the borehole packer testing, slug tests, and short-term pumping tests on exploration boreholes (GEMTEC 2023) versus depth is shown in Figure 8.6.

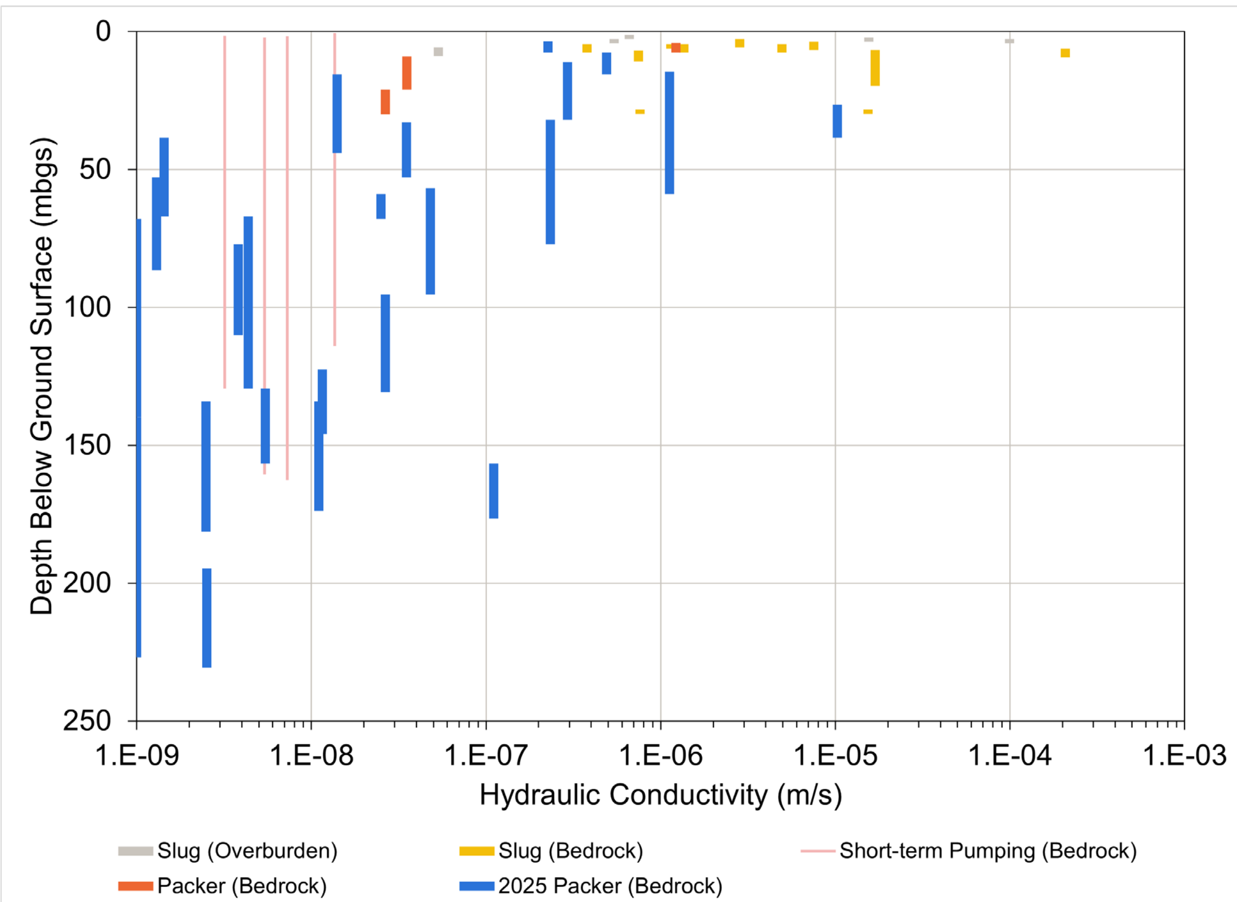

Figure 8.6 Hydraulic Testing Results Collected from Single Well Response Tests (Slug Tests), Packer Tests, and Short-Term Pumping Tests (with Depth in mbgs)

Table 8.6 Summary of Short-Term Pumping Test Data

Borehole ID	Lithology	Test Date (mm/dd/yyyy)	Aquifer Thickness[1] (m)	Max. Drawdown (m)	T[2] (m^2/s)	K[3] (m)	Analysis Method
NFGC-21-110	Siltstone / Quarts-Vein Zones	12/04/2021	127.86	3.2	3.55×10^{-7}	2.78×10^{-9}	Theis
					5.98×10^{-7}	4.68×10^{-9}	Cooper-Jacob
					2.70×10^{-7}	2.11×10^{-9}	Theis Recovery
					Geometric Mean (m/s)	**3.02×10^{-9}**	-
NFGC-21-129	Siltstone / Greywacke / Quartz-Vein Zones	12/04/2021	113.45	2.85	1.23×10^{-6}	1.08×10^{-8}	Theis
					2.31×10^{-6}	2.04×10^{-8}	Cooper-Jacob
					1.10×10^{-6}	9.70×10^{-9}	Theis Recovery
					Geometric Mean (m/s)	**1.29×10^{-8}**	-
NFGC-21-167	Graphitic Siltstone	12/04/2021	160.92	2.38	1.17×10^{-6}	7.27×10^{-9}	Theis
					1.17×10^{-6}	7.27×10^{-9}	Cooper-Jacob
					1.17×10^{-6}	7.27×10^{-9}	Theis Recovery
					Geometric Mean (m/s)	**7.27×10^{-9}**	-
NFGC-21-261	Graphitic Siltstone	12/04/2021	158.34	2.55	7.43×10^{-7}	4.69×10^{-9}	Theis
					1.24×10^{-6}	7.83×10^{-9}	Cooper-Jacob
					5.77×10^{-7}	3.64×10^{-9}	Theis Recovery
					Geometric Mean (m/s)	**5.12×10^{-9}**	-
					Geometric Mean (All Tests) (m/s)	**6.17×10^{-9}**	-

Notes:

[1] Assumed aquifer thickness

[2] Transmissivity (square metre(s) per second [m^2/s])

[3] Hydraulic conductivity (m/s)

Source: GEMTEC (2023)

8.1.2.2.4 Groundwater Levels

Manual Groundwater Level Surveys

In August 2021, GEMTEC collected manual groundwater level measurements from 56 existing exploration boreholes within the LAA/RAA (GEMTEC 2023). In December 2021, prior to the short-term pumping tests, groundwater level measurements were collected from boreholes NFGC-21-110, NFGC-21-129, and NFGC-21-261 (GEMTEC 2023). The groundwater level measurements were adjusted for the stickup length and inclination of each borehole and were referenced to measured collar elevations. Groundwater levels measured by GEMTEC in 2021 ranged from -0.28 mbgs in borehole NFGC-21-263 to 8.65 mbgs in borehole NFGC-21-152 (GEMTEC 2023). Groundwater elevations ranged from 45.71 masl within NFGC-21-152 to 90.67 masl within NFGC-21-164. A summary of groundwater levels and groundwater elevations for boreholes collected in 2021 are presented in Table 8.7.

For the monitoring wells, groundwater levels ranged from -0.42 mbgs in 23MW-02D to 4.33 mbgs in 23MW-10.

Groundwater elevations ranged from 30.245 masl at 23MW-12D (located near the east bank of the Gander River) to 113.85 masl at 23MW-01 (located at a topographic high approximately 3 km northwest of Joe Batt's Pond). Groundwater elevations within the 21 monitoring wells fluctuated between 2023 and 2025 but were within the expected ranges of variability. Groundwater elevations within 23MW-11 fluctuated the most during this monitoring period, ranging from 80.84 masl in July 2025 to 84.045 masl in November 2024 (an elevation difference of 3.205 m). A summary of groundwater elevations for the 21 monitoring wells between 2023 and 2025 is presented in Table 8.8.

Table 8.7 Summary of Manual Groundwater Levels and Groundwater Elevations for Exploration Boreholes

Borehole ID	Coordinates		Inclination (°)	Vertical Depth (m)	Measurement Date	Water Level (mbgs)	Water Level (masl)
	Easting (m)	Northing (m)					
NFGC-20-36	658244.791	5427466.324	-45	106.07	08/24/2021	0.67	86.97
NFGC-20-39	658884.481	5429155.945	-45	115.97	08/24/2021	0.96	79.94
NFGC-20-45	658239.693	5427508.996	-45	115.97	08/24/2021	0.58	85.92
NFGC-20-46	658266.985	5427492.557	-45	119.50	08/24/2021	0.78	86.32
NFGC-20-64	658207.767	5427441.782	-45	106.07	08/26/2021	0.02	87.75
NFGC-20-66	658739.149	5428664.938	-45	120.92	08/23/2021	1.98	88.35
NFGC-20-68	658739.652	5428664.640	-60	200.05	08/23/2021	1.93	88.30
NFGC-21-77	658301.893	5427415.725	-45	218.18	08/24/2021	1.89	88.72
NFGC-21-78	658182.869	5427426.266	-45	118.79	08/23/2021	0.28	87.66
NFGC-21-84	658252.671	5427490.350	-45	120.21	08/24/2021	0.54	86.41
NFGC-21-85	658148.375	5427388.434	-45	111.30	08/23/2021	0.88	88.28
NFGC-21-110	658999.079	5428946.414	-45	129.44	08/27/2021	1.64	88.16
					12/04/2021	0.74	89.06
NFGC-21-129	658197.875	5427475.370	-45	114.02	08/23/2021	0.65	86.66
					12/04/2021	0.10	87.21
NFGC-21-130	657138.701	5425687.170	-45	121.41	08/26/2021	3.03	52.29
NFGC-21-137	658185.033	5427453.721	-45	107.48	08/23/2021	0.51	87.37
NFGC-21-142	657138.340	5425717.238	-45	154.15	08/26/2021	2.37	51.48
NFGC-21-147	657075.384	5425582.535	-45	169.14	08/26/2021	4.57	49.77
NFGC-21-152	657075.893	5425582.293	-60	196.59	08/26/2021	8.65	45.71
NFGC-21-156	658069.358	5427404.910	-45	194.45	08/26/2021	1.49	85.50
NFGC-21-157	657641.991	5427535.439	-45	116.67	08/24/2021	3.44	90.22
NFGC-21-162	657617.445	5427550.505	-45	106.07	08/24/2021	5.44	90.49
NFGC-21-164	658203.580	5427215.703	-45	203.65	08/21/2021	1.34	90.67
NFGC-21-166	657668.210	5427579.113	-45	112.85	08/24/2021	4.00	89.13

Table 8.7 Summary of Manual Groundwater Levels and Groundwater Elevations for Exploration Boreholes

Borehole ID	Coordinates		Inclination (°)	Vertical Depth (m)	Measurement Date	Water Level (mbgs)	Water Level (masl)
	Easting (m)	Northing (m)					
NFGC-21-167	665274.276	5430982.429	-45	162.63	12/04/2021	1.68	59.16
NFGC-21-170	658113.731	5427379.475	-45	120.92	08/23/2021	1.10	88.15
NFGC-21-174	658204.595	5427215.135	-45	258.80	08/24/2021	1.55	90.56
NFGC-21-179	665363.710	5430988.136	-45	179.61	08/25/2021	3.22	58.84
NFGC-21-180	665203.845	5430849.626	-45	173.24	08/25/2021	2.29	57.38
NFGC-21-186	665130.007	5430833.922	-45	183.85	08/25/2021	3.43	56.07
NFGC-21-209	658721.815	5428675.021	-45.5	139.08	08/27/2021	1.07	86.26
NFGC-21-217	658147.560	5427151.442	-55.5	330.47	08/24/2021	0.67	89.78
NFGC-21-218	663406.715	5428927.795	-45.5	127.67	08/25/2021	1.15	61.91
NFGC-21-223	658241.211	5427550.903	-45.5	79.88	08/24/2021	0.84	84.66
NFGC-21-231	658124.583	5427448.065	-44	118.65	08/23/2021	0.76	85.73
NFGC-21-233	659024.072	5428935.085	-45.5	243.93	08/27/2021	1.23	89.15
NFGC-21-235A	663420.239	5428877.065	-45.5	123.39	08/25/2021	0.51	60.12
NFGC-21-248	657930.013	5427271.198	-72.5	79.16	08/24/2021	-0.27	81.41
NFGC-21-248A	657929.848	5427271.417	-74.5	358.47	08/24/2021	-0.20	81.36
NFGC-21-249	658502.701	5428353.214	-42	166.61	12/07/2021	0.63	75.46
NFGC-21-284A	658125.259	5427200.201	-45	279.31	08/24/2021	1.59	88.57
NFGC-21-253	663361.152	5428824.166	-45.5	175.25	08/25/2021	- [1]	- [1]
NFGC-21-255	658503.528	5428381.021	-42	184.68	08/24/2021	3.91	73.12
NFGC-21-257	657950.877	5427310.044	-78	338.15	08/24/2021	0.11	81.67
NFGC-21-261	663394.484	5428833.666	-45	160.51	08/25/2021	1.96	60.06
					12/04/2021	1.71	60.30
NFGC-21-263	657951.506	5427309.732	-72	317.22	08/24/2021	-0.28	82.05
NFGC-21-265	657930.200	5427271.900	-78	12.96	08/24/2021	- [2]	- [2]
NFGC-21-265A	657929.463	5427271.130	-78	333.55	08/24/2021	-0.26	81.41

Table 8.7 Summary of Manual Groundwater Levels and Groundwater Elevations for Exploration Boreholes

Borehole ID	Coordinates		Inclination (°)	Vertical Depth (m)	Measurement Date	Water Level (mbgs)	Water Level (masl)
	Easting (m)	Northing (m)					
NFGC-21-268	658522.640	5428312.741	-45.5	92.90	08/24/2021	1.83	74.25
NFGC-21-270	657747.900	5427325.400	-49	316.22	08/24/2021	-0.24	80.24
NFGC-21-280	657710.354	5427460.208	-45	197.81	08/24/2021	0.41	85.94
NFGC-21-290A	659074.363	5429163.663	-45	117.87	08/23/2021	1.48	82.51
NFGC-21-298	658079.931	5427369.971	-45.5	121.15	08/23/2021	0.53	87.38
NFGC-21-307	658592.272	5428358.691	-45.5	80.81	08/24/2021	1.45	83.57
NFGC-21-307A	658592.934	5428358.430	-47	22.01	08/24/2021	1.17	83.87
NFGC-21-307B	658593.497	5428358.141	-47	348.86	08/24/2021	1.69	83.59
NFGC-21-309	663350.650	5428930.907	-45.5	159.77	08/25/2021	- [3]	- [3]

Notes:

[1] No water was detected at 6 metres below top of casing (mbtoc) (GEMTEC 2023).

[2] Casing is at ground surface. The well is plugged with a membrane that is punctured and water is flowing from the hole (GEMTEC 2023).

[3] No water was detected at 4.8 mbtoc (GEMTEC 2023).

"-" - No data available

mbgs – metre(s) below ground surface

masl – metre(s) above sea level

Source: GEMTEC (2023)

Table 8.8 Summary of Manual Groundwater Level and Groundwater Elevation Data for Monitoring Wells

Monitoring Well ID	Water Level Range (2023^{A} to 2025)			Groundwater Elevation (2023^{A} to 2025)		
	Min (mbgs)	Max (mbgs)	Range (m)	Min (masl)	Max (masl)	Range (m)
23MW-01	0.47	3.02	2.55	111.305	113.85	2.545
23MW-02S	-0.01	1.12	1.13	35.83	36.955	1.125
23MW-02D	-0.42	0.39	0.81	36.455	37.26	0.805
23MW-03	0.23	0.62	0.40	88.04	88.435	0.395
23MW-04	1.04	3.75	2.72	82.79	85.505	2.715
23MW-05	0.10	0.52	0.42	100.43	100.85	0.42
23MW-06	0.14	0.65	0.51	93.205	93.71	0.505
23MW-07	0.15	0.57	0.43	98.28	98.705	0.425
23MW-08	0.19	1.22	1.03	77.34	78.371	1.031
23MW-09	0.84	1.42	0.58	82.47	83.05	0.58
23MW-10	1.12	4.33	1.99	98.826	101.45	2.624
23MW-11	0.33	3.53	3.21	80.84	84.045	3.205
23MW-12S	0.52	1.79	1.27	31.535	32.805	1.27
23MW-12D	0.74	3.04	2.30	30.245	32.54	2.295
25MW-01S	0.43	1.06	0.63	78.631	79.261	0.63
25MW-01D	0.64	2.04	1.40	77.732	79.132	1.4
25MW-02S	0.23	0.39	0.16	76.374	76.534	0.16
25MW-02D	0.24	0.91	0.67	75.748	76.413	0.665
25MW-03S	0.42	0.48	0.06	50.206	50.261	0.055
25MW-03D	0.35	0.50	0.15	50.291	50.441	0.15
25MW-08D	1.94	2.23	0.30	77.136	77.431	0.295

Notes:

[A] Monitoring wells 25MW-01D to 25MW-08D were installed in 2025, therefore only include manual groundwater level measurements from October 2025 and December 2025.

Min – minimum

Max – maximum

mbgs – metre(s) below ground surface

masl – metre(s) above sea level

D – Deep well; S – Shallow well

Groundwater Level Logger Data

Automatic water level data was recorded from July 2023 to December 2025. Select data from this monitoring period is presented as hydrographs in Figures 8.7 and 8.8. Hydrographs for each monitoring well will be provided in the Project-specific baseline reports, which will be submitted to applicable regulators prior to construction. A summary of automatic water level data recorded by water level loggers from July 16, 2023, to December 13, 2025, is presented in Table 8.9. Each figure contains the daily precipitation data from the Gander International Airport weather station (ECCC 2025) to identify possible relationships between groundwater levels and precipitation. Precipitation values are presented as millimetres equivalent of rain.

Table 8.9 Summary of Automatic Groundwater Elevation Data for Monitoring Wells

Monitoring Well ID	Minimum Water Level		Maximum Water Level		Range in Water Level (m)
	Elevation (masl)	Date (mm/dd/yyyy)	Elevation (masl)	Date (mm/dd/yyyy)	
23MW-01	112.182	09/08/2024	113.948	03/30/2024	1.766
23MW-02S	35.660	07/21/2025	36.607	02/28/2025	0.947
23MW-02D	36.651	10/07/2025	37.393	11/15/2024	0.742
23MW-03	87.529	07/22/2025	88.907	03/06/2025	1.378
23MW-04	82.736	10/22/2025	86.053	03/30/2024	3.317
23MW-05	100.100	07/22/2025	101.142	11/18/2024	1.042
23MW-06	92.642	08/15/2025	93.833	02/28/2025	1.191
23MW-07	98.216	10/07/2025	99.030	02/28/2025	0.814
23MW-08	77.012	07/22/2025	79.627	09/27/2025	2.615
23MW-09	82.252	08/18/2025	83.214	03/08/2025	0.962
23MW-10	99.999	12/01/2025	102.021	10/29/2025	2.022
23MW-11	81.050	11/04/2025	84.217	11/23/2024	3.167
23MW-12S	31.735	10/09/2025	32.873	03/29/2024	1.138
23MW-12D	31.568	10/08/2025	32.606	11/25/2024	1.038
25MW-01S	79.261	12/13/2025	79.864	10/31/2025	0.603
25MW-01D	79.130	12/13/2025	79.545	10/31/2025	0.415
25MW-02S	76.276	11/05/2025	76.458	10/31/2025	0.182
25MW-02D	75.646	11/05/2025	75.846	10/31/2025	0.2
25MW-03S	50.231	11/12/2025	50.330	10/31/2025	0.099
25MW-03D	50.344	11/12/2025	50.574	10/31/2025	0.23
25MW-08D	77.213	11/15/2025	77.845	10/30/2025	0.632

Notes:
m – metre(s)
masl – metre(s) above sea level

Figure 8.7 Hydrograph of Shallow and Deep Paired Monitoring Wells 23MW-02S/D

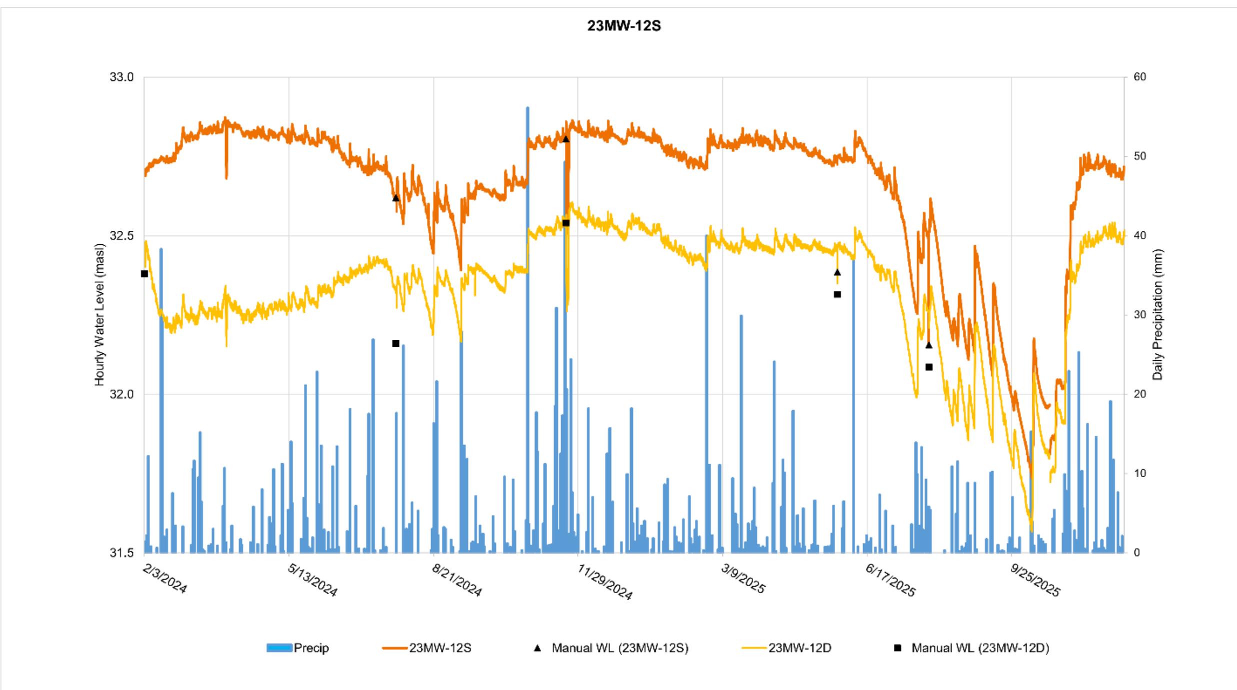

Figure 8.8 Hydrograph of Shallow and Deep Paired Monitoring Wells 23MW-12S/D

Observed groundwater levels generally follow the topography, with the monitoring well located at the highest elevation, 23MW-01, reporting a range of 112.182 masl to 113.948 masl, and the monitoring well at the lowest elevation, 23MW-12D, reporting a range of 31.568 masl to 32.606 masl (Table 8.8). Fluctuations in groundwater levels were observed in the 21 monitoring wells on site during the period of record. Monitoring well 23MW-04 reported the greatest fluctuation in groundwater level (3.317 m) and had a relatively high hydraulic conductivity (2.1×10^{-4} m/s). Monitoring well 25MW-03S reported the lowest fluctuation in groundwater level (0.099 m).

The hydrographs show a similar pattern for the period of record, July 2023 to December 2025. Groundwater exhibits a response to precipitation events in 13 of the 21 monitoring wells on site, with increased response associated with lower hydraulic conductivity values (discussed in Section 8.1.2.2.3). Recharge through October and March following the spring freshet is apparent in the monitoring wells, with peaks in November and sustained water levels through January, and peaks in April. Water levels decrease through January and February as more precipitation falls as snow and remains above the surface. Drought conditions were observed in one of the 21 monitoring wells on site, during the summer months and into the fall months of 2025. In monitoring well 23MW-11, during this time, there was limited response to precipitation events in comparison to previous years in 2023 and 2024. Water level logger data was not available for monitoring wells 23MW-10, 25MW-01S/D to 25MW-03S/D, or 25MW-08D during this time; therefore, no comments can be made on their response to drought conditions. On September 27, 2025, an increase in water level was observed in monitoring well 23MW-08. This increase corresponds to the drilling of monitoring well 25MW-08D, which began on the same day. Water used during the drilling of 25MW-08D was injected back into the aquifer, causing an increase in water level within 23MW-08.

Groundwater Flow Directions

Based on topography in the Project Area and water levels collected during October 2025, groundwater contours were generated as shown in Figure 8.9. Shallow groundwater predominantly flows northwest toward the Gander River. In the eastern section of the Project Area, groundwater flows southeast toward the Joe Batts Pond drainage system. Limited data from the southern portion of the site suggests that shallow groundwater flow likely follows surface water drainage patterns, trending southward toward Gander Lake. Likewise, assumed water level elevations of surface water features were used to inform groundwater flow contours shown in Figure 8.9.

Vertical hydraulic gradients were estimated by comparing water levels observed in paired adjacent monitoring wells (i.e., shallow and deep well pairs) throughout the baseline period. Vertical hydraulic gradient is used to determine if groundwater in the area is flowing downward (i.e., indicating an area of recharge) or upward (i.e., indicating an area of discharge). Table 8.10 summarizes the vertical hydraulic gradients for the paired adjacent monitoring wells within the groundwater monitoring network from 2023 to 2025. Groundwater flow was generally observed to be upwards at the 23MW-02S/D and 25MW-03S/D monitoring well pairs and downwards at the 23MW-08/25MW-08D, 23MW-12S/D, 25MW-01S/D, and 25MW-02S/D monitoring well pairs.

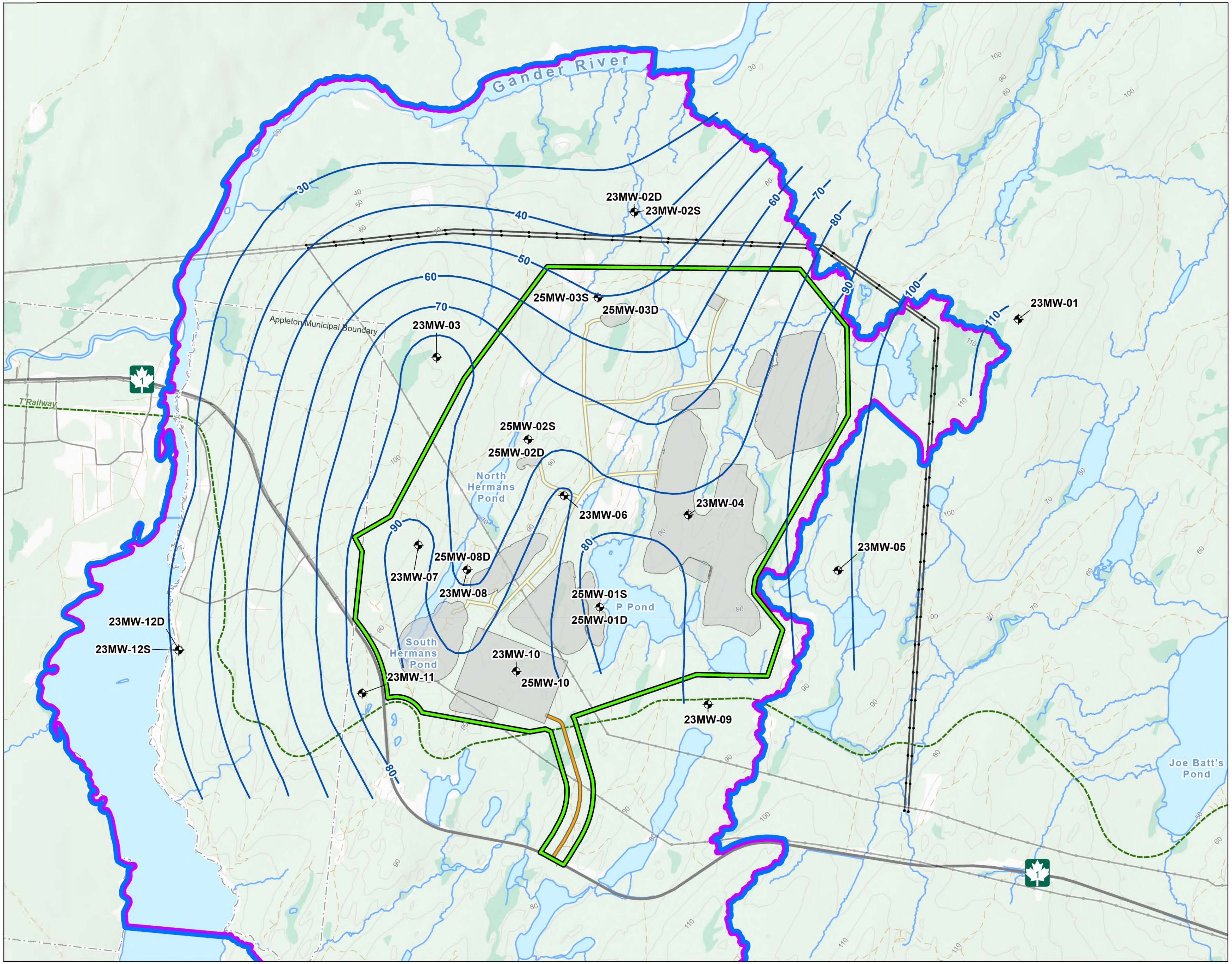

Figure No.
8.9

Title
Groundwater Contours

Client/Project 121418510_412
New Found Gold Corp.
Queensway Gold Project
Groundwater Modelling

Project Location
North Gander Lake
Newfoundland and Labrador

Prepared by AC on 2026-03-12
Revised by NW on 2026-03-23
TR by AF on 2026-03-18

N

0 250 500 1,000 m
(At original document size of 11x17)
1:30,000

Project Area
Local Assessment Area
Regional Assessment Area
Monitoring Well
Groundwater Contour (10 m)

Proposed Project Layout
Haul Road
Access Road
Proposed Site Features

Existing Infrastructure
Transmission Line
Proposed Transmission Line (Re-routing)
Highway
Collector
Local / Street
Resource Road / Trail
NL T'Railway Provincial Park

Wetlands and Waterways
Watercourse
Waterbody
Wetland

Other Features
Contour (10 m)
Municipal Boundaries

Notes
1. Coordinate System: NAD 1983 CSRS MTM 2
2. Data Sources: New Found Gold Corp.; Stantec; Government of Newfoundland and Labrador, Department of Environment, Conservation and Climate Change, Department of Forestry, Agriculture and Lands - Land Use Atlas Mapping Service, Department of Municipal and Community Affairs; National Road Network, Statistics Canada.
3. Background: Government of Newfoundland and Labrador, Department of Forestry, Agriculture and Lands - Land Use Atlas Mapping. Esri, NASA, NGA, USGS, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community, Esri, USGS

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Table 8.10 Vertical Hydraulic Gradients

Monitoring Well Pair	Monitoring Event	Water Elevation Difference (m)	Gradient	Groundwater Flow Direction
23MW-02S/D	July 2023	-0.88	-0.032	Upward
	July 2024	-0.96	-0.035	Upward
	September 2024	-0.885	-0.032	Upward
	November 2024	-0.79	-0.029	Upward
	May 2025	-0.765	-0.028	Upward
	July 2025	0.15	0.0055	Downward
	October 2025	-0.625	-0.023	Upward
23MW-08 / 25MW-08D	October 2025	0.459	0.028	Downward
	December 2025	0.194	0.012	Downward
23MW-12S/D	Jan/Feb 2024	0.36	0.015	Downward
	July 2024	0.46	0.019	Downward
	September 2024	0.425	0.018	Downward
	November 2024	0.265	0.011	Downward
	May 2025	0.43	0.018	Downward
	July 2025	0.435	0.018	Downward
	October 2025	0.805	0.034	Downward
	December 2025	2.22	0.093	Downward
25MW-01S/D	October 2025	0.899	0.043	Downward
	December 2025	0.129	0.0061	Downward
25MW-02S/D	October 2025	0.121	0.0053	Downward
	December 2025	0.626	0.028	Downward
25MW-03S/D	October 2025	-0.085	-0.0049	Upward
	December 2025	-0.18	-0.010	Upward

8.1.2.2.5 Groundwater Quality

A baseline characterization of groundwater quality is meant to provide a reference for future change in groundwater chemistry related to seasonal trends and/or site activities. With respect to metal or metal concentrate mining, exceedances of various metal parameters are anticipated for the baseline groundwater quality characterization of the LAA/RAA.

Groundwater quality in the LAA/RAA was characterized with samples collected from seven exploration boreholes in 2021, and 22 groundwater monitoring wells between 2023 and 2025 (GEMTEC 2023, 2024; Stantec 2025). Samples were analyzed for general chemistry, dissolved metals, cyanide (total and weak acid dissociable), radium-226, benzene, toluene, ethylbenzene, and xylene, and petroleum hydrocarbons. Results were compared to the criteria in the GCDWQ (Health Canada 2025) and Atlantic Risk Based Corrective Action (RBCA) Ecological Tier I Environmental Quality Standards for Groundwater (<10 m from Surface Water Body) Discharging to Fresh Water (Atlantic RBCA 2022), as applicable.

Exceedances of Atlantic RBCA, GCDWQ and/or MDMER criteria were reported for the following parameters for at least one borehole/monitoring well: aluminum (21 wells, 6 boreholes), ammonia (4 boreholes), antimony (4 wells), arsenic (11 wells, 2 boreholes), beryllium (1 well), chromium (1 well), cobalt (10 wells, 3 boreholes), colour (5 wells), copper (7 wells, 1 boreholes), cyanide (1 wells), fluoride (4 wells, 1 borehole), iron (15 wells, 6 boreholes), lead (3 wells), manganese (20 wells, 7 boreholes), modified total petroleum hydrocarbons (2 boreholes), nickel (1 well), pH (12 wells, 1 borehole), selenium (1 well), total suspended solids (2 wells, 5 boreholes), and zinc (9 wells, 4 boreholes). The remaining parameters were either non-detect or detected at concentrations below the chosen criteria. Plots of minimum, maximum, and mean concentrations of general chemistry and metals for samples analyzed between 2021 and 2025 are shown in Figures 8.10 and 8.11, respectively.

Water quality data from the groundwater monitoring network were plotted on a Piper plot (Figure 8.12; Piper 1944), which can provide an indication of water quality evolution over time. Based on the Piper Plot, the groundwater of the site can generally be described as calcium-magnesium-bicarbonate type that is indicative of fresh groundwater. Groundwater from exploration boreholes NFGC-21-261 and NFGC-21-280, however, is indicative of sodium bicarbonate and sodium chloride type water, respectively. Groundwater samples were predominantly slightly acidic with moderate acid buffering potential and low conductivity, indicating fresh conditions. Langelier Saturation Index values for groundwater samples indicate groundwater is slightly under saturated with calcium carbonate, but with a relatively low corrosion impact.

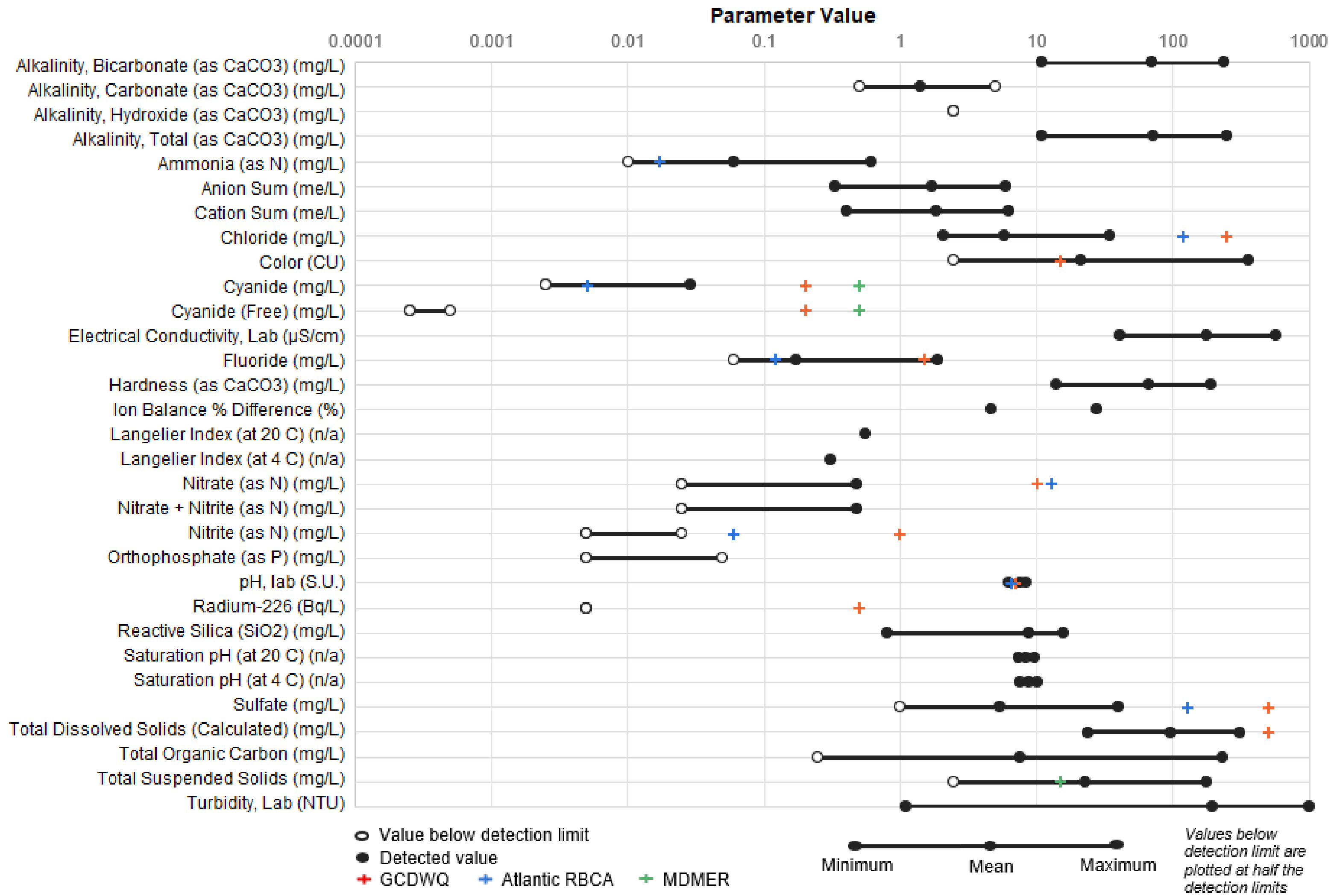


Figure 8.10 Baseline Groundwater General Chemistry Compared to Atlantic RBCA, GCDWQ, and MDMER Criteria

NEWFOUNDGOLD

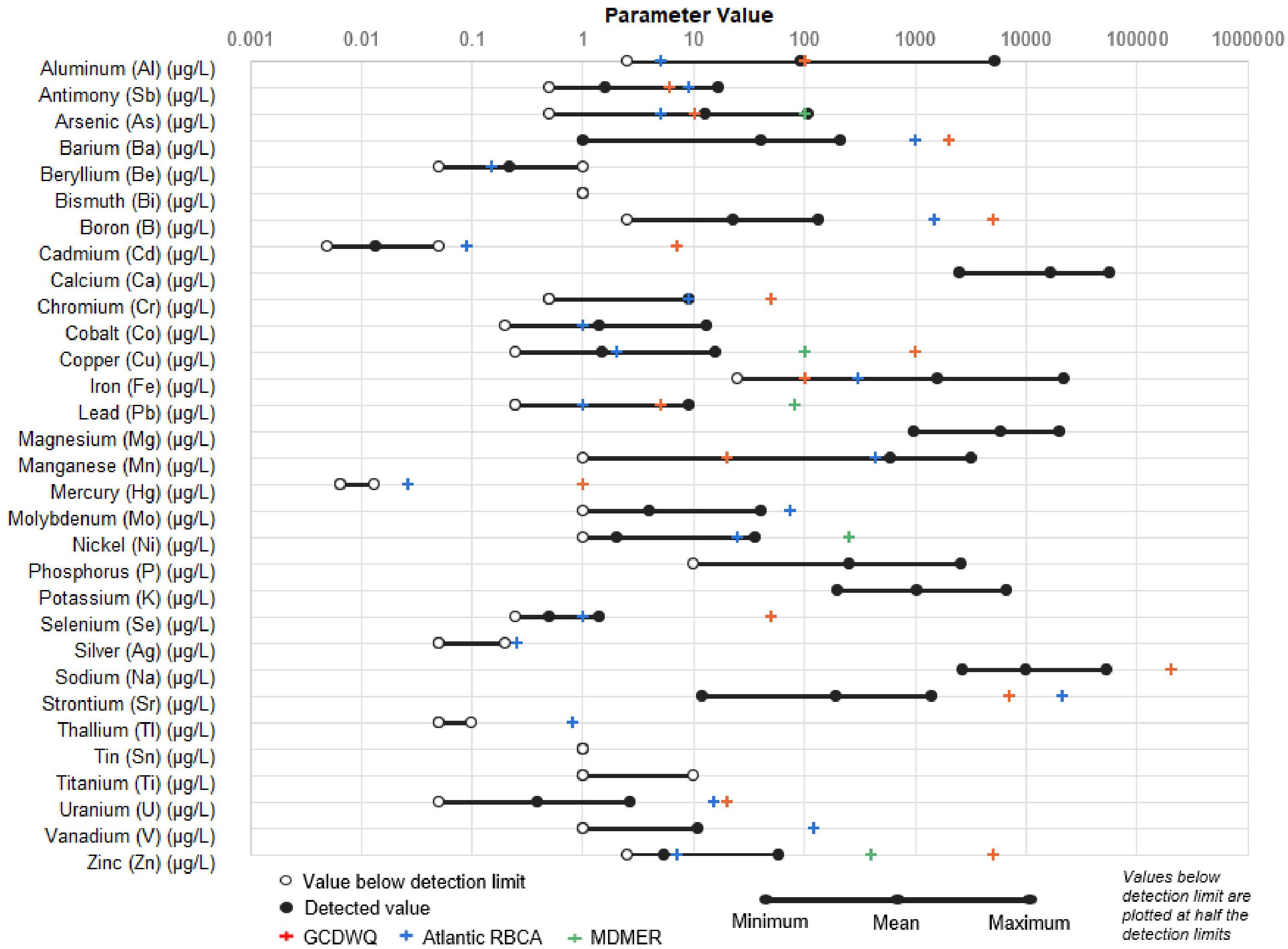


Figure 8.11 Baseline Groundwater Dissolved Metals Chemistry Compared to Atlantic RBCA, GCDWQ, and MDMER Criteria

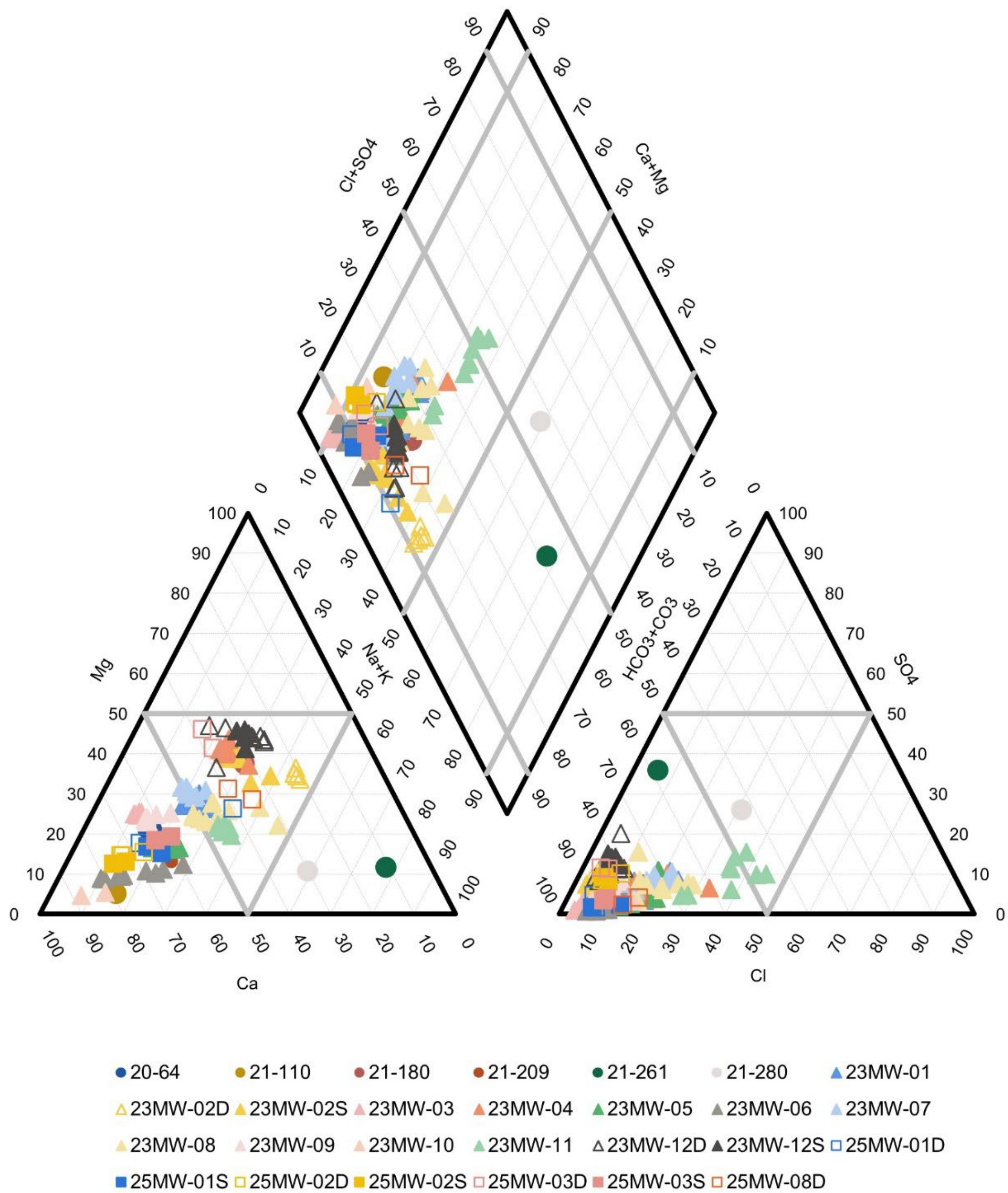


Figure 8.12 Piper Plot of Baseline Groundwater Chemistry

8.2 Potential Effects and Effect Pathways

A summary of the potential effects and Project effect pathways to be assessed for Groundwater Resources is provided in Table 8.11. Potential environmental effects and effects pathways were selected based on the review of similar projects in NL and other parts of Canada, and professional judgement.

Table 8.11 Potential Effects and Effect Pathways for Groundwater Resources

Potential Effect	Effect Pathway(s)
Change in groundwater quantity	• Construction of site infrastructure will result in the reduction of infiltration where impervious surfaces remain, thereby altering groundwater flow patterns and recharge rates, affecting groundwater discharge to surface water features and wetlands • Dewatering of South Herman's Pond as described in Section 9, which could potentially alter groundwater discharge to surface water features • Reduced groundwater availability for existing well-users in the Project Area due to long-term dewatering of the open pits
Change in groundwater quality	• Changes in groundwater chemistry from infiltrating water in exposed areas of overburden removal associated with earthworks activities • Release of contact seepage from Project components • Degradation of groundwater quality in potable water supplies compared to applicable guidelines

8.3 Mitigation and Management Measures

Environmental management plans will be developed and/or updated by New Found Gold to mitigate the effects of the Project on Groundwater Resources. A list of standard mitigation measures to be applied throughout Project construction, operation, and rehabilitation and closure is provided in Table 4.31. Many of these standard mitigation measures will serve to avoid or reduce potential effects on Groundwater Resources, including the measures identified for the following Project activities:

- Site Clearing, Site Preparation, and Erosion and Sediment Control
- Soil Management
- Works In or Near Fish Habitat
- Site Water Management
- Blasting
- Vehicles / Equipment / Roads
- Materials Handling and Waste Management
- Rehabilitation and Closure

The following mitigation measures specific to the Groundwater Resources have been identified for the Project:

- Groundwater quantity and quality will be monitored and adaptively managed, as required, using a network of groundwater monitoring wells to document Project effects on groundwater flow and quality. Monitoring locations will be maintained until the water levels and water quality have stabilized post-closure. Twenty-one monitoring wells were installed and sampled between 2023 and 2025. The results of the monitoring events are discussed in Section 8.1.2.2. The monitoring wells have been strategically placed outside of the direct footprint and downgradient of key infrastructure so they can be incorporated into the long-term groundwater monitoring program during mine operation, at closure, and post-closure monitoring.
- Interception wells or deep sumps within the perimeter drainage ditches around the WRSF, ore stockpile, and overburden storage facility will be installed to intercept groundwater seepage that exceeds MDMER Schedule 4 Table 1 limits prior to discharging to local surface water receivers (as required). Water will be transferred to the site-wide contact water management system for treatment prior to discharge to the environment. Accepted industry best practice geochemistry methods will be used to predict mine contact runoff and seepage quality.
- Seepage from the WRSF to local surface water receivers during closure is predicted to potentially require treatment during the post-closure phase. Passive treatment systems will be potentially installed (as required) in seepage collection ditches and sedimentation ponds (e.g., permeable reactive barriers, engineered wetlands) to reduce metal/metalloid concentrations to baseline concentrations.

8.4 Residual Environmental Effects

Potential environmental effects on the Groundwater Resources were identified in Section 8.2. For the Groundwater Resources, two effects were identified: change in groundwater quantity and groundwater quality. Residual effects (i.e., those remaining following implementation of mitigation [Section 8.3]) for each Project phase are evaluated below. The assessment of residual effects considers the following key factors:

- There are 12 drilled water wells within the LAA/RAA that may be used as potable water sources for residences and/or cabins. Given the distance between the Project and these well users (approximately 3 km), the Project is not anticipated to interact with the nearest reported domestic groundwater user.
- Groundwater monitoring wells will be maintained to verify the accuracy of predictions made during the environmental assessment, to assess the implementation and effectiveness of mitigation and the nature of the residual effects, and to manage adaptively, if required.
- Most groundwater samples collected from the Project Area met Atlantic RBCA, GCDWQ, and MDMER guidelines, though some wells showed higher levels of metals like aluminum, arsenic, manganese, and iron. The groundwater is generally fresh, mostly calcium-magnesium-bicarbonate type, with some exceptions. Samples tended to be slightly acidic and had low conductivity, indicating fresh conditions, and were slightly undersaturated with calcium carbonate.

- Interception wells or deep sumps within the perimeter drainage ditches around the WRSF, ore stockpile, and overburden storage facility will be installed to intercept groundwater seepage that exceeds MDMER Schedule 4 Table 1 limits prior to discharging to local surface water receivers (as required). Water will be transferred to the site-wide contact water management system for treatment prior to discharge to the environment. Accepted industry best practice geochemistry methods will be used to predict mine contact runoff and seepage quality.
- Seepage from the WRSF to local surface water receivers during closure is predicted to potentially require treatment during the post-closure phase. Passive treatment systems will be potentially installed (as required) in seepage collection ditches and sedimentation ponds (e.g., permeable reactive barriers, engineered wetlands) to reduce metal/metalloid concentrations to baseline concentrations.

8.4.1 Analytical Assessment Techniques

A numerical three-dimensional groundwater flow model (Appendix 8.A) was developed to represent baseline conditions and to assess the potential effects of the Project on groundwater resources. The three-dimensional groundwater flow model was used to provide quantitative predictions about changes in groundwater levels and flow during the operation and rehabilitation and closure phases of the Project and the resulting changes in groundwater discharge to surface water as follows:

- Operation:
  - Dewatering rates from development of the open pits, and associated changes to groundwater levels and baseflow to surrounding surface water features
  - Groundwater seepage rates and flow pathways from the WRSF, overburden storage facility, and ore stockpile
- Rehabilitation and Closure:
  - Groundwater inflow rates to the open pits at progressive stages during filling with water to form a pit lake
- Groundwater seepage rates and flow pathways from the closed and rehabilitated WRSF and overburden storage facility

The numerical groundwater model was developed as a steady state baseline model by defining the model domain and grid, steady state parameter zones and boundary conditions, and calibrating the groundwater model to average site conditions. Predictive scenarios were run by adjusting the calibrated model to reflect operational or closure conditions. The models were developed using the MODFLOW 2005 computer code (Harbaugh 2005) and run through the user interface program Groundwater Vistas (Version 9.04; ESI 2024).

The groundwater model domain encompasses an area of approximately 210 square kilometres (km²), with boundaries chosen to be sufficiently far from the zone of influence of the Project. The model grid spacing is generally 150 m x 150 m, with further refinement to 25 m x 25 m in the vicinity of Project components. The elevation of the top layer of the model is set to ground surface, defined by the NL 5 m digital elevation model, which was updated in February 2021. Fourteen (14) layers were used for vertical discretization, for a total of 1,340,640 grid cells, 1,042,637 of which were active (i.e., not outside of a no-flow boundary condition). Layer thicknesses were uniform throughout the model with Layer 1 being 5 m thick, Layers 2 and 3 being 10 m thick, Layers 4 to 6 being a total thickness of 65 m, Layers 7 to 9 being a total thickness of 110 m, and Layers 10 to 14 being a total thickness of 600 m.

Calibration of the model was achieved by adjusting hydraulic conductivity, recharge, and stream bed and lakebed leakage. The calibration process involved varying model parameters with the range of baseline data until an acceptable match to water levels and baseflow targets was obtained. The model is calibrated to be within acceptable industry standards. Details of the model development and calibration are presented in the Groundwater Modelling report (Appendix 8.A).

The groundwater model consists of a Study Area, which was subdivided into seven surface water catchment areas, as shown in Figure 8.13. Three surface water Catchment Zones (Zones 2 to 4) were used in the model for the purpose of baseflow estimation. Zone 3 encompasses most of the Project Area and the mine footprint, and Zones 2 and 4 are immediately adjacent to the Project Area and have been included as reference areas.

8.4.2 Change in Groundwater Quantity

Groundwater quantity effects can include potential lowering of local water levels, with consequent reduction in water levels in water supply wells drilled for the Project, reduction in domestic well yield in proximity to Project activities, and reduction in local streamflow. A related concern is the potential for diversion of surface water toward the open pits in the event that intervening permeable overburden of bedrock structures are encountered, with consequent increase in dewatering requirements, and possible reduction in streamflow during the summer period.

8.4.2.1 Construction

During construction, the Project activities and components that may interact with groundwater quantity and results in an environmental effect include mine site preparation and earthworks, construction / installation of infrastructure and equipment. Local changes in infiltration rates through compaction of ground surfaces or construction of infrastructure may result in reduced infiltration within the Project Area. Stripping of topsoil and removal of vegetation in the Project Area will result in changes in evapotranspiration rates and runoff and may result in decreased infiltration rates where impervious surfaces remain, or increased infiltration rates where vegetation is removed. These changes are considered to have a limited effect on groundwater resources due to their limited extent of development (footprint) during construction.

The open pit mine areas will be isolated from overland drainage and shallow groundwater seepage through the overburden with trenches / ditches, sedimentation ponds, and other water management measures (Appendix 4.A). During the pre-stripping activities, particular care will be taken so that water collected within the open pits is pumped into settling basins, which will be built in advance of the construction work for the open pit mine areas. These basins (sedimentation ponds) will also be used during operation to receive water pumped from the open pits to allow for settling of suspended solids prior to discharge to the environment. A portion of this collected water will also be used for dust suppression, as required and where practicable. As mine development progresses, the degree of groundwater table decline within several hundred metres of the open pits will gradually increase in both overburden and bedrock. This effect is characterized for the operation phase below (Section 8.4.2.2).

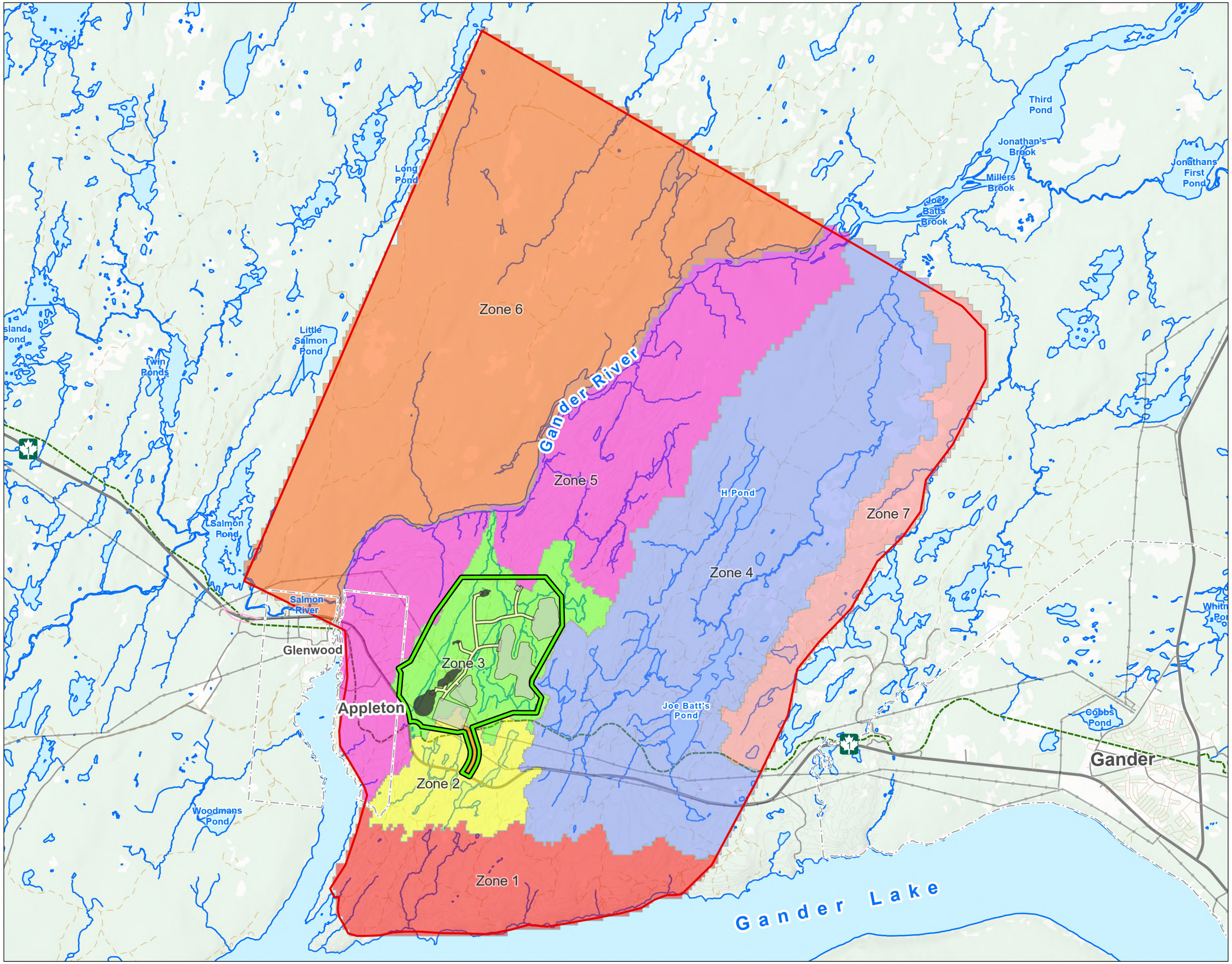


Figure No.
8.13

Title
Surface Water Catchments

Client/Project — 121418510_413

New Found Gold Corp.
Queensway Gold Project
Groundwater Modelling

Project Location
North Gander Lake,
Newfoundland and Labrador

Prepared by AC on 2025-12-18
QR by NW on 2026-01-02
TR by SS on 2026-03-23

N

0 1 2 4 km
(At original document size of 11x17)
1:90,000

- Project Area
- Study Area

Surface Water Catchments for Baseflow Estimation
- Zone 1
- Zone 2
- Zone 3
- Zone 4
- Zone 5
- Zone 6
- Zone 7

Proposed Project Layout
- Access Road
- Haul Road
- Open Pit
- Proposed Site Features

Existing Infrastructure
- Transmission Line
- Highway
- Collector
- Local / Street
- Local / Unknown
- Ramp
- Resource Road / Trail
- NL T'Railway Provincial Park

Administrative Boundaries
- Municipal Boundary

Waterways
- Watercourse
- Waterbody

Land Cover
- Forested Area
- Non-forested Area

Notes
1. Coordinate System: NAD 1983 CSRS UTM Zone 21N
2. Data Sources: New Found Gold Corp.; Stantec.
3. Background: Government of Newfoundland and Labrador, Department of Environment, Conservation, and Climate Change; Department of Forestry, Agriculture and Lands - Land Use Atlas Mapping Service; Department of Municipal and Community Affairs; Additional topographic basemapping from Esri, NASA, NGA, USGS, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community, Esri, USGS

Stantec

Construction earthworks may encounter groundwater and require water management (i.e., localized dewatering to maintain dry working conditions and/or contact water collection). This could result in limited local changes to groundwater flow direction and/or lowering of groundwater levels and a potential decrease in discharge to surface water features.

The resulting change in groundwater flow patterns and recharge rates may affect groundwater discharge to surface water features and wetlands. Potential effects to surface water features and wetlands from the lowering of groundwater levels and changes to baseflow are further discussed in Section 9 (Surface Water Resources) and Section 11 (Terrestrial Environment).

8.4.2.2 Operation

Similar to the construction phase, the main potential effect to groundwater quantity during mine operation is the potential lowering of groundwater levels in the overburden and bedrock aquifer surrounding the open pits during dewatering. Groundwater quantity is also expected to be affected through reduced recharge in the vicinity of the overburden storage facility, ore stockpile, and WRSF. Given the distance to the nearest domestic water well, surface water is the primary receptor which may be affected by lowering of groundwater levels during operation.

Results of the groundwater flow modelling indicate that dewatering rates for the open pits during the operation phase will range from 222 cubic metres per day (m^3/day) at the Jackpot pit to 2,358 m^3/day at the Keats pit. The predicted change in water table elevation (drawdown) due to dewatering of the open pits at the end of operation in comparison to baseline conditions is shown on Figure 8.14. Dewatering of the open pits is predicted to lower the water table by a minimum of 5 m over an area extending approximately 240 m surrounding the Jackpot pit, approximately 160 m surrounding the Dome pit, approximately 350 m surrounding the Iceberg pit, and approximately 540 m surrounding the Keats pit. There are no known water supply wells or active groundwater permits that supply potable water within the 5 m water table drawdown contour for the open pits (Figure 8.14).

Dewatering of the open pits during the operation phase, as predicted from the groundwater flow model, will result in localized changes in groundwater discharge compared to baseline baseflow conditions. Model results suggest a 21% reduction in baseflow may occur within Catchment Zone 3 (the catchment which encompasses the mine footprint), where simulated values changed from -12,960 m^3/day under baseline conditions to -10,281 m^3/day during the operation phase. Simulated reductions in baseflow for the catchments outside the mine area (Zone 2 and Zone 4) were negligible (i.e., ≤ 2%), suggesting that operation of the mine will have a limited influence on groundwater discharge beyond the immediate vicinity of the open pits. The effect of the operation phase on baseflow is provided in Table 8.12.

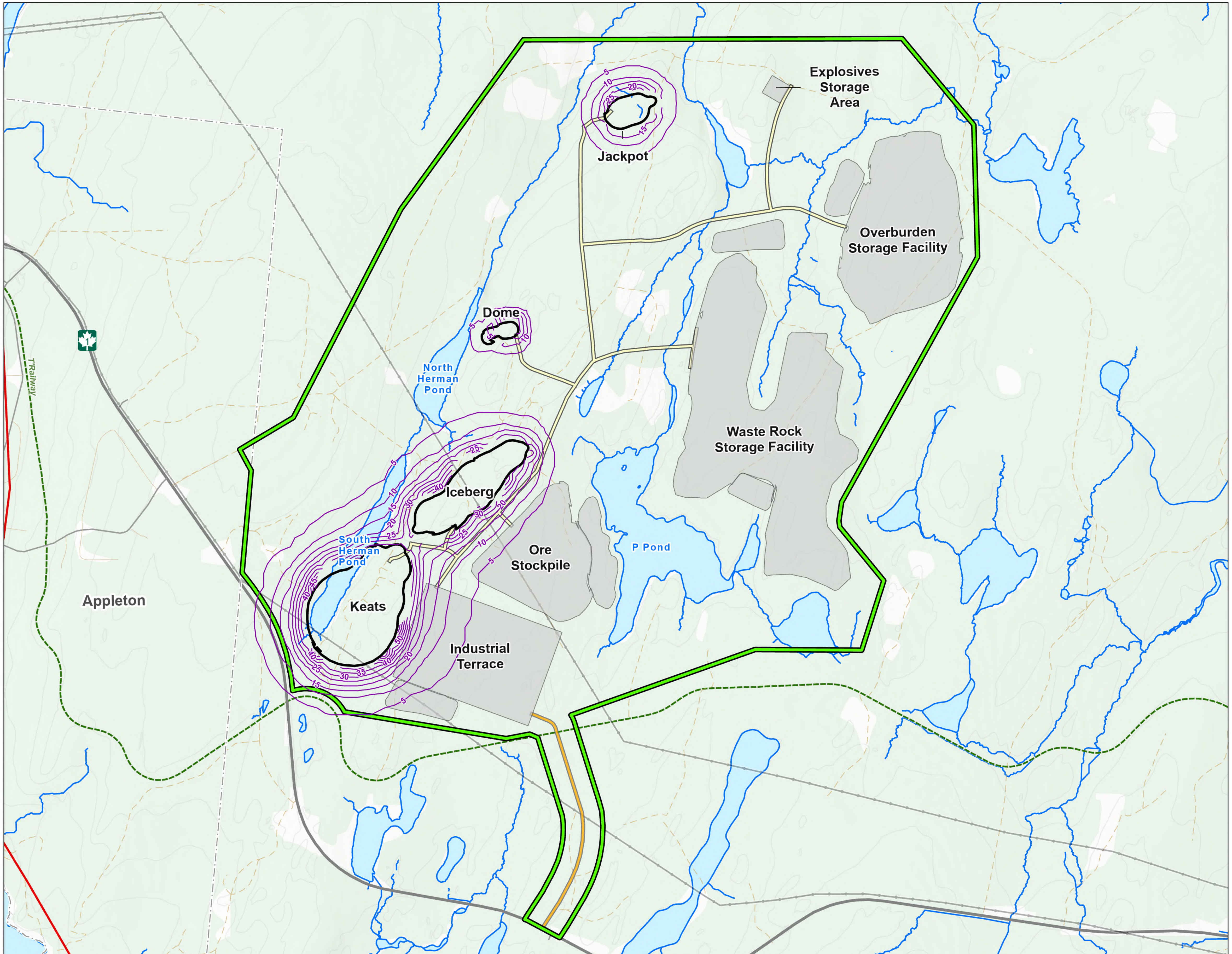


Figure No.

8.14

Title

Predicted Water Table Drawdown - Operation Phase

Client/Project 121418510_405

New Found Gold Corp.
Queensway Gold Project
Groundwater Modelling

Project Location
North Gander Lake,
Newfoundland and Labrador

Prepared by AC on 2025-12-18
QR by NW on 2026-04-01
TR by SS 0n 2026-03-23

N

0 200 400 600 800 m

(At original document size of 11x17)
1:20,000

Project Area
Study Area

Model Features

Predicted Water Table Drawdown Contour (m)

Proposed Project Layout

Access Road
Haul Road
Proposed Site Features
Open Pit

Existing Infrastructure

Transmission Line
Highway
Collector
Local / Street
Resource Road / Trail
NL T'Railway Provincial Park

Administrative Boundaries

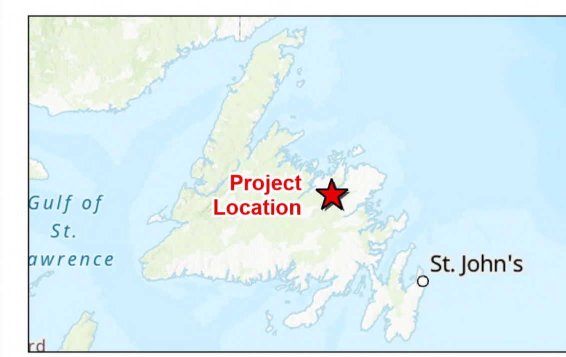
Municipal Boundary

Waterways

Watercourse
Waterbody

Land Cover

Forested Area
Non-forested Area



Notes

1. Coordinate System: NAD 1983 CSRS UTM Zone 21N
2. Data Sources: New Found Gold Corp.; Stantec.
3. Background: Government of Newfoundland and Labrador, Department of Environment, Conservation, and Climate Change; Department of Forestry, Agriculture and Lands - Land Use Atlas Mapping Service; Department of Municipal and Community Affairs; Additional topographic basemapping from Esri, NASA, NGA, USGS, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community, Esri, USGS

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Table 8.12 Simulated Baseflow (Operation Phase)

Catchment Zone	Area (km²)	Simulated Baseflow (m³/day)		Change (m³/day)	Percent Reduction (%)
		Baseline	Operation		
Zone 2	7.34	-6,310	-6,177	133	-2
Zone 3	12.49	-12,960	-10,281	2,679	-21
Zone 4	58.17	-48,832	-48,832	0	0

Notes:
km² – square kilometre(s)
m³/day – cubic metre(s) per day

8.4.2.3 Rehabilitation and Closure

The main potential effects to groundwater quantity during rehabilitation and closure include rising groundwater levels immediately upon cessation of open pit mine dewatering as the open pits begin to flood with rainwater, runoff, and groundwater seepage. During this period, the local groundwater movement would continue to be toward the open pits; however, as the water levels rise in the open pits, the degree of distant drawdown will gradually recover to near pre-mining levels.

The predicted change in water table elevation (drawdown) during rehabilitation and closure in comparison to baseline conditions is shown on Figure 8.15. The simulated water table contours suggest that the extent of the drawdown area will be substantially reduced compared to during the operation phase. Groundwater elevations are predicted to return to near baseline conditions, except in the area within the open pits. Modelled residual drawdown of up to 1 m is reported around the perimeter of the Dome pit, and up to 7 m is reported around the perimeter of the Iceberg and Keats pits (Figure 8.15). This residual drawdown around the pit perimeters reflects incomplete recovery likely due to the hydraulic connection between the flooded pits and the adjacent aquifers.

Closure of water management infrastructure will result in the removal of contact water collection systems that may result in groundwater originating from the WRSF discharging to the natural environment. These changes will continue beyond the rehabilitation and closure phase and will reach a steady-state condition once the open pits are filled.

During progressive and closure rehabilitation, the removal and/or rehabilitation of the ore stockpiles and rehabilitation of the WRSF can change groundwater recharge rates (e.g., through re-vegetation). These changes will affect groundwater flow patterns and discharge to surface water features and wetlands. Potential effects to surface water features and wetlands are further assessed in Section 9 (Surface Water Resources) and Section 11 (Terrestrial Environment).

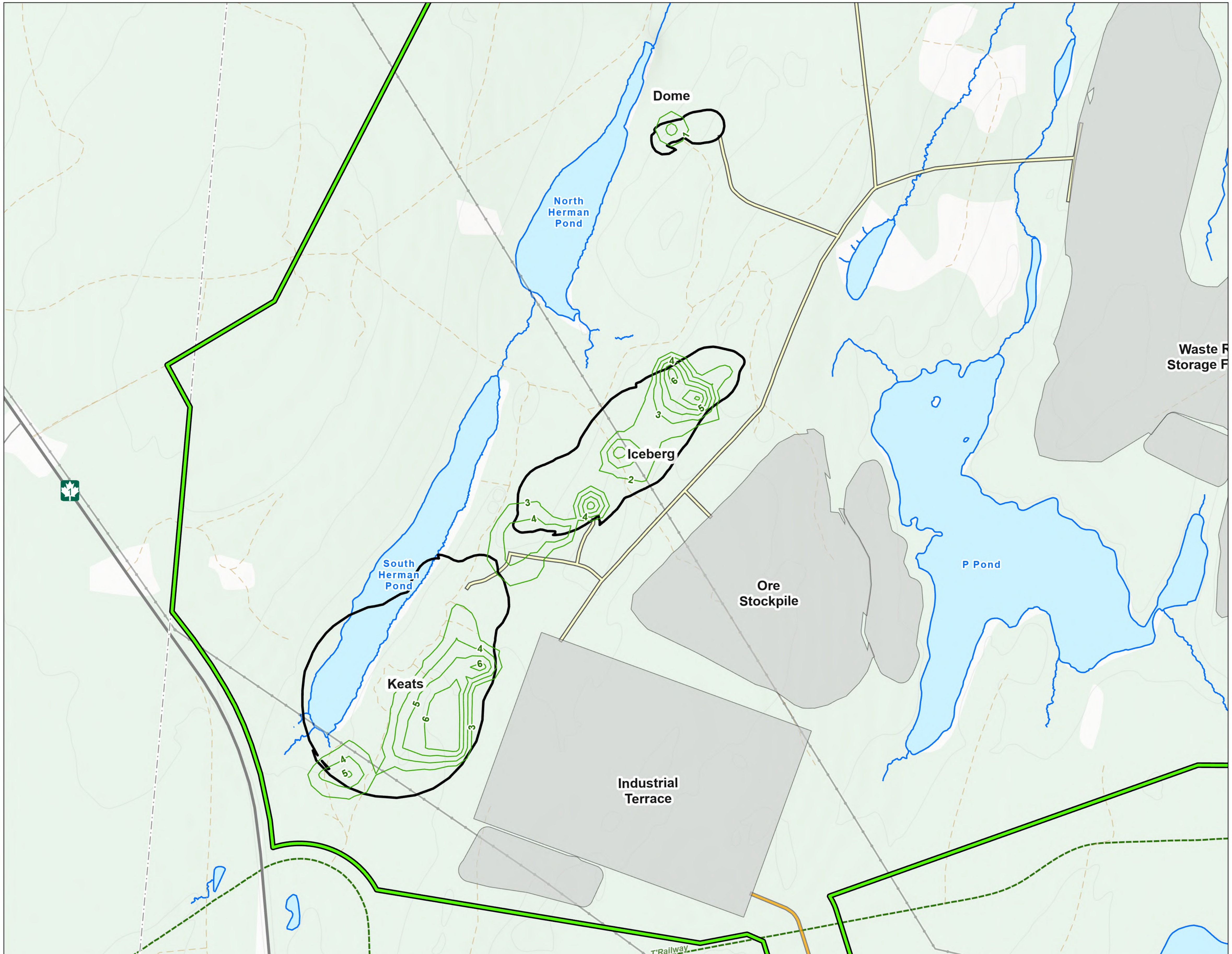


Figure No.
8.15

Title
Predicted Water Table Drawdown - Rehabilitation and Closure Phase

Client/Project 121418510_408
New Found Gold Corp.
Queensway Gold Project
Groundwater Modelling

Project Location
North Gander Lake,
Newfoundland and Labrador

Prepared by AC on 2025-12-18
QR by NW on 2026-04-01
TR by SS on 2026-03-23

N

0 200 400 m
(At original document size of 11x17)
1:10,000

Project Area
Study Area

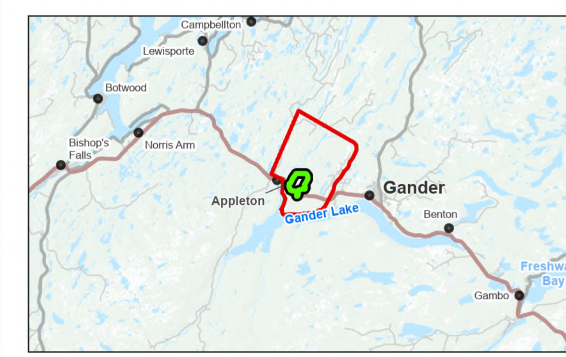
Model Features
Predicted Water Table Drawdown Contour (m)
Access Road
Haul Road
Proposed Site Features
Open Pit

Existing Infrastructure
Transmission Line
Highway
Collector
Local / Street
Resource Road / Trail
NL T'Railway Provincial Park

Administrative Boundaries
Municipal Boundary

Waterways
Watercourse
Waterbody

Land Cover
Forested Area
Non-forested Area



Notes
1. Coordinate System: NAD 1983 CSRS UTM Zone 21N
2. Data Sources: New Found Gold Corp.; Stantec.
3. Background: Government of Newfoundland and Labrador, Department of Environment, Conservation, and Climate Change; Department of Forestry, Agriculture and Lands - Land Use Atlas Mapping Service; Department of Municipal and Community Affairs; Additional topographic basemapping from Esri, NASA, NGA, USGS, Esri, CGIAR, USGS

Stantec

During the rehabilitation and closure phase, groundwater inflows to the open pits were predicted to occur as the open pits fill and hydraulic equilibrium is gradually re-established with surrounding groundwater levels. Model results suggest that the Iceberg, Jackpot, and Dome pits will not overflow due to groundwater inflow alone, as simulated groundwater levels equilibrated at elevations lower than the overflow elevations. The inflow rates to the open pits at the various stages of filling are presented in Table 8.13.

Table 8.13 Modelled Groundwater Inflow Rates to the Open Pits (Rehabilitation and Closure Phase)

Open Pit	Inflow at End of Operation (m^3/day)	Inflow at Half Filled Pit Lake (m^3/day)	Inflow at Overflowing Condition (m^3/day)
Keats	-1,179	-1,101	-876
Iceberg	-515	-466	0 [1]
Jackpot	-222	-144	0 [1]
Dome	-245	-111	0 [1]
Total	**-2,161**	**-1,822**	**-876**

Notes:

[1] Indicates that the pit will not overflow by groundwater alone, as groundwater equilibrated at an elevation lower than the overflow elevation.

m^3/day – cubic metre(s) per day

The effect of the rehabilitation and closure phase on baseflow is provided in Table 8.14. The model results suggest that simulated baseflow during rehabilitation and closure for surface water Catchment Zone 2 and Zone 4 were largely unchanged (≤2%) from the baseline values, which suggests negligible change in groundwater discharge. Surface water Catchment Zone 3 reported a 14% decrease in baseflow compared to baseline (from -12,960 to -11,178 m^3/day), indicating a partial but incomplete recovery of groundwater discharge following pit flooding.

Table 8.14 Simulated Baseflow (Rehabilitation and Closure Phase)

Catchment Zone	Area (km^2)	Simulated Baseflow (m^3/day)		Change (m^3/day)	Percent Reduction (%)
		Baseline	Closure		
Zone 2	7.34	-6,310	-6,199	111	-2
Zone 3	12.49	-12,960	-11,178	1,782	-14
Zone 4	58.17	-48,832	-48,818	14	-0.03

Notes:

km^2 – square kilometre(s)

m^3/day – cubic metre(s) per day

8.4.2.4 Summary of Effects on Groundwater Quantity

Based on the information presented above, and the implementation of mitigation and management measures, Project related effects are predicted to be:

- **Magnitude:** Through the application of mitigation measures, residual effects from the Project on changes to groundwater quantity and flow are anticipated to result in a measurable change that is elevated above baseline conditions during the operation and rehabilitation and closure phases, since drawdown near the open pits is predicted to be up to approximately 60 m during the operation phase and residual drawdown of up to approximately 7 m is predicted to remain around the open pit perimeters during the rehabilitation and closure phase (i.e., incomplete recovery to baseline conditions). During the construction phase, residual effects are anticipated to be within normal variability that would be expected relative to baseline conditions.
- **Geographic Extent:** Project effects on groundwater quantity and flow are expected to be confined to the LAA/RAA during the construction, operation, and rehabilitation and closure phases.
- **Duration:** Residual effects for the construction phase will be restricted to the construction phase and on an as-needed bases (i.e., short-term duration). Residual effects for the operation and rehabilitation and closure phases will extend beyond the life of the Project (i.e., long-term duration), as groundwater levels are not expected to return to baseline after Project activities have ceased and the site entered the rehabilitation and closure phase.
- **Frequency:** Residual effects will occur continuously during the construction, operation, and rehabilitation and closure Project phases.
- **Reversibility:** Residual effects will be reversible during the construction phase, however during the operation and rehabilitation and closure phases, residual effects are unlikely to be reversed.

8.4.3 Change in Groundwater Quality

Groundwater quality effects can include changes in groundwater chemistry near Project components and may adversely affect groundwater quality in wells should they be located in proximity to Project activities, and contaminated discharge to local surface water.

8.4.3.1 Construction

Project activities during construction that could affect groundwater quality are mine site preparation and earthworks. During construction, groundwater quality effects can include changes in groundwater chemistry from infiltrating water in exposed areas of overburden removal. The short duration of the construction period is not anticipated to result in metal leaching / acid rock drainage issues; therefore, groundwater quality effects are not anticipated during construction, with eventual changes to water quality, if any, observed during operation.

8.4.3.2 Operation

During operation, the Project activities and components that may interact with groundwater quality and result in adverse environmental effects include open pit mining, management of overburden and waste rock, and water management. The overburden storage facility, ore stockpile, and WRSF have the potential to affect groundwater quality. Infiltration into the overburden storage facility, ore stockpile, and WRSF from precipitation may result in seepage or recharge out of the base of the stockpiles to groundwater and/or surface water receivers. This seepage from the stockpiles will migrate through overburden and shallow bedrock toward discharge points at streams, lakes, or wetlands. Based on the topography and drainage characteristics of the Project Area, groundwater transport pathways from a source to a receptor steam or lake are likely to be short (i.e., less than a few hundred metres). Given the distance to the nearest domestic water well, surface water features would be the primary receptor of contact seepage from the stockpiles. Predicted water quality from source areas during operation and predicted discharge to surface water receivers from Project components during operation are summarized in this section.

The estimated mean seepage quality during operation from the overburden storage facility, ore stockpile, and WRSF is presented in Table 8.15. The mean arsenic groundwater seepage, at the end of operation, is predicted to be 0.21 milligrams per litre (mg/L) from the overburden storage facility, 2 mg/L from the ore stockpile, and 0.98 mg/L from the WRSF. These concentrations exceed the arsenic MDMER limit of 0.10 mg/L. No other parameters are expected to exceed the MDMER in seepage to groundwater during operation.

Table 8.15 Predicted Mean Concentrations of Groundwater Seepage from Project Components (Operation Phase)

Parameter	Units	MDMER[1]	Overburden Storage Facility	Ore Stockpile	WRSF
Sulphate	mg/L	-	83	51	92
Chloride	mg/L	-	8.9	15	14
Fluoride	mg/L	-	1.9	0.79	2.3
Phosphate	mg/L	-	0.35	0.5	0.56
Ammonia	mg/L	-	0	0.56	1.2
Nitrate	mg/L	-	0.86	4.2	9.3
Nitrite	mg/L	-	0.0087	0.17	0.21
Aluminum	mg/L	-	2.2	0.7	2.4
Antimony	mg/L	-	0.084	0.042	0.054
Arsenic	mg/L	0.10	**0.21**	**2.0**	**0.98**
Barium	mg/L	-	0.069	0.056	0.2
Beryllium	mg/L	-	0.0017	0.0043	0.0028
Bismuth	mg/L	-	0.017	0.015	0.011
Boron	mg/L	-	0.30	0.15	0.38
Cadmium	mg/L	-	0.0002	0.0003	0.0003
Calcium	mg/L	-	114	78	144

Table 8.15 Predicted Mean Concentrations of Groundwater Seepage from Project Components (Operation Phase)

Parameter	Units	MDMER[1]	Overburden Storage Facility	Ore Stockpile	WRSF
Chromium	mg/L	-	0.017	0.013	0.011
Cobalt	mg/L	-	0.0034	0.004	0.013
Copper	mg/L	0.10	0.017	0.015	0.032
Iron	mg/L	-	1.1	0.34	1.1
Lead	mg/L	0.08	0.0033	0.002	0.0039
Magnesium	mg/L	-	22	12	21
Manganese	mg/L	-	0.45	0.32	0.74
Mercury	mg/L	-	0.0002	0.0002	0.0003
Molybdenum	mg/L	-	0.06	0.02	0.14
Nickel	mg/L	0.25	0.0087	0.0091	0.021
Potassium	mg/L	-	12	4.9	14
Selenium	mg/L	-	0.017	0.012	0.018
Silver	mg/L	-	0.0017	0.0013	0.0028
Sodium	mg/L	-	9.1	11	8.4
Strontium	mg/L	-	0.86	0.9	1.4
Thallium	mg/L	-	0.0017	0.0013	0.0028
Tin	mg/L	-	0.0069	0.0085	0.012
Uranium	mg/L	-	0.005	0.0014	0.019
Vanadium	mg/L	-	0.017	0.015	0.022
Zinc	mg/L	0.40	0.07	0.056	0.11

Notes:
[1] MDMER, Schedule 4, Table 1, Maximum Authorized Monthly Mean Concentration
"-" – Not applicable
Bold and Shaded – Concentration exceeds the indicated criteria.

The fate of seepage through the overburden storage facility, ore stockpile, and WRSF under the groundwater flow condition representative of operation was predicted using the three-dimensional groundwater flow model (Appendix 8.A). The fate of seepage at the end of operation is presented on Figure 8.16, which shows there are no known groundwater users located within the seepage pathways of the Project components.

The particle traces were used to quantify the discharge rates and travel times to the receiving environment during the operation phase and are summarized in Table 8.16.

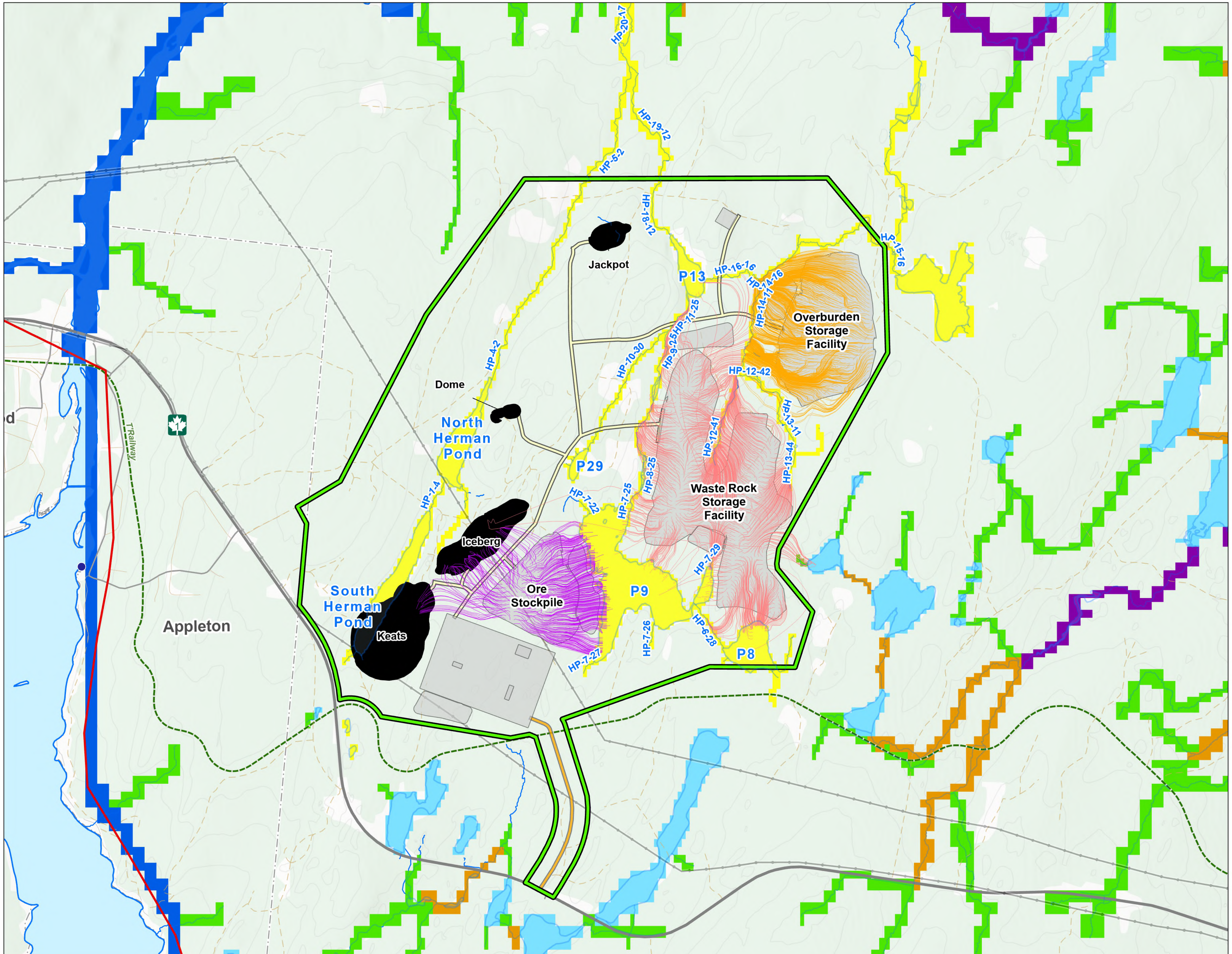


Figure No.

8.16

Title

Predicted Particle Traces from Project Components to the Receiving Environment - Operation Phase

Client/Project 121418510_406

New Found Gold Corp.
Queensway Gold Project
Groundwater Modelling

Project Location
North Gander Lake,
Newfoundland and Labrador

Prepared by AC on 2025-12-18
QR by NW on 2026-04-01
TR by SS on 2026-03-23

N

0 0.5 1 km

(At original document size of 11x17)
1:25,000

Project Area

Model Features

Particle Tracking (Operations)
- Ore Stockpile
- Overburden Storage Facility
- Waste Rock Storage Facility

River Order
- 1
- 2
- 3

Model Boundaries
- CHD
- GHB (Ponds and Lakes)
- DRN
- Open Pit - No Flow

Proposed Project Layout
- Access Road
- Haul Road
- Proposed Site Features

Well Location (Existing users, 12 different wells)

Existing Infrastructure
- Transmission Line
- Highway
- Collector
- Local / Street
- Resource Road / Trail
- NL T'Railway Provincial Park

Administrative Boundaries
- Municipal Boundary
- Waterbody

Land Cover
- Forested Area
- Non-forested Area

Notes
1. Coordinate System: NAD 1983 CSRS UTM Zone 21N
2. Data Sources: New Found Gold Corp.; Stantec.
3. Background: Government of Newfoundland and Labrador, Department of Environment, Conservation, and Climate Change; Department of Forestry, Agriculture and Lands - Land Use Atlas Mapping Service; Department of Municipal and Community Affairs; Additional topographic basemapping from Esri, NASA, NGA, USGS, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community, Esri, USGS

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Table 8.16 Predicted Discharge Rates and Travel Times from Project Components to the Receiving Environment (Operation Phase)

Source	Receiver	Discharge (m^3/day)	Travel Time (Year)		
			5th Percentile	50th Percentile	95th Percentile
Overburden Storage Facility	HP-13-11	1	0.19	0.19	0.19
	HP-14-11	44	0.05	0.08	35
	HP-14-16	35	0.05	0.09	193
	HP-14-43	16	0.05	0.11	48
	HP-15-16	4	0.03	0.04	0.05
	Sum	**100**	-	-	-
Ore Stockpile	P9	217	0.05	0.09	190
	Iceberg	60	19	87	1,845
	Keats	8	58	114	1,102
	Sum	**285**	-	-	-
WRSF	HP-11-25	12	0.05	19	4,550
	HP-12-41	395	0.02	0.06	93
	HP-12-42	36	0.03	0.06	160
	HP-13-11	19	0.04	0.10	297
	HP-13-44	113	0.03	0.07	0.23
	HP-14-11	26	0.07	0.12	845
	HP-14-16	1	0.29	0.29	0.29
	HP-16-16	3	0.26	0.29	20
	HP-6-28	22	0.06	0.08	706
	HP-7-29	64	0.03	0.08	63
	HP-8-25	133	0.02	0.06	171
	HP-9-25	27	0.07	1	1,066
	P8	120	0.02	0.06	19
	P9	75	0.03	0.11	1,093
	P13	2	0.28	0.29	0.30
	Out of Catchment Zone 3	19	0.09	9	10
	Sum	**1,067**	-	-	-

Note:
m^3/day – cubic metre(s) per day

The predicted groundwater flow pathway of seepage from the overburden storage facility is generally west towards receivers HP-14-11, HP-14-16, HP-14-43, HP-15-16, and HP-16-16. The lower bound estimate of predicted travel times from the overburden storage facility to a surface water feature is 0.03 years to HP-15-16.

The predicted groundwater flow pathway of seepage from the ore stockpile is generally west towards the Iceberg and Keats pits and east towards Lake P9. The lower bound estimate of predicted travel times from the ore stockpile to a surface water feature is 0.05 years to Lake P9.

The predicted groundwater flow pathway of seepage from the WRSF is generally to the north towards HP-11-25, HP-12-41, HP-12-42, HP-13-11, HP-14-11, HP-14-16, HP-16-16, and P13; to the east towards HP-13-44; to the south towards HP-6-28, HP-7-29, Lake P8, and Lake P9; and to the west towards HP-8-25 and HP-9-25. The lower bound estimate of predicted travel times from the WRSF to a surface water feature is 0.02 years to HP-12-41 and HP-8-25.

The three-dimensional groundwater flow model was also used to predict the discharge of seepage from the overburden storage facility, ore stockpile, and WRSF to surface water features.

For the overburden storage facility, the total predicted seepage of 100 m^3/day primarily reported to monitoring locations HP-14-11 (44 m^3/day), HP-14-16 (35 m^3/day), and HP-14-43 (16 m^3/day), with minor contributions to other receivers.

Seepage from the ore stockpile was predicted to discharge to the Iceberg Pit, which captured approximately 21% (60 m^3/day of 285 m^3/day) and Keats Pit, which captured 3% (8 m^3/day of 285 m^3/day) of discharge, with the remainder discharged toward Lake P9 (217 m^3/day).

For the WRSF, the total predicted seepage was 1,067 m^3/day. The largest predicted discharges were to HP-12-41 (395 m^3/day), HP-8-25 (133 m^3/day), HP-13-44 (113 m^3/day), and P8 (120 m^3/day), with additional contributions distributed among other receivers and outside the catchment (19 m^3/day).

As the seepage from the stockpiles may affect surface water quality, the effects are further characterized in Section 9 (Surface Water Resources).

8.4.3.3 Rehabilitation and Closure

During rehabilitation and closure, the overburden storage facility and ore stockpile will be depleted and rehabilitated and are not predicted to act as sources post-closure. The main potential effect to groundwater quality during rehabilitation and closure is the continued seepage from the WRSF through overburden and bedrock, although re-vegetation of the WRSF during progressive and closure rehabilitation will reduce seepage from operational levels. Predicted groundwater quality effects from the WRSF post-closure and predicted discharge to surface water receivers post-closure are summarized in this section. As the seepage from the WRSF may affect surface water quality, the effects are further characterized in Section 9 (Surface Water Resources).

Table 8.17 provides a summary of mean concentrations for groundwater seepage originating from the overburden storage facility, ore stockpile, and WRSF during rehabilitation and closure. The mean arsenic groundwater seepage, post-closure, is predicted to be 0.67 mg/L from the WRSF. This concentration exceeds the arsenic MDMER limit of 0.10 mg/L. No other parameters are predicted to exceed the MDMER limits during rehabilitation and closure.

Table 8.17 Predicted Mean Concentrations of Groundwater Seepage from Project Components (Rehabilitation and Closure Phase)

Parameter	Units	MDMER[1]	WRSF
Sulphate	mg/L	-	84
Chloride	mg/L	-	12
Fluoride	mg/L	-	2.1
Phosphate	mg/L	-	0.47
Ammonia	mg/L	-	0.14
Nitrate	mg/L	-	1.1
Nitrite	mg/L	-	0.025
Aluminum	mg/L	-	2
Antimony	mg/L	-	0.037
Arsenic	mg/L	0.10	**0.67**
Barium	mg/L	-	0.16
Beryllium	mg/L	-	0.0023
Bismuth	mg/L	-	0.005
Boron	mg/L	-	0.31
Cadmium	mg/L	-	0.00023
Calcium	mg/L	-	120
Chromium	mg/L	-	0.005
Cobalt	mg/L	-	0.011
Copper	mg/L	0.10	0.027
Iron	mg/L	-	1.1
Lead	mg/L	0.08	0.0035
Magnesium	mg/L	-	17
Manganese	mg/L	-	0.61
Mercury	mg/L	-	0.00023
Molybdenum	mg/L	-	0.077
Nickel	mg/L	0.25	0.019
Potassium	mg/L	-	10
Selenium	mg/L	-	0.013
Silver	mg/L	-	0.0023
Sodium	mg/L	-	7
Strontium	mg/L	-	1.2
Thallium	mg/L	-	0.0023

Table 8.17 Predicted Mean Concentrations of Groundwater Seepage from Project Components (Rehabilitation and Closure Phase)

Parameter	Units	MDMER[1]	WRSF
Tin	mg/L	-	0.0083
Uranium	mg/L	-	0.015
Vanadium	mg/L	-	0.017
Zinc	mg/L	0.40	0.088

Notes:
[1] MDMER, Schedule 4, Table 1, Maximum Authorized Monthly Mean Concentration
"-" – Not applicable
Bold and Shaded – Concentration exceeds the indicated criteria.

The fate of seepage that recharges beneath the WRSF at closure was predicted using the three-dimensional groundwater flow model (Appendix 8.A). The fate of seepage at closure is presented on Figure 8.17 and was used to quantify the discharge rates and travel times to the receiving environment from the WRSF. The results are summarized in Table 8.18.

The total predicted seepage of 545 m^3/day from the WRSF is predicted to primarily report to HP-14-11 (149 m^3/day), HP-8-28 (72 m^3/day), HP-6-28 (71 m^3/day), HP-13-44 (63 m^3/day), Lake P9 (28 m^3/day), and HP-7-29 (25 m^3/day), with minor contributions to other receivers.

As noted above, as the seepage from the WRSF may affect surface water quality, the effects are further characterized in Section 9 (Surface Water Resources).

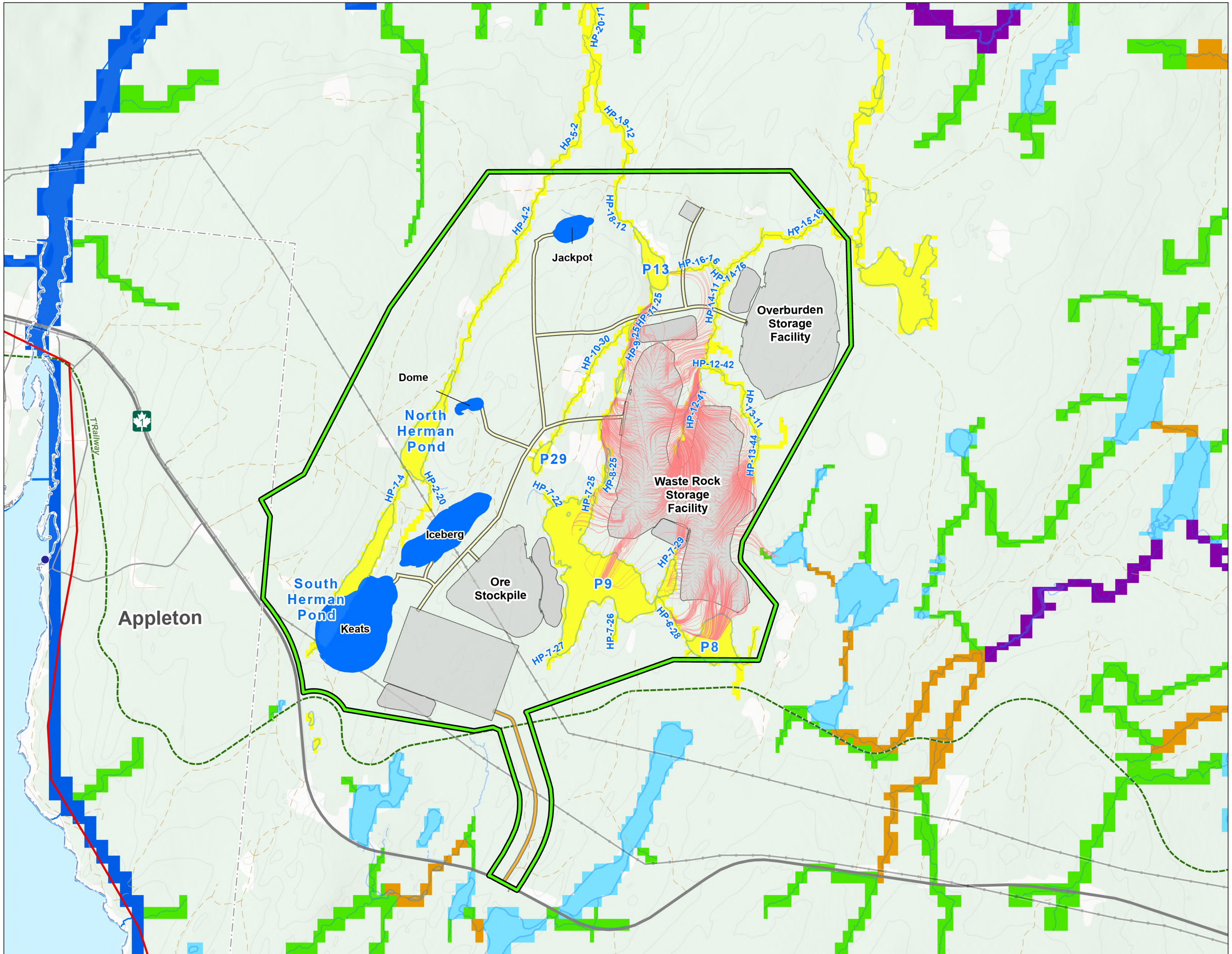


Figure No.
8.17

Title
Predicted Particle Traces from Project Components to the Receiving Environment - Rehabilitation and Closure Phase

Client/Project 121418510_409
New Found Gold Corp.
Queensway Gold Project
Groundwater Modelling

Project Location
North Gander Lake,
Newfoundland and Labrador

Prepared by AC on 2025-12-18
QR by NW on 2026-04-01
TR by SS on 2026-03-23

N

0 0.5 1 km
(At original document size of 11x17)
1:25,000

- Project Area
- Study Area

Model Features

Particle Tracking (Closure)
- Waste Rock Storage Facility

River Order
- 1
- 2
- 3

Model Boundaries
- CHD (Gander River and Pits)
- GHB (Ponds and Lakes)
- DRN

Proposed Project Layout
- Access Road
- Haul Road
- Proposed Site Features

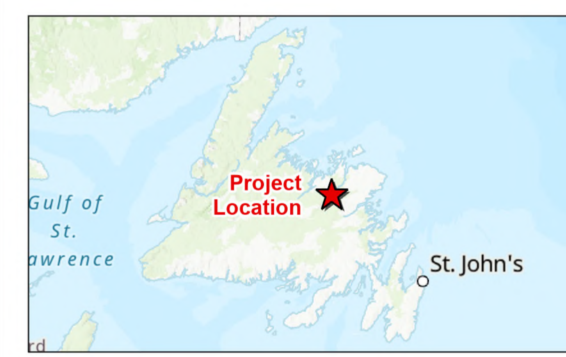
- Well Location (Existing users, 12 different wells)

Existing Infrastructure
- Transmission Line
- Highway
- Collector
- Local / Street
- Resource Road / Trail
- NL T'Railway Provincial Park

Administrative Boundaries
- Municipal Boundary

Waterways
- Watercourse
- Waterbody

Land Cover
- Forested Area
- Non-forested Area



Notes
1. Coordinate System: NAD 1983 CSRS UTM Zone 21N
2. Data Sources: New Found Gold Corp.; Stantec.
3. Background: Government of Newfoundland and Labrador, Department of Environment, Conservation, and Climate Change; Department of Forestry, Agriculture and Lands - Land Use Atlas Mapping Service; Department of Municipal and Community Affairs; Additional topographic basemapping from Esri, NASA, NGA, USGS, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community, Esri, USGS

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Table 8.18 Predicted Discharge Rates and Travel Times from Project Components to the Receiving Environment (Rehabilitation and Closure Phase)

Source	Receiver	Discharge (m^3/day)	Travel Times (Year)		
			5th Percentile	50th Percentile	95th Percentile
WRSF	HP-11-25	5	0.05	12	8,600
	HP-12-41	100	0.04	0.12	268
	HP-13-11	1	4	42	79
	HP-13-44	63	0.04	0.09	6
	HP-14-11	149	0.08	0.18	0.25
	HP-16-16	4	0.28	1	167
	HP-6-28	71	0.10	18	18
	HP-7-29	25	0.03	0.13	230
	HP-8-28	72	0.03	0.08	198
	HP-9-25	14	0.07	0.10	344
	P9	28	1	3	569
	Out of Catchment Zone 3	13	0.06	1	10
	Sum	**545**	-	-	-

Note:
m^3/day – cubic metre(s) per day

8.4.3.4 Summary of Effects on Groundwater Quality

Groundwater modelling completed to date predicts arsenic levels in groundwater seepage surrounding the overburden storage facility, ore stockpile, and WRSF to be above the MDMER concentration limit of 0.1 mg/L. Interception wells or deep sumps within the perimeter drainage ditches around the WRSF, ore stockpile, and overburden storage facility will be installed to intercept groundwater seepage that exceeds MDMER Schedule 4 Table 1 limits prior to discharging to local surface water receivers (as required). Water will be transferred to the site-wide contact water management system for treatment prior to discharge to the environment. Accepted industry best practice geochemistry methods will be used to predict mine contact runoff and seepage quality. Seepage from the WRSF to local surface water receivers during closure is predicted to potentially require treatment during the post-closure phase. Passive treatment systems will be potentially installed (as required) in seepage collection ditches and sedimentation ponds (e.g., permeable reactive barriers, engineered wetlands) to reduce metal/metalloid concentrations to baseline concentrations.

Based on the information presented above, and the implementation of mitigation and management measures, Project related effects are predicted to be:

- **Magnitude:** Through the application of mitigation measures, residual effects from the Project on changes to groundwater quality are anticipated to result in a measurable change that is elevated above baseline conditions during the operation and rehabilitation and closure Project phases, since seepage concentrations of arsenic from the overburden storage facility, ore stockpile, and WRSF are predicted to exceed the MDMER criteria. During the construction phase, residual effects are anticipated to be within normal variability that would be expected relative to baseline conditions. As the seepage from the WRSF, ore stockpiles and overburden storage facility may affect surface water quality, these effects, in consideration of the mitigation identified above, are further characterized in Section 9 (Surface Water Resources).
- **Geographic Extent:** Project effects on groundwater quality are expected to be confined to the LAA/RAA during the operation and rehabilitation and closure phases.
- **Durations:** Residual effects will be long-term in duration and will extend beyond the life of the Project.
- **Frequency:** Residual effects will occur continuously during the operation and rehabilitation and closure Project phases.
- **Reversibility:** Residual effects, during the operation and rehabilitation and closure phases, are predicted to be irreversible as the WRSF will be a permanent feature on the landscape that will continue to effect groundwater seepage. Groundwater quality will improve over time, however the arsenic concentration during rehabilitation and closure is predicted to exceed MDMER. Potential effects on surface water quality, in consideration of the mitigation identified above, are further characterized in Section 9 (Surface Water Resources).

8.4.4 Summary

Overall, with the application of mitigation and management measures, residual adverse effects on Groundwater Resources are predicted to be not significant.

The main residual effect on groundwater quantity and flow identified in this assessment is the lowering of the water table as a result of open pit dewatering, thereby altering groundwater flow patterns and recharge rates, affecting groundwater discharge to surface water features and wetlands. This effect will be most notable during the operation phase, and to a lesser extent during closure as the open pits fill and groundwater levels recover.

The threshold for significance defined in Section 8.2 for groundwater quantity relates to the reduction in groundwater availability for existing well users in the Project Area due to long-term dewatering of the open pits. There are no known third-party groundwater users located within the portion of the LAA/RAA where lowering of the water table is predicted. Groundwater discharge to surface water features will be affected by the dewatering of the open pits. Potential effects to surface water features and wetlands as a result of a reduction in groundwater discharge and/or levels are further assessed in the Surface Water Resources VC (Section 9).

The main residual effect on groundwater quality in this assessment is the release of contact seepage from Project components (i.e., overburden storage facility, ore stockpile, and WRSF) to the end receptor. This effect will be most notable during the operation phase and post-closure when the predicted mean concentration of seepage from Project components exceeds the MDMER limit for arsenic (0.10 mg/L) and the travel times to the surface water receivers are less than one year. This effect will be mainly confined to the Project Area, with a portion of the groundwater flow paths from the Project components extending to the LAA/RAA. Potential effects on surface water will be mitigated as further described and assessed in Section 9 (Surface Water Resources).

The threshold for significance defined in Section 8.2 for groundwater quality relates to the degradation of groundwater quality in potable water supplies compared to applicable guidelines. No potable groundwater users are known within the predicted pathways for seepage from Project components, therefore, the residual effects of the Project on the groundwater quality during each Project phase are not significant. The effect of the groundwater quality discharging to surface water features is evaluated in Section 9.

Based on application of the mitigation measures identified in Section 8.3 and New Found Gold's commitment to comply with regulatory standards, residual environmental effects on Groundwater Resources are likely to be not significant. The assessment of existing conditions and the conceptual model representing groundwater processes are based on industry standards and practices for quality assurance and control, which are applied to both field and laboratory procedures. The predicted effects to groundwater levels and baseflow from the Project are based on a steady-state groundwater flow model. Prediction confidence is high because the groundwater flow model was calibrated within an acceptable range of error for groundwater levels and groundwater discharge to surface water features. As discussed in the Groundwater Modelling report (Appendix 8.A), predictions made using the model are based on several conservative assumptions and a factor of safety of two was applied to groundwater inflow estimates for pits that are close to the existing locations of watercourses and ponds.

8.5 Follow-up and Monitoring Programs

Follow-up and monitoring programs are intended to verify the accuracy of predictions made during the environmental assessment, to assess the implementation and effectiveness of mitigation and the nature of the residual effects, and to manage adaptively, if required. New Found Gold, in consultation with the Water Resources Management Division of NLDECCC, will establish a groundwater monitoring network that can include real-time monitoring and be comprised of groundwater monitoring wells for monitoring groundwater quality and quantity. New Found Gold will bear the reasonable costs associated with the monitoring network to collect baseline data before Project commencement and throughout the life of the Project.

During Project development, a groundwater monitoring program will be implemented for main Project components, building on the baseline groundwater study, to confirm potential changes in groundwater associated with Project activities. The groundwater monitoring program will be developed based on regulatory requirements for both quantity and quality and will be continued during closure and will document water quality and recovery in groundwater levels across the Project Area.

Groundwater monitoring well locations were selected in consultation with New Found Gold and between 2023 and 2025, 21 monitoring wells were installed throughout the Project Area (Figure 8.5). Groundwater monitoring will be completed on a quarterly basis and will include groundwater sample collection for chemical analysis, manual water level measurement, and data retrieval from automated water level dataloggers. Analytical results will be compared to the GCDWQ and Atlantic RBCA criteria to identify parameters that may be elevated compared to baseline conditions.

Groundwater monitoring well locations will be reviewed at regular intervals. Monitoring locations may be added or removed from the monitoring program in accordance with their utility in monitoring the effects of the Project on the environment.

Monitoring well locations will be maintained until the location is no longer required. If a monitoring well location is no longer required but is identified as part of a regulatory approval, it will only be removed from the monitoring program once the required amendments are approved.

8.6 References

AMEC. 2013. Hydrogeology of Western Newfoundland. Submitted to Water Resources Management Division, Department of Environment and Conservation, Government of Newfoundland and Labrador. Report No. TF8312717. Dated March 2013.

Atlantic RBCA (Atlantic Risk Based Corrective Action). 2022. Ecological Tier I Environmental Quality Standard (EQS) for Groundwater (µg/L). Updated July 2022.

Batterson, M.J. 2000. Landforms and Surficial Geology of the Gander Map Sheet (NTS 2D/15). Newfoundland Department of Mines and Energy, Geological Survey. Map 2000-19, Open File 02D/15/0350.

Blackwood, R.F. 1982. Gander River, Newfoundland. Map 80-031. Scale: 1:50 000. In Geology of the Gander Lake (2D/15) and Gander River (2E/2) Area. Government of Newfoundland and Labrador, Department of Mines and Energy, Mineral Development Division. Report 82-04.

Bouwer, H. and R.C. Rice. 1976. A Slug Test Method for Determining Hydraulic Conductivity of Unconfined Aquifers with Completely or Partially Penetrating Wells. *Water Resources Research* 12, no. 5: 423-428.

Cooper, H. H. and C. E. Jacob. 1946. A generalized graphical method for evaluating formation constants and summarizing well field history, Am. Geophys. Union Trans., vol. 27, pp. 526-534.

Currie, K.L. 1995. Geology, Gander River, Newfoundland. Scale: 1:50 000. Geological Survey of Canada. Open File 03162.

ECCC (Environment and Climate Change Canada). 2025. Canadian Climate Normals 1991-2020. Available at: https://climate.weather.gc.ca/climate_normals/. Accessed on January 12, 2026.

ESI (Environmental Simulations Inc.). 2024. Groundwater Vistas Version 9. 254 Ziegler Road, Leesport, PA, 19533.

GEMTEC (GEMTEC Consulting Engineers and Scientists Limited). 2023. Preliminary Baseline Hydrogeology Study New Found Gold Corp. Queensway North Project. Prepared for New Found Gold Corp. July 19, 2023. Project No. 100424.001.

GEMTEC. 2024. 2023 Baseline Geotechnical and Hydrogeological Studies, Queensway North Project. Prepared for New Found Gold Corp. April 10, 2024. Project No. 100424.004.

Harbaugh, A.W. 2005. MODFLOW-2005, the U.S. Geological Survey modular ground-water model—the Ground-Water Flow Process: U.S. Geological Survey Techniques and Methods 6-A16.

Health Canada. 2025. Guidelines for Canadian Drinking Water Quality – Summary Tables. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch, Health Canada, Ottawa, Ontario.

Liverman, D. and D. Taylor. 1990. Surficial Geology of Insular Newfoundland. Geological Survey Branch, Department of Mines and Energy, Government of Newfoundland and Labrador. Map 90-08. Scale: 1:500 000.

Newfoundland and Labrador Department of Energy and Mines. 2013. Geoscience Atlas. Available at: https://geoatlas.gov.nl.ca/Default.htm. Accessed on November 12, 2025.

NLDECCC (Newfoundland and Labrador Department of Environment, Conservation and Climate Change). 2025. Drilled Water Well Database for Newfoundland and Labrador, 1950 – December 2025.

Piper, A.M. 1944. A graphical procedure in the geochemical interpretation of water analyses. *Transactions, American Geophysical Union*, 25: 914-23.

Scott, S. and D.M. Taylor. 2012. Surficial Geology of the Gander River Map Area (NTS 2E/02). Government of Newfoundland and Labrador, Department of Natural Resources, Geological Survey. Map 2012-09. Open File 2E/02/1717.

Stantec (Stantec Consulting Ltd.). 2025. Queensway North Property – 2024 Groundwater Monitoring Program. Final Report prepared for New Found Gold Corp. July 4, 2025. 11 pp. + Appendices.

Theis, C.V. 1935. “The Relation Between the Lowering of the Piezometric Surface and the Rate and Duration of Discharge of a Well Using Groundwater Storage.” *Am. Geophys. Union Trans* 16: 519 – 524.

9 Surface Water Resources

Surface Water Resources were selected as a valued component (VC) because they have the potential to both influence, and be influenced by, Project activities. Surface water plays a key role in the hydrological cycle and the regional environment. The assessment will consider effects on surface water quantity and quality, considering effects on human and ecological uses, fish and aquatic habitats, and local socio-economic factors. Project activities may affect surface water systems by altering drainage patterns, managing water, and disturbing land, which can change how water flows and connects across the area. These changes could affect water levels and quality in nearby streams, ponds, and wetlands, depending on where, when, and how the work is done.

A Certificate of Approval, issued by Newfoundland and Labrador (NL) Department of Environment, Conservation and Climate Change (NLDECCC), is required for both construction and operation phases of a mine and sets concentration limits for specific parameters in the discharge effluent (typically those provided in the *Metal and Diamond Mining Effluent Regulations* [MDMER] under the federal *Fisheries Act*). The *Environmental Control Water and Sewage Regulations*, under the NL *Water Resources Act*, regulate the discharge of sewage and other effluent and specifies that the metal mining industry must comply with MDMER. Several sections (32, 35, and 36) and subsections of the *Fisheries Act* pertain to surface water and potential interactions with a Project, as does MDMER, and the Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life (CWQG-FAL).

As shown on Figure 9.1, Project spatial boundaries for Surface Water Resources include the Project Area (the immediate area in which Project activities and components occur), the Local Assessment Area (LAA, includes the Project Area and the watersheds that interact with the Project Area) and the Regional Assessment Area (RAA, incorporates the Project Area and LAA, and extends to include a larger portion of the Gander River system to provide regional context for potential effects).

A significant adverse residual effect on surface water quantity is defined as a measurable change in hydrological and/or sediment transport regime that does not meet established instream flow needs (environmental flow thresholds) and contravenes a watershed management target, including:

- An uncompensated loss of fish habitat
- Changes to flow that increase sedimentation and erosion above regulatory guidance in waterbodies receiving surface water runoff
- Changes to flows that cause flooding downstream of the Project beyond existing conditions
- Changes to pond and lake levels outside the Project Area to a point that it affects their ability to support existing ecological functions

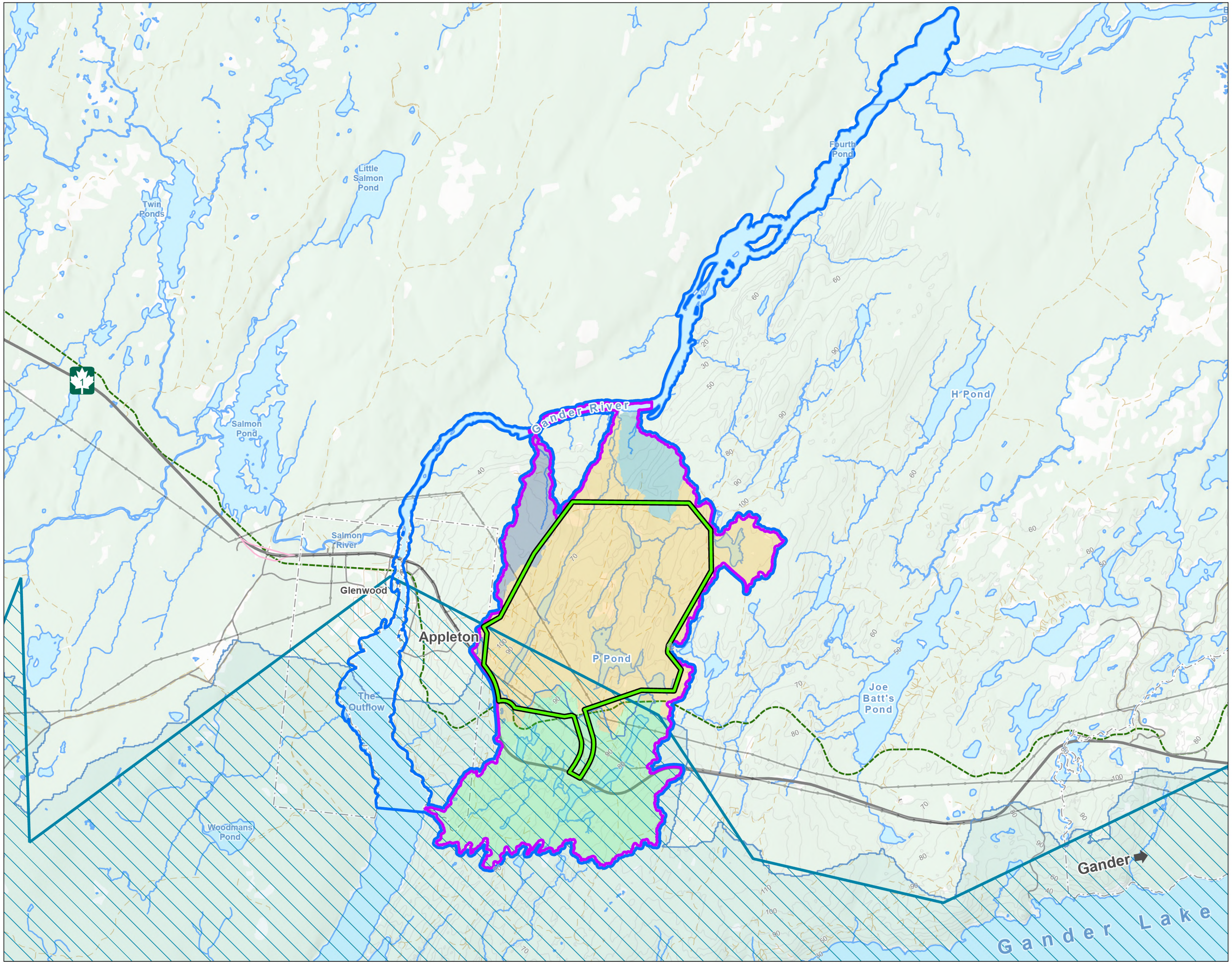


Figure No.
9.1

Title
Surface Water Spatial Boundaries

Client/Project 121418510_127
New Found Gold Corp.
Queensway Gold Project

Project Location
North Gander Lake
Newfoundland and Labrador

Prepared by NW on 2025-11-14
Updated by NW on 2026-03-05
TR by JR on 2026-03-03

N

0 0.5 1 2 km
(At original document size of 11x17)
1:65,000

- Project Area
- Local Assessment Area
- Regional Assessment Area

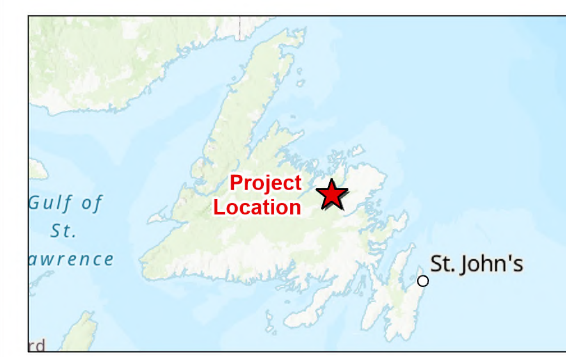
Watersheds
- Protected Surfacewater Boundary (NLDFAL)
- Gander Lake Watershed (NLDECCC-WRMD)

Watershed Delineation (Stantec 2025)
- GLT1 (Gander Lake Tributary 1)
- GRT1 (Gander River Tributary 1)
- GRT2 (Gander River Tributary 2)
- HP (Hermans Pond)

Wetlands and Waterways
- Watercourse
- Waterbody

Existing Infrastructure
- Transmission Line
- Highway
- Collector
- Local / Street
- Ramp
- Resource Road / Trail
- NL T'Railway Provincial Park

Other Features
- Contour (10 m)
- Municipal Boundaries



Notes
1. Coordinate System: NAD 1983 CSRS MTM 2
2. Data Sources: New Found Gold Corp.; Stantec; Government of Newfoundland and Labrador, Department of Environment, Conservation and Climate Change, Department of Forestry, Agriculture and Lands - Land Use Atlas Mapping Service, Department of Municipal and Community Affairs; National Road Network, Statistics Canada.
3. Background: Government of Newfoundland and Labrador, Department of Forestry, Agriculture and Lands - Land Use Atlas Mapping. Esri, NASA, NGA, USGS, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community, Esri, USGS

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A significant adverse residual effect on surface water quality is defined as a measurable change in water quality that exceeds an implemented water quality requirement, such as MDMER limits or a site-specific water quality guideline for the protection of aquatic life, or contravenes a watershed management target, including:

- degrading water quality that causes acute or chronic toxicity to aquatic life
- changes the trophic status of a lake or stream
- exceeds the generally accepted total suspended solids (TSS) monitoring guideline (the CCME CWQG-FAL) applied for Project activities

9.1 Existing Conditions

9.1.1 Approach and Methods

Existing surface water conditions have been determined through both desktop methods and field programs. The methods used to acquire information on existing conditions for the Surface Water VC are presented in the following sections.

9.1.1.1 Surface Water Quantity

9.1.1.1.1 Physiographic Setting

Information on the physiographic setting of the Project was gathered using historical and publicly available sources. The physiographic setting of the Project was compiled through a review of climate data (e.g., temperature and precipitation data, applicable intensity-duration-frequency [IDF] curves, evapotranspiration data, climate change predictions), as well as through a consideration of surface feature soils, topography, and vegetation.

9.1.1.1.2 Regional Hydrology

Assessment of the regional hydrology included completion of a regional flow assessment (mean monthly flows [MMFs], mean annual flows [MAFs], peak return period runoff rate, and baseflow), flow duration curves (FDCs), as well as the calculation of low and environmental flows.

Regional Flow Assessment

A regional assessment using publicly available hydrometric data for stations operated by the Water Survey of Canada (WSC) was developed to define relationships between watershed area and hydrological statistics (MAF, MMF, peak flows, low flows, and environmental flows).

The WSC stations were first assessed using a series of selection criteria before assuming homogeneity between sites. Transpositional scaling assumes homogeneity will be more likely due to their proximity, similar climate and physiographic conditions between the selected regional WSC stations. The following criteria were used for WSC station selection for the homogeneity test assessment:

1. WSC station watershed has an area no greater than one order of magnitude difference to the largest LAA watercourse watershed, limited to less than 100 square kilometres (km^2) gross drainage area.
2. The station is located less than 150 kilometres (km) from the Project Area to maintain climatic and physiographic comparability with local watersheds, with comparisons of annual precipitation between sites and the LAA to determine coastal versus continental climate regime.
3. The station has a period of record that falls within one climate normal period - preferably the most recent Environment and Climate Change Canada (ECCC) climate normal period currently being estimated for climate stations in Canada (1991 to 2020) (ECCC 2024).
4. The station has a natural flow regime (non-regulated) as LAA watersheds are natural.
5. The station has a period of record greater than 20 years to support development of long-term hydrological statistics for average, low and high flows, and estimation of 100-year event flows. Stations with period of record of greater than 15 years are included in the assessment as they typically represent smaller watersheds in the region that are closer in size to the LAA watersheds.

Flow Durations Curves

Flow durations curves show the percentage of time a given discharge value is exceeded in a streamflow monitoring station's period of record. FDCs were developed for each of the WSC stations used in the regional analysis by comparing the mean daily flow with the MAF for each respective station.

Low and Environmental Flows

Low flow indices for the RAA were derived using a regional frequency analysis for NL (Zadeh 2012). Low flows for 1-day and 7-day durations were calculated for return periods of 2-, 10-, 20-, 50-, and 100-years using relationships based on watershed area developed by Zadeh (2012). This work to estimate low flows also relied on a spreadsheet provided by NLDECCC (then the Newfoundland and Labrador Department of Municipal Affairs and Environment [NLDMAE]).

Environmental flows were established, as outlined in Zadeh (2012), using relationships between the MAF and in-stream flow needs for the winter and summer periods. The MAFs were developed as described above for the summer (April to September) and winter (October to March) periods. Recommended minimum flows for these periods are 50% MAF and 30% MAF for summer and winter, respectively, based on 'excellent' river conditions, as per Zadeh (2012).

9.1.1.1.3 Local Hydrology

Information of the hydrology within the LAA was gathered using desktop methods and field-based assessments. Desktop methods included the development of an environmental water balance, a review of local and regional hydrology, and a review of local water users. Field work included the installation and maintenance of hydrometric stations and the collection of bathymetric data.

Environmental Water Balance

An environmental water balance was developed for pre-development conditions based on available data for climate normal, wet year, and dry year conditions. Surplus runoff was calculated in the water balance model based on climate and physiographic characteristics.

The Thornthwaite monthly water balance model, refined by the United States Geological Survey, was used (Thornthwaite 1948; McCabe and Markstrom 2007). Surface runoff was estimated based on net precipitation less the evapotranspiration and infiltration losses. Input parameters were established based on latitude, local climate and soil conditions, and guidance provided by the United States Geological Survey.

Field Data

The baseline local hydrology assessment includes an ongoing field hydrometric monitoring program established in 2024. Four hydrometric stations (three riverine; one pond water level) and associated monitoring equipment were installed in July 2024, as detailed in Figure 9.2 and Table 9.1 at historical hydrometric station locations SW-03, SW-04, SW-08 and P-9 Pond. The stations are equipped with Solinst Leveloggers® to monitor continuous water level and water temperature. A Solinst barologger® is installed at the site (SW-04) to collect atmospheric pressure and air temperature data to barometrically correct Levelogger® water level data. The hydrometric stations have been equipped to continue logging water level data year-round. Figure 9.3 presents the typical stilling well setup for each of the four hydrometric stations. A baseline report will be submitted to applicable regulators prior to construction of the Project. Information from the baseline program has been summarized and included in Section 9.1.2.

Table 9.1 Surface Water Quantity Monitoring Locations

Station ID	Location	Type of Gauge	Continuous Water Level	Manual Flow Measurements
SW-03	Gander River Tributary downstream	Riverine	Yes	Yes
SW-04[1]	Gander River Tributary upstream	Riverine	Yes	Yes
SW-08	Gander Lake Tributary 1	Riverine	Yes	Yes
P-9	P-9 Pond Water Level Station	Pond Level	Yes	No

Note:
[1] SW-4 site also recording barometric pressure (Barologger)

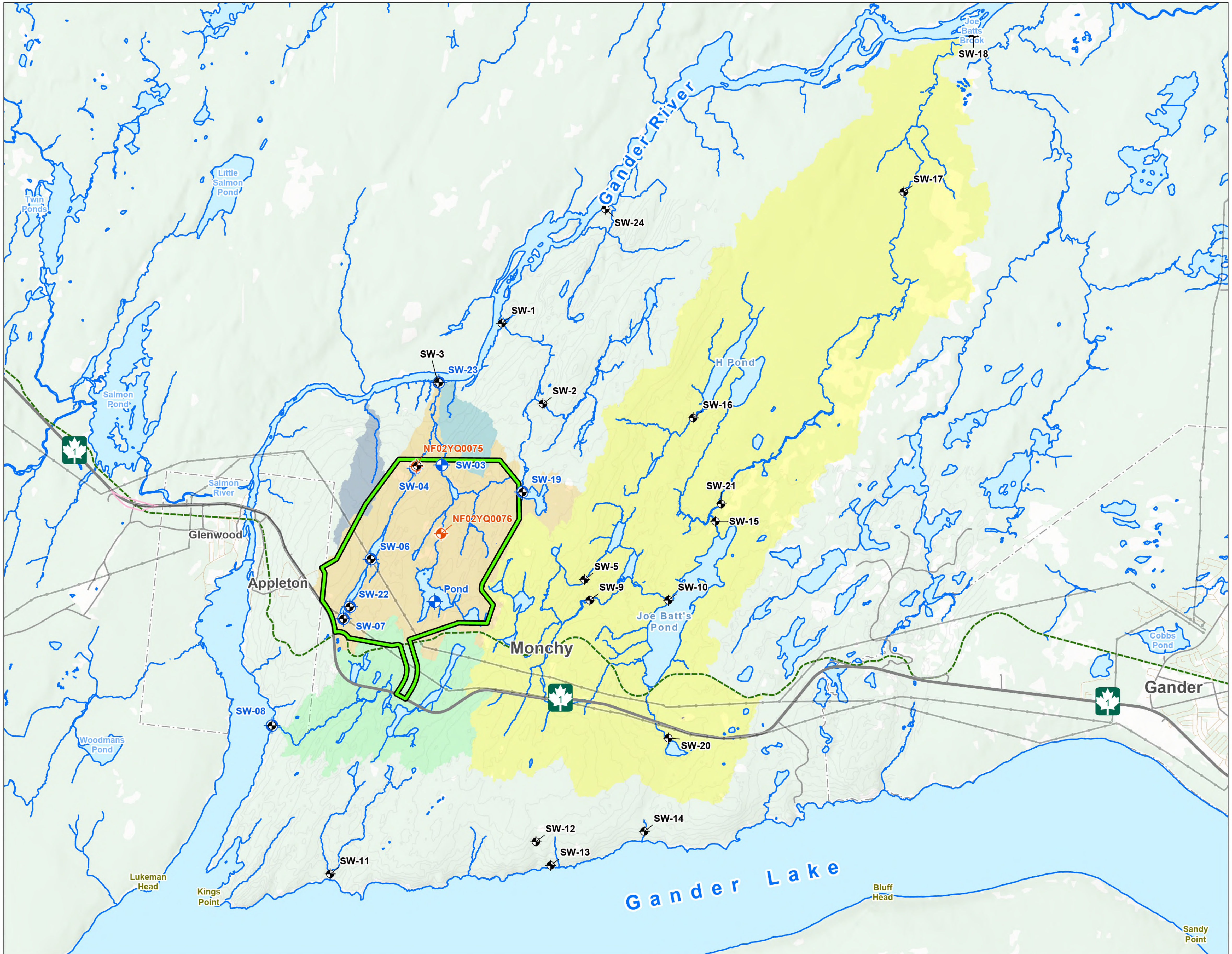


Figure No.
9.2

Title
Existing and Historical Surface Water Quality Monitoring Locations

Client/Project 121418510_901
New Found Gold Corp.
Queensway Gold Project

Project Location
North Gander Lake
Newfoundland and Labrador

Prepared by NW on 2025-08-12
TR by NB on 2026-03-18

N

0 0.5 1 2 km
(At original document size of 11x17)
1:75,000

Proposed Project Layout
- Project Area

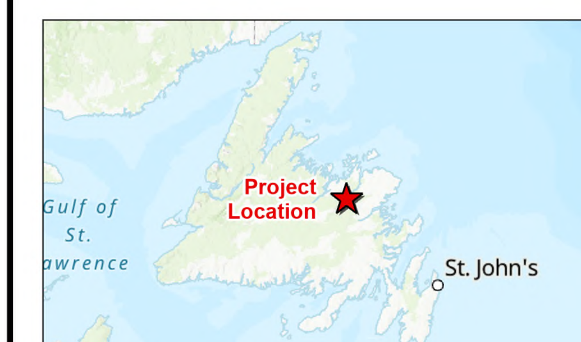
Surface Water Monitoring Locations
- Stantec
- NL WRMD Real Time
- Gemtec (2023)

Watershed Delineation (Stantec 2025)
- GLT1 (Gander Lake Tributary 1)
- GRT1 (Gander River Tributary 1)
- GRT2 (Gander River Tributary 2)
- HP (Hermans Pond)
- JBB (Joe Batt's Brook)

Existing Infrastructure
- Transmission Line
- Highway
- Collector
- Local / Street
- Ramp
- NL T'Railway Provincial Park

Wetlands and Waterways
- Watercourse
- Waterbody

Administrative Boundaries
- Municipal Boundary



Notes
1. Coordinate System: NAD 1983 CSRS MTM 2
2. Data Sources: New Found Gold Corp.; Stantec; GEMTEC; Government of Newfoundland and Labrador, Department of Environment and Climate Change
3. Background: Government of Newfoundland and Labrador, Department of Environment and Climate Change, Department of Fisheries, Forestry, and Agriculture Land Use Atlas Mapping Service, Department of Municipal and Provincial Affairs; National Road Network, Statistics Canada; Additional topographic basemapping from Esri, NASA, NGA, USGS, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community, Esri, USGS

Stantec

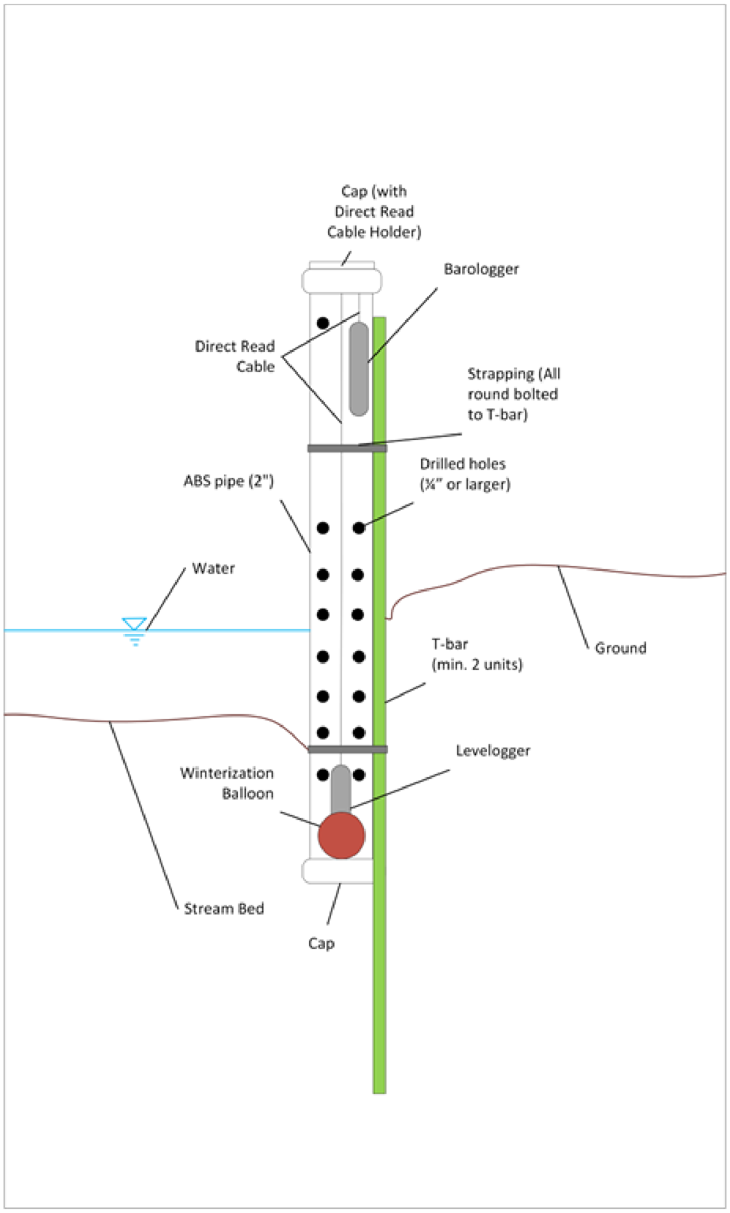


Figure 9.3 Typical Stilling Well for Continuous Level Logger Installation

Manual flow measurements and logger downloads were conducted at the three watercourse hydrometric stations for six events in 2024 (July to December 2024). Additional monitoring events were completed in 2025 and the results of these will be incorporated into the baseline report that will be submitted to applicable regulators prior to construction. Manual measurements of streamflow are conducted using the Mid-Section Area-Velocity Method, where the discharge is calculated from multiple velocity measurements and cross-section areas (Botma and Struyk 1971; World Metrological Organization [WMO] 2010a). Water velocity measurements are conducted using a SonTek FlowTracker2 acoustic doppler velocimeter. Manual measurements are processed in Aquarius™ hydrometric analysis software to develop station rating curves.

The in situ continuous water levels and manual flow measurements are used to develop rating curves in the Aquarius™ software. The rating curve estimates continuous flows based on the relationship between water level and manual flow measurements. The WSC's manual for developing rating curves titled Hydrometric Manual – Data Computations (Rainville et al. 2016), WMO Manual on Stream Gauging, Vol. I: Fieldwork (WMO 2010a), WMO Manual on Stream Gauging, Vol. II: Computation of discharge (WMO 2010b) are used in this study to support rating curve development. The rating curve equation applied is listed in Rainville et al. (2016).

Equation 1

$$\boldsymbol{Q = C(h + a)^{n}}$$

Where:

Q	= discharge (cubic metre per second [m^3/s])
C, n	= constants
h	= gauge height/offset (m)
a	= stage at zero flow

9.1.1.1.4 Hydrological Model

The US Army Corps of Engineers' Hydrologic Engineering Center Hydrologic Modelling System (HEC-HMS) Software Version 4.12 was used for the development of the baseline and Project phases hydrological models. Due to the limited period of available local flow data within the site watersheds, regional calibration was completed using data from a nearby WSC hydrometric station. The Peters River near Botwood station (WSC 02YO006) is the closest regional flow station, with a total period of record from 1981 to 2023 and was selected for calibration based on its long record, proximity to the Project (approximately 43 km west), comparable drainage area (177 km²), and similar watershed characteristics (Figure 9.4). The standalone Peters River watershed model was first developed and calibrated using WSC HYDAT streamflow data for the period 2001 to 2005, which includes a representative range of high flow and low flow conditions, and was then validated using data from 2006 to 2007. The Peters River watershed delineation is presented in Figure 9.4. The calibrated parameter set from the Peters River model was subsequently transferred to the baseline hydrologic model for the Project Area. The baseline watershed delineation is shown in Figure 9.5.

The NL provincial land cover compilation and soils data were used to define subwatershed characteristics, such as the hydrologic Curve Number (CN) (Newfoundland and Labrador Government Services 2011, Government of Newfoundland and Labrador [GNL] 2025). The CN for each subwatershed was calculated using the Soil Conservation Service Runoff CN method as defined by the United States Department of Agriculture (USDA) Technical Release for Urban Hydrology for Small Watersheds (TR-55) (USDA 1986). A weighted average of CN values for each individual subwatershed was used to define the overall CN. Consistent with the TR-55 Manual, the Soil Conservation Service watershed lag method was used to calculate lag time.

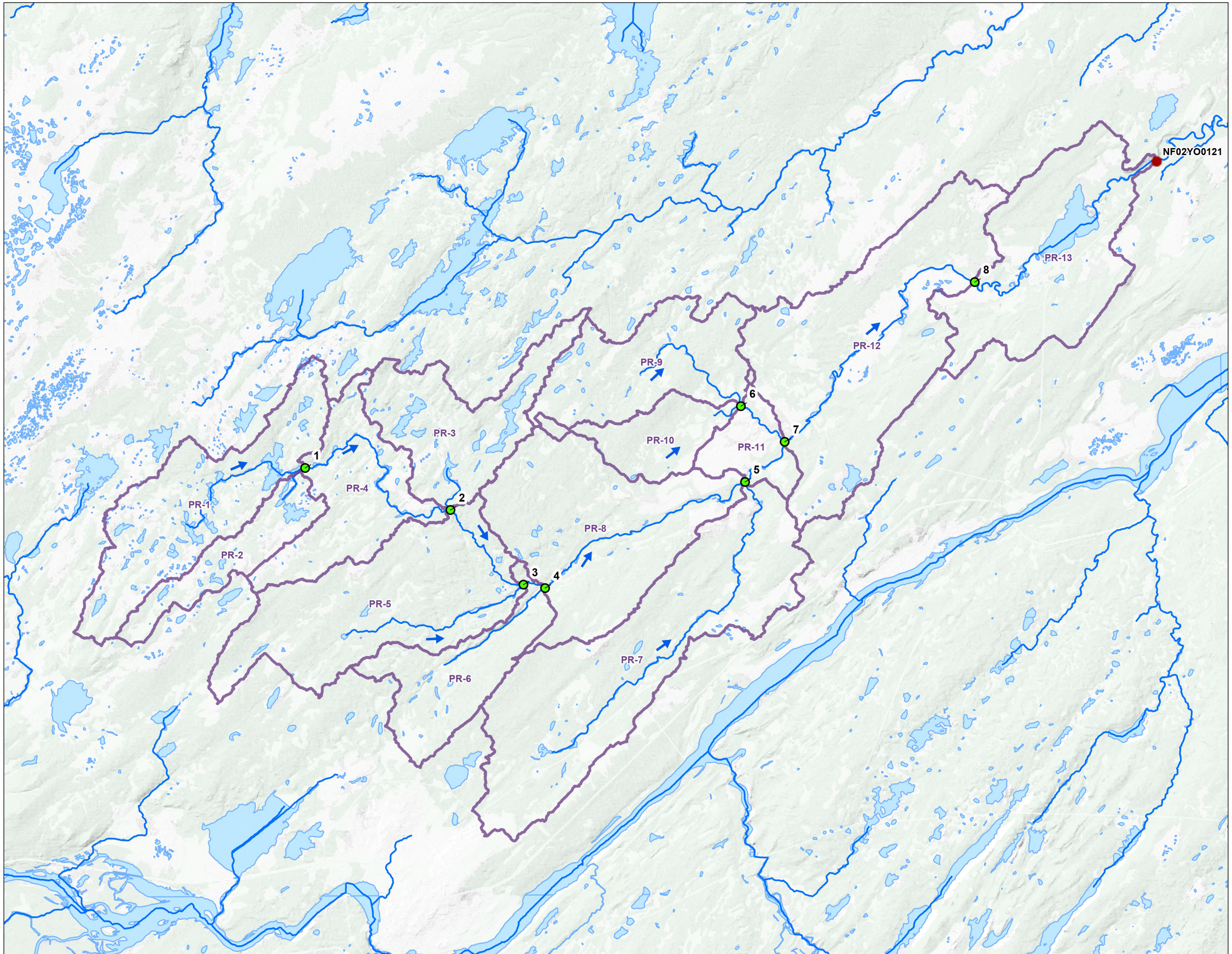


Figure No.
9.4

Title
Peter's River Watersheds

Client/Project
New Found Gold Corp.
Queensway Gold Property

121418510_902

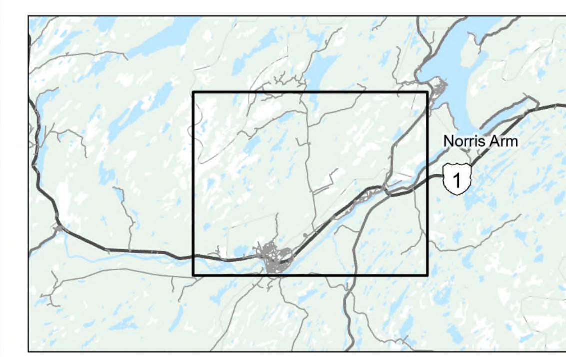
Project Location
North Gander Lake
Newfoundland and Labrador

Prepared by NW on 2025-09-17
Revised by NW on 2026-03-25
TR by JC on 2026-03-18

N

0 1 2 3 km
(At original document size of 11x17)
1:100,000

Legend
- Hydrometric Station (NL WRMD)
- Junction for Watershed Model
- Streams (5 m DEM delineation)
- Flow Direction
- Waterbody (NLFFNR 2024)
- Subwatershed (Stantec 2025)
- Forested Area



Notes
1. Coordinate System: NAD 1983 CSRS MTM 2
2. Data Sources: Stantec; Government of Newfoundland and Labrador, Department of Environment and Climate Change, Department of Fisheries, Forestry, and Agriculture Land Use Atlas Mapping Service, Department of Municipal and Provincial Affairs, Department of Environment and Climate Change, Water Resources Management Division.
3. Background: ESRI

Stantec

\\ca0151-PPFSS01\work_group\12114\active\121417598\03_data\gis_cad\mapping\ArcGIS Pro\121418510_NewfoundGold\121418510_NFG_SW.aprx Revised: 2026-04-29 By: nwhite

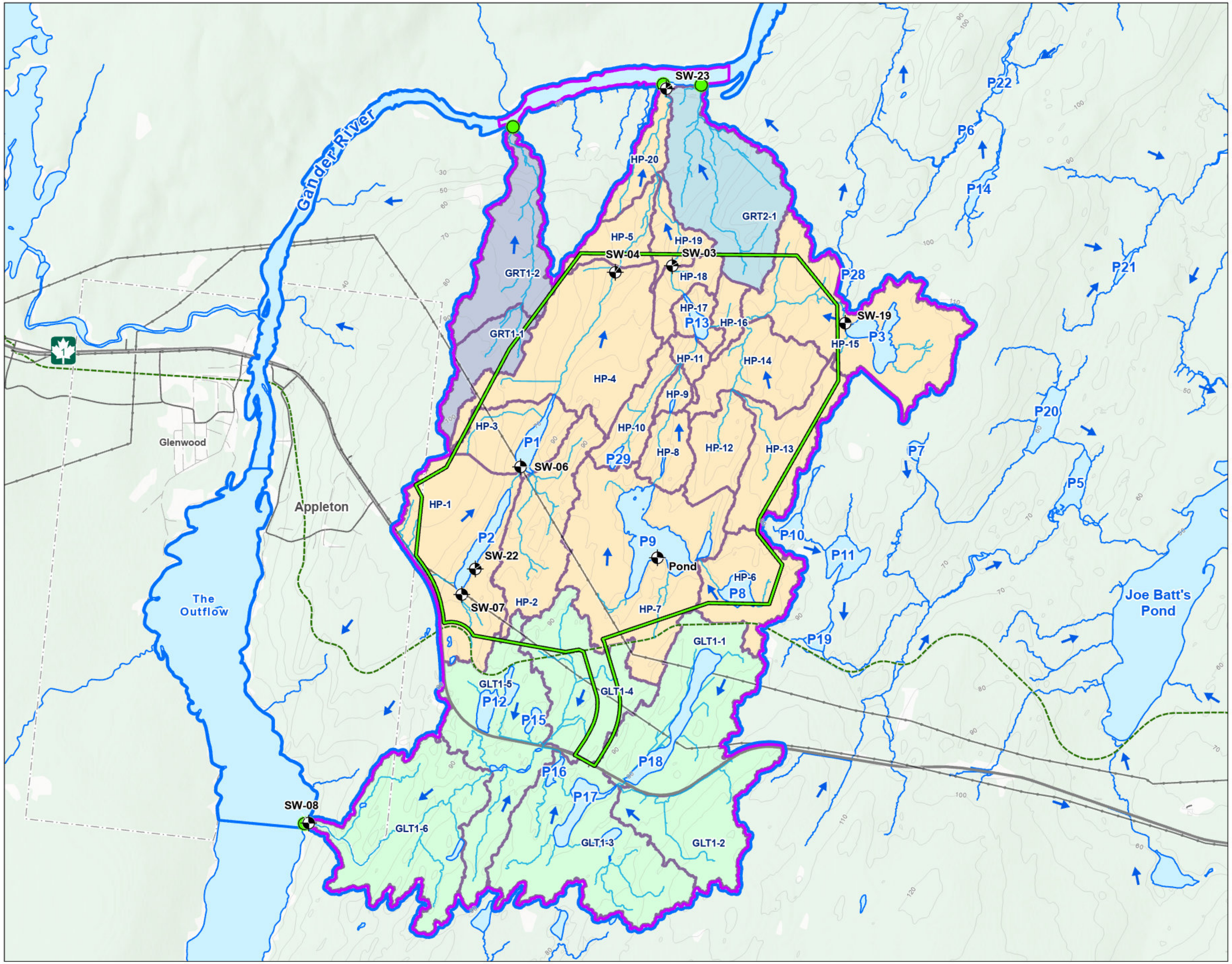


Figure No.
9.5

Title
Baseline (Pre-Development) Watersheds

Client/Project
121418510_909
New Found Gold Corp.
Queensway Gold Property

Project Location
North Gander Lake
Newfoundland and Labrador

Prepared by NW on 2025-12-09
Revised by NW on 2026-03-24
TR by AS on 2025-12-09

N

0 0.25 0.5 1 1.5 km
(At original document size of 11x17)
1:35,000

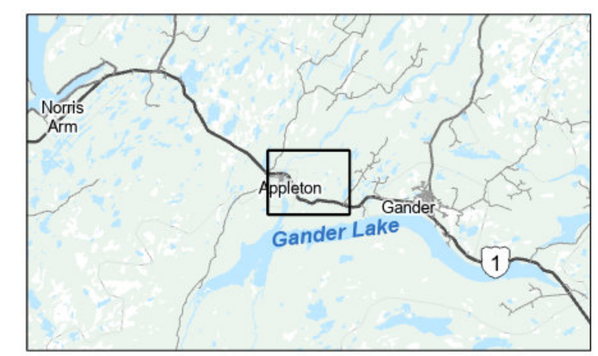
Legend

- Project Area / Local Assessment Area
- Local Assessment Area
- Regional Assessment Area
- Surface Water Monitoring Location
- Outlet for Watershed Model
- Flow Paths
- Flow Direction
- Watercourse
- Waterbody

Watershed Delineation (Stantec 2025)
- GLT1 (Gander Lake Tributary 1)
- GRT1 (Gander River Tributary 1)
- GRT2 (Gander River Tributary 2)
- HP (Hermans Pond)
- Subwatershed (Stantec 2025)

SocioEconomic / Built Infrastructure
- Trans-Canada Highway
- Secondary Road
- Local Road
- Transmission Line
- NL T'Railway Provincial Park
- Municipal Boundary

Other Features
- Contour (10 m)



Notes
1. Coordinate System: NAD 1983 CSRS MTM 2
2. Data Sources: New Found Gold Corp.; Stantec; GEMTEC; Government of Newfoundland and Labrador, Department of Environment, Conservation and Climate Change, Department of Forestry, Agriculture and Lands - Land Use Atlas Mapping Service, Department of Municipal and Community Affairs.
3. Background: Government of Newfoundland and Labrador, Department of Forestry, Agriculture and Lands - Land Use Atlas Mapping; Statistics Canada National Road Network.

Stantec

The HEC-HMS model defines reach components that route hydrographs through typical channel cross-sections using the Muskingham-Cunge routing method. Subwatershed elements were linked with channel routing where the main river channel of each watershed physically exists. Minor creeks and tributaries are not modelled with channel routing. Channel length and slope vary between subwatersheds and were determined from the topographic assessment using Light Detection and Ranging (LiDAR) data and the provincial digital elevation model (DEM). Channel geometry was approximated as trapezoidal for all channels and reaches.

The Temperature Index method was chosen to process snowmelt conditions (United States Army Corps of Engineers [USACE] 2026). Specific input parameters were chosen based off typical values and through further optimization of the Peter's River model relative to local flow data. The ATI-melt rate function is needed for this method and was determined using snow depth measurements from the ECCC Gander International Airport station (Station ID 8401703).

The chosen loss method was the linear deficient and constant method, appropriate for long-term continuous modelling runs within HEC-HMS (USACE 2026). This method defines an initial deficient capacity for the watershed and accounts for changes in infiltration capacity as the soil becomes saturated. These values were iteratively generated through Peter's River model calibration. Impervious areas were set to 0, as the watersheds cover naturalized land areas with minimal impervious surface.

The Recession Baseflow Method was used to define baseflow within the HEC-HMS models (USACE 2026). The Recession Baseflow method defines initial discharge per area associated with each watershed. The initial discharge value comes from the results of the regional baseflow assessment.

Nearby ECCC climate stations were used to provide daily temperature and precipitation depths for the models. The primary source of meteorological data for the Peters River model and for the Project baseline hydrologic model were the Wooddale Bishop's Falls climate station (Station ID 8404310) and Gander International Airport climate station (Station ID 8401703), respectively. The baseline model was developed using climate normal Year 1999 data.

Prior to Project construction, the baseline model outputs will be compared to local hydrology data from the monitoring stations established in 2024.

9.1.1.2 Surface Water Quality

Information on the surface water quality of the Project Area was gathered using historical, publicly available information sources, and well as field-based assessments between 2021 and 2024. Assessment of surface water quality included a review of both regional and local water quality.

Regional Water Quality

Real-time water quality data was obtained from two NLDECCC real-time water quality monitoring stations located within the LAA boundary, NF02YQ0075 (Herman's Pond Brook) and NF02YQ0076 (Pond 226 Brook) (Figure 9.2). The surface water baseline report (Stantec 2026, in prep) containing detailed water quality statistics for the two real-time monitoring stations will be provided to applicable regulators prior to construction; a summary of relevant information is provided in Section 9.1.2.3. Analytical parameters monitored at these stations include temperature, pH, dissolved oxygen (DO), conductivity, turbidity, and total dissolved solids (TDS).

Local Water Quality

From 2021 to 2023, a total of 21 watercourse stations and three waterbody stations were sampled across the Project Area (Stantec 2026, in prep). An ongoing field water quality monitoring program established in 2024 includes a total of six watercourse stations and two waterbody stations across the Project Area.

All water quality samples for the historical and ongoing water quality monitoring programs were collected in clean laboratory-prepared containers specific to each analysis and were stored and shipped in coolers at approximately 4 degrees Celsius (ºC). Water samples were submitted under chain of custody protocols to AGAT laboratories in St. John's, NL for laboratory analysis of general water quality parameters, metals, mercury, and TSS.

The water quality monitoring locations, waterbody type and period of monitoring are summarized in Table 9.2, and the water quality monitoring locations (existing and historical) are shown on Figure 9.2.

Table 9.2 Surface Water Quality Monitoring Locations

Station ID	Surface Water Feature Type	Monitoring Period
SW-1	Watercourse	Quarterly (May 2021 – Dec 2023)
SW-2	Watercourse	Quarterly (May 2021 – Dec 2023)
SW-3[A]	Watercourse	Quarterly (May 2021 – Dec 2023), Monthly (Jul – Nov 2024)
SW-4[A]	Watercourse	Quarterly (May 2021 – Dec 2023), Monthly (Jul – Nov 2024)
SW-5	Watercourse	Quarterly (May 2021 – Dec 2023)
SW-6[A]	Waterbody	Quarterly (May 2021 – Dec 2023), Monthly (Jul – Nov 2024)
SW-7[A]	Watercourse	Quarterly (May 2021 – Dec 2023), Monthly (Jul – Nov 2024)
SW-8[A]	Watercourse	Quarterly (May 2021 – Dec 2023), Monthly (Jul – Nov 2024)
SW-9	Watercourse	Quarterly (May 2021 – Dec 2023)
SW-10	Waterbody	Quarterly (May 2021 – Dec 2023)
SW-11	Watercourse	Quarterly (May 2021 – Dec 2023)
SW-12	Watercourse	Quarterly (May 2021 – Dec 2023)
SW-13	Watercourse	5 sampling events (Jun 2022, Jan – Dec 2023)
SW-14	Watercourse	Quarterly (May 2021 – Dec 2023)
SW-15	Watercourse	Quarterly (May 2021 – Dec 2023)
SW-16	Watercourse	Quarterly (May 2021 – Dec 2023)

Table 9.2 Surface Water Quality Monitoring Locations

Station ID	Surface Water Feature Type	Monitoring Period
SW-17	Watercourse	Quarterly (May 2021 – Dec 2023)
SW-18	Watercourse	4 sampling events (Jun 2022, Jan 2023, May 2023, Dec 2023)
SW-19[A]	Watercourse	Quarterly (May 2021 – Dec 2023), Monthly (Jul – Nov 2024)
SW-20	Watercourse	Quarterly (May 2021 – Dec 2023)
SW-21	Watercourse	Quarterly (May 2021 – Dec 2023)
SW-22[A]	Waterbody	Monthly (Jul – Nov 2024)
SW-23	Watercourse	4 sampling events (Jun 2022, Jan 2023, May 2023, Dec 2023)
SW-24	Watercourse	4 sampling events (Jun 2022, Jan 2023, May 2023, Dec 2023)

Note:
[A] – Existing surface water quality station monitored by Stantec

9.1.2 Description of Existing Conditions

To establish existing conditions for Surface Water Resources, this section provides an overview of the physiographic setting, local climate, regional hydrology, local hydrology, bathymetry, and existing surface water quality.

9.1.2.1 Physiography

The Project Area is located within the Central Newfoundland Forest Ecoregion (ecoregion 2A) which comprises approximately the northeastern third of Island of Newfoundland (Meades 1990; Arsenault et al. 2016). This region has a typical continental climate with the largest maximum and minimum temperatures seasonally. The majority of landcover is classified as boreal forest, characterized by rolling hills interspersed with low ecological productivity scrub land, domed bogs, and many lakes. The primary driver of ecological succession is wildfire, supported by the high summer air temperatures and well drained, nutrient poor soils.

9.1.2.1.1 Climate

Representative climate data was selected from ECCC climate station for the nearby municipality of Gander. The climate normal for Gander was developed using an ensemble of three climate stations that have been located at the Gander International Airport, covering differing periods of record, data resolution, and climate trends. These stations were selected as they cover a large span of time, have high quality resolution for much of the period covered, are close in proximity and elevation to the Project Area, and provide access to both historical data and recent climate trends and statistics. The 1991-2020 climate normal precipitation and temperature data was developed with data from the Gander International Airport (8401700), Gander Domestic Airport Climate Station (8401705), and the Gander International Airport (8401703), as presented in Table 9.3.

Table 9.3 Climate Normal (1991-2020) Temperature, Total Precipitation, and Snowfall for Combined Gander International Airport and Gander Airport Climate Stations

Month	Average Temperature (ºC)	Total Precipitation (mm)	Snowfall (cm)
January	-6.6	102.8	97.1
February	-6.8	91.4	81.0
March	-3.8	105.2	85.5
April	1.4	92.0	45.5
May	6.7	93.8	10.6
June	11.6	88.8	1.5
July	16.6	105.0	0.0
August	16.6	101.7	0.0
September	12.3	115.2	0.1
October	6.7	119.9	12.4
November	1.8	110.1	29.7
December	-3.1	121.3	80.2
Year	**4.5**	1,247.1	443.4

Note:
cm = centimetres

Air Temperature

From the generated climate normal (1991-2020) dataset, average monthly and annual temperatures were estimated as displayed in Table 9.3. The climate normal mean temperature ranged from -6.8°C in February and 16.7°C in June and July.

Precipitation

The climate normal precipitation for the Gander stations for the 1991-2020 period is presented in Table 9.2. The total monthly precipitation for the Gander climate normal ranged from 88.8 millimetres (mm) in June to 121.3 mm in December. Snowfall data indicates the relative proportion of precipitation which fell as snow. Snowfall values are an input for the hydrologic model and local water balance, including the accuracy of the local precipitation inputs. Gander receives an average of 43 days per year with precipitation greater than 10 mm, and an average of nine consecutive days without precipitation indicating dry periods.

IDF Curves

An IDF curve was obtained from ECCC using the Gander International Airport data from 1937 through 2021 using a Gumbel distribution and the methods of moments. The period of record spans 72 years, using a composite of two stations as the original station was decommissioned in 2016. The IDF curve results are presented in Table 9.4 and Figure 9.6.

Table 9.4 Intensity-Duration-Frequency Curves for Gander International Airport Station

Duration	Total Rainfall (mm)						
	2-year	5-year	10-year	25-year	50-year	100-year	# Years
5 minutes	4.6	6.5	7.8	9.5	10.7	11.9	74
10 minutes	6.6	9.3	11.2	13.5	15.2	16.9	74
15 minutes	7.9	11.3	13.5	16.4	18.5	20.6	74
30 minutes	10.4	15.1	18.2	22.1	25	27.9	74
1 hour	13.3	18.2	21.5	25.6	28.6	31.7	74
2 hours	18.4	23.9	27.6	32.2	35.6	39	73
6 hours	30.4	38.5	43.8	50.5	55.5	60.5	73
12 hours	39.2	50.5	57.9	67.4	74.4	81.3	72
24 hours	47.1	63.5	74.3	88.1	98.3	108.4	74

Source: ECCC (2024)

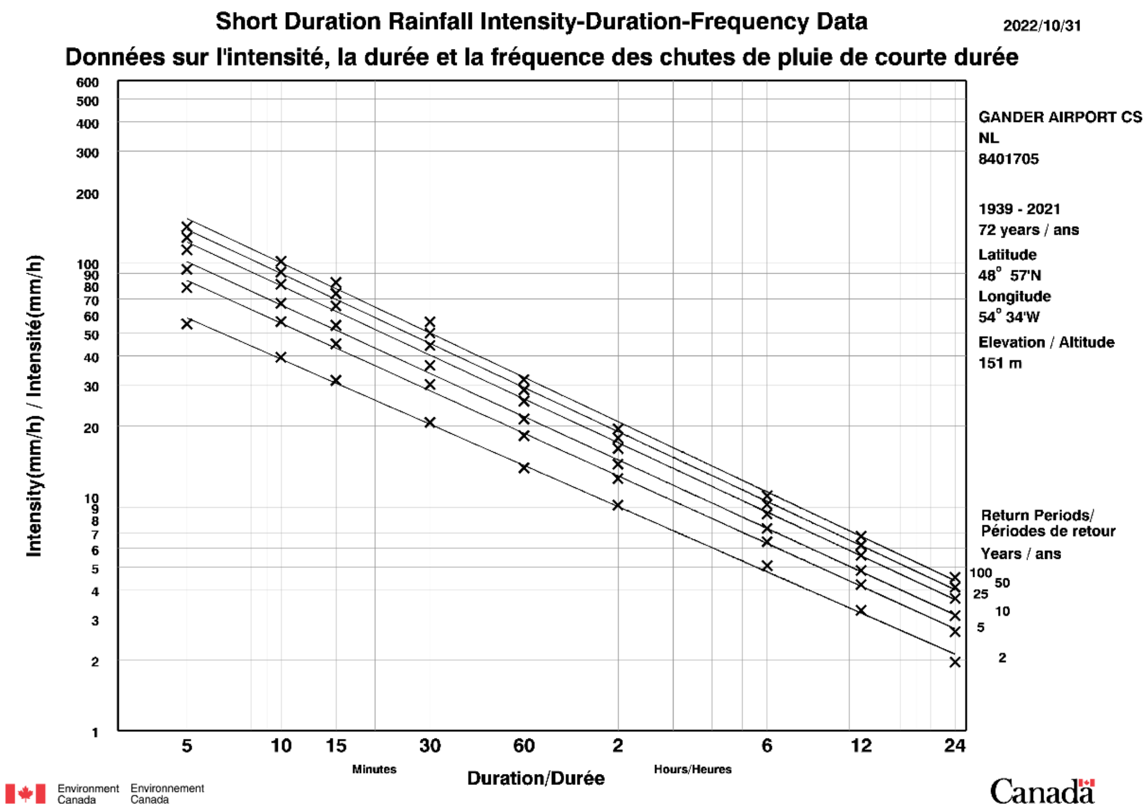


Figure 9.6 Intensity-Duration-Frequency Curves for Gander International Airport

Long-term precipitation statistics such as 30-day rainfall, probable maximum precipitation (PMP), and daily mean precipitation events for the Gander International Airport (8401700) are summarized in Table 9.5. The data provided has a period of record of 75 years. Rainfall increases consistently with both storm duration and return period. The PMP, representing the theoretical maximum precipitation for each duration, ranges from 328.4 mm for 1 day to 989.3 mm for 30 days, demonstrating the potential for extreme rainfall under worst-case meteorological scenarios.

Table 9.5 30-Day precipitation and PMP, Gander International Airport

Duration (days)	Total Rainfall (mm)						
	2	5	10	25	50	100	PMP
1	52.5	66.8	76.3	88.4	97.3	106.1	328.4
2	62.3	79.9	91.5	106.2	117.1	128.0	406.5
3	68.4	87.9	100.8	117.1	129.2	141.2	454.0
4	75.3	94.4	107.1	123.1	135.0	146.8	456.7
5	80.9	101.3	114.9	132.0	144.7	157.3	488.9
6	86.9	108.4	122.5	140.4	153.7	166.9	515.1
7	91.9	112.9	126.7	144.2	157.2	170.1	510.6
8	96.9	117.8	131.6	149.1	162.1	175.0	516.6
9	101.0	122.7	137.1	155.3	168.8	182.1	537.1
10	106.5	129.5	144.7	163.9	178.2	192.4	568.4
15	130.0	158.2	176.9	200.5	217.9	235.3	694.7
20	148.7	180.0	200.7	226.9	246.3	265.5	776.2
25	170.0	207.7	232.7	264.2	287.6	310.9	925.3
30	190.9	230.8	257.2	290.5	315.3	339.9	989.3

Source: ECCC (2025)

9.1.2.1.2 Climate Change Predictions

A discussion of the potential effects of climate change on the Project is provided in Section 15.1.1. Climate change impacts are also considered for surface water resources to support the planning and development of water management infrastructure for current and future climate scenarios. Impacts from climate change to the Project Area are necessary to consider, as warming of 1.3°C of Canada's climate between 1948 and 2016 has been observed (Bush and Lemmen 2019). Newfoundland has experienced a 0.8°C increased average annual temperature, with projected winter temperatures increasing by 4.7°C and summer temperatures 2.9°C by the mid 21st century in comparison to mid 20th century (NLDMAE 2020). Increases in frequency of natural phenomena such as hurricanes and tropical storms have also contributed to increased coastal erosion, sea level rise, sea surge, loss of sea ice, and exacerbated other climate related issues such as presence of invasive species and melting permafrost (GNL 2020).

Modelled climate change projections coming from the ensembled CMIP6 models, distributed through Climatedata.ca are provided in 30-year time frame projection periods. Based on a potential mine development temporal scale including construction, operation, active closure, and further into the post-closure period, projections of climate change impacts for the 2021-2050 years are considered to include the active mine, closure, and post-closure period.

Changes in temperature and precipitation are described in the ensuing sections using the moderation emissions scenario, defined as the Shared Socioeconomic Pathway (SSP)2-4.5, as recommended by the CSA (2019). Climate change results are modelled for the most recent 30-year climate normal time period of 2021-2050. Results for the same periods for the SSP1-2.6 and SSP5-8.5 models are included in the baseline reports (Stantec 2026, in prep) that will be submitted to applicable regulators prior to construction.

9.1.2.1.3 Temperature

As shown in Table 9.6, it is expected that mean temperatures will rise most substantially in winter months with a projected 2.3°C change, but spring, summer and fall are also expected to be increased by 1.9°C each. Spring warming will have effects on the rate of snowmelt and thus water storage on the landscape and ensuing runoff, while higher summer and fall temperatures will contribute to increased likelihood of drought and evapotranspiration.

Table 9.6 Projected Temperature Changes at Gander International Airport Climate Station - SSP2-4.5, Projection Period 2021-2050, relative to 1971-2000 Climate Normal

Parameter	Spring	Summer	Autumn	Winter
Median Increase in Temperature	+1.9˚C	+1.9˚C	+1.9˚C	+2.3˚C
90th percentile confidence interval	+1.2˚C – +2.8˚C	+1.4˚C – +3.3˚C	+1.3 ˚C – +2.7 ˚C	+1.7˚C – +3.4˚C
Source: ClimateData.ca (2025)				

9.1.2.1.4 Precipitation

Projected changes in precipitation will affect the IDF curves at the 2021-2050 period. The impacted IDF curve is provided for the moderate emissions scenario, SSP2-4.5, in Table 9.7 and Figure 9.7.

Table 9.7 Projected IDF Curve at Gander International Airport Climate Station - SSP2-4.5, Projection Period 2021-2050 - Converted to Total Rainfall Depths

Duration	Total Precipitation (mm)					
	2-year	5-year	10-year	25-year	50-year	100-year
5 minutes	5.2	7.3	8.8	10.7	12.0	13.4
10 minutes	7.3	10.5	12.7	15.2	17.2	19.0
15 minutes	8.8	12.8	15.3	18.5	20.8	23.3
30 minutes	11.5	17.0	20.5	25.0	28.0	31.5
1 hour	15.0	21.0	24.0	29.0	32.0	36.0

Table 9.7 Projected IDF Curve at Gander International Airport Climate Station - SSP2-4.5, Projection Period 2021-2050 - Converted to Total Rainfall Depths

Duration	Total Precipitation (mm)					
	2-year	5-year	10-year	25-year	50-year	100-year
2 hours	20.0	28.0	32.0	36.0	40.0	44.0
6 hours	34.8	43.2	49.2	57.0	60.0	66.0
12 hours	44.4	56.4	64.8	75.6	84.0	92.4
24 hours	55.2	69.6	84.0	100.8	110.4	122.4

Source: Climatedata.ca (2025)

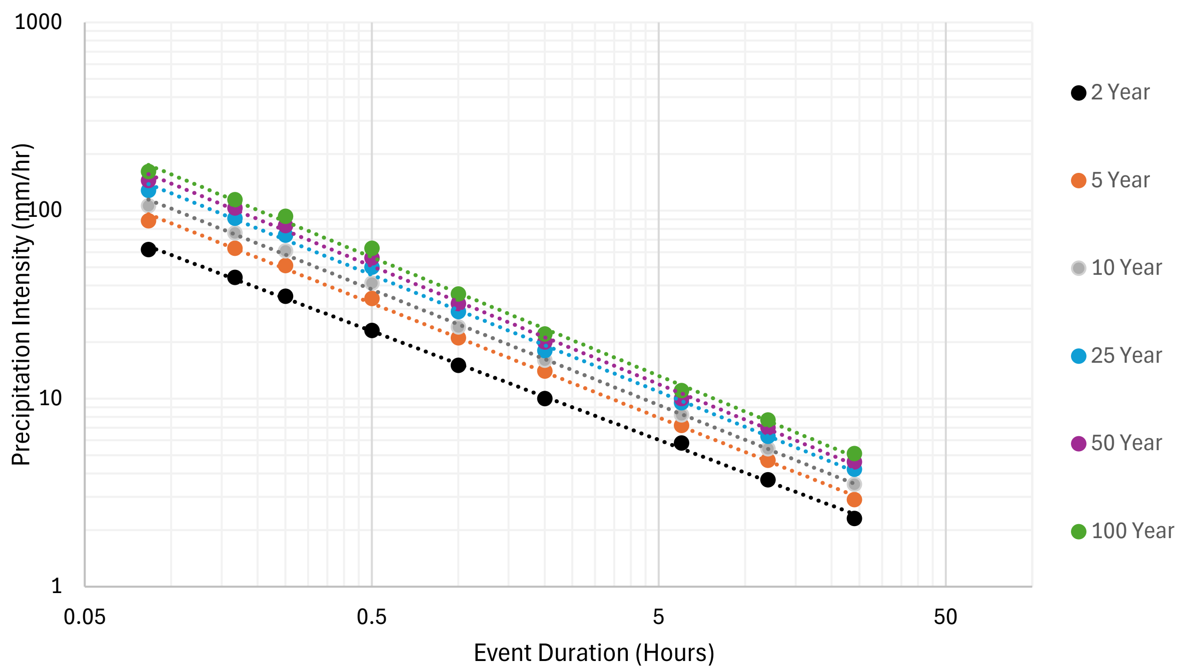


Figure 9.7 Projected IDF Curve at Gander International Climate Station – SSP2-4.5, Projection Period 2021-2050

IDF curves for the low and high emissions scenarios (SSP1-2.6 and SSP5-8.5) as well as the relative percent difference comparison tables will be submitted to applicable regulators prior to construction in the surface water baseline report (Stantec 2026, in prep). Under the SSP2-4.5 emissions scenario presented in Figure 9.3, the Project Area will see an overall increase in precipitation reaching 11.8%, indicating higher precipitation volume for each of the listed storm durations and return periods. Using the SSP1-2.6 and SSP5-8.5 models yields increases of 11.9% and 13.9%, respectively. It is predicted that precipitation events of any duration and return period will be higher in value in the future meaning storm intensity and frequency will increase.

9.1.2.1.5 Soils and Geology

Bedrock geology in the Project Area (Section 8.1.2.1) generally consists of mudstones, siltstones, and sandstones of the middle Ordovician Davidsville Group that is located within the Exploits subzone of the Dunnage technostratigraphic zone (Blackwood 1982; Currie 1995).

The Project Area is part of the Central Newfoundland Forest ecoregion (AMEC 2014). Most of the sub regions soils are classified as humo-ferric podzols, indicating large concentrations of inorganic material and are relatively dry. These soils are found in well drained regions typically forested with coniferous and mixed forest types. The soil is generally characterized as course fragments, nutrient poor, with low water storage capacity (AMEC 2014).

9.1.2.1.6 Topography

The topography of the Project Area is defined by rolling hills, ranging from 150 m above sea level in the east to 200 m above sea level in the south and west of the region. Bogs are a common feature among the forested hills and are differentiated from those in other regions of the province due to the lack of dwarf and black huckleberry. The most common type is a domed bog, noted for its raised regions mixed with pools and broken waterways of still water (AMEC 2014).

9.1.2.1.7 Vegetation

Identified regional vegetation is primarily densely forested regions consisting of fire stands of black spruce, white spruce and trembling aspen (AMEC 2014). As forest fires are a frequent driver of vegetative succession in the region, recently disturbed to well recovered regions have differing vegetation and dominant ground cover. The region is typically described as a mix of thick forest and post-fire scrubland with nutrient poor soils in a continental climate.

9.1.2.1.8 Watershed Delineation

The LAA is located within four primary watersheds: Joe Batt's Brook, Herman's Pond, Gander River Tributary 1, and Gander River Tributary 2 (Figure 9.4). Watershed boundaries are estimated using a 5-m resolution provincial DEM (GNL 2020) and a derived 1-m resolution airborne LiDAR dataset (New Found Gold 2021).

9.1.2.1.9 Local Water Users

The Gander Lake water treatment system services the area around Gander including the Project Area, and services a population of 11,054 (GNL 2024). This treatment plant is part of the Gander Lake Public Supply Area, which is a protected watershed zone including the entirety of Gander Lake, the outflow to Gander River, and the two municipalities of Gander and Appleton. Additional information on the Protected Water Supply Area is provided in Section 13.1.2.1.3. There are no human-made controls or engineered systems blocking the outflow of Gander Lake to Gander River or surrounding tributaries. The region is characterized by the presence of many ponds which serve as potential water sources for local cabins and are commonly used for fishing and hunting purposes. The Gander River is also an important scheduled salmon river in Newfoundland.

9.1.2.2 Surface Water Quantity

9.1.2.2.1 Regional Hydrology

Regional Flow Assessment

Sixteen WSC stations were selected to complete homogeneity testing to represent flows within the LAA. WSC stations having a watershed area over 1,000 km², those on regulated watercourses, and those with heterogeneous data were removed from the analysis, leaving seven stations that were included in the regional flow assessment. Figure 9.8 shows the relationship between MAF and watershed area for the seven stations and shows the relationship equation for MAF (Qmean) that can be used to predict MAFs in the LAA based on catchment area.

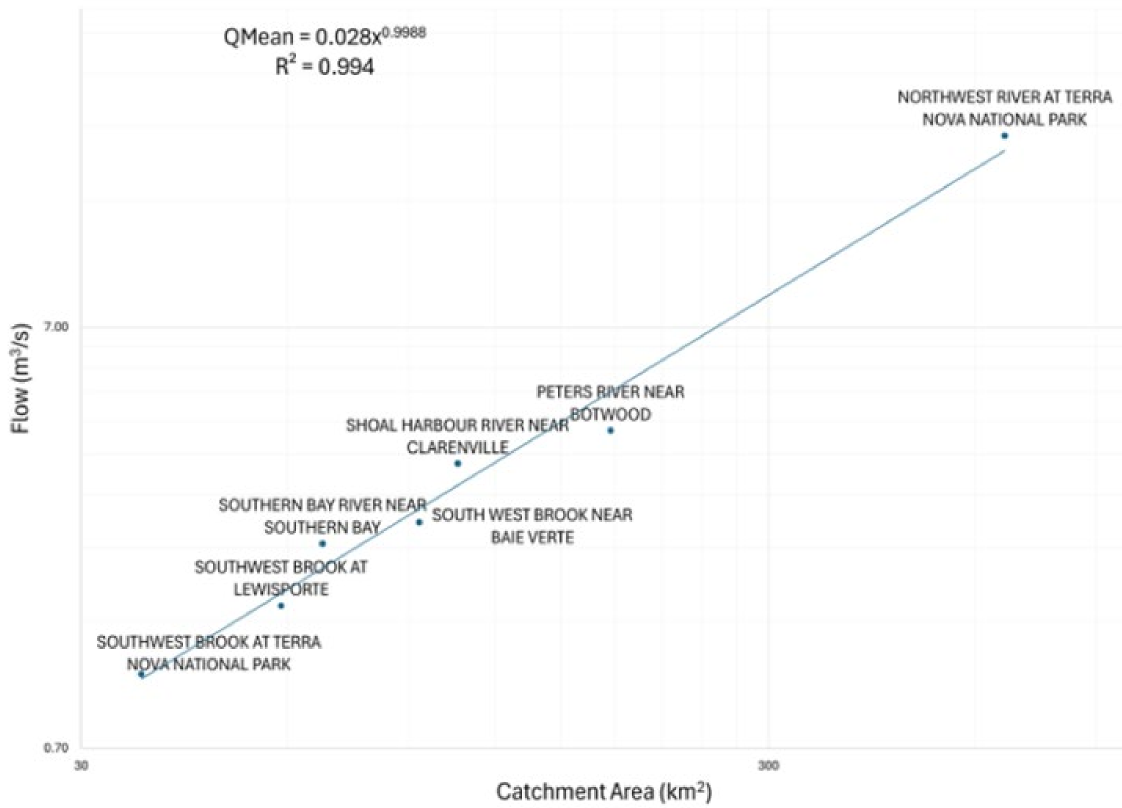


Figure 9.8 Projected IDF Curve at Gander International Climate Station – SSP2-4.5, Projection Period 2021-2050

The MMFs per unit area for the selected WSC stations are presented in Figure 9.9. Streamflow tends to peak twice a year, first in April/May due to snow melt, and again in November due to fall rainfall events. Minimum flows are observed during winter months (January and February) and late summer (July to September).

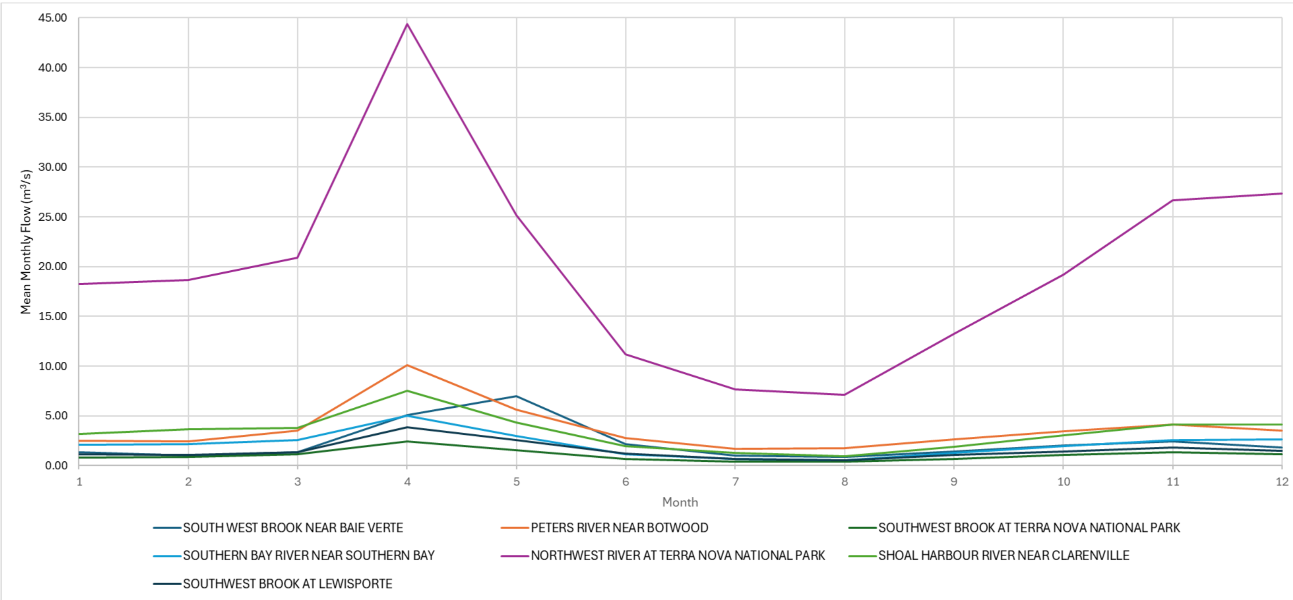


Figure 9.9 Mean Monthly Flows for Selected WSC Stations

Regional relationships for peak flows were developed using the seven WSC stations selected for the regional assessment. Figure 9.10 presents the relationships between peak flows and watershed areas for various return periods (2-, 5-, 10-, 20-, 50-, 100- and 200-year events).

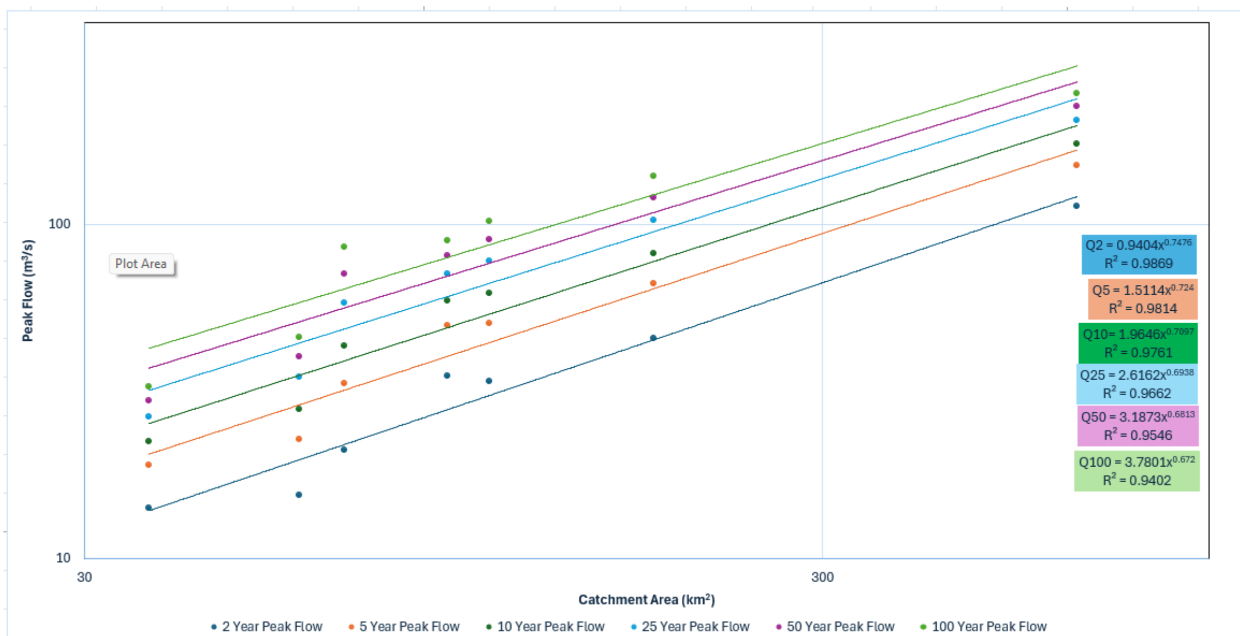


Figure 9.10 Peak Flow and Watershed Area Relationship for Regionally Selected WSC Stations

Flow Durations Curves

FDCs for the selected WSC stations were developed and the results are shown in Figure 9.11. The FDCs are normalized for watershed area to present a range of flow durations and facilitate station to station comparison. The FDCs demonstrate reasonably good regional homogeneity.

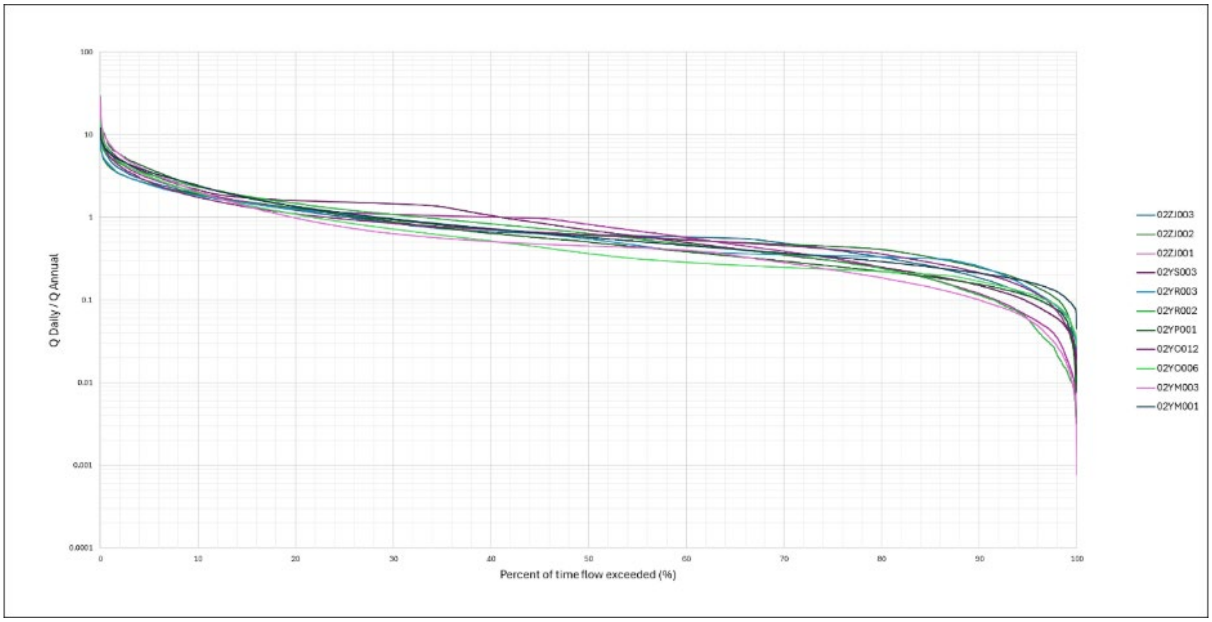


Figure 9.11 Flow Duration Curves of Selected WSC stations

Low and Environmental Flows

Low flow relationships were derived using the regional frequency analysis developed by Zadeh (2012) and put forward in the province's low flow calculation spreadsheet. Relationships were developed between low flows and watershed area using the province's low flow spreadsheet for various return periods. Table 9.8 provides a range of low and environmental flow statistics for a range of arbitrary watershed areas based on these regional relationships.

Table 9.8 Low and Environmental Flows for Various Watershed Areas

Flow Statistic (m^3/s)	Watershed Area (km^2)					
	1	5	10	25	50	100
1Q2	0.002	0.0012	0.026	0.071	0.153	0.329
7Q2	0.003	0.015	0.031	0.085	0.180	0.383
1Q50	0.000	0.003	0.005	0.015	0.032	0.070
7Q50	0.001	0.003	0.007	0.019	0.041	0.086
1Q100	0.000	0.002	0.003	0.009	0.020	0.042
7Q100	0.000	0.002	0.004	0.012	0.026	0.055
Summer Environmental Flow (50% MAF)	0.014	0.070	0.140	0.349	0.697	1.392
Winter Environmental Flow (30% MAF)	0.008	0.042	0.084	0.209	0.418	0.835

Note: m^3/s = cubic metres per second

9.1.2.2.2 Local Hydrologic Assessment

Environmental Water Balance

An environmental water balance was developed based on available data for climate normal, wet year, and dry year conditions. Results are taken from the third year for discussion as the model requires a two year warm-up period to calibrate results. Detailed water balance results are provided in the surface water baseline report (Stantec 2026, in prep).

Results from the environmental water balance under the three scenarios (Climate Normals, Wet year, and Dry year) are presented in Tables 9.9 to 9.11. These results show that expected annual evapotranspiration ranges from 467.2 mm in the dry year to 469.8 mm in the climate normal year. These evapotranspiration rates are within 2% to 6% of the range given in the Water Resources Atlas of Newfoundland of 475 to 499 millimetres per year (mm/year) reported for the LAA (Newfoundland and Labrador Department of Environment and Lands 1992).

Table 9.9 Environmental Water Balance – Climate Normals Results

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Precipitation	102.8	91.4	105.2	92.0	93.8	88.8	105	101.7	115.2	119.9	110.1	121.3
Actual Evapotranspiration	11.1	12.2	20.2	28.5	50.6	73.7	98.8	82.1	46.5	24.9	12.9	8.3
Soil Moisture Storage	138.9	126.7	106.5	100	100	100	100	100	100	100	100	91.7
Total Runoff	12.7	6.3	3.2	113.7	116	84.1	54.9	41.9	60.3	77.8	87.2	40.9

Table 9.10 Environmental Water Balance – Dry Year Results

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Precipitation	92.8	88.1	84.5	85.2	71.5	75.5	77.7	93.9	90.7	98.7	108.9	97.1
Actual Evapotranspiration	11.1	12.1	20	27.9	50	74.9	99.8	80.2	45.8	24.5	12.8	8.1
Soil Moisture Storage	138.9	126.9	106.9	100	100	100	90.6	100	100	100	100	91.9
Total Runoff	12.7	6.3	3.2	102.2	94.6	64.3	34.1	23.8	38.4	56.5	76.6	35.6

Table 9.11 Environmental Water Balance – Wet Year Results

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Precipitation	116.4	117.8	141.8	90.8	93.6	106.1	104.8	113.3	117.4	136.2	117.3	131.8
Actual Evapotranspiration	11.2	12.4	21	28.7	51.2	72.2	96.9	79.2	44.8	24.4	12.9	13.1
Soil Moisture Storage	138.8	126.5	105.4	100	100	100	100	100	100	100	100	100
Total Runoff	12.7	6.3	3.2	119.8	127.8	95.3	67.7	53.4	73.7	90.1	92.8	43.7

Field Program

Manual flow measurements and logger downloads were conducted at the three hydrometric stations (SW-3, SW-4, and SW-8) for six events in 2024 (July to December 2024), with additional monitoring events in 2025. The hydrometric station at P-9 Pond collected continuous water level data only throughout 2024 and 2025.

The in situ continuous water levels and manual flow measurements were used to develop rating curves in the Aquarius™ software. A rating curve was developed for each station in the Aquarius™ software using the field measured flow rates and corresponding barometrically corrected water stage data collected for each separate hydrometric station. Rating curve equations and resulting coefficient of determination values are provided in Table 9.12.

Table 9.12 Rating Curve Equations for Hydrometric Stations

Hydrometric Station	Rating Curve Equation	R^2 value
SW-3	$Q = 4.4911(WL)^{5.732}$	0.75
SW-4	Q = 26.172(WL)7.7309	0.99
SW-8	$Q = 0.5254(WL)^{2.4008}$	0.72

Notes:
Q = Discharge (m^3/s)
WL = water level at staff gauge (m)

9.1.2.2.3 Bathymetry

Bathymetric data was collected in P1, P2, P4, and P12 in 2024, and at P9 and P13 in 2025 using a combined Global Positioning System and sonic transducer. Mapping was collected using a vessel-mounted, single-beam sonar chartplotter (Garmin Echomap 75CV UHD Chartplotter). Vertical and horizontal resolutions of ± 0.13 m and 3.0 m, respectively, were achieved for the surveys of all four locations. Lake perimeters from base mapping were digitized into a Geographic Information System database to calculate surface area and perimeter. Bathymetric data were used to determine maximum depth and digitized to estimate lake volume and calculate mean lake depth.

9.1.2.2.4 Hydrological Model Results

Peter's River result after calibration is compared against the Peters River near Botwood HYDAT station data in Figure 9.5. Within the Peter's River model, baseflows and average flows appear to be well represented, as are spring freshet volumes. The model tends to underestimate flow volumes in late fall and early winter, when the ground is expected to be frozen. In general, the model aligns with the flow response from the HYDAT station. The Peter's River model was validated using observed flow data from 2006 and 2007 and showed satisfactory performance with a Nash Sutcliffe Efficiency of 0.51 and a coefficient of determination of 0.53 (Figure 9.12).

The model parameters from Peter's River model were then used to develop the Project baseline model as described in Section 9.1.1.1.4. The result of the baseline model for the main outlet of North Herman's Pond (HP) for climate normal year 1999 is shown in Figure 9.13. Flow at the HP outlet ranged from 0.021 m^3/s to 2.093 m^3/s with a mean of 0.272 m^3/s.

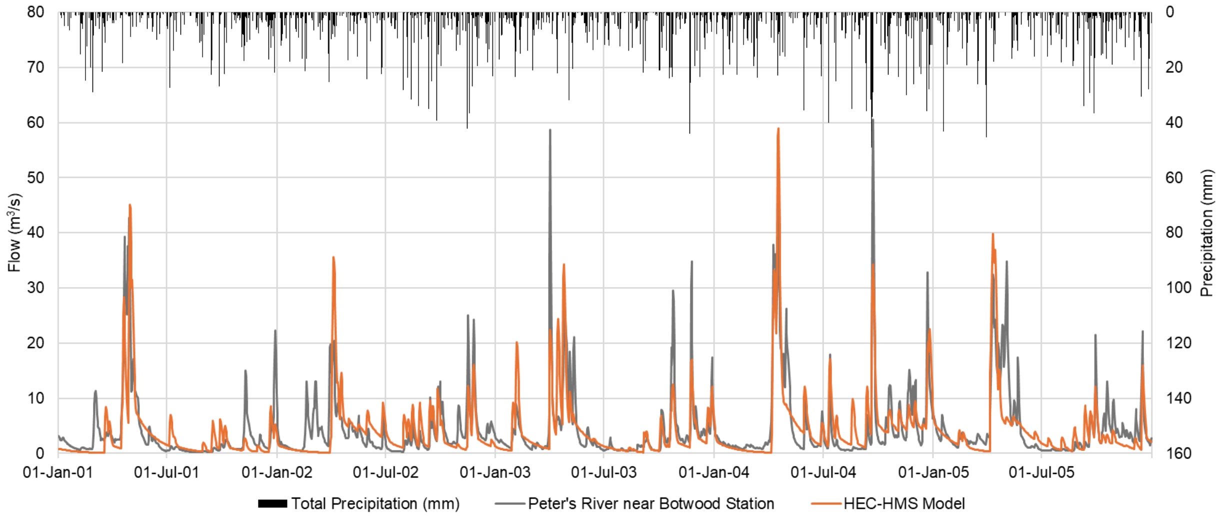


Figure 9.12 Peter's River Model Calibration – January 1, 2001 to December 31, 2005

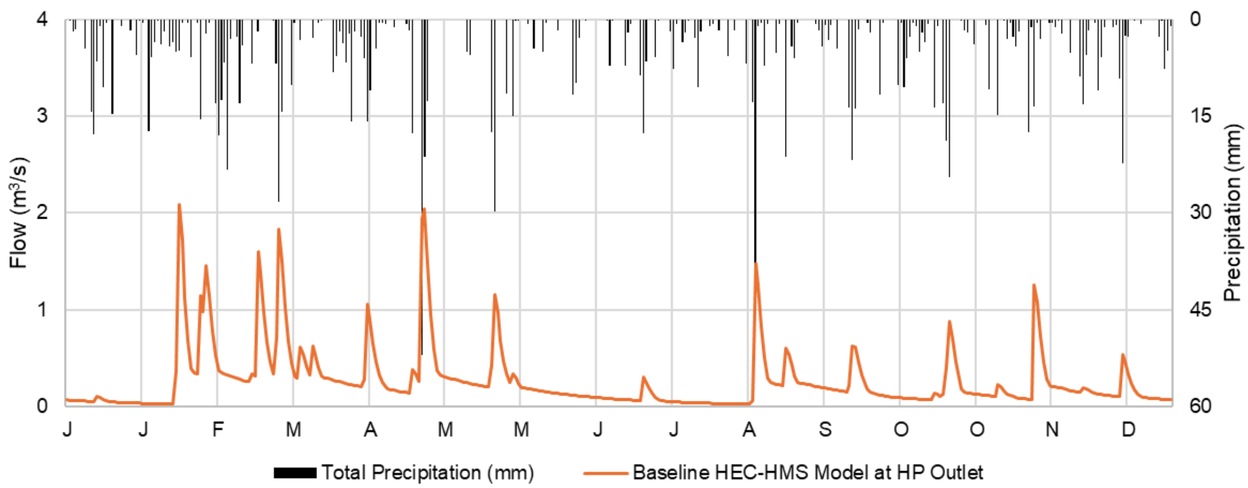


Figure 9.13 Baseline Model Hydrograph for North Herman's Pond Outlet

9.1.2.3 Surface Water Quality

9.1.2.3.1 Real-Time Water Quality Monitoring Stations

Real-time water quality data for the 2024 deployment period was obtained from two NLDECCC real-time water quality monitoring stations. The two monitoring stations are located within the LAA boundary (Figure 9.2).

Table 9.13 presents summary water quality statistics showing the daily average water quality concentrations for the parameters monitored at the two real-time water quality monitoring stations, NF02YQ0075 (Herman's Pond Brook) and NF02YQ0076 (Pond 226 Brook), during the 2024 deployment period.

Table 9.13 Summary of Water Quality Parameters in Real-Time Water Quality Monitoring Stations

Station ID	No. of Readings[1]	Conductivity (µS/cm)		DO (mg/L)		pH (pH units)		TDS (g/L)		Turbidity (NTU)	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
NF02YQ0075	24,254	25.1	124.5	2.5	14.1	4.69	7.34	0.02	0.08	-3.66	841.7
NF02YQ0076	24,101	24.6	120.8	6.7	14.6	5.93	7.10	0.03	0.08	-3.04	2,743

Notes:

µS/cm = micro siemens per centimetre; mg/L = milligrams per litre; g/L = grams per litre; NTU = nephelometric turbidity unit

[1] The 2024 deployment period for the two stations was from October to November 2024 (removal for winter season), and the 2025 deployment period was from May to December 2025.

In general, monitoring station NF02YQ0075 reported higher concentrations of the measured parameters during the 2024 deployment period, except for turbidity which was higher in monitoring station NF02YQ0076. The daily averages for NF02YQ0075 and NF02YQ0076 reported exceedances for pH (CWQG-FAL – 6.5 to 9). For NF02YQ0075, one pH daily average (or 3%) was below the CWQG-FAL lower limit of 6.5 and no daily averages were above the upper limit of 9. For NF02YQ0076, 27 pH daily averages (or 77%) were below the CWQG-FAL lower limit, and no daily averages were above the upper limit.

9.1.2.3.2 Water Quality Monitoring Programs

To facilitate data analysis and discussion, results are assessed by grouping monitoring stations located in watercourses and waterbodies, outlined in Section 9.1.1.2.2. From 2021 to 2023, a total of 21 watercourse stations and three waterbody stations were sampled across the Project Area. An ongoing field water quality monitoring program established in 2024 includes a total of six watercourse stations and two waterbody stations across the Project Area.

General Chemistry

Table 9.14 provides summary surface water quality statistics for the tested *in situ* and laboratory general chemistry parameters.

Nutrients

Table 9.15 presents a summary of laboratory analytical nutrients results. In general, the statistical analysis presented in Table 9.15 shows that the nutrient parameter concentrations are higher in the watercourse samples than in the waterbody samples.

Metals and Metalloids

Table 9.16 presents a summary of laboratory analytical total and dissolved metals result. Of the parameters that exceeded the CWQG-FAL values, the watercourse samples generally had higher concentrations than the waterbody samples, except for aluminum which had a higher 75th percentile value in waterbody samples.

Table 9.14 Summary of General Chemistry in Local Water Quality Monitoring Stations

Surface Water Feature Type	Parameter	Units	RDL	CWQG-FAL		Minimum	Maximum	Mean	25th Percentile	75th Percentile	Standard Deviation	No. of Samples	No. of Non-Detect Results	No. of Exceedances
				Short-Term	Long-Term									
Waterbody	DO, Field	mg/L	-	-	Variable[1]	4.31	13.28	8	68.5	9.5	3.2	10	0	2
	Conductivity, Field	µS/cm	-	-	-	23.1	232.3	107.2	62.4	148.2	59.9	27	0	-
	pH, Field	-	-	-	6.5 to 9.0	5.67	8.17	6.72	6.18	6.99	0.60	32	0	10
	Temperature, Field	°C	-	-	Narrative[2]	0.2	24.2	11.7	3.6	19.4	8.4	32	0	-
	Alkalinity, Total	mg/L	5	-	-	5	30	15.9	11	21	7.19	32	2	-
	Chloride	mg/L		640	120	6	48	20.9	10	30.8	12.3	32	0	0
	Cyanide	mg/L	0.002	-	-	-	0.002	-	-	-	-	6	5	0
	WAD Cyanide	mg/L	0.002	-	0.005	-	-	-	-	-	-	6	6	0
	Fluoride	mg/L	0.12	-	0.12	-	-	-	-	-	-	32	32	0
	Hardness	mg/L		-	-	6.8	37.8	20.5	13.8	25.8	8.5	32	0	-
	pH, Lab	-	-	-	6.5 to 9.0	6.01	7.12	6.54	6.33	6.77	0.29	32	0	16
	Sulphate	mg/L	2	-	-	<2	15	2.99	1.64	4	2.4	32	12	-
	TSS	mg/L	5	-	-	-	42	-	-	-	-	32	22	2
	Radium-226	Bq/L	0.005	-	-	-	0.007	-	-	-	-	6	4	0
Watercourse	DO, Field	mg/L	-	-	Variable[1]	0.79	22.2	9.11	77.1	12.5	4.65	30	0	-
	Conductivity, Field	µS/cm	-	-	-	11.6	558.2	65.4	21.8	85.1	68.4	217	4	-
	pH, Field	-	-	-	6.5 to 9.0	5.03	8.9	6.5	6.14	6.9	0.57	224	0	114
	Temperature, Field	°C	-	-	Narrative[2]	-0.2	26.8	9.13	1.9	16.2	7.38	224	7	-
	Alkalinity, Total	mg/L	5	-	-	<5	68	11.6	5	16	9.64	224	50	-
	Chloride	mg/L		640	120	2	91	8.3	3	9	9.7	224	0	0
	Cyanide	mg/L	0.002	-	-	-	0.004	-	-	-	-	18	16	0
	WAD Cyanide	mg/L	0.002	-	0.005	-	0.002	-	-	-	-	18	17	0
	Fluoride	mg/L	0.12	-	0.12	-	0.17	-	-	-	-	224	220	2
	Hardness	mg/L		-	-	4.1	63.2	13.3	8.2	16.7	8.2	224	0	-
	pH, Lab	-	-	-	6.5 to 9.0	5.54	7.48	6.36	6.09	6.61	0.35	224	0	156
	Sulphate	mg/L	2	-	-	-	5	-	-	-	-	224	195	-
	TSS	mg/L	5	-	-	-	85	-	-	-	-	224	201	5
	Radium-226	Bq/L	0.005	-	-	-	0.01	-	-	-	-	224	218	0

Notes:

Bq/L= becquerels per litre; RDL = reporting detection limit; WAD = weak acid dissociable

Bold – Value exceeds the CWQG-FAL short-term guideline; Underlined – Value exceeds the CWQG-FAL long-term guideline

"-" – Criteria or calculation not available

[1] CWQG-FAL long-term lowest acceptable concentration for warm water biota (early life stages) = 6 mg/L; warm water biota (other life stages) = 5.5 mg/L; cold water biota (early life stages) = 9.5 mg/L; cold water biota (other life stages) = 6.5 mg/L.

[2] CWQG-FAL long-term guideline for thermal stratification = thermal additions to receiving waters should be such that thermal stratification and subsequent turnover dates are not altered from those exiting prior to the addition of heat from artificial origins; maximum weekly average temperature = thermal additions to receiving waters should be such that the maximum weekly average temperature is not exceeded; short-term exposure to extreme temperatures = thermal additions to receiving water should be such that the short-term exposure to maximum temperatures are not exceeded, exposures should not be so lengthy or frequent as to adversely affect the important species.

Table 9.15 Summary of Nutrients in Local Water Quality Monitoring Stations

Surface Water Feature Type	Parameter	Units	RDL	CWQG-FAL		Minimum	Maximum	Mean	75th Percentile	95th Percentile	Standard Deviation	No. of Samples	No. of Non-Detect Results	No. of Exceedances
				Short-Term	Long-Term									
Waterbody	DOC	mg/L		-	-	5	11	7.4	7.9	10.5	1.9	10	19	-
	Ammonia (as N)	mg/L	0.03	0.0173	190	-	**0.74**	-	-	-	-	32	0	7
	Nitrate (as N)	mg/L	0.05	124	3.0	-	0.42	-	-	-	-	32	31	0
	Nitrite (as N)	mg/L	0.05	-	0.06	-	0.06	-	-	-	-	32	0	0
	TP	mg/L	0.002	-	Framework[1]	0.007	0.068	0.018	0.014	0.049	0.019	9	0	-
	TOC	mg/L	0.5	-	-	4.2	14.9	8.7	9.6	14.4	2.6	32	0	-
Watercourse	DOC	mg/L		-	-	4.3	14	7.5	9	10.7	2.18	30	0	-
	Ammonia (as N)	mg/L	0.03	0.0173	190	-	**14.6**	-	-	-	-	223	188	35
	Nitrate (as N)	mg/L	0.05	124	3.0	<0.05	2.61	0.14	0.15	0.44	0.22	223	98	0
	Nitrite (as N)	mg/L	0.05	-	0.06	-	0.38	-	-	-	-	223	218	4
	TP	mg/L	0.002	-	Framework[1]	<0.002	0.072	0.025	0.028	0.068	0.022	30	2	-
	TOC	mg/L	0.5	-	-	<0.5	36.3	8.9	10	13.9	3.9	223	1	-

Notes:

DOC = dissolved organic carbon; TP = total phosphorus; TOC = total organic carbon

Bold – Value exceeds the CWQG-FAL short-term guideline; Underlined – Value exceeds the CWQG-FAL long-term guideline

"-" – criteria or calculation not available

[1] CWQG-FAL long-term framework for total phosphorus provides the following trigger ranges: ultra-oligotrophic <0.004 mg/L; oligotrophic 0.004-0.01 mg/L; mesotrophic 0.01-0.02 mg/L; meso-eutrophic 0.02-0.035 mg/L; eutrophic 0.035-0.1 mg/L; hyper-eutrophic >0.1 mg/L

Table 9.16 Summary of Total and Dissolved Metals in Local Water Quality Monitoring Stations

Surface Water Feature Type	Parameter	Units	RDL	CWQG-FAL		Minimum	Maximum	Mean	75th Percentile	95th Percentile	Standard Deviation	No. of Samples	No. of Non-Detect Results	No. of Exceedances
				Short-Term	Long-Term									
Waterbody	Aluminum	µg/L	5	-	5/100[1]	<5	659	147.4	138.3	522.7	162.9	32	1	18
	Antimony	µg/L	2	-	-	-	2	-	-	-	-	32	31	-
	Arsenic	µg/L	2	-	5	<2	7	2.9	4	6	1.7	32	13	3
	Barium	µg/L	5	-	-	-	6	-	-	-	-	32	27	-
	Beryllium	µg/L	2	-	-	-	-	-	-	-	-	32	32	-
	Bismuth	µg/L	2	-	-	-	-	-	-	-	-	32	32	-
	Boron	µg/L	5	29,000	1,500	-	7	-	-	-	-	32	30	0
	Cadmium	µg/L	0.017	Equation[2]	Equation[2]	-	-	-	-	-	-	32	32	0
	Calcium	mg/L	0.1	-	-	1.4	9.9	5.4	7.1	9.3	2.7	32	0	-
	Chromium	µg/L	1	-	-	-	4	-	-	-	-	32	29	-
	Cobalt	µg/L	1	-	-	-	-	-	-	-	-	32	32	-
	Copper	µg/L	1	-	Equation[3]	-	3	-	-	-	-	32	24	1
	Iron	µg/L	50	-	300	64	898	250.1	275.5	596.1	177.3	32	0	7
	Lead	µg/L	0.5	-	Equation[4]	-	0.8	-	-	-	-	32	30	0
	Magnesium	mg/L	0.1	-	-	0.8	3.6	1.7	2.0	2.4	0.56	32	0	-
	Manganese*	µg/L	2	Equation[5]	Variable[5]	6	148	60.1	102	145.3	55.5	10	0	0
	Mercury	ng/L	26	-	26	-	604	-	-	-	-	32	20	2
	Molybdenum	µg/L	2	-	73	-	3.5	-	-	-	-	32	31	0
	Nickel	µg/L	2	-	Equation[6]	-	18	-	-	-	-	32	28	0
	Potassium	mg/L	0.58	-	-	<0.58	1.1	0.5	0.7	0.9	0.2	32	4	-
	Selenium	µg/L	1	-	1	-	1.7	-	-	-	-	32	27	1
	Silver	µg/L	0.1	-	0.25	-	-	-	-	-	-	32	32	0
	Sodium	mg/L	0.1	-	-	4.7	25.9	13.4	18.1	24.7	7.1	32	0	-
	Strontium	µg/L	5	-	-	9	70	36.4	47.3	67.5	18.9	32	0	-
	Thallium	µg/L	0.1	-	0.8	-	-	-	-	-	-	32	32	0
	Tin	µg/L	2	-	-	-	-	-	-	-	-	32	32	0
	Titanium	µg/L	2	-	-	-	10	-	-	-	-	32	27	-
	Uranium	µg/L	0.2	33	15	-	-	-	-	-	-	32	32	0
	Vanadium	µg/L	2	-	-	-	-	-	-	-	-	32	32	-
	Zinc*	µg/L	5	Equation[7]	Equation[7]	-	11	-	-	-	-	10	7	0

Table 9.16 Summary of Total and Dissolved Metals in Local Water Quality Monitoring Stations

Surface Water Feature Type	Parameter	Units	RDL	CWQG-FAL		Minimum	Maximum	Mean	75th Percentile	95th Percentile	Standard Deviation	No. of Samples	No. of Non-Detect Results	No. of Exceedances
				Short-Term	Long-Term									
Watercourse	Aluminum	µg/L	5	-	5/100[1]	<5	1,030	95.1	111.5	216.9	89.0	224	2	147
	Antimony	µg/L	2	-	-	-	2	-	-	-	-	224	222	-
	Arsenic	µg/L	2	-	5	-	17	-	-	-	-	224	193	6
	Barium	µg/L	5	-	-	-	11	-	-	-	-	224	202	-
	Beryllium	µg/L	2	-	-	-	-	-	-	-	-	224	224	-
	Bismuth	µg/L	2	-	-	-	-	-	-	-	-	224	224	-
	Boron	µg/L	5	29,000	1,500	-	12	-	-	-	-	224	203	0
	Cadmium	µg/L	0.017	Equation[2]	Equation[2]	-	0.27	-	-	-	-	224	221	2
	Calcium	mg/L	0.1	-	-	0.5	8.9	2.72	3.33	5.86	1.59	224	0	-
	Chromium	µg/L	1	-	-	-	5	-	-	-	-	224	206	-
	Cobalt	µg/L	1	-	-	-	4	-	-	-	-	224	218	-
	Copper	µg/L	1	-	Equation[3]	-	39	-	-	-	-	224	172	11
	Iron	µg/L	50	-	300	<50	3,280	301.8	318	944.1	373.1	224	9	59
	Lead	µg/L	0.5	-	Equation[4]	-	22.4	-	-	-	-	224	214	4
	Magnesium	mg/L	0.1	-	-	0.4	12.2	1.59	1.73	3.4	1.43	224	0	-
	Manganese*	µg/L	2	Equation[5]	Variable[5]	7	3,960	270.7	70.8	1,301.7	788.1	30	0	6
	Mercury	ng/L	26	-	26	-	659	-	-	-	-	224	178	16
	Molybdenum	µg/L	2	-	73	-	-	-	-	-	-	224	224	0
	Nickel	µg/L	2	-	Equation[6]	-	69	-	-	-	-	224	188	3
	Potassium	mg/L	0.1	-	-	<0.1	3.54	0.3	0.3	0.6	0.3	224	38	-
	Selenium	µg/L	1	-	1	-	4.6	-	-	-	-	224	203	10
	Silver	µg/L	0.1	-	0.25	-	0.4	-	-	-	-	224	219	3
	Sodium	mg/L	0.1	-	-	0.3	57.5	6	6.8	19.3	6.3	224	0	-
	Strontium	µg/L	5	-	-	<5	64	19.1	22	43.7	11.2	224	1	-
	Thallium	µg/L	0.1	-	0.8	-	-	-	-	-	-	224	224	0
	Tin	µg/L	2	-	-	-	-	-	-	-	-	224	224	0
	Titanium	µg/L	2	-	-	-	14	-	-	-	-	224	204	-
	Uranium	µg/L	0.2	33	15	-	-	-	-	-	-	224	224	0
	Vanadium	µg/L	2	-	-	-	4	-	-	-	-	224	222	-
	Zinc*	µg/L	5	Equation[7]	Equation[7]	-	11	-	-	-	-	30	20	5

Table 9.16 Summary of Total and Dissolved Metals in Local Water Quality Monitoring Stations

Surface Water Feature Type	Parameter	Units	RDL	CWQG-FAL		Minimum	Maximum	Mean	75th Percentile	95th Percentile	Standard Deviation	No. of Samples	No. of Non-Detect Results	No. of Exceedances
				Short-Term	Long-Term									

Notes:

μg/L = micrograms per litre

Bold – Value exceeds the CWQG-FAL short-term guideline; <u>Underlined</u> – Value exceeds the CWQG-FAL long-term guideline

"-" – criteria or calculation not available

* – parameter is reported as a dissolved concentration

1 – The CWQG-FAL for total aluminum is dependent on pH. If pH < 6.5, the guideline is 5 μg/L; if pH ≥ 6.5, the guideline is 100 μg/L.

2 – The CWQG-FAL for total cadmium is calculated based on hardness. Short-Term Guideline = $10^{\{1.016[\log(\text{hardness})]-1.71\}}$. Long-Term Guideline = $10^{\{0.836(\log[\text{hardness}])-2.46\}}$.

3 – The CWQG-FAL for total copper is calculated based on hardness. Long-Term Guideline = $0.2*e^{\{0.8545[\ln(\text{hardness})]-1.465\}}$.

4 – The CWQG-FAL for total lead is calculated based on hardness. Long-Term Guideline = $e^{\{1.273[\ln(\text{hardness})]-4.705\}}$.

5 – The CWQG-FAL for dissolved manganese can be determined using the look-up table found in Scientific Criteria Document for the Development of the Canadian Water Quality Guidelines for the Protection of Aquatic Life: Manganese (CCME 2019).

6 – The CWQG-FAL for total nickel is calculated based on hardness. Long-Term Guideline = $e^{\{0.76[\ln(\text{hardness})]+1.06\}}$.

7 – The short-term CWQG-FAL for dissolved zinc is calculated based on hardness and DOC. Short-Term Guideline = exp(0.833[ln(hardness)]+0.240[ln(DOC)]+0.526. The long-term CWQG-FAL for dissolved zinc is calculated based on hardness, DOC, and pH. Long-Term Guideline = exp(0.947[ln(hardness)]-0.815[pH]+0.398[ln(DOC)]+4.625.

9.1.2.3.3 Parameters of Potential Concern

Parameters of Potential Concern (PoPCs) were identified based on parameters where the 75th percentile concentration (and 25th percentile for pH, which has an upper limit and lower limit) exceeded the guideline concentration in the CWQG-FAL. Table 9.17 presents the parameters that were identified as PoPCs in the Project Area waters.

Table 9.17 Surface Water Quality Parameters of Potential Concern

Waterbodies	Watercourses
pH (*in situ*)	pH (*in situ*)
Aluminum (total)	Aluminum (total)
	Iron (total)

9.1.2.3.4 Surface Water Feature Type Comparison

When comparing the surface water feature types, specifically waterbodies (lakes and ponds) and watercourses (streams, rivers, and creeks), there are some differences in parameter concentrations and similarities between PoPCs.

Based on calculated 75th percentile values, waterbodies reported higher concentrations of general chemistry and metals and metalloids parameters than watercourses. Watercourses generally reported higher concentrations of nutrients parameters than waterbodies.

In situ pH and total aluminum were identified as PoPCs in both waterbodies and watercourses, as discussed in Section 9.4.3.2.1. An additional PoPC (total iron) was identified in watercourses but was not identified in waterbodies. The 75th percentile for total iron in watercourses was 318 micrograms per litre (µg/L), which is above the CWQG-FAL of 300 µg/L. Comparatively, the 75th percentile for total iron in waterbodies was 275.5 µg/L, which is below the CWQG-FAL value.

9.2 Potential Effects and Effect Pathways

A summary of the potential effects and Project effect pathways to be assessed for Surface Water Resources is provided in Table 9.18. Potential environmental effects and effects pathways were selected based on the review of similar projects in NL and other parts of Canada, and professional judgement.

Table 9.18 Potential Effects and Effect Pathways for Surface Water Resources

Potential Effect	Effect Pathway(s)
Change in surface water quantity	• Site preparation and ground disturbance, which could change catchment areas, increase runoff and flooding potential, and reduce infiltration and evapotranspiration due to increases in imperviousness and reduction of vegetative cover • Temporary dewatering for the installation of foundations for buildings, ore stockpile and waste rock storage facility, which could potentially alter groundwater discharge to surface water features • Dewatering of South Herman's Pond, which could potentially alter groundwater discharge to surface water features and alter surface water drainage patterns • Construction of watercourse crossings, which have the potential to increase flooding and alter overland flow drainage patterns • Construction of trenches and excavations, which could potentially affect surface water quantity by changing groundwater discharge to surface water features by altering preferential groundwater flows and lowering of groundwater levels • Development of water management infrastructure, which could result in surface drainage changes related to contact water collection in perimeter collection ditches • Development of the waste rock and overburden storage facilities and ore stockpile, which will alter runoff, flooding potential, and infiltration and evapotranspiration • Linear facilities (roads) with accompanied drainage infrastructure (ditches, culverts), which may increase runoff potential due to changes in impervious cover, slope and vegetation management • Final rehabilitation of disturbed areas with appropriate cover materials and vegetation to stabilize soils, which could reduce overland flow and surface erosion, increase evapotranspiration, and reduce infiltration • Re-establishment of drainage patterns, to the extent reasonably feasible, which could change the contributing areas of the local watersheds and subsequently affect surface water quantity
Change in surface water quality	• Site preparation and ground disturbance, which can convey sediment (as TSS) to receiving waters • Ground disturbance, which can expose loose soil and rock to precipitation and runoff that will be discharged to temporary ditching and ponds and ultimately to the receiving environment • Waste rock and ore handling, which can increase TSS loading from disturbed and un-stabilized ground surfaces and active work zones • Contact water and seepage originating from the ore stockpile, overburden and waste rock storage facilities that is not captured by the contact water management infrastructure, which could discharge to surface water receptors • Project effluent discharge at the FDP to surface water receptors, which can transport effluent to the receiving environment.

9.3 Mitigation and Management Measures

Environmental management plans will be developed and/or updated by New Found Gold to mitigate the effects of the Project on Surface Water Resources. A list of standard mitigation measures to be applied throughout Project construction, operation, and rehabilitation and closure is provided in Table 4.31. This list of standard mitigation measures incorporates the *Standard Mitigation Measures* provided by the Impact Assessment Agency of Canada (2026). Many of these standard mitigation measures will serve to avoid or reduce potential effects on Surface Water Resources, including the measures identified for the following Project activities:

- Site Clearing, Site Preparation, and Erosion and Sediment Control
- Soil Management
- Works In or Near Fish Habitat
- Site Water Management
- Blasting
- Vehicles / Equipment / Roads
- Materials Handling and Waste Management
- Rehabilitation and Closure

The following mitigation measures specific to the Surface Water Resources have been identified for the Project:

- Water management infrastructure, such as ponds and catch basins, will be constructed to manage via water transfer (i.e., pumping the design storm volume [1:100 year design storm]).
- Development of a site-specific Water Management Plan for the Project (Section 4, Appendix 4.A).
- Water inventory will be reduced through perimeter berms and promotion of overland flow of non-contact runoff.
- Flow to fish bearing streams and wetlands will be maintained by maintaining pre-development catchments and/or flows to the extent practicable.
- Water management pumping and energy requirements during operation will be reduced through grading and gravitational drainage.
- Mine water management infrastructure will be developed to control mine contact water.
- Runoff will be directed away from active work areas before construction commences, reducing the volume of sediment-laden water to be managed.
- Site contact water will be directed through grading of ditches and construction of diversion channels to a central collection pond (IT-TP-01) so it can be managed and discharged through two FDPs for the Project: P-9 Pond and North Herman's Pond.

- Interception wells or deep sumps within the perimeter drainage ditches around the Waste Rock Storage Facility (WRSF), ore stockpile, and overburden storage facility will be installed to intercept groundwater seepage that exceeds MDMER Schedule 4 Table 1 limits prior to discharging to local surface water receivers (as required). Water will be transferred to the site-wide contact water management system for treatment prior to discharge to the environment. Accepted industry best practice geochemistry methods will be used to predict mine contact runoff and seepage quality.
- The amount and timing of exposed soil left open at any one time will be limited to reduce the potential for erosion.
- Mine contact water will be treated via a sedimentation pond (IT-TP-01) and mine water treatment plant (as required) to provide effluent compliance with regulatory effluent limits.
- Mine effluent will discharge via two FDPs to assist in maintaining stream flows downstream of P-Pond and North Herman's Pond, where feasible.
- Mean monthly and daily effluent water quality at FDPs will be managed to be below MDMER Schedule 4 Table 1 limits.
- Dewatering will be carried out gradually to prevent sediment resuspension and bank destabilization.
- Only rock materials characterized as not acid-generating, non-potentially acid-generating and non-metal-leaching will be used for project works.
- Seepage from the WRSF to local surface water receivers during closure (Section 9.4.2.1) is predicted to potentially require treatment during the post-closure phase. Passive treatment systems will be potentially installed (as required) in seepage collection ditches and sedimentation ponds (e.g., permeable reactive barriers, engineered wetlands) to reduce metal/metalloid concentrations to baseline concentrations.
- Pit overflows can have in-pit treatment (if required) applied to precipitate out metals/metalloids or discharge into a passive treatment system (e.g., engineered wetland) prior to discharge to local surface water receivers.

9.4 Residual Environmental Effects

Potential environmental effects on Surface Water Resources were identified in Section 9.2. For Surface Water Resources, two effects were identified: change in surface water quantity and change in surface water quality. Residual effects (i.e., those remaining following implementation of mitigation [Section 9.3]) for each Project phase are evaluated below. The assessment of residual effects considers the following key factors:

- The Project is located within one watershed (Herman's Pond watershed), which discharges into the Gander Lake to reduce potential effects on surface water resources.
- The Project has been designed to avoid losses of watercourses and waterbodies through careful planning of the placement of infrastructure and shifting locations of activities away from watercourses and waterbodies, as practically feasible. Where avoidance is not feasible, mitigation measures will be employed to reduce the potential for effects.

- Most surface water samples collected from the Project Area met CWQG-FAL and MDMER guidelines, though some baseline samples showed higher levels of metals like aluminum, arsenic, manganese, and iron.
- Surface water monitoring locations for quality and quantity will be maintained to verify the accuracy of predictions made during the environmental assessment, to assess the implementation and effectiveness of mitigation and the nature of the residual effects, and to manage adaptively, if required.
- During construction and operation, mine contact water will be collected and treated prior to discharge via sedimentation ponds or sedimentation pond and mine water treatment plant prior to discharge to the environment.
- Groundwater seepage from the WRSF, overburden storage facility or ore stockpiles that will potentially migrate to local surface water receivers with elevated arsenic concentrations above regulatory criteria will be intercepted by interceptor wells or deep sumps within the contact water ditches and conveyed to the collection ponds for treatment prior to discharge to local surface water receivers.
- Mine effluent will discharge via two FDPs to create two mine effluent point sources: to P-Pond and North Herman’s Pond. This will assist in maintaining stream flows downstream of P-Pond and North Herman’s Pond, where feasible.

9.4.1 Change in Surface Water Quantity

9.4.1.1 Methods for Assessing Change in Surface Water Quantity

Flows and water levels under pre-development conditions were used as the baseline against which Project-related changes during the construction, operation, rehabilitation and closure and post-closure phases were assessed. Pre-disturbance (baseline) watershed areas are presented in Section 9.1.2.1.8 (Figure 9.5) and expected changes to these watersheds were delineated for subsequent phases of the mine life (operation and post-closure) as presented in Figures 9.14 and 9.15. The changes in watershed areas are primarily a result of the construction of mine infrastructure and the implementation of the Water Management Plan (Appendix 4.A).

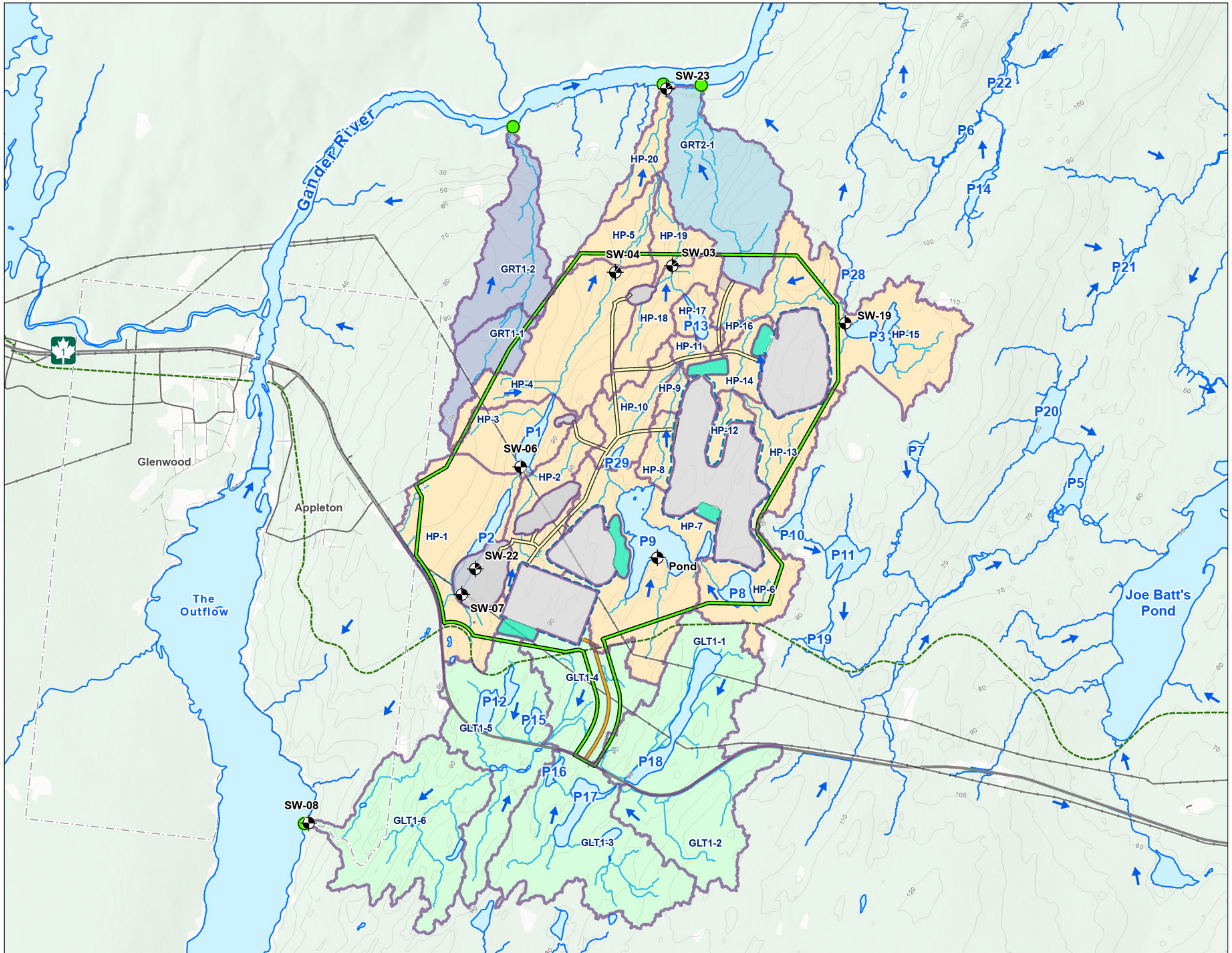


Figure No.
9.14

Title
Construction / Operation Watersheds

Client/Project — 121418510_910
New Found Gold Corp.
Queensway Gold Property

Project Location
North Gander Lake
Newfoundland and Labrador

Prepared by NW on 2025-12-18
Revised by NW on 2026-01-26
TR by JC on 2026-01-26

N

0 0.25 0.5 1 1.5 km
(At original document size of 11x17)
1:35,000

Legend

- Project Area / Local Assessment Area
- Surface Water Monitoring Location
- Outlet for Watershed Model

Watershed Delineation Ops Phase

- Watercourse
- Flow Paths
- Flow Direction
- Waterbody

Watershed Delineation (Stantec 2026)

- GLT1 (Gander Lake Tributary 1)
- GRT1 (Gander River Tributary 1)
- GRT2 (Gander River Tributary 2)
- HP (Herman's Pond)
- Subwatershed (Stantec, 2025)

Proposed Project Layout

- Access Road
- Haul Road
- Ditch
- Proposed Site Features
- Sedimentation Pond

SocioEconomic / Built Infrastructure

- Trans-Canada Highway
- Secondary Road
- Local Road
- Transmission Line
- NL T'Railway Provincial Park
- Municipal Boundary

Other Features

- Contour (10 m)

Notes

1. Coordinate System: NAD 1983 CSRS MTM 2
2. Data Sources: New Found Gold Corp.; Stantec; GEMTEC; Government of Newfoundland and Labrador, Department of Environment, Conservation and Climate Change, Department of Forestry, Agriculture and Lands - Land Use Atlas Mapping Service, Department of Municipal and Community Affairs.
3. Background: Government of Newfoundland and Labrador, Department of Forestry, Agriculture and Lands - Land Use Atlas Mapping; Statistics Canada National Road Network.

Stantec

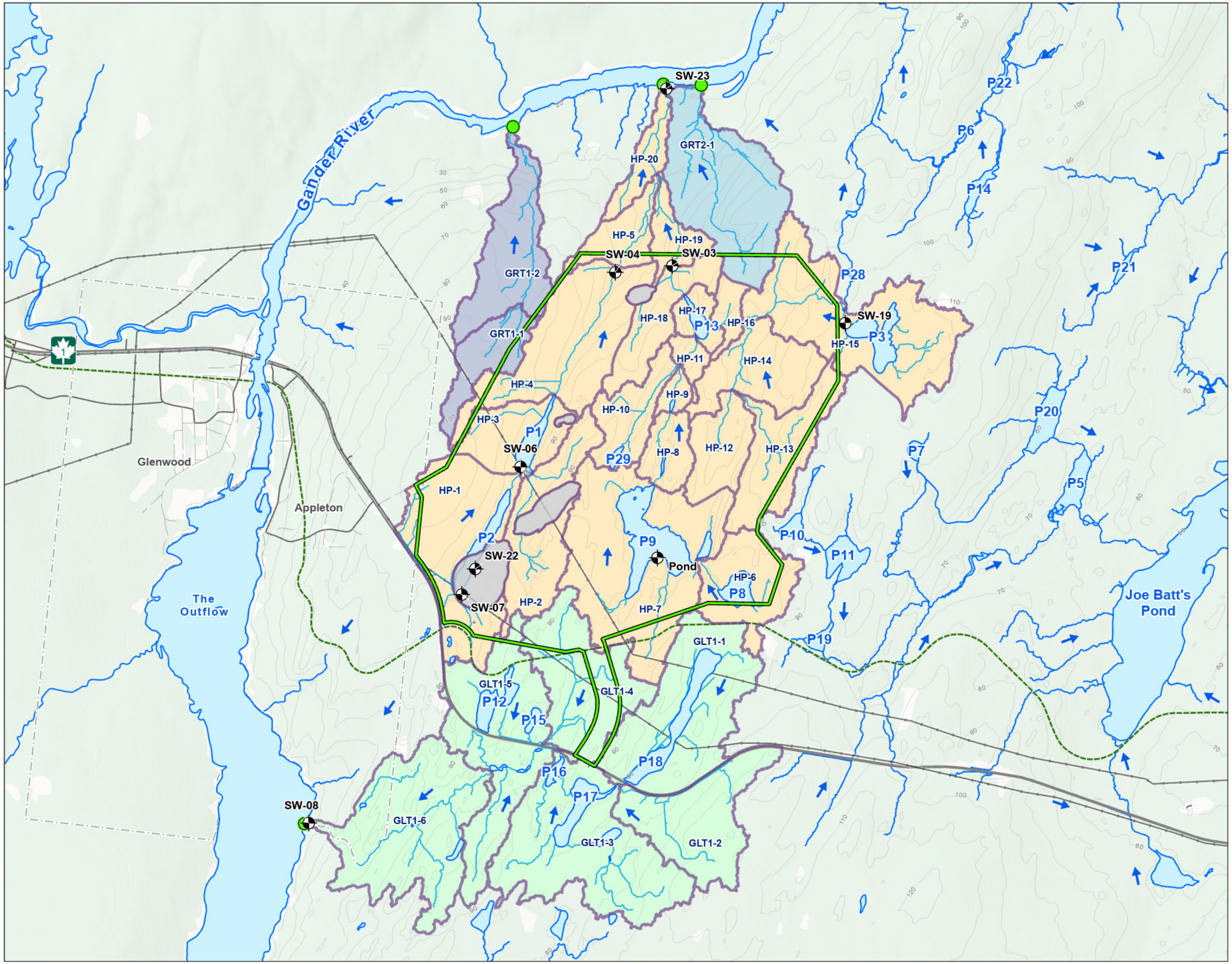


Figure No.

9.15

Title

Rehabilitation and Closure Watersheds

Client/Project 121418510_922

New Found Gold Corp.
Queensway Gold Property

Project Location
North Gander Lake
Newfoundland and Labrador

Prepared by NW on 2026-03-26
QR by AS on 2026-04-22

N

0 0.25 0.5 1 1.5 km

(At original document size of 11x17)
1:35,000

Legend

- Project Area / Local Assessment Area
- Surface Water Monitoring Location
- Outlet for Watershed Model

Watersheds and Waterways

- Flow Paths
- Watercourse
- Flow Direction
- Waterbody

Watershed Delineation (Stantec 2026)

- GLT1 (Gander Lake Tributary 1)
- GRT1 (Gander River Tributary 1)
- GRT2 (Gander River Tributary 2)
- HP (Herman's Pond)
- Subwatershed (Stantec 2026)

Proposed Project Layout

- Open Pit

SocioEconomic / Built Infrastructure

- Trans-Canada Highway
- Secondary Road
- Local Road
- Transmission Line
- NL T'Railway Provincial Park
- Municipal Boundary

Other Features

- Contour (10 m)

Notes

1. Coordinate System: NAD 1983 CSRS MTM 2
2. Data Sources: New Found Gold Corp.; Stantec; GEMTEC; Government of Newfoundland and Labrador, Department of Environment, Conservation and Climate Change, Department of Forestry, Agriculture and Lands - Land Use Atlas Mapping Service, Department of Municipal and Community Affairs.
3. Background: Government of Newfoundland and Labrador, Department of Forestry, Agriculture and Lands - Land Use Atlas Mapping; Statistics Canada National Road Network.

Stantec

Project related changes in surface water quantity were assessed at the watershed scale using the following approach:

- A site-wide water balance model was developed in GoldSim™ to predict the water quantity changes through the Project phases (Appendix 9.A). The water balance model includes the four open pits, overburden storage facility, WRSF, ore stockpiles, and industrial complex.
- The change in MAF from baseline conditions was used as a screening threshold to determine whether further assessment of changes in flow was required. Changes in MAF were calculated using a daily model for watersheds during the following phases of mine development: Mine Year 7 (operation), Mine Year 8 (active closure), Mine Year 11 (post-closure before all pits are filled), and Mine Year 35 (post-closure once all pits full). Watersheds with an expected change in MAF greater than 10% were carried forward to subsequent assessment steps. The +/-10% threshold is selected based on case studies presented by Richter et. al (2011), which indicate that a high level of ecological protection is provided when flow alterations are within 10% of the natural flow, and guidance provided by Fisheries and Oceans Canada (2013).
- For watersheds with an expected decrease of over 10%, the MAF was compared with baseline environmental flows. The residual effect was considered not to be significant if the predicted MAF was greater than the baseline environmental flow value. If the expected MAF was lower than the baseline environmental flow value, a locally significant surface water quantity effect is expected within the LAA.

For watersheds with an expected increase in MAF of over 10%, the expected MAF was compared with expected flood flows (Q100) to assess the potential for flooding and erosion. The residual effect was considered not to be significant if the predicted MAF was less than the flood flow (Q100) for the watercourse. If the expected MAF was greater than the Q100 flow value, a locally significant surface water quantity effect is expected within the LAA

9.4.1.2 Water Balance Model Results

Outflows and water quality from the sedimentation ponds are forecast in the water balance and water quality model, accounting for seepage and surface flow collected in the perimeter ditching of Project infrastructure and from dewatering of the pits. Conceptual water management applied in the water balance model for the construction/operation phase (Mine Year 1) and full build out operation phase (Mine Years 5-7) are presented in Figures 9.16 and 9.17. Further mine years are included in Appendix 9.A. The mine contact water from the site is captured within the Industrial Complex sedimentation pond (IT-TP-01) prior to release to the environment via two FDPs (FDP-01 and FDP-02). Based on the water quality model results (Section 9.4.2.1), the runoff and intercepted seepage from the WRSF and ore stockpiles is predicted to require treatment for arsenic to meet MDMER criteria and will be directed to a mine water treatment plant prior to discharge to IT-TP-01 and eventually the FDPs.

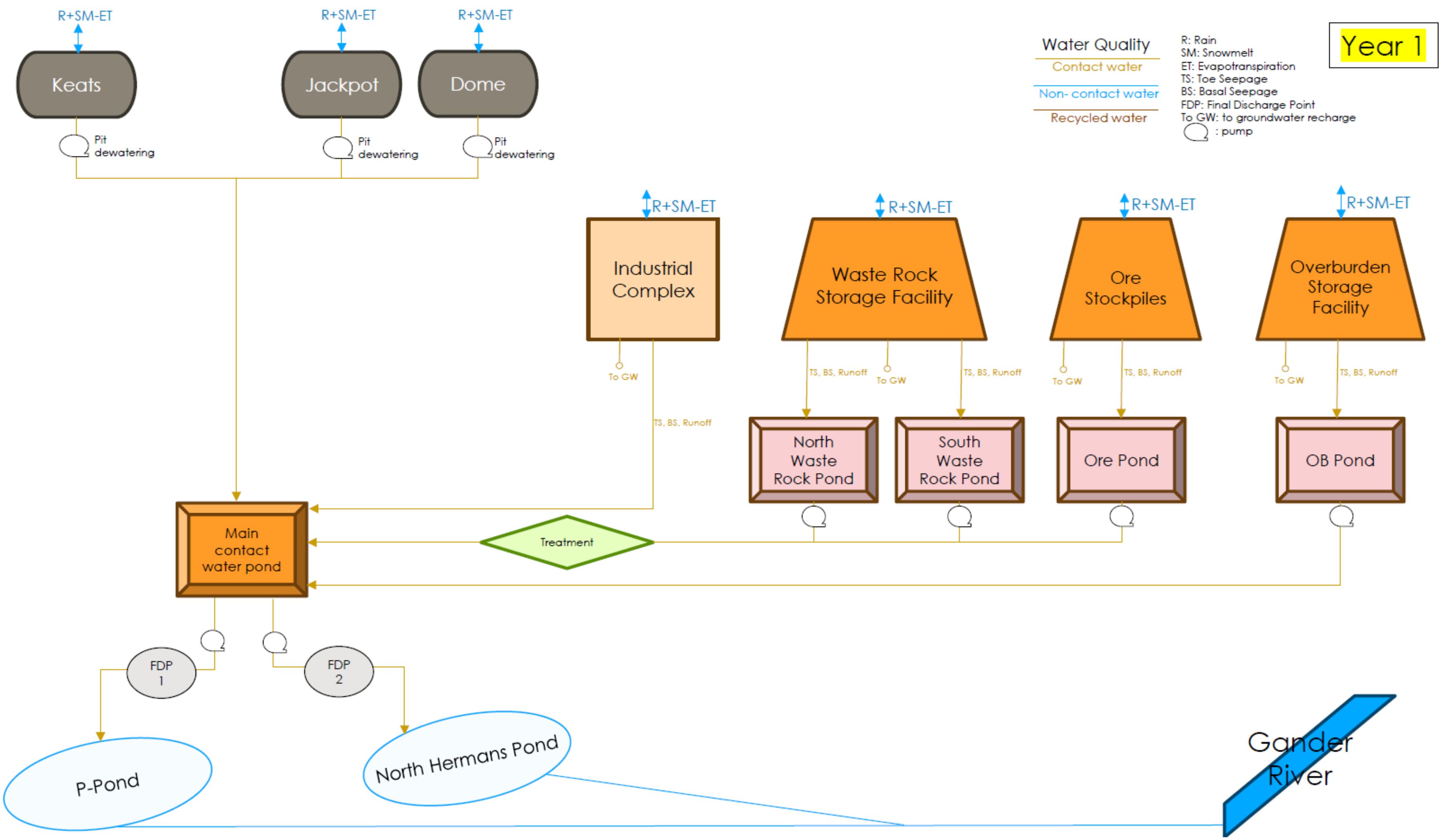


Figure 9.16 Mine Year 1 Conceptual Water Balance Model

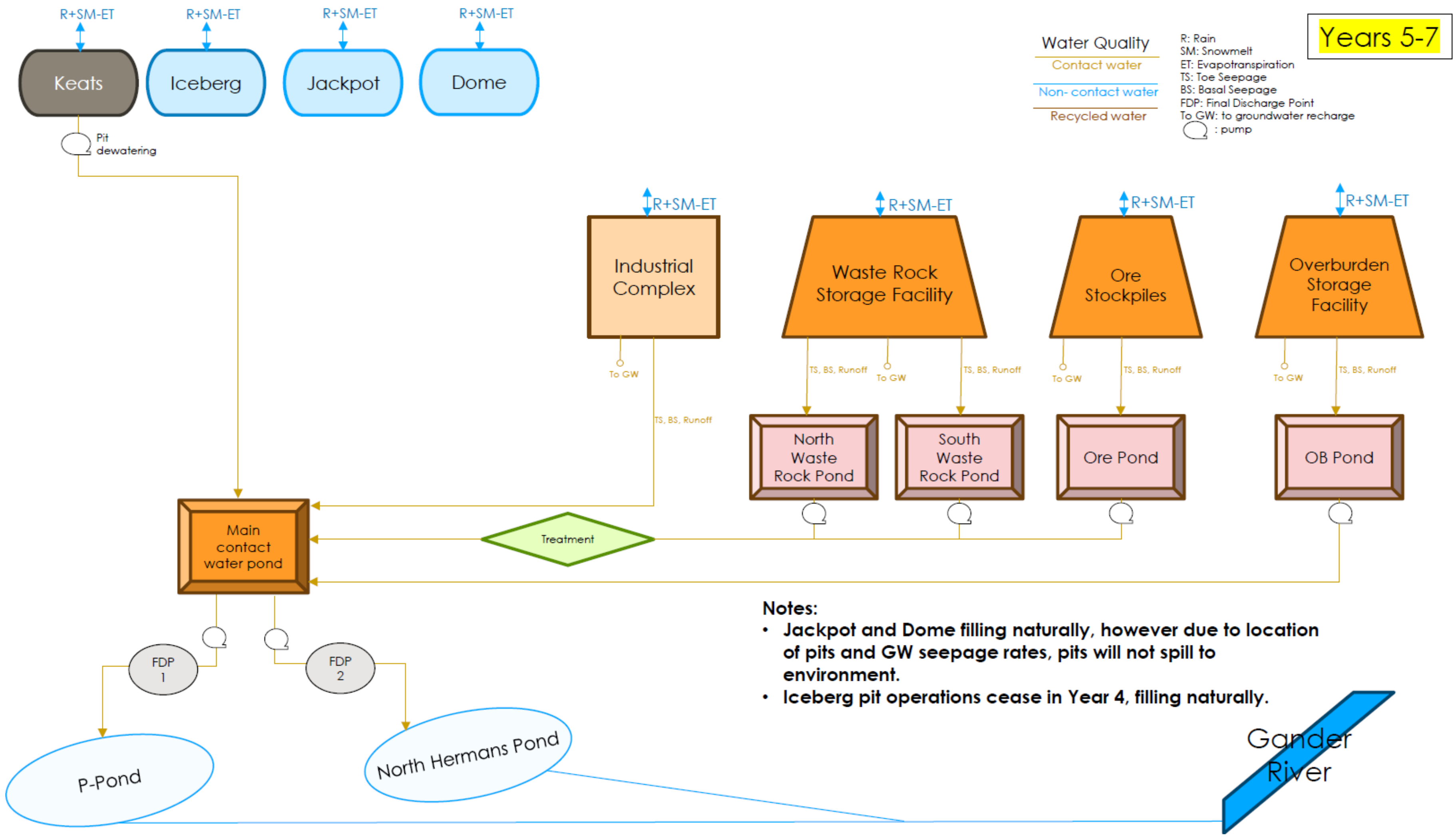


Figure 9.17 Mine Years 5-7 Conceptual Water Balance Model

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The water quantity model predicts that the sedimentation ponds become full during the freshet of the first year and the FDPs discharge thereafter. Table 9.19 presents the pond outflows for operation (Year 2 and 7), and active closure – site rehabilitation (Year 8). The magnitude of the flow from the sedimentation ponds is dictated by pond volume/ level, surface water flow into the pond, and groundwater infiltration transferred to the ponds via the site drainage ditches and pit dewatering. Further water balance detail is provided in Appendix 9.A.

As outlined in Section 4 (Project Description), the four pits will be actively mined based on the pit development schedule as presented in Table 9.20.

The pit water balance components during the construction and operation phases include groundwater seepage, precipitation, surface runoff from natural areas and within the pit footprint, evaporation and dewatering. For the Jackpot and Dome pits, upon end of operation, dewatering will stop and the pits will begin to naturally fill with surface water and groundwater. The predicted groundwater table elevation and associated inflow/outflow rates for the pits when filled (Section 8 – Groundwater Resources) indicate that due to the topographic location of the Jackpot and Dome pits within the landscape, the pits will act as groundwater recharge with no discharge via pit overflow. This means the Jackpot and Dome pits are not predicted to have surface discharges during the closure phase.

Table 9.19 Climate Normal Sedimentation Pond and FDP Outflows (m³/day)

Pond	Period	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
OB-SP-01	Operation – Year 2	719	762	1,158	1,294	763	694	795	791	1,057	1,168	1,081	1,026	942
	Operation – Year 7	784	784	1,190	1,333	799	732	839	833	1,103	1,212	1,118	1,058	982
	Active Closure – Year 8	794	929	1,204	1,352	817	752	864	855	1,128	1,237	1,138	1,074	1,012
WR-SP-01	Operation – Year 2	819	899	1,429	1,484	774	583	649	665	934	1,039	1,072	1,126	956
	Operation – Year 7	899	899	1,429	1,484	774	583	649	665	934	1,039	1,072	1,126	963
	Active Closure – Year 8	928	1,089	1,402	1,527	845	736	847	830	1,170	1,357	1,309	1,271	1,109
WR-SP-02	Operation – Year 2	386	422	670	698	346	261	292	301	434	495	507	530	445
	Operation – Year 7	422	422	670	698	346	261	292	301	434	495	507	530	448
	Active Closure – Year 8	435	510	658	717	378	330	380	374	540	637	613	595	514
OS-SP-01	Operation – Year 2	915	915	1,392	1,536	1,020	948	1,088	1,062	1,292	1,362	1,283	1,233	1,170
	Operation – Year 7	915	915	1,392	1,536	1,020	948	1,088	1,062	1,292	1,362	1,283	1,233	1,170
	Active Closure – Year 8	477	560	731	817	510	474	546	537	677	723	666	633	612
IT-TP-01	Operation – Year 2	8,796	9,240	11,922	12,621	9,514	8,932	9,585	9,512	10,881	11,293	10,965	10,815	10,340
	Operation – Year 7	7,320	3,833	5,921	6,421	3,816	3,339	3,805	3,777	4,897	5,322	5,123	5,045	4,885
	Active Closure – Year 8	3,448	4,043	5,234	5,782	3,427	3,106	3,574	3,513	4,650	5,167	4,868	4,670	4,290
FDP-01	Operation – Year 2	4,134	4,343	5,604	5,932	4,472	4,198	4,505	4,471	5,114	5,308	5,154	5,083	4,860
	Operation – Year 7	3,441	1,802	2,783	3,018	1,794	1,569	1,788	1,775	2,301	2,501	2,408	2,371	2,296
	Active Closure – Year 8	1,621	1,900	2,460	2,717	1,611	1,460	1,680	1,651	2,185	2,429	2,288	2,195	2,016
FDP-02	Operation – Year 2	4,662	4,897	6,319	6,689	5,042	4,734	5,080	5,041	5,767	5,985	5,812	5,732	5,480
	Operation – Year 7	3,880	2,032	3,138	3,403	2,023	1,770	2,017	2,002	2,595	2,821	2,715	2,674	2,589
	Active Closure – Year 8	1,828	2,143	2,774	3,064	1,816	1,646	1,894	1,862	2,464	2,739	2,580	2,475	2,274

Table 9.20 Pit Development Schedule

Pit	Mine Year							Notes
	1	2	3	4	5	6	7	
Keats	✓	✓	✓	✓	✓	✓	✓	Dewatering stops Year 8, Mineralized Material Below Cut-Off Grade deposited in pit Year 8. Pit fills in Year 25
Iceberg		✓	✓	✓				Dewatering stops Year 5. Keats acid rock drainage and metal leaching material deposited in pit Year 5. Mineralized Material Below Cut-Off Grade material placed in pit Year 8. Pit fills Year 31
Jackpot	✓	✓						Dewatering stops Year 3.
Dome	✓	✓						Dewatering stops Year 3.

For the Iceberg pit, when finished being actively mined during the operation phase (Mine Year 5), potentially acid generating (PAG) waste rock will be placed within the pit shell. During Mine Year 8 of active closure, Iceberg and Keats pit will have the remaining mineralized material below cut off grade from the ore stockpile pad placed within them. The predicted time to fill via direct precipitation and groundwater inflow for the Iceberg and Keats pits and to become surface water features with discharge via the pit overflow spillway to the Herman's Pond system occurs in Mine Years 31 and 25, respectively under climate normal condition (Figures 9.18 and 9.19).

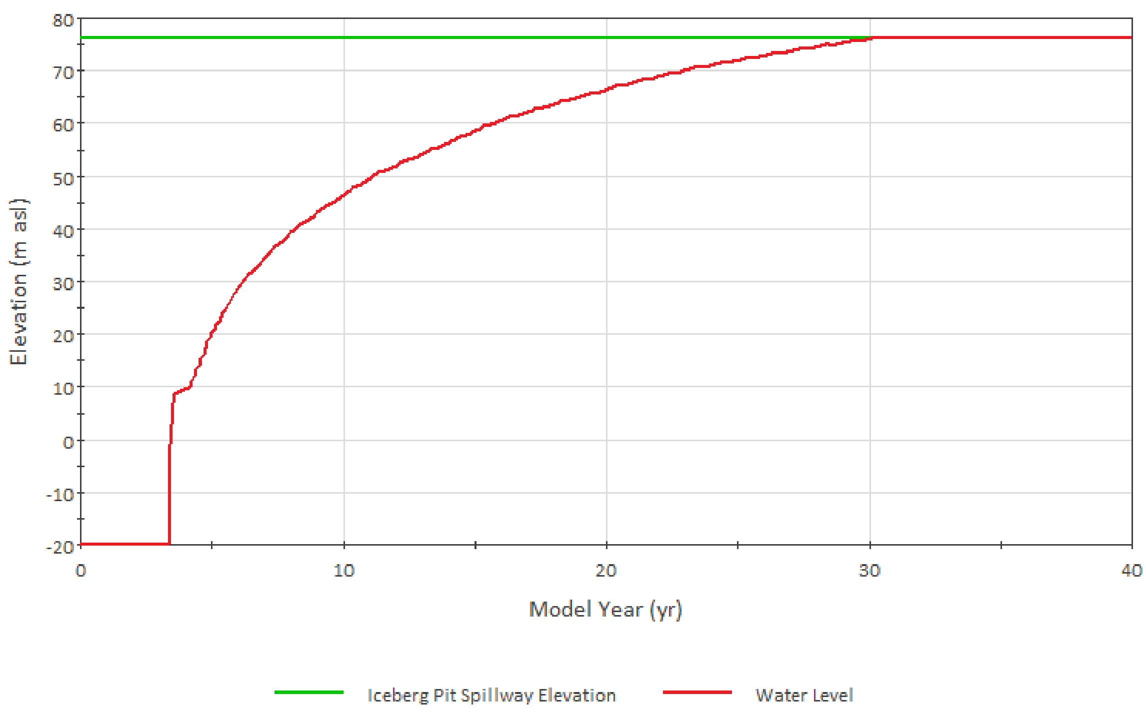


Figure 9.18 Iceberg Pit Natural Pit Filling

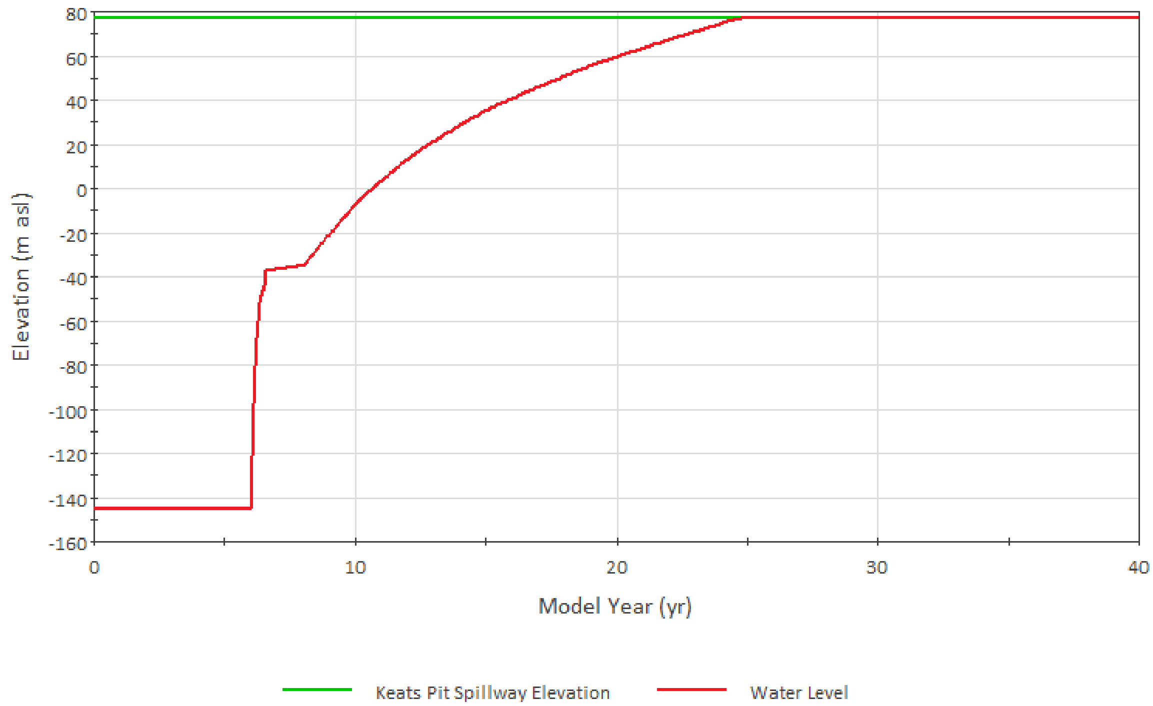


Figure 9.19 Keats Pit Natural Pit Filling

9.4.1.3 Residual Effects on Surface Water Quantity

The residual effects follow the incorporation of the mitigation measures described in Section 9.3. Changes in watershed area and estimated changes in MAFs through the mine life phases are presented in Table 9.19. The table shows only watersheds that are impacted by the Project (reduction or increase in flow). Where changes in MAF were projected to vary less than ±10%, no residual effect is anticipated. Where an increase of over 10% in MAF is predicted, increased flows during high flow events were considered a potential residual effect. Where a decrease of over 10% in MAF is predicted, decreased flows during low flow events (environmental flows) were considered a potential residual effect.

Construction and Operation (Mine Years 1 to 7)

The predicted surface water quantity percent and calculated flow changes anticipated during the construction and operation phases from pre-development conditions are presented in Table 9.21. The site layout for construction and operation phase is presented in Figure 9.14. Residual effects for construction and operation were considered together as changes to water quantity are anticipated to be minimal through construction activities with the largest changes captured during the operation phase when mine infrastructure is built out to its full footprint (Mine Year 7).

Table 9.21 Summary of Watershed Area, MAF, and Environmental Flow Changes through the Project Expansion Phases

Watershed Name	Watershed Area (km²)					MAF (m³/s)					Largest Change in MAF (%)	MAF % of Pre-Development Summer Environmental Flow				MAF % of Pre-Development Winter Environmental Flow			
	Baseline	Operation Year 7	Active Closure Year 8	Post Closure Year 11	Post Closure Year 35	Baseline	Operation Year 7	Active Closure Year 8	Post Closure Year 11	Post Closure Year 35		Operation Year 7	Active Closure Year 8	Post Closure Year 11	Post Closure Year 35	Operation Year 7	Active Closure Year 8	Post Closure Year 11	Post Closure Year 35
GLT1-4	0.943	0.789	0.789	0.943	0.943	0.022	0.018	0.018	0.022	0.022	-16% (Op, ACl)	65%	65%	98%	98%	175%	175%	230%	230%
GLT1-5	1.293	1.249	1.249	1.293	1.293	0.136	0.132	0.132	0.136	0.136	-3% (Op, ACl)	94%	94%	101%	101%	223%	223%	234%	234%
GLT1-6	1.435	1.435	1.435	1.435	1.435	0.170	0.165	0.165	0.170	0.170	-3% (Op, ACl)	94%	94%	100%	100%	224%	224%	233%	233%
HP-1	1.289	1.099	1.099	1.108	1.108	0.030	0.025	0.025	0.025	0.048	+61% (PCl35)	69%	69%	70%	219%	181%	181%	183%	432%
HP-10	0.320	0.406	0.406	0.406	0.406	0.007	0.009	0.009	0.009	0.009	+27% (All)	154%	154%	154%	154%	323%	323%	323%	323%
HP-11	0.107	0.082	0.082	0.107	0.107	0.075	0.086	0.084	0.077	0.077	+15% (Op)	130%	124%	104%	104%	374%	288%	241%	241%
HP-12	0.412	0.133	0.133	0.412	0.412	0.010	0.003	0.003	0.010	0.010	-68% (Op, ACl)	-39%	-39%	90%	90%	1%	1%	217%	217%
HP-13	0.662	0.44	0.44	0.662	0.662	0.015	0.010	0.010	0.015	0.015	-34% (Op, ACl)	35%	35%	103%	103%	125%	125%	239%	239%
HP-14	0.616	0.205	0.205	0.616	0.616	0.039	0.018	0.018	0.039	0.039	-54% (Op, ACl)	-8%	-8%	100%	100%	53%	53%	233%	233%
HP-15	1.456	1.389	1.389	1.456	1.456	0.034	0.032	0.032	0.034	0.034	-5% (Op, ACl)	88%	88%	97%	97%	214%	214%	229%	229%
HP-16	0.139	0.139	0.139	0.139	0.139	0.076	0.053	0.053	0.076	0.076	-30% (Op, ACl)	40%	40%	99%	99%	133%	133%	232%	232%
HP-17	0.167	0.167	0.167	0.167	0.167	0.154	0.143	0.141	0.156	0.156	-9% (ACl)	86%	83%	103%	103%	254%	212%	238%	238%
HP-18	0.225	0.446	0.446	0.446	0.446	0.159	0.153	0.151	0.166	0.166	-5% (ACl)	93%	90%	109%	109%	264%	224%	249%	249%
HP-19	0.234	0.234	0.234	0.234	0.234	0.165	0.159	0.157	0.172	0.172	-5% (ACl)	92%	90%	108%	108%	262%	223%	247%	247%
HP-2	0.824	0.465	0.465	0.666	0.666	0.019	0.011	0.011	0.015	0.017	-44% (Op, ACl)	12%	12%	60%	81%	87%	87%	167%	201%
HP-20	0.239	0.239	0.239	0.239	0.239	0.272	0.274	0.270	0.263	0.287	+6% (PCl35)	102%	98%	93%	111%	289%	239%	222%	252%
HP-3	0.511	0.497	0.497	0.497	0.497	0.060	0.077	0.074	0.052	0.076	+27% (Op)	156%	147%	74%	155%	454%	333%	190%	325%
HP-4	1.474	1.136	1.136	1.136	1.136	0.094	0.103	0.100	0.078	0.103	-17% (PCl11)	119%	114%	67%	118%	346%	269%	178%	264%
HP-5	0.307	0.307	0.307	0.307	0.307	0.102	0.110	0.107	0.085	0.110	-16% (PCl11)	116%	111%	67%	115%	334%	263%	179%	259%
HP-6	0.612	0.522	0.522	0.612	0.612	0.014	0.012	0.012	0.014	0.014	-15% (Op, ACl)	71%	71%	102%	102%	186%	186%	236%	236%
HP-7	1.851	1.371	1.371	1.849	1.849	0.057	0.069	0.067	0.057	0.057	+22% (Op)	143%	136%	99%	99%	426%	313%	232%	232%
HP-8	0.264	0.163	0.163	0.264	0.264	0.063	0.073	0.071	0.063	0.063	+16% (Op)	132%	126%	99%	99%	396%	293%	232%	232%
HP-9	0.089	0.076	0.076	0.089	0.089	0.065	0.075	0.073	0.065	0.065	+15% (Op)	130%	124%	99%	99%	389%	290%	232%	232%

Notes:

Largest changes in MAF compared to the baseline conditions and the Project phase that this change will be experienced in

Changes in % of the MAF refer to the conservative scenarios (refers to the Project expansion phase which could result in the greatest change in MAF)

Op = Operation Year 7, ACl = Active Closure Year 8, Cl = Closure, PCl11 = Post Closure Year 11, PCl35 = Post Closure Year 35, All = All phases

Summer Environmental Flow (50% MAF) and Winter Environmental Flow (30% MAF) were used in this assessment (Zadeh 2012)

GLT = Gander Lake Tributary; HP = Herman's Pond

Watersheds within the unnamed Gander Lake Tributary (GLT) sub-watersheds GLT1-5 and GLT1-6, and the Herman's Pond (HP) sub-watersheds HP-4, HP-5, HP-15, HP-17, HP-18, HP-19 and HP-20, are expected to experience MAF changes varied less than ±10% of pre-development MAF values. Therefore, no residual effects to surface water quantity in these sub-watersheds are expected from the Project activities.

The GLT sub-watershed GLT1-4, and HP sub-watersheds HP-1, HP-2, HP-6, HP-12, HP-13, HP-14 and HP-16, are expected to experience a decrease in MAF of greater than 10%. Site infrastructure (piles, pads and pits) with re-direction of contact water to the site-wide water management system will reduce these sub-watershed drainage areas and subsequently their outlet flows. The sub-watersheds GLT1-4, HP-1, HP-2, HP6, HP-13, and HP-16 post-development MAFs are expected to be higher than the pre-development summer and winter environmental low flows even with the decrease in predicted MAF rate. The sub-watershed HP-14 MAF is projected to be 8% lower and 53% higher than pre- development summer and winter environmental flows, respectively. The HP-12 sub-watershed MAF is expected to be 39% lower and 1% higher than pre-development summer and winter environmental flows, respectively.

The HP sub-watersheds HP-3, HP-7, HP-8, HP-9 HP-10 and HP-11 are projected to experience an increase in MAF of greater than 10% from Project activities, as they are downstream of the FDPs. The MAF values that were predicted to increase more than 10% were compared to the Q100 flood flows and ranged from 0.5% to 1.1% of the Q100 flow rates.

Active Closure (Mine Years 8 to 10)

Details of predicted surface water quantity changes anticipated during the active closure phase from pre-development conditions are presented in Table 9.21 and discussed below. Residual effects for active closure were considered based on Mine Year 8 where the largest changes are captured. The site layout for active closure phase is presented in Figure 9.15.

The GLT sub-watersheds GLT1-5 and GLT1-6 and HP sub-watersheds HP-4, HP-5, HP-15, HP-17, HP-18, HP-19 and HP-20 are expected to experience MAF change within ±10% of pre-development MAF. No residual effect to surface water quantity is expected as a result of the Project for these watersheds.

The GLT sub-watershed GLT1-4, and HP sub-watersheds HP-1, HP-2, HP-6, HP-12, HP-13, HP-14 and HP-16, are expected to experience a decrease in MAF rates of greater than 10%. The GLT1-4, HP-1, HP-13, HP-16, HP-2 and HP6 post-development MAFs are expected to be higher than the pre-development summer and winter environmental low flows even with the decrease in MAF. The HP-14 MAF is projected to be 8% lower and 53% higher than pre-development summer and winter environmental flows, respectively. The HP-12 MAF is expected to be 39% lower and 1% higher than pre-development summer and winter environmental flows, respectively.

The HP sub-watersheds HP-3, HP-10, HP-7, HP-8, HP-9 and HP-11 are projected to experience an increase in MAF of greater than 10%. The MAF values predicted to increase more than 10% were compared to the Q100 flood flows and ranged for 0.5% to 1.0% of the baseline Q100 flow rates.

Post-Closure (Mine Years 11+)

Details of predicted surface water quantity changes anticipated during the post-closure phases are presented for two scenarios: 1) Prior to the Iceberg and Keats pits discharging to the environment (Mine Years 11 to 24); and 2) When the Iceberg and Keats pits overflow (Mine Years 25+ (Keats); 31+ (Iceberg)). The flow changes from pre-development conditions are presented in Table 9.21. Residual effects for post-closure were considered based on Mine Year 11 when Iceberg and Keats pits are not predicted to discharge to the environment, and Mine Year 35 when both Iceberg and Keats are discharging. The site layout for the post-closure phase is presented in Figure 9.15.

During post-closure Mine Year 11, the GLT sub-watersheds GLT1-4, GLT1-5 and GLT1-6 and HP sub-watersheds HP-6, HP-7, HP-8, HP-9, HP-11, HP-12, HP-13, HP-14, HP-15, HP-16, HP-17, HP-18, HP-19 and HP-20, are expected to experience MAF changes within ±10% of pre-development MAF rates; therefore, no residual effect to surface water quantity is expected as a result of the Project for these watersheds. The HP sub-watersheds HP-1, HP-2, HP-3, HP-4 and HP-5 are expected to experience a decrease in MAF of greater than 10%; however, their post-development MAFs are expected to be higher than the pre-development summer and winter environmental low flows even with the decrease in MAF. HP-10 is projected to experience an increase in MAF of greater than 10%. The HP-10 predicted MAF was compared to the Q100 flood flow and is 0.5% of the baseline Q100 flow rate.

During post-closure Mine Year 35, the GLT sub-watersheds GLT1-4, GLT1-5 and GLT1-6 and HP sub-watersheds HP-2, HP-4, HP-5, HP-6, HP-7, HP-8, HP-9, HP-11, HP-12, HP-13, HP-14, HP-15, HP-16, HP-17, HP-18, HP-19 and HP-20 are expected to experience MAF change within ±10% of pre-development MAF; therefore, no residual effect to surface water quantity is expected as a result of the Project for these watersheds. The HP sub-watersheds HP-1, HP-3 and HP-10 are projected to experience an increase in MAF of greater than 10%. MAF values that were predicted to increase more than 10% were compared to the Q100 flood flows and ranged for 0.5% to 1.1% of the pre-development Q100 flow rates.

9.4.1.4 Water Withdrawals

The need for additional water beyond reuse of water from the sedimentation ponds, including a freshwater intake is currently being assessed for the Project. If a potential water withdrawal from P Pond (P9; sub-watershed HP7) or North Heman's Pond (P1; sub-watershed HP3) is required, it will have a maximum monthly water taking rate that is no more than 10% of the MAF rate of the waterbody. Where changes in MAF in the system are less than 10%, there is no residual effect expected.

9.4.1.5 Summary of Effects on Surface Water Quantity

A residual project effect on surface water quantity is defined as a change in MAF greater than 10% at the boundary of the LAA compared to baseline MAF. Table 9.22 summarizes the changes to MAF in the sub-watersheds for the Project during the various Project phases. During the operation (Mine Years 1 to 7) and active closure phase (Mine Years 8-10), it is expected that nine sub-watersheds in the Project Area will maintain a MAF within ±10% of pre-development conditions. Eight sub-watersheds are predicted to experience a decrease in MAF of over 10%, with six of those watersheds expected to maintain both summer and winter environmental flow rates and two watersheds are predicted to have lower flows than summer environmental flows. Six sub-watersheds will experience an increase in MAF of over 10% during the operation and active closure phases, however these flows will not exceed the Q100 flood flow volumes.

Table 9.22 Summary of Flow Changes throughout Project Phases

Project Phase	Number of Watersheds (Watershed IDs)		
	MAF within +/- 10% of Baseline Conditions	**MAF increase by greater than 10% of Baseline Conditions**	**MAF decrease of greater than 10% Baseline Conditions**
Operation (Mine Years 1 to 7)	9 (GLT1-5, GLT1-6, HP-4, HP-5, HP-15, HP-17, HP-18, HP-19, HP-20)	6 (HP-3, HP-7, HP-8, HP-9, HP-10, HP-11)	8 (GLT1-4, HP-1, HP-2, HP-6, HP-12, HP-13, HP-14, HP-16)
Active Closure (Mine Years 8 to 10)	9 (GLT1-5, GLT1-6, HP-4, HP-5, HP-15, HP-17, HP-18, HP-19, HP-20)	6 (HP-3, HP-7, HP-8, HP-9, HP-10, HP-11)	8 (GLT1-4, HP-1, HP-2, HP-6, HP-12, HP-13, HP-14, HP-16)
Post-Closure (Mine Years 11 to 31)	17 (GLT1-4, GLT1-5, GLT1-6, HP-6, HP-7, HP-8, HP-9, HP-11, HP-12, HP-13, HP-14, HP-15, HP-16, HP-17, HP-18, HP-19, HP-20)	1 (HP-10)	5 (HP-1, HP-2, HP-3, HP-4, HP-5)
Post-Closure (Mine Year 32+)	23 (all sub-watersheds)	-	-

During the post-closure period (Mine Years 11 to 31) when the Iceberg and Keats pits are not discharging, it is expected that 18 sub-watersheds will maintain a MAF within ±10% of pre-development conditions. Five watersheds are predicted to experience a decrease in MAF of over 10%; however, all are expected are expected to maintain environmental flows.

During the Post-Closure in Mine Year 31 and after when the Iceberg and Keats pits are overflowing, it is expected that 23 watersheds in the Project Area will maintain a MAF within ±10% of pre-development conditions.

The magnitude of potential freshwater intake withdrawals from either P Pond, North ' Pond or other receivers within the LAA will not cause a net reduction in these freshwater systems and their downstream catchments that exceeds a change greater than 10% of the baseline MAF rate.

Based on the information presented above, and the implementation of mitigation and management measures, Project related effects on Surface Water Quantity are predicted to be:

- **Magnitude:** The magnitude of residual effects with the implementation of mitigation measures is predicted to be a moderate measurable change that is detectable within the individual Herman's Pond and unnamed Gander Lake Tributary sub-watersheds within the LAA with changes in MAF over 10% causing a potential localized residual effects, although not considered significant.
- **Geographic Extent:** Project effects on surface water quantity is predicted to extend to the outlet of the Herman's Pond watershed, and upper watershed of the unnamed Gander Lake Tributary within the boundaries of the LAA.
- **Durations:** Residual effects are predicted to be continuous and long-term in duration. The natural seasonal variations including precipitation, surface runoff and groundwater flows could affect the surface water quantity within the LAA; however, these variations would not be considered a Project-related effect. Changes to some watersheds within the LAA will be realized post-closure (e.g., open pits, WRSF land form); therefore these are considered long-term effects.

- **Frequency:** Residual effects will occur continuously during the operation and rehabilitation and closure Project phases.
- **Reversibility:** Residual effects on water quantity for most of the watercourses/ waterbodies are considered to be reversible as conditions will return to pre-development flow patterns for the majority of the LAA in Post-Closure. Effects on watercourses/ waterbodies overprinted by the open pits (e.g., South Herman's Pond) are considered irreversible.

9.4.2 Change in Surface Water Quality

9.4.2.1 Water Quality Model

9.4.2.1.1 Methods

A water quality model (Appendix 9.A) was developed to estimate the mass loadings from material stockpiles (e.g., waste rock, overburden, mineralized materials), open pits, and water management ponds to evaluate the effects of the proposed Project on surface water quality and to support operational decision-making. The model was developed using GoldSim™ with the contaminant transport module to predict water quality associated with the water balance for each Project component. GoldSim™ is commonly used in the mining industry to develop integrated water balance and water quality models and to predict water quality at user-defined modelling nodes by combining system dynamics with discrete event simulations.

The model was run dynamically on a daily timestep for 50 years and generated monthly averaged results. Two geochemical source term scenarios—Expected Case (representing 50th percentile concentrations and loading rates) and Upper Case (representing 90th percentile concentrations and loading rates)—were modelled under Normal (i.e., average) Climate conditions. Contact water quality was predicted by integrating the geochemical source terms, developed to represent chemical loadings from Project components, into the water balance. The collected mine contact water runoff and seepage is directed to the main contact pond (IT-TP-01) prior to discharge to the environment at FDP locations.

9.4.2.1.2 Sources of Parameters of Potential Concern

Waste rock from major lithologies at the Project, along with overburden and mineralized materials, were characterized to assess their acid-generation potential, neutralizing capacity, and metal leaching behavior as part of the ongoing metal leaching and acid rock drainage (ML/ARD) testing program. Further information is included in Section 4.1.2.2. Geochemical characterization studies for the Project are ongoing and will be used to refine the ML/ARD potential of mined materials.

The ongoing ML/ARD characterization program has followed guidance in the Mine Environment Neutral Drainage (MEND) publication entitled "Prediction Manual for Characterizing Drainage Chemistry from Sulphidic Geological Materials" (MEND 2009). To date, the program has included the following:

- Static testing of 387 samples of waste rock (n = 355), overburden (n = 39), and mineralized material below cut-off grade (MMBCG) (n = 13) including Acid Base Accounting to determine the neutralization potential ratio (NPR), defined as the ratio of Modified Sobek neutralization potential (measured by titration) to acid potential (calculated from total sulphur), which is used to classify the acid generation potential of samples as follows:
  - NPR ≤ 1: PAG
  - 1 < NPR < 2: uncertain acid generation potential
  - NPR ≥ 2: non-potentially acid generating (non-PAG)
- Solid-phase elemental analysis to determine near-total elemental concentrations and identify constituents of potential concern.
- Short-term leach testing including Synthetic Precipitation Leaching Procedure and Shake Flask Extraction to assess parameters with elevated short-term leaching potential.
- Kinetic testing of waste rock using humidity cell tests to evaluate longer-term rates of acid generation, neutralization, and metal release from the test materials. Elemental leaching rates from the humidity cell tests were used to develop geochemical source terms used in the water quality model.

Current results from the ongoing ML/ARD testing program are summarized as follows:

- 72% of samples are classified as non-PAG, 14% are classified as having uncertain acid generation potential, and 15% are classified as PAG.
  - Material types with the highest acid generation potential: black siltstone waste rock, interbedded black siltstone and greywacke waste rock, and MMBCG.
  - Predominantly non-PAG material types: siltstone waste rock greywacke waste rock, and overburden.
- Parameters with leaching potential based on short-term leaching tests and kinetic testing results include arsenic, copper, nickel, and zinc.
  - Arsenic concentrations are more commonly elevated in leachates from non-PAG materials expected to generate neutral drainage, whereas copper, nickel, and zinc concentrations are more commonly elevated in leachates from PAG materials and in the humidity cells that generated net acidity.

9.4.2.1.3 Summary of Water Quality Modelling Results

The water quality model was used to predict water quality in the open pits during the pit dewatering, pit filling, and pit overflow/maintenance phases, and in the water management ponds during the operation and active closure phases. Detailed modelling results are presented in the Water Balance and Water Quality Model Report (Appendix 9.A).The following sub-sections summarize Climate Normal – Expected Case scenario water quality model results for the open pits and water management ponds for metals with discharge limits in Schedule 4 Table 1 of the MDMER (i.e., arsenic, copper, lead, nickel, and zinc).

Open Pits

- Generally, concentrations of metals subject to MDMER discharge limits fluctuate during pit dewatering in the operation phase, increase during the initial pit filling phase when there are no surface discharges, and then gradually decrease as pit filling continues and water volumes increase before reaching a stable maximum elevation or overflowing once the water level reaches the spillway.
- In Keats pit and Iceberg pit, which are expected to overflow, total arsenic concentrations are predicted to exceed the monthly mean MDMER discharge limit (0.1 mg/L) during the dewatering operation phase and initial pit filling. Concentrations are then expected to decline to below the MDMER limit by the time each pit begins to overflow in post-closure.
- In Jackpot pit, which is not expected to overflow, total arsenic concentrations are predicted to exceed the monthly mean MDMER discharge limit during the pit filling phase, which occurs during the operation and active closure phases. Once water levels stabilize at a steady elevation during post-closure, concentrations are expected to decline below the MDMER limit. In Dome pit, which is also not expected to overflow, total arsenic concentrations are not predicted to exceed the monthly mean MDMER discharge limit during any phase of pit development.
- Total concentrations of copper, lead, nickel, and zinc are not predicted to exceed monthly mean MDMER discharge limits in any open pit at any stage of pit development.

Water Management Ponds

- Total arsenic concentrations are predicted to exceed the monthly mean MDMER discharge limit in the WRSF ponds (WR-SP-01 and WR-SP-02) and the ore stockpile pond (OS-SP-01) from approximately Mine Year 3 through their decommissioning during the active closure phase (Mine Years 8 to 9). Without treatment of outflows from these ponds, exceedances of total arsenic are also predicted in the main contact water pond (IT-TP-01).
- To simulate arsenic treatment, predicted arsenic concentrations in outflows from the WRSF ponds and the ore stockpile pond were capped at the monthly mean MDMER discharge limit of 0.1 mg/L. Assuming treatment, total arsenic concentrations in the main contact water pond are predicted to remain below the MDMER criterion throughout the operation phase and to decrease further following decommissioning of the other ponds at the end of active closure (Mine Years 8 to 9).
- Total arsenic concentrations are not predicted to exceed the monthly mean MDMER discharge limit in the overburden storage facility pond (OB-SP-01).
- Total copper, lead, nickel, and zinc concentrations are not predicted to exceed monthly mean MDMER discharge limits in any pond during any stage of mine development.

9.4.2.2 Groundwater Seepage Assessment

Section 8.4.3 of the Groundwater VC presents the potential changes to groundwater quality from the Project for the operation and closure mine phases. The groundwater modelling completed to date predicts arsenic levels in groundwater seepage surrounding the overburden storage facility, ore stockpile, and WRSF to be above the MDMER concentration limit of 0.1 mg/L (Table 9.23). It should be noted that elevated arsenic concentrations in groundwater above the MDMER limit of 0.10 mg/L were also observed in baseline groundwater quality monitoring, as presented in Section 8.1.2.2.5 of the Groundwater Resources VC. All other parameters are predicted to be below MDMER criteria for groundwater seepage from Project components (Section 8.4.3, Tables 8.15 and 8.17).

Table 9.23 Predicted Mean Arsenic Concentrations of Groundwater Seepage from Project Components

Parameter	Units	MDMER	Overburden Storage Facility	Ore Stockpile	WRSF
Arsenic (Operation)	mg/L	0.10	**0.21**	**2.0**	**0.98**
Arsenic (Closure)	mg/L	0.10	N/A	N/A	**0.67**

Notes:
Bold and Underlined – Concentration exceeds the MDMER criteria
N/A as piles are removed during active closure

For operation, the predicted groundwater flow pathway of seepage from the overburden storage facility is generally towards HP-14, HP-15 and HP-16 with a minimum predicted travel time of 0.04 years to reach the surface water features. For the ore stockpile, the predicted groundwater flow pathway is generally west towards Iceberg and Keats pits, with an estimated travel time of 0.09 years to reach the P9 pond. Finally, the predicted groundwater flow pathway of seepage from the WRSF is generally north towards HP-12, HP-13 and HP-14, with an estimated travel time of 0.06 years to reach HP-12. Average daily discharge rates and travel times to each receiver during operation and closure can be found in Table 9.24.

Table 9.24 Predicted Discharge Rates and Travel Times from Project Components to the Receiving Environment

Source	Receiver	Discharge (m³/day)		50th Percentile Travel Time (Year)	
		Operation	Closure	Operation	Closure
Overburden Storage Facility	HP-13	1	-	0.19	-
	HP-14	95	375	0.08	0.15
	HP-15	4	46	0.04	0.06
	HP-16	-	6	-	0.26
Ore Stockpile	P9	217	83	0.09	13
	Iceberg	60	17	87	0.19
	Keats	8	-	114	-
WRSF	HP-11	12	5	19	12
	HP-12	431	100	0.06	0.12
	HP-13	132	64	0.07	0.09
	HP-14	27		0.12	
	HP-16	3	4	0.29	1
	HP-6	22	71	0.08	18
	HP-7	64	25	0.08	0.13
	HP-8	133	72	0.06	0.08
	HP-9	27	14	1	0.10
	P8	120	-	0.06	-
	P9	75	28	0.11	1
	P13	2	-	0.29	-

Notes:
m³/day – cubic metres per day

The highest seepage rates are predicted for HP-12, HP-8, HP-13 and P8 from the WRSF and overburden storage facility, and the 50th percentile travel times to these surface water receivers are between 0.06 and 19 years during operation. As part of detailed design, a hydrogeological study will be conducted to refine predicted travel times from pile areas (overburden, WRSF and ore stockpile) to local surface water receivers. A seepage-surface water mixing assessment will be conducted to confirm the expected change in water quality in local receivers and whether there would be a potential increase from what is assessed in assimilative capacity study in Section 9.4.2.3. Results of the study will be incorporated into the design of perimeter seepage collection ditches to improve collection of shallow groundwater flow from the piles, including grading and perimeter drainage infrastructure (e.g., liners, rockfill drains).

Interceptor wells and/or deep sump collection systems will be designed and installed as required at locations within or adjacent to the perimeter ditches of the piles. Interceptor wells and deep sumps are commonly used in management of contaminated seepage at mine sites to reduce POPC loads to local surface water receivers (Newfoundland and Labrador Department of Environment and Conservation 2005).

In addition to updated modelling of the site, monitoring will be conducted of the seepage quality during operation and active closure periods to confirm changes in intercepted groundwater seepage quality. As part of detailed design development for closure, the installation of passive treatment measures, including permeable reactive barriers, retrofitting deep sumps and seepage collection ditches as passive treatment systems to treat contact seepage prior to discharge to local receivers will be considered.

A detailed design approach, along with the hydrogeological study discussed above, will be applied to develop targeted groundwater seepage collection as required for the overburden storage facility, WRSF and ore stockpile, prior to seepage entering local receivers. Receiver concentrations would not be expected to further increase above the receiver concentrations assessed in Section 9.4.2.3 for the FDP mixing zone assessment.

9.4.2.3 Assimilative Capacity Assessment

9.4.2.3.1 Methods

An Assimilative Capacity study was conducted to estimate predicted surface water quality in waterbodies and watercourses receiving discharges directly from the site and extending to the ultimate receiver, the Gander River. Two FDPs are proposed, located at P-Pond (Pond P-9; FDP-01) and North Herman's Pond (Pond P1; FDP-02) as shown on Figure 9.20, that are active from Mine Year 1 to the end of Mine Year 9 during the operation and closure phases. In the post closure phase, additional contributions are expected from the Keats and Iceberg pits, with overflows commencing in Mine Years 25 and 31, respectively.

The Assimilative Capacity assessment was conducted at each proposed FDP to evaluate the ability of the respective receiving environments to assimilate effluent discharges under two discharge conditions during the operation and closure phases: regulatory and average. The regulatory condition represents a conservative dry-condition scenario, combining conservative effluent concentrations with low receiving-flow conditions for watercourses. The average condition represents typical long-term discharge conditions over the operation and closure periods. For both regulatory and average conditions, effluent discharges to the initial receivers were modelled using the near-field mixing model Cornell Mixing Zone Expert System, CORMIX, Version 12.0 (Doneker and Jirka 2017). Modelled concentrations at the downstream limit of the CORMIX model were then used as inputs to a mass balance approach to estimate concentrations at downstream evaluation points (Figure 9.20). A post-closure scenario was also evaluated to represent the worst expected water quality conditions following closure, during which two pits (Iceberg and Keats) are assumed to overflow to the environment. The modelling approach is presented in detail in Appendix 9.B.

Figure No.

9.20

Title

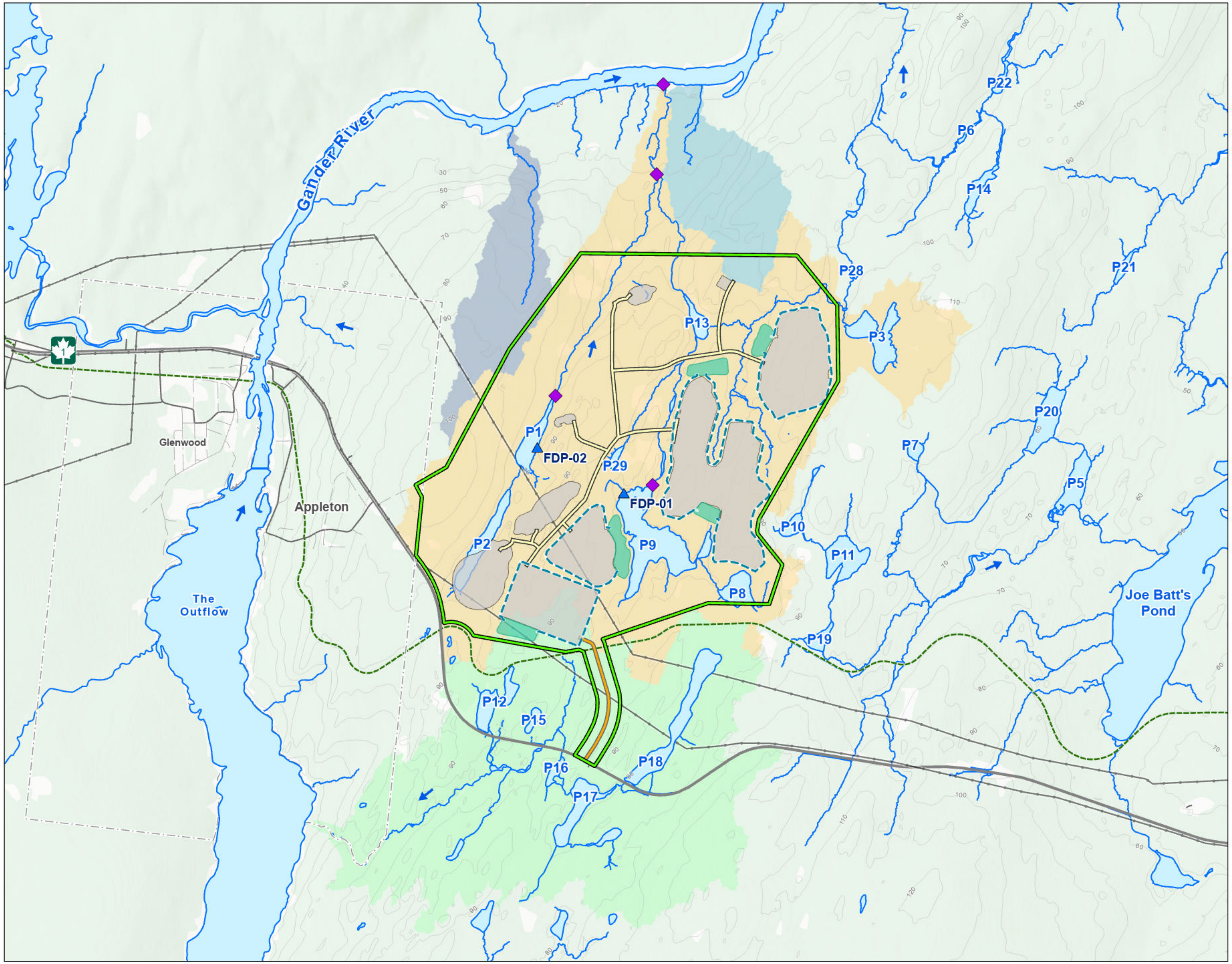
Location of Final Discharge Points

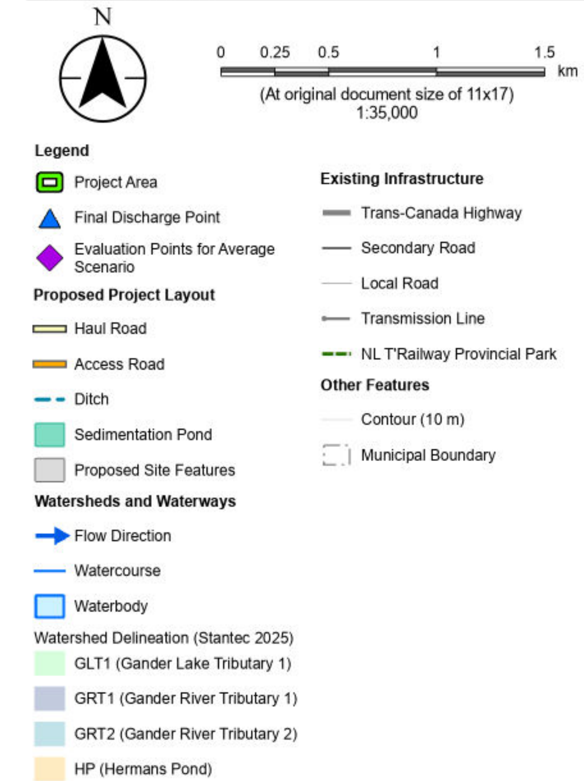
Client/Project 121418510_919

New Found Gold Corp.
Queensway Gold Property

Project Location
North Gander Lake
Newfoundland and Labrador

Prepared by NW on 2026-03-31
TR by NB on 2026-03-31





Notes
1. Coordinate System: NAD 1983 CSRS MTM 2
2. Data Sources: New Found Gold Corp.; Stantec; GEMTEC; Government of Newfoundland and Labrador, Department of Environment, Conservation and Climate Change, Department of Forestry, Agriculture and Lands - Land Use Atlas Mapping Service, Department of Municipal and Community Affairs.
3. Background: Government of Newfoundland and Labrador, Department of Forestry, Agriculture and Lands - Land Use Atlas Mapping; Statistics Canada National Road Network.

Stantec

Input parameters for these three scenarios were:

- Regulatory Operating Conditions:
  - Maximum average monthly limits for PoPCs listed in MDMER Schedule 4 Table 1 for effluent
  - 95th percentile predicted monthly average water quality results for PoPCs not listed in MDMER from the water quality model
  - 75th percentile baseline water quality in the receiving waterbodies
  - 7Q10 flow conditions (7-day low flow, 10-year return period) in the receiving watercourses based on regression analysis. Receiving ponds and lakes were evaluated using conservative ambient conditions and the available bathymetry
  - Pit dewatering and mine rock pile seepage (toe and basal) flow out of the ponds for the mine year with the highest discharge from the site to represent effluent discharge during dry conditions (Mine Year 2, January monthly average flow)
- Average Operating Conditions
  - Average predicted water quality for PoPCs for effluent and pit overflows from water quality model
  - Average baseline water quality in the receiving waterbodies
  - MAF in the receivers based on regression analysis
  - Modelled effluent flow for the mine year with the highest contaminant mass loading (Mine Year 7)
- Post-Closure Conditions
  - Average predicted water quality for pit overflows during the period of worst expected water quality
  - Average baseline water quality in the receiving waterbodies
  - MAF in the receivers based on regression analysis
  - Modelled effluent flow for the period of worst expected water quality (Mine Year 25)

Effluent and Receiver Flows

Regional regression relationships between watershed areas and flow were used to estimate the natural flow contribution at each FDP location, as well as at downstream points. A detailed description of local hydrological conditions has been provided in Section 9.1.2.2.2. Both FDPs are located within the Herman's Pond watershed and discharge to tributary brooks that converge at a downstream point (HP-Conf) located approximately 3.9 km downstream of FDP-01 and 3.0 km downstream of FDP-02. The flow then continues downstream to the Herman's Pond watershed outlet (HP-Outlet) that discharges to the Gander River (GR) (Figure 9.20).

Table 9.25 provides the watershed area, MAF and 7Q10 low flow at the downstream evaluation points during the operation/active closure phases. The watershed area and MAF at the evaluation points during the post-closure phase are given in Table 9.26.

Table 9.25 Evaluation Point Flow Contributions from Non-Contact Areas during Operation/Active Closure

Evaluation Point	Watershed Area (km²)	7Q10 (m³/day)	MAF (m³/day)
FDP-01/Pond P9	1.89	39	4,575
FDP-02/Pond P1	2.06	43	4,980
HP-Conf	9.28	291	22,379
HP-Outlet	9.51	300	22,954
Gander River (GR)	4,453	725,081	10,641,683

Table 9.26 Evaluation Point Flow Contribution from Non-Contact Areas during Post-Closure

Evaluation Point	Watershed Area (km²)	MAF (m³/day)
HP-Conf	11.17	22,379
HP-Outlet	11.41	22,954
Gander River (GR)	4,455	10,669,421

The expected effluent flow rate from each FDP during the operation and active closure phased and the overflows from the pits during post-closure for the average climate conditions (Table 9.27) are taken from the Water Balance Model as described in Section 9.1.1.1.3. For the regulatory (dry condition) discharge scenario, the effluent flow was defined as the combined seepage (toe and basal) from the mine rock piles (waste rock, ore, overburden), plus pit dewatering discharge from the water balance outputs for Mine Year 2, which represents the year with the maximum combined seepage and dewatering contribution from the site. January monthly average flows from Mine Year 2 were selected as representative of dry-condition discharge. No direct precipitation inputs were assumed under these conditions.

Effluent discharges are expected to occur between Mine Year 1 and Year 10. For the average condition scenario, Mine Year 6 was selected for assessment, as it represents the year with the highest overall mass loading from the site. During post-closure, the expected 95th percentile PoPC concentrations in the Iceberg and Keats pit outflows are generally below applicable CWQG-FAL values, except for arsenic. The highest arsenic loads are predicted in Mine Year 26, Month 4, following the start of Keats pit overflow. This period was therefore selected to represent the worst expected post-closure condition, with water quality expected to improve thereafter.

Table 9.27 Effluent Flow Rates and Pit Overflows

FDP	Receiving Waterbody/Watershed	Year-2 Average January Seepage (Toe and Basal) and Dewatering (m³/month)	Average Flow in Year 6 (m³/month)	Flow in Year 26, Month 4 (m³/month)
FDP-01	Pond P9	76,857	119,958	-
FDP-02	Pond P1	86,669	135,272	-
Keats Overflow	HP-1	-	-	76,490

Effluent and Receiver Water Quality

The effluent quality during operation and active closure and pit overflow water for the post-closure periods was simulated using a GoldSim model, as described in Section 9.4.2.1. PoPCs have been identified for the Project and include parameters with MDMER discharge limits, and parameters commonly associated with ore rock that have a listed CWQG-FAL value. The 95th percentile predicted effluent and pit overflow parameter concentrations were compared to applicable CWQG-FAL values and the 75th percentile concentrations in the receiving waterbodies to identify the PoPCs. Simulated water quality statistics (mean and 95th percentile) for the PoPCs from Mine Year 1 to Year 10 are summarized in Table 9.28. Cyanide was not identified as a PoPC, as no on-site ore processing is proposed for the Project. Radium-226 was similarly not identified as a PoPC, as concentrations in the ore and waste rock are not expected to result in measurable contributions to effluent quality.

Average and 75th percentile concentrations for the PoPCs in the receiving waterbodies (i.e., background conditions) are summarized in Table 9.28 and are considered to be representative of the ambient conditions in the receivers. A description of local water quality has been provided in Section 9.1.2.3. Source water quality information is available for Gander Lake, which supplies the public drinking water system for the Town of Appleton (GNL 2025). Water quality in Gander Lake was used as representative of background conditions in the Gander River for the purposes of this assessment.

For modelling purposes, PoPCs that are subject to MDMER limits were assumed to require treatment prior to discharge. For the regulatory condition scenario, treated effluent concentrations were conservatively assumed to be equal to the maximum authorized monthly mean limits specified under the MDMER. For PoPC without applicable MDMER limits, effluent water quality under the regulatory scenario was assumed to be the 95th percentile of the expected concentrations predicted by the GoldSim model (Appendix 9.A). Under average operating conditions, the predicted average effluent concentrations corresponding to peak annual loading were used for PoPC. For pit overflows during post-closure conditions, predicted average concentrations were applied.

Table 9.28 Summary of PoPCs Concentrations in Effluent, Pit Overflow and Receiving Waterbodies

Parameter	Units	CWQG-FAL (Long term)	Maximum Average Monthly MDMER Limit	Initial Receiver Concentration		Gander River* Concentration		95th percentile for FDP Discharge (Year 1 – Year 10) ***	Average Water Quality for FDP in Year 6 (Average Scenario)	Monthly Average (Post-Closure; Mine Year 26 Month 04)
				75p	Average	75p	Average			Keats Overflow
Arsenic (As)	mg/L	0.005	0.1	0.004	0.0029	0.0005[3]	0.0005[3]	0.064	0.054[5]	0.093
Copper (Cu)	mg/L	0.002[1]	0.1	0.0005[3]	0.0005[3]	0.00025[3]	0.00025[3]	0.004	0.002	0.0010
Lead (Pb)	mg/L	0.001[1]	0.08	0.00025[3]	0.00025[3]	0.00025[3]	0.00025[3]	0.0006	0.0005	0.0003
Nickel (Ni)	mg/L	0.025[1]	0.25	0.001[3]	0.001[3]	0.0013[3]	0.0013[3]	0.003	0.002	0.001
Zinc (Zn)	mg/L	0.019[1]	0.4	0.0025[3]	0.0025[3]	0.0013[3]	0.0013[3]	0.015	0.010	0.006
Unionised Ammonia	mg/L as N	0.019	0.5	0.00005[4]	0.00005[4]	0.00005[3]	0.00005[3]	0.00008	0.00004	0.00001
Fluoride (F)	mg/L	0.12	-	0.06[3]	0.06[3]	0.003[3]	0.003[3]	0.31	0.20	0.10
Phosphorous (P)	mg/L	Framework[2]	-	0.014	0.018	0.005	0.004	0.114	0.093[5]	0.068
Aluminum (Al)	mg/L	0.1[1]	-	0.14	0.15	0.13	0.13	0.31	0.180	0.05
Cadmium (Cd)	µg/L	0.04[1]	-	0.0085[3]	0.0085[3]	0.02[3]	0.02[3]	0.06	0.03	0.01
Chromium (Cr) (VI)	mg/L	0.001	-	0.0005[3]	0.0005[3]	0.00025[3]	0.00025[3]	0.002	0.002[5]	0.001
Mercury (Hg)	µg/L	0.026	-	0.013[3]	0.013[3]	0.01[3]	0.01[3]	0.04	0.03	0.02
Selenium (Se)	mg/L	0.001	-	0.0005[3]	0.0005[3]	0.00025[3]	0.00025[3]	0.003	0.002	0.0009
Silver (Ag)**	mg/L	0.00025	-	0.00005[3]	0.00005[3]	0.00005	0.00005	0.0004	0.0002	0.00013

Notes:

75p – 75th percentile
* Gander Lake water quality is assumed to be representative of water quality in the Gander River
** Parameter was not sampled in Gander Lake. Concentrations were assumed to be consistent with those measured in other receiving waterbodies
*** Based on monthly average water quality model results
[1] CWQG-FAL calculated using a hardness value of 20.5 mg/L as calcium chloride, pH 6.72, and DOC of 7.4 mg/L
[2] CWQG-FAL long-term framework for total phosphorus provides the following trigger ranges: ultra-oligotrophic <0.004 mg/L; oligotrophic 0.004-0.01 mg/L; mesotrophic 0.01-0.02 mg/L; meso-eutrophic 0.02-0.035 mg/L; eutrophic 0.035-0.1 mg/L; hyper-eutrophic >0.1 mg/L
[3] More than 50% of samples were below the detection limit. A value equal to ½-detection limit was assumed.
[4] Unionized ammonia was calculated using pH (receiver 6.72; effluent 6), temperature (average 11.7°C; 75th percentile 19°C).
[5] Concentration calculated to match peak loading year during Year 1-10

9.4.2.3.2 Summary of Assimilative Capacity Assessment Results

Regulatory Scenario

A dilution-mixing scenario with conservative ambient and effluent conditions as described in the previous section was modelled using CORMIX. The results of CORMIX modelling for the mixing in the initial receivers are presented in Table 9.29.

Table 9.29 CORMIX Dilution Ratios in Initial Receivers (Regulatory Scenario)

Scenario		Distance from FDP				
	5 m	30 m	50 m	75 m	100 m	150 m
Dilution Ratios at FDP-01	4.9	8.3	10.2	12	13.3	15.2
Dilution Ratios at FDP-02	6.1	9.3	11.4	13.5	15.1	17.5

The dilution ratio at 150 m was used to estimate mixed concentrations at the pond outlets. Predicted concentrations of arsenic, copper, lead, zinc, unionized ammonia, and aluminum exceed applicable CWQG-FAL values at both the Pond P1 and Pond P9 outlets. A mass balance approach using 7Q10 flow conditions along Herman's Pond Brook shows that the mixing zone for these parameters extends to the Gander River. The CORMIX model at the Gander River shows a dilution factor of 4.9 at 50 m, with concentrations of assessed parameters decreasing below applicable guidelines at this point, with lead requiring the longest mixing zone. Table 9.30 shows the concentration of PoPC at HP-Outlet before reaching the Gander River, based on mass balance, and at 50 m into the Gander River, based on the CORMIX model.

Table 9.30 Concentrations of PoPC at the Evaluation Points and at Gander River under Regulatory Scenario

Parameter	Units	CWQG-FAL (Long term)	75th percentile in Initial Receivers	75th percentile Gander River Concentration	Concentration at Evaluation Point			
					Pond P9 Outlet	Pond P1 Outlet	HP-Outlet	Gander River – 50 m
Arsenic (As)	mg/L	0.005	0.004	0.0005	0.010	0.009	0.010	0.002
Copper (Cu)	mg/L	0.002	0.0005	0.00025	0.007	0.006	0.006	0.001
Lead (Pb)	mg/L	0.001	0.00025	0.00025	0.005	0.005	0.005	0.001
Nickel (Ni)	mg/L	0.025	0.001	0.0013	0.017	0.015	0.016	0.004
Zinc (Zn)	mg/L	0.019	0.0025	0.0013	0.029	0.025	0.026	0.006
Unionised Ammonia	mg/L as N	0.019	0.00005	0.00005	0.033	0.029	0.030	0.006
Fluoride (F)	mg/L	0.12	0.06	0.003	0.08	0.07	0.08	0.02
Phosphorous (P)	mg/L	0.02*	0.014	0.005	0.021	0.020	0.020	0.008
Aluminum (Al)	mg/L	0.1	0.14	0.14	0.15	0.15	0.15	0.13
Cadmium (Cd)	μg/L	0.04	0.0085	0.02	0.01	0.01	0.01	0.02
Chromium (Cr) (VI)	mg/L	0.001	0.0005	0.0003	0.0006	0.0006	0.0006	0.0003
Mercury (Hg)	μg/L	0.026	0.013	0.01	0.015	0.015	0.015	0.011
Selenium (Se)	mg/L	0.001	0.0005	0.00025	0.0006	0.0006	0.0006	0.0003
Silver (Ag)	mg/L	0.00025	0.00005	0.00005	0.00007	0.00007	0.00007	0.00005

Notes:
Shaded values indicate concentrations below CWQG-FAL or background concentrations
*Application of upper value of mesotrophic range (20 μg/L) as guideline limit to reduce likelihood of the receiver moving into a higher phosphorus trophic status range (meso-eutrophic).

Average Scenario

The results of CORMIX modelling for the average scenario in the initial receivers are presented in Table 9.31.

Table 9.31 CORMIX Dilution Ratios in Initial Receivers (Average Scenario)

Scenario		Distance from FDP				
	5 m	30 m	50 m	75 m	100 m	150 m
Dilution Ratios at FDP-01	5	8.1	9.9	11.7	13	15
Dilution Ratios at FDP-02	6	8.9	10.9	12.8	14.4	16.8

The dilution ratio at 150 m was used to estimate mixed concentrations at the pond outlets. Under average operating conditions, predicted concentrations of PoPC generally meet CWQG-FAL values at the pond outlets except arsenic. A mass balance approach using MAF flow conditions along Herman's Pond Brook shows that the mixing zone for arsenic ends prior to the Gander River at HP-Conf.

A summary of results for this scenario at the evaluation points is provided in Table 9.32.

Post-Closure Scenario

Under post-closure conditions, predicted 95th percentile monthly average water model output concentrations of PoPCs in pit overflows were generally below applicable CWQG-FAL values, with the exception of arsenic (Table 9.28). Arsenic is therefore a primary parameter requiring a mixing zone under post-closure conditions. Using a mass-balance approach, at HP-Outlet, the predicted arsenic concentration is 0.011 mg/L, which is above the guideline value (0.005 mg/L). However, results of the CORMIX model at the Gander River indicate rapid dilution within the near-field (0 to 150 m) of the confluence resulting in arsenic concentrations decreasing to below the CWQG-FAL value within a short distance downstream (Table 9.33). This scenario represents the worst expected post-closure condition, with arsenic concentrations in pit overflows anticipated to decrease over time. Aluminum concentrations under post-closure conditions are also evaluated at the downstream points and within the Gander River using the same mass balance and CORMIX framework (Table 9.33).

Table 9.32 Concentration of PoPC at Evaluation Points for the Average Scenario

Parameter	Units	CWQG-FAL (Long term)	Average Concentration in Initial Receivers	Average Gander River Concentration	Concentration at Evaluation Point				
					Pond P9 Outlet	Pond P1 Outlet	Downstream HP-Conf	HP-Outlet	Gander River – 5 m
Arsenic (As)	mg/L	0.005	0.0029	0.0005	0.006	0.006	0.005	0.005	0.002
Copper (Cu)	mg/L	0.002	0.0005	0.00025	0.001	0.001	0.001	0.001	0.0003
Lead (Pb)	mg/L	0.001	0.00025	0.00025	0.0003	0.0003	0.0003	0.0003	0.0003
Nickel (Ni)	mg/L	0.025	0.001	0.0013	0.001	0.001	0.001	0.001	0.001
Zinc (Zn)	mg/L	0.019	0.0025	0.0013	0.003	0.003	0.003	0.003	0.002
Unionised Ammonia	mg/L as N	0.019	0.00005	0.00005	0.0001	0.0001	0.0001	0.0001	0.0001
Fluoride (F)	mg/L	0.12	0.06	0.003	0.07	0.07	0.07	0.07	0.02
Phosphorous (P)	mg/L	0.02*	0.018	0.004	0.023	0.022	0.021	0.021	0.009
Aluminum (Al)	mg/L	0.1	0.15	0.13	0.15	0.15	0.15	0.15	0.14
Cadmium (Cd)	µg/L	0.04	0.0085	0.02	0.01	0.01	0.01	0.01	0.02
Chromium (Cr) (VI)	mg/L	0.001	0.0005	0.0003	0.001	0.001	0.001	0.001	0.0003
Mercury (Hg)	µg/L	0.026	0.013	0.01	0.01	0.01	0.01	0.01	0.01
Selenium (Se)	mg/L	0.001	0.0005	0.00025	0.001	0.001	0.001	0.001	0.0003
Silver (Ag)	mg/L	0.00025	0.00005	0.00005	0.00006	0.00006	0.00006	0.00006	0.00005

Notes:

Shaded values indicate concentrations below CWQG-FAL or background concentration

*Application of upper value of mesotrophic range (20 µg/L) as guideline limit to reduce likelihood of the receiver moving into a higher phosphorus trophic status range (meso-eutrophic).

Table 9.33 Concentration of PoPC at Evaluation Points for the Post-Closure Scenario

Parameter	Units	CWQG-FAL (Long term)	Average Concentration in Initial Receivers	Average Gander River Concentration	Concentration at Evaluation Point		
					Downstream HP-Conf	HP-Outlet	Gander River – 5m
Arsenic (As)	mg/L	0.005	0.0029	0.0005	0.011	0.010	0.003
Copper (Cu)	mg/L	0.002	0.0005	0.00025	0.0005	0.001	0.0003
Lead (Pb)	mg/L	0.001	0.00025	0.00025	0.0003	0.0003	0.0003
Nickel (Ni)	mg/L	0.025	0.001	0.0013	0.001	0.001	0.001
Zinc (Zn)	mg/L	0.019	0.0025	0.0013	0.003	0.003	0.002
Unionised Ammonia	mg/L as N	0.019	0.00005	0.00005	0.00005	0.00005	0.00005
Fluoride (F)	mg/L	0.12	0.06	0.003	0.06	0.06	0.02
Phosphorous (P)	mg/L	0.020*	0.018	0.004	0.022	0.022	0.009
Aluminum (Al)	mg/L	0.1	0.15	0.13	0.14	0.14	0.13
Cadmium (Cd)	µg/L	0.04	0.0085	0.02	0.01	0.01	0.02
Chromium (Cr) (VI)	mg/L	0.001	0.0005	0.0003	0.001	0.001	0.0003
Mercury (Hg)	µg/L	0.026	0.013	0.01	0.01	0.01	0.01
Selenium (Se)	mg/L	0.001	0.0005	0.00025	0.001	0.001	0.0003
Silver (Ag)	mg/L	0.00025	0.00005	0.00005	0.00006	0.00006	0.00005

Notes:
Shaded values indicate concentrations below CWQG-FAL or background concentration
*Application of upper value of mesotrophic range (20 µg/L) as guideline limit to reduce likelihood of the receiver moving into a higher phosphorus trophic status range (meso-eutrophic).

9.4.2.4 Summary of Effects on Surface Water Quality

Mine contact water discharged from the two FDPs will comply with MDMER discharge requirements prior to entering the receiving environment and non-contact surface waters are expected to remain at baseline conditions.

Localized effects are expected in the receiving watercourses (Herman's Pond Brook, Gander River) and receiving waterbodies (P Pond and South Herman's Pond) immediately downstream of the FDPs. For the assimilative capacity assessment worst-case scenario, local effects will extend 50 m from the outlet point of Herman's Pond watershed into the ultimate receiver (Gander River) before water quality is expected to return to either baseline levels or below CWQG-FAL. It is noted that these localized effects may be overestimated due to the conservative approach taken in the supporting water quality modeling and assimilative capacity assessment. Specific PoPCs that have been identified as having the largest mixing zones for the regulatory, average and post-closure scenarios, include lead and arsenic.

Interception wells or deep sumps within the perimeter drainage ditches around the WRSF, overburden storage facility and ore stockpiles will be installed to intercept groundwater seepage that exceeds MDMER Schedule 4 Table 1 limits prior to discharging to local surface water receivers (as required). Water will be transferred to the site-wide contact water management system for treatment prior to discharge to the environment. During post-closure, need for the installation of passive treatment systems will be evaluated based on follow up modelling of groundwater seepage patterns around former site infrastructure.

Based on the information presented above, and the implementation of mitigation and management measures, Project related effects on Surface Water Quantity are predicted to be:

- **Magnitude:** The magnitude of the residual adverse effects is considered to be low, as predicted changes in water quality at the LAA boundary during the construction, operation and rehabilitation and closure phases are predicted to be within the range of natural variability.
- **Geographic Extent:** Project effects on surface water are predicted to extend 50 m into the Gander River for the assimilative capacity assessment worst-case scenario, with localized effects experienced within the LAA.
- **Durations:** Residual effects will be continuous and both short term (i.e., storm events) and long term (seepage from the WRSF) in duration.
- **Frequency:** Residual effects will occur continuously during the operation and rehabilitation and closure phases.
- **Reversibility:** Residual effects on water quality for the watercourses and waterbodies are considered to be reversible as conditions will return to baseline once Project discharges cease. Irreversible effects may occur as a result of seepage from mine infrastructure, such as the WRSF.

9.4.3 Summary

Based on application of the mitigation measures identified in Section 9.3 and New Found Gold's commitment to comply with regulatory standards, residual environmental effects on Surface Water Resources are likely to be not significant. The level of confidence in the assessment of residual environmental effects on surface water resources is high. The predicted effects are common to mining operation and are well understood. A conservative approach in characterizing surface water quality and quantity effects was taken to represent a credible worst-case of environmental effects. However, it is likely that the environmental effects of the Project will be less than predicted as a result of the assumptions and conservatism applied in the assessment.

9.5 Follow-up and Monitoring Programs

The objective of the monitoring program is to confirm compliance with regulatory requirements, support predictions of effects of the Project on water quality, identify changes in drainage patterns and surface water flow, and determine if additional mitigation or emergency response measures are required. Monitoring results will be submitted to NLDECCC as per the Certificate of Approval and will include the laboratory certificates of analysis and in spreadsheet format. An annual report is planned to be submitted to NLDECCC identifying relative trends in parameters and a discussion of the significance of the findings.

The proposed monitoring program will include surface water quality monitoring, surface water flow monitoring of nearby watercourses and effluent discharge locations, and visual inspections of facility infrastructure. The proposed monitoring locations (Figure 9.2) are preliminary and will be reviewed and modified as design proceeds in consultation with regulators, and in accordance with permits and approvals.

A Project Environmental Effects Monitoring program will be developed under a separate cover, which should be used in conjunction with the monitoring plan to meet federal MDMER requirements. These details will be developed in partnership with ECCC prior to operation.

Quality Assurance and Quality Control is an integral component of proper field and laboratory procedures. As stated in the MDMER (Schedule 5, Section 7(e)), water quality monitoring is to be conducted by implementing quality assurance and quality control measures that will improve the accuracy of water quality monitoring data.

9.5.1 Surface Water Quantity Monitoring

As part of routine operation, effluent discharge, mine water and process water, and potable water volumes will be recorded on a daily basis. Records will include a monthly total and average volumes.

Hydrometric monitoring will be conducted at the FDPs at a minimum accuracy of 15% of the total discharge once ponds are commissioned and discharge occurs. Water level will be translated to flow through an established stage-discharge curve. Water levels will be manually measured periodically using a staff gauge at the time of data logger retrieval for comparison to the automated level to detect measurement drift in pressure transducers and make any required data adjustments.

Flow monitoring of pumping equipment on site will be conducted using flow totalizing meters, including the open pit dewatering rates, pumped discharge from the localized ponds to the central water treatment pond, and pumped discharge from the central water treatment pond to the receivers. Water levels in the water management ponds will be monitored using pressure transducers to estimate the daily flow volume discharge from the water management ponds.

Hydrometric monitoring will also be conducted at existing provincial real-time hydrometric stations and other existing hydrometric stations within the Project Area. Continuous water level measurements and periodic manual flow measurements will be conducted to develop rating curves.

9.5.2 Surface Water Quality Monitoring

Surface water quality will be impacted when runoff is in contact with mine infrastructure. A surface water quality monitoring program will be implemented during construction, operation, and rehabilitation and closure to assess compliance with applicable regulatory requirements and to evaluate the effectiveness of water management measures.

In accordance with the MDMER (Subsections 5, 14, and 17), effluent discharged from the FDPs will be subject to the monthly characterization and acute toxicity testing, and bi-annual sublethal toxicity testing.

Water quality monitoring stations will also be established downstream of the WRSF, ore stockpiles and overburden areas on applicable watercourses to confirm seepage collection systems are functioning as designed. Existing provincial real-time water quality monitoring stations will be included in the monitoring program.

The locations of the surface water monitoring stations may require some adjustments in the field post-construction, where applicable. The sampling frequency at FDPs may be decreased from monthly to quarterly if the MDMER parameter concentrations are found to be less than 10% of the value set out in column 2 of Schedule 4 for 12 consecutive months. Water quality monitoring stations that are not associated with an FDP will be re-evaluated after the first year of operation.

9.6 References

AMEC. 2014. Regional Flood Frequency Analysis for Newfoundland and Labrador 2014 Update. Prepared for Water Resources Management Division, Department of Environment and Conservation, Government of Newfoundland and Labrador. September 2014. Revised May 2015.

Arsenault, A., R. LeBlanc and D. Brooks. 2016. Unravelling the Past to Manage Newfoundland's Forests for the Future. December 2016. DOI:10.5558/tfc2016-085

Blackwood, R F. 1982. Gander River, Newfoundland. Map 80-031. Scale: 1:50 000. In Geology of the Gander Lake (2D/15) and Gander River (2E/2) Area. Government of Newfoundland and Labrador, Department of Mines and Energy, Mineral Development Division, Report 82-04.

Botma, H. and A. Struyk. 1971. Errors in measurement of flow by velocity area methods. Delft Hydraulics Laboratory and Rijkswaterstaat.

Bush, E. and D.S. Lemmen. 2019. Canada's Changing Climate Report; Government of Canada, Ottawa, ON. 444 p.

ClimateData.ca. 2025. Intensity-Duration-Frequency (IDF) Curves for Canada. Available at: https://climatedata.ca/.

Currie, K. L. 1995. Geology, Gander River, Newfoundland. Scale: 1:50 000. Geological Survey of Canada, Open File 03162

Doneker, R.L. and Jirka, G.H. 2017. CORMIX User Manual: A Hydrodynamic Mixing Zone Model and Decision Support for Pollutant Discharges into Surface Waters, Report prepared for U.S. Environmental Protection Agency.ECCC (Environment and Climate Change Canada). 2024. Gander International Airport IDF curves. climate-data-pdf-idf-future-gander-airport.pdf

ECCC 2025. Historical Climate Data For Gander international Airport Climate station (Station ID: 8401700)

Fisheries and Oceans Canada. 2013. Framework for Assessing the Ecological Flow Requirements to Support Fisheries in Canada. DFO Can Sci. Advis. Sec. Sci. Adivis. Rep. 2013/17.

GNL (Government of Newfoundland and Labrador). 2020. Newfoundland and Labrador 5m Digital Elevation Model. Available at: https://stantec.maps.arcgis.com/home/item.html?id=7203aef91a024ece843c4be4b3727dda

GNL. 2024. Permit to Operate – Gander – Drinking Water System. OP-W-13554-2024.

GNL. 2025. Community Water Resources Report – Appleton. Source Water Quality. Water Resources Portal. https://maps.gov.nl.ca/water/reports/viewreport.aspx?COMMUNITY_NAME=Appleton

Impact Assessment Agency of Canada. 2026. Standard Mitigation Measures. Streamlining the Impact Assessment Process. January 2026. Available at: https://www.canada.ca/content/dam/iaac-acei/documents/policy-guidance/pg-gp/standard-mitigation-measures/Standard_mitigation_measures.pdf

McCabe, G.J. and S.L. Markstrom. 2007. A Monthly Water-Balance Model Driven by a Graphical User Interface. https://doi.org/10.3133/ofr20071088

Meades, S.J. 1990. Natural Regions of Newfoundland and Labrador. A contract report submitted to the Protected Areas Association.

MEND (Mine Effluent Neutral Drainage). 2009. Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials, Report prepared for MEND. Report 1.20.1, p. 1-579.

Newfoundland and Labrador Department of Environment and Conservation. 2005. Policy Directive: Management of Impacted Sites. February 22, 2005. https://www.gov.nl.ca/mca/files/env-protection-ics-guidance-document-for-the-management-of-impacted-sites-v2.0-feb-6-2014.pdf

Newfoundland and Labrador Department of Environment and Lands. 1992. Water Resources Division. Water Resources Atlas of Newfoundland. Chapter 10 - Potential Evapotranspiration. January 1992.

NLDMAE (Newfoundland and Labrador Department of Municipal Affairs and Environment). 2020. The Way Forward on Climate Change in Newfoundland and Labrador. Climate Change Branch, St John's, NL.

Newfoundland and Labrador Geological Survey. 2011. Surficial Geology - Regional. Newfoundland and Labrador GeoScience Atlas OnLine. Last update: 2011. https://geoatlas.gov.nl.ca

New Found Gold. 2021. LiDAR Data.

Rainville, F., D. Hutchinson, A. Stead, D, Moncur, and D. Elliot. 2016. Hydrometric manual - data computations: stage-discharge model development and maintenance. Water Survey of Canada. Available at: https://publications.gc.ca/site/eng/9.898971/publication.html

Richter, B., M. Davis, C. Apse and C. Konrad. 2011. Short Communication A Presumptive Standard for Environmental Flow Protection. River Research and Applications.

Stantec (Stantec Consulting Ltd.). 2026 in prep. Queensway Surface Water Baseline Report. Final Report in preparation for New Found Gold Corp.

Thornthwaite, C.W. 1948. An approach toward a rational classification of climate: Geographical Review. V. 38.

USACE (United States Army Corps of Engineers). 2026. HEC-HMS User Manual. Hydrological Engineering Center. Available at: https://www.hec.usace.army.mil/confluence/hmsdocs/hmsum/latest

USDA (United States Department of Agriculture). 1986. Technical Reference 55 – Urban Hydrology for Small Watersheds. 2nd Ed. Conservation Engineering Division. Available at: https://www.nrc.gov/docs/ML1421/ML14219A437.pdf

WMO (World Metrological Organization). 2010a. Manual on Stream Gauging, Vol. I: Fieldwork. WMO-No. 1044

WMO. 2010b. Manual on Stream Gauging, Vol. II: Computation of discharge. WMO-No. 1044.

Zadeh, S. 2012. Low Flow Frequency Study for Newfoundland and Labrador. Master of Engineering Thesis, Faculty of Engineering and Applied Science, Memorial University of Newfoundland.