



BUILD NOVA SCOTIA

Phase II Environmental Site Assessment (Final)

Former Frenchvale Mine Site, Frenchvale, Nova Scotia

Property Identification Designation Number: 15845167



April 2025 – 24-8606



April 11, 2025

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*Phase II Environmental Site Assessment (Final), Former Frenchvale Mine Site,
Frenchvale, Nova Scotia, Parcel Identification Designation Number 15845167*

Dillon Consulting Limited (Dillon) is pleased to provide this Phase II Environmental Site Assessment (ESA) of the Former Frenchvale Mine property located in Frenchvale, Nova Scotia, and identified by Parcel Identification Designation Number (PID No.) 15845167.

Should you have any questions, please do not hesitate to contact us.

Sincerely,

DILLON CONSULTING LIMITED

A handwritten signature in blue ink, appearing to read "N. Wambolt".

Nadine Wambolt, B.Tech, CET
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Our file: 24-8606

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Executive Summary

Dillon Consulting Limited (Dillon) was retained by Build Nova Scotia (BNS), on behalf of Nova Scotia Department of Natural Resources and Renewables (NSDNRR) to complete a Phase II Environmental Site Assessment (ESA) at the former Frenchvale Mine property (herein referred to as the “subject property” or the “site”), located in Frenchvale, Cape Breton County, Nova Scotia.

The former Frenchvale Mine site (i.e., Parcel Identification Designation (PID No.) 15845167) is owned by DNRR. The site can be accessed by an unpaved access road (Quarry Road) that extends west from Gouthro Road. A former mill processing area and weigh scale were historically present on-site, with a former limestone quarry located off-site to the northwest and west. Historically, the former off-site quarry supplied the Sydney Steel Plant with carbonate materials, including limestone and dolomite, and operated from 1964 to 1970 and then reopened in 1971 for an unknown period. Crushing, screening, and milling operations associated with the former quarry took place at the site. Overburden and plant screening materials were reportedly dumped and spread over areas of the site. Tailings were not reported to have been present at the site. Structures and infrastructure (i.e., weigh scale) were constructed to support site operations. While the majority of the former site infrastructure has been removed, some infrastructure remnants are present on-site (e.g., former weigh scale foundation).

Prior to initiation of the Phase II ESA, Dillon completed a Phase I ESA (i.e., “Phase I Environmental Site Assessment (Final), Former Frenchvale Mine Site, Frenchvale, Nova Scotia, Property Identification Designation Number: 15845167, dated April 11, 2025) for the site. Findings of the Phase I ESA identified five on-site areas of potential environmental concern (APECs) (i.e., APEC #1: overburden/fill stockpiled material, APEC #2 surface debris/waste scattered across the site, APEC #3 buried and/or partially buried debris, APEC #4 waste rock pile, and APEC #5 off-site and upgradient former quarry operations). Based on the identified APECs, a Phase II ESA was recommended for the site.

The generalized groundwater flow direction at the site is interpreted to be south/southeast towards Gouthro Lake. For comparison to the Nova Scotia Contaminated Sites Regulations (NS CSRs) Tier I Environmental Quality Standards (EQS), the site is considered to be commercial, potable with coarse-grained soil (based on site observations and grain size analysis completed during the Phase II ESA).

The Phase II ESA included the advancement of nineteen (19) manual boreholes across the site, and soil, surface water and sediment sampling. Analysis was for contaminants of potential concern (COPCs), as identified during the Phase I ESA, as follows: metals (including mercury and sulphur), benzene, toluene, ethylbenzene, xylenes (BTEX) and modified total petroleum hydrocarbons (TPH), polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), pH, conductivity, and general chemistry (water only). Potential naturally occurring radioactive materials (NORM) was assessed for by collection of one sample for gross alpha beta and isotope analysis. Acid rock drainage (ARD) was pre-screened by assessing concentrations of sulphur, chloride, electrical conductivity, sodium adsorption ratio (SAR), and

pH at select surface soil and sediment sample locations in areas where overburden piles and waste rock had been identified. Two representative soil samples were submitted for grain size analysis.

Findings of the Phase II ESA are as follows:

- Based on the analytical results for surface water samples collected from on-site watercourses, aluminum concentrations exceeded the Tier I EQS at each sample location. In addition, copper, iron and manganese concentrations exceeding the Tier I EQS were noted at one surface water sample location (i.e., SW8). Some of the metals exceedances in surface water may be attributed to background; however, off-site sampling would be required to confirm¹. Surface water exceedances have not been delineated. Collection of a surface water sample from the near shoreline of Gouthro Lake is recommended².
- Based on the analytical results, metals concentrations in sediment were within the applicable Tier I EQS, with the exception of lead, manganese and/or zinc at two sample locations (i.e., SED8 and SED9). It is noted that the highest arsenic and mercury concentrations were also reported at the SED8 location, although these were below the Tier I EQS. Further, the only detected sulphur concentration was at SED8, with a concentration of 5,500 mg/kg. While there is no Tier I EQS for sulphur, the concentration at SED8 exceeded the Sulphide Bearing Material Disposal Regulation guideline of 4,000 mg/kg (which was referenced for comparison purposes in absence of a Tier I EQS). Analysis of sediment from SED8 for ARD is recommended. Metals exceedances in sediment are located on the northeast portion of the site and are not delineated to the north or south. Collection of a sediment sample within Gouthro Lake is recommended.² No exceedances were identified for BTEX/TPH or PAH parameters for sediment.
- Metals (i.e., beryllium, cadmium, copper, selenium, uranium and zinc) exceedances in soil above the Tier I EQS, and above the Environment Canada Background Soil Database concentrations (Dillon, 2011), are present at site. Lateral delineation of metals impacts in soil has been achieved to the north. Lateral delineation has not been achieved to the east, south or west. Vertical delineation has not been achieved. Further soil sampling is recommended to obtain delineation of the identified metals impacts. No BTEX/TPH, PCB, or PAH exceedances were identified in soil. While there is no Tier I EQS for sulphur, the concentration (i.e., 4,600 mg/kg) at BH10 (1.0 m) exceeded the Sulphide Bearing Material Disposal Regulation guideline of 4,000 mg/kg (which was referenced for comparison purposes in absence of a Tier I EQS). It is recommended that ARD sampling be completed at BH10.

¹ Based on the findings of the Phase I ESA, the majority of the site was historically used/disturbed as part of the historical mine activities. Therefore, background concentrations could not be assessed within the site limits.

² Sampling near shoreline of Gouthro Lake was planned as part of the Phase II ESA; however, could not be completed due to site conditions at the time of the January 2025 field program (ice/snow).

- As noted above, pre-screening of select soil and sediment samples for ARD was completed. Samples analysed for SAR were below the Canadian Council of Minister of the Environment (CCME) Soil Quality Guideline (SQG) for the Protection of Environmental and Human Health (used in the absence of a Tier I EQS for SAR). Review of the pre-screening data indicates a low potential for ARD. Therefore, assessment for ARD is only recommended at SED8 and BH10, as noted above.
- Based on the analytical results for one soil sample submitted for Gross Alpha-Beta and Isotope analysis to assess the potential for NORM, concentrations remain below the applicable Health Canada Guidelines for the Management of NORM. Therefore, no further assessment related to NORM is recommended.

The statements made in this Executive Summary are subject to the same limitations presented in Section 7.0 and are to be read in conjunction with the remainder of this report.

1.0 Introduction

Dillon Consulting Limited (Dillon) was retained by Build Nova Scotia (BNS), on behalf of the Department of Natural Resources and Renewables (DNRR), to complete a Phase II Environmental Site Assessment (ESA) of the Former Frenchvale Mine property (herein referred to as the “subject property” or the “site”), located in Frenchvale, Cape Breton County, Nova Scotia (see Figure 1, appended, for the site location). The following document has been prepared to summarize the findings of the Phase II ESA activities completed to date. This report presents the Phase II ESA methodology (Section 2.0), results (Section 3.0), conceptual site model (CSM) (Section 4.0), summary and recommendations (Section 5.0).

1.1 Purpose

Prior to initiation of the Phase II ESA, Dillon completed a Phase I ESA (i.e., “Phase I Environmental Site Assessment (Final), Former Frenchvale Mine Site, Frenchvale, Nova Scotia, Property Identification Designation Number: 15845167, dated April 11, 2025) for the site. Findings of the Phase I ESA identified five on-site areas of potential environmental concern (APECs) (i.e., APEC #1: overburden/fill stockpiled material, APEC #2 surface debris/waste scattered across the site, APEC #3 buried and/or partially buried debris, APEC #4 waste rock pile, and APEC #5 off-site and upgradient former quarry operations). Based on the identified APECs, a Phase II ESA was recommended for the site. Specifically, assessment of relevant media of concern (i.e., soil, surface water, and sediment) was recommended, with sampling to include the following contaminants of potential concern (COPCs): metals (including mercury and sulphur), benzene, toluene, ethylbenzene, xylenes (BTEX) and modified total petroleum hydrocarbons (TPH), polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), pH, conductivity, and general chemistry (water only). Potential naturally occurring radioactive materials (NORM) was recommended to be initially assessed for by collection of one sample for gross alpha beta analysis. It was also recommended that acid rock drainage (ARD) be pre-screened by assessing concentrations of sulphur, chloride, electrical conductivity, sodium adsorption ratio (SAR), and pH at select surface soil and sediment sample locations in areas where overburden piles and waste rock had been identified (i.e., APECs #1 and #4).

The full Phase I ESA report can be found in Appendix A, and is discussed further below in Section 1.2.

Following completion of the Phase I ESA, a Phase II ESA Field Program was developed (as detailed in Dillon’s letter “Phase II Environmental Site Assessment Field Program – Final, Former Frenchvale Mine Site, Frenchvale, Nova Scotia, Property Identification Designation Number (PID No.): 15845167”, dated September 18, 2024), which included the following planned scope of work:

Table 1: Phase II ESA Field Program Summary

Sampling Point	Rationale	COPCs	Media
BH1, BH2, and BH3	Assessing soil conditions in identified APEC #2 debris areas, containing burned heavy equipment tires, rusted steel, discarded fishing gear, and degraded/partially buried geotextile rolls.	Metals, PHCs, PAHs, PCBs	Soil
BH4 and BH5	Assessing soil conditions of stockpiled material (APEC # 1) and soil conditions downgradient of washout area.	Metals, PHCs	Soil
BH6, BH7, and BH8	Characterizing soil conditions of stockpiled material (APEC# 1).	Metals, PAHs, Grain Size (one location), ARD screening (one location).	Soil
BH9 and BH10	Assessing soil conditions downgradient of stockpiles (APEC #1).	Metals, ARD screening (one location).	Soil
BH11 ⁹	Assessing soil conditions downgradient of waste rock pile (APEC #4).	Metals, pH, conductivity, ARD screening	Soil
BH12	Location bordering known (buried debris) or inferred neighboring activities that may have impacted the site (APEC #5).	Metals, PHCs	Soil
BH13	Assessing soil conditions near the former weigh scale (APEC #3). Note, at the time of the Phase I ESA site visit, the weigh scale remnants were observed to be submerged in water. The water depth appeared to be over 1 meter (m) in areas, with protruding metal visible. Based on this health and safety hazard (which was communicated to BNS) BH18 was advanced as close to the weigh scale as safely possible (i.e., a safe distance was maintained from the weigh scale).	Metals, PHCs, PAHs	Soil
BH14	Assessing soil conditions at a downgradient location of rusted heavy equipment debris (APEC #2)	Metals, PHCs, PCBs	Soil
BH15	Assessing soil conditions near a rusted drum identified during the site visit (APEC #2).	Metals, PHCs, PCBs	Soil
BH16	Assessing soil conditions in waste rock pile (APEC #4).	Metals, Gross Beta Alpha NORM, ARD Screening	Soil
SW/SED1, SW/SED2	Proposed as potential background locations, it is noted that based on the findings of the Phase I ESA it was considered unlikely that true local background samples could be collected within the site boundary limits. Therefore, these samples were repurposed to provide characterization at the site boundaries.	Metals, General Chemistry	SW, SED
SW/SED3	Assessing surface water and sediment conditions at washout identified downgradient of stockpiles (APEC #1)	Metals, General Chemistry, PAHs (SED only), pH, ARD Screening (Sed only)	SW, SED
SW/SED4, SW/SED5	Assessing overland runoff to Gouthro Lake	Metals, General Chemistry, pH	SW/SED

Sampling Point	Rationale	COPCs	Media
SW/SED6	Assessing identified iron staining and precipitate in area with buried and rusted metal (APEC #3).	Metals, General Chemistry, pH	SW/SED
SW/SED7	Assessing convergence near overburden/fill and ponded area outlet (APEC #2, APEC #3, and APEC #5).	Metals, General Chemistry, pH, PHCs	SW/SED
SW/SED8	Assessing iron precipitate observed in watercourse (APEC #1).	Metals, General Chemistry, pH	SW/SED
SW/SED9	Assessing metal debris observed in watercourse (APEC #2).	Metals, General Chemistry, pH	SW, SED
SW/SED10	Assessing potential seep near identified waste rock pile (APEC #4).	Metals, General Chemistry, pH, ARD Screening (Sed only)	SW, SED

Notes:

1. SW denotes surface water.
2. SED denotes sediment.
3. General chemistry (a.k.a. RCAP) is analysis only completed on water.
4. Inferred surface water outflow direction in the area is south/southeast towards Gouthro Lake.
5. Metals analysis in media to include analysis of mercury and sulphur at select locations. Petroleum hydrocarbon (PHC) analysis includes BTEX/TPH.
6. ARD pre-screening parameters to include pH, sulphur, chloride, electrical conductivity, and SAR.
7. Areas of partially buried debris were observed across the site. Based on interview information, there is potential for on-site buried debris (exact location, if present, is unknown). Assessment of APEC #3 will be across the site, as applicable, and as described in Table 1.
8. Deeper soil samples were collected at each of the test hole locations (proposed depth of 1.0 mbgs, if conditions allowed) that were not analyzed, but kept in archive in the event that contaminants of concern (CoCs) were identified above the applicable guidelines and required further delineation or characterization to satisfy provincial protocols.
9. Sample was collected but held for potential future analysis based on the initial findings.
10. BH is a manual/hand dug test hole.

Following completion of the initial Phase II ESA field program, and preliminary review of the analytical data, subsequent Phase II ESA activities were recommended (and completed once approved by BNS) as follows:

- Three (3) additional on-site hand-auger boreholes (i.e., BH17 through BH19) were advanced to further characterize the extent of the identified metal impacts in soil.
- Additional requested metals analysis for five (5) soil samples collected during the initial Phase II ESA field program (and held) from a deeper soil profile (depths ranging from 0.30 mbgs to 1.0 mbgs) at BH1, BH3, BH10, BH12, and BH14.
- Metals analysis of the soil sample collected at BH11 (0-0.15 mbgs), which was collected during the initial Phase II ESA field program and held.
- As noted above, as part of the Phase II ESA, one soil sample was analyzed for gross alpha beta to assess for NORM. As the gross alpha beta results exceeded the lowest isotope comparison criteria (discussed further in **Section 3.3.6**), additional detailed individual isotope analysis was completed to further assess the potential for radioactive materials.

The Phase II ESA was completed in accordance with the Canadian Standards Association (CSA) Standard No. Z769-00 (R2023), the Nova Scotia Contaminated Sites Regulations (NS CSRs), and associated Ministerial Protocols to identify and, where possible, delineate potential environmental contamination that may have resulted from historical activities on the former Frenchvale mine site.

The findings presented in this report are based on limited visual observations made during Phase II ESA site visits, intrusive investigations, which consisted of hand-augering; soil, sediment, and surface water sampling.

1.2 Background

The former Frenchvale Mine site (i.e., PID No: 15845167) is owned by DNRR and is classified as provincial forest (resource). The site can be accessed by an unpaved access road (Quarry Road) that extends west from Gouthro Road. A former mill processing area and weigh scale were historically present on-site, with a former limestone quarry located off-site to the northwest and west. Historically, the former off-site quarry supplied the Sydney Steel Plant with carbonate materials, including limestone and dolomite, and operated from 1964 to 1970 and then reopened in 1971 for an unknown period of time. Crushing, screening, and milling operations associated with the former quarry took place at the site. Overburden and plant screening materials were reportedly dumped and spread over areas of the site. Tailings were not reported to have been present at the site. Structures and infrastructure (i.e., weigh scale) were constructed to support site operations. While the majority of the former site infrastructure has been removed, remains of some infrastructure are present on-site (e.g., former weigh scale foundation).

Surrounding land uses are primarily resource, with some residential properties located north/northeast and northwest of the site. The site is not serviced by municipal water and sewer. The topographic gradient suggests that the regional groundwater flow direction is likely south/southeast towards Gouthro Lake.

1.3 Regional Geology and Hydrogeology

To describe the regional physiography and expected hydrogeologic conditions beneath the subject property, the following documents were reviewed:

- Stea, R.R., Conley, H., and Brown, Y. (compilers) 1992: Surficial Geology of the Province of Nova Scotia; Nova Scotia Department of Natural Resources, Map 92-3, Scale 1:500,000.
- Keppie, J.D. (compiler) 2000: Geological Map of the Province of Nova Scotia; Nova Scotia Department of Natural Resources, Minerals and Energy Branch, Map ME 2000-1, Scale 1:500,000.

The surficial geology of the subject area is mapped as stony till plain and drumlins. Till is a stony, sandy matrix and consists of material derived from local bedrock sources, ranging in thickness from 2 meters (m) to 20 m. Drumlin facies are siltier due to erosion and incorporation of older till units by glaciers, ranging in thickness from 4 m to 30 m. Soil observed during the Phase II ESA generally consisted of silty sand, or sand and crushed gravel (see Appendix B for further details). Two representative soil samples collected from the site indicated a coarse-grained soil classification.

The regional bedrock geology of the site is primarily mapped as the Kempt Head, Sydney River, Gays River, MacBeth Brook and Macumber Formations as part of the Lower Windsor Group formation of the Carboniferous period, consisting of anhydrite, salt, gypsum, shale, marine dolomite, and limestone. Bedrock was not encountered during the Phase II ESA.

The topography of the site is flat to rolling with many surface boulders; drumlins-elongate or oval hills veneered by stony till with underlying multiple till layers. Regional topography suggests the regional shallow groundwater flow is likely southeast towards Gouthro Lake.

The local shallow groundwater flow direction may vary from the regional context and be influenced by backfilled areas with coarse-grain materials and/or debris, which may provide a more permeable conduit for groundwater flow when compared to the lower permeability of the native soils.

1.4 Regulatory Framework

1.4.1 Nova Scotia Contaminated Sites Regulations and Associated Ministerial Protocols

The Phase II ESA was conducted in accordance with the NS CSRs and associated Ministerial Protocols. The assessment work was conducted in accordance with the Ministerial Protocol PRO-200 (Environmental Site Assessment for Limited Remediation), specifically for an L3 ESA, which applies to the assessment of contamination from a single source or multiple sources with single or multiple contaminants of concern. Specifically, the criteria used to assess impacts at the site were the NS Tier I Environmental Quality Standards (EQS) for soil, sediment, groundwater (October 2022) and surface water (September 2021) for a property having commercial land-use, potable groundwater usage and coarse-grained soil conditions.

The Nova Scotia Maximum Concentration Background Levels for Nova Scotia, as presented in the Environment Canada's (EC) Background Soil Database (Dillon, 2011), were also used for comparison of metals in soil.

As there are no NS Tier I EQS for SAR in soil or sediment, the Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQGs) for the Protection of Environmental and Human Health were used as comparison criteria for this analysis.

As there are no Tier I EQS for sulphur in soil or sediment, the comparison value from the Sulphide Bearing Material Disposal Regulations under Section 66 of the Environment Act was used.

There is no Tier I EQS for Index of Additive Cancer Risk (IACR) as Nova Scotia Environment and Climate Change (NSECC) deemed that specific provincial standards were not warranted in instances where appropriate guidelines were available from the CCME or other Canadian and international jurisdictions. Therefore, for comparison purposes, the CCME IACR of 1 mg/kg was used.

2.0 Methodology

2.1 General

The Phase II ESA activities completed to date at the site included:

- Surface water sampling at nine (9) locations (i.e., SW1 to SW10, with the exception of SW2, which could not be sampled due to dry conditions) for general chemistry, total metals (including mercury and sulphur).
- Sediment sampling at nine (9) locations (i.e., SED1 to SED10, with the exception of SED2, which could not be sampled due to rocky conditions with minimal observed sediment). The sediment sampling locations correlated to the surface water sampling locations. Analysis included metals (including mercury and sulphur), BTEX/TPH and PAHs.
- Completion of nineteen (19) planned hand dug boreholes, with select soil samples submitted for metals (including mercury and sulphur), electrical conductivity, pH, SAR, Gross Alpha Beta, BTEX/TPH, PCBs and/or PAH analysis.

It is to be noted that one additional grab surface water/sediment sample was planned for collection from the shoreline of Gouthro Lake; however, due to frozen and snow-covered site conditions at the time of the planned sampling in January 2025, this sample could not be safely collected.

The sampling locations are presented on Figure 3 (appended). Site photographs are presented in Appendix C.

2.2 Utility Locates

Dillon contacted public utilities including Bell Fiber 360, Bell Aliant, Rogers, Nova Scotia Power Incorporated (NSPI) and Cape Breton Regional Municipality to confirm the presence/absence of their services at the site. Underground utilities were reviewed prior to commencing hand-augering activities.

2.3 Surface Water Sampling

On October 17, 2024, nine (9) surface water samples were collected (i.e., SW1 and SW3 through SW10) from the available surface water features at the site. One (1) duplicate sample (i.e., QAQC03) was also collected. The surface water samples were collected as a grab sample placed directly into laboratory-provided sample bottles containing the appropriate preservatives. Care was taken to collect surface water into the sample bottles at an angle slightly above horizontal such that preservatives were not lost. The sample bottles were placed into a cooler containing ice for shipment to ALS Environmental Analytical (ALS) Lab in Dartmouth, Nova Scotia for general chemistry and metals (including mercury and sulphur) analysis. ALS is accredited by the Canadian Association of Laboratory Accreditation (CALA). Field water quality readings (i.e., conductivity, turbidity, pH, dissolved oxygen, and temperature) and Global Positioning System (GPS) coordinates were recorded at each surface water sampling station.

2.4 Sediment Sampling

On October 17, 2024, nine (9) representative sediment samples were collected (i.e., SED1 and SED3 through SED10) from the available surface water features at the site. Sediment samples were collected at the same location as the surface water samples, with the surface water sampling being completed prior to the sediment sampling. Sediment samples were collected using a shovel. The sample bottles were placed into a cooler containing ice for shipment to ALS Lab for metals (including mercury and sulphur), chloride, pH, electrical conductivity, SAR, BTEX/TPH and/or PAH analysis.

2.5 Shallow Surface Soil Sampling

Shallow surface soil sampling was completed between October 15 and 17, 2024. Sixteen (16) hand dug boreholes (i.e., BH1 through BH16) were completed using a hand auger to a maximum depth of 1 m. Representative samples were collected at surface and at the final borehole depth. Three (3) additional step-out surface soil samples (i.e., BH17 to BH19 at depths of 0-0.15 m) were collected on January 14, 2025.

A continuous geological log was recorded during the advancement of each borehole and described the stratigraphy encountered. The presence/absence of evidence of potential contamination (i.e., visual staining and olfactory indications) was documented. Field screening was completed with the collection of VOC headspace measurements where PHC impacts were suspected based on the summary of Phase I ESA findings. Samples collected for analysis of PHCs were collected using Terra Core™ samplers and placed directly into laboratory supplied containers preserved with methanol. Samples collected for other analyses were collected as a grab sample and placed directly into laboratory supplied containers. Standard industry best practises regarding sample preservation and storage, and the cleaning of sampling apparatus were followed. Select soil samples were submitted to ALS Labs for metals (including mercury and sulphur), pH, electrical conductivity, SAR, chloride, Gross Alpha Beta and NORM Radionuclide, BTEX/TPH, PAHs, and/or grain size analysis.

Quality Assurance and Quality Control

Quality Assurance/Quality Control (QA/QC) protocols were established and followed throughout the monitoring program. This included the collection of duplicate samples. As discussed in sections above, non-dedicated equipment, such as the shovel and hand auger, were decontaminated between sampling locations using a phosphate free detergent and distilled water. Methods used during the field work followed Dillon's Standard Environmental Field Procedures which are based on industry standards and described in the respective sections above.

Blind field duplicate samples were collected during the assessment including: one (1) duplicate surface water sample, one (1) duplicate sediment sample and three (3) duplicate soil samples.

Sample bottles were labelled with sample/location ID, project name and number, company name (Dillon), and time and date of collection. Once collected, samples were immediately placed in coolers containing ice to maintain a temperature of less than 10°C. To minimize the potential for cross contamination, new nitrile gloves were used to collect each sample, and non-dedicated sampling equipment was decontaminated between each sampling location.

To evaluate the precision associated with sampling and analytical methods, the samples and their duplicates were used to calculate the relative percent difference (RPD). The RPD is defined as the absolute value of the variation between a sample's analytical concentration and its duplicate, when compared to the average concentration of the original and the duplicate in detected samples. The RPD is calculated using the following equation:

$$= \frac{|V_1 - V_2|}{\frac{(V_1 + V_2)}{2}} \times 100$$

RPD is used to assess the validity of the field and laboratory analytical procedures for parameters analyzed that are greater than five (5) times the reportable detection limit (RDL). Dillon set a screening-level RPD acceptance criterion of less than 40% for surface water and groundwater, and 60% for soil/sediment³. As noted above, field duplicates were collected during the assessment, with RPDs calculated for the parent and duplicate samples.

³ Based on the CCME Guidance Manual for Environmental Site Characterization in Support of Environmental and Human Health Risk Assessment, Volume 1 Guidance Manual (2016).

3.0 Results

3.1 Surface Water Quality

Surface water analytical results are presented in Table D-1, Appendix D and are summarized in the sections below. Laboratory certificates of analysis are provided in Appendix E. Surface water sample exceedances are presented on Figure 4, appended.

3.1.1 General Chemistry and Metals

A total of nine (9) surface water samples (i.e., SW1, SW3 through SW10), and one (1) field duplicate (i.e., QAQC 03 [duplicate of SW6]), were submitted for general chemistry and total metals analysis, which included total sulphur and total mercury. General chemistry and total metals concentrations in surface water were generally either below laboratory detection limits, or within the applicable Tier I EQS, with the following exceptions:

- Aluminum concentrations in each of the analysed samples, ranging from 0.0085 mg/L (in QAQC 03, the field duplicate of SW6) to 0.361 mg/L (in SW8), exceeded the NS Tier I EQS of 0.005 mg/L.
- The copper concentration of 0.00229 mg/L, iron concentration of 7.22 mg/L and manganese concentration of 1.15 mg/L at SW8 exceeded the Tier I EQS of 0.002 mg/L, 0.3 mg/L and 0.43 mg/L, respectively.

While there is potential for some of the above noted exceedances in surface water to be naturally occurring, off-site background sampling of surface water would be required to confirm.

Mercury was not detected in any of the surface water samples.

Sulphur concentrations were detected in each of the analyzed surface water samples ranging from 2.62 mg/L (in SW8) to 6.99 mg/L (in SW5). There is no Tier I EQS for sulphur in surface water.

3.2 Sediment Quality

Sediment analytical results are presented in Tables D-2 through D-4, Appendix D and are summarized in the sections below. Laboratory certificates of analysis are provided in Appendix E. Sediment sample exceedances are presented on Figure 5, appended.

3.2.1 Metals

A total of nine (9) sediment samples (i.e., SED1, SED3 through SED10) and one (1) field duplicate (i.e., QAQC 04 [duplicate of SED3]) were submitted for metals analysis, including mercury and sulphur. Metals concentrations in sediment were generally either below laboratory detection limits or within the applicable NS Tier I EQS, with the following exceptions:

- The lead concentration of 116 mg/kg in SED8, exceeded the Tier I EQS of 91.3 mg/kg.
- The manganese concentrations of 1,390 mg/kg (in SED8) and 3,270 mg/kg (in SED9) exceeded the Tier I EQS of 1,100 mg/kg.
- The zinc concentration of 406 mg/kg in SED8 exceeded the Tier I EQS of 315 mg/kg.

It is noted that the highest arsenic and mercury concentrations were also reported at the SED8 location, although these concentrations were below the Tier I EQS. Further, the only detected sulphur concentration was at SED8, with a concentration of 5,500 mg/kg, noting that while there is no Tier I EQS for sulphur, the concentration at SED8 exceeds the Sulphide Bearing Material Disposal Regulation guideline of 4,000 mg/kg (which has been included for comparison purposes in absence of Tier I EQS).

3.2.2 Sodium Adsorption Ratio (SAR)

Two (2) soil samples, and one (1) field duplicate (i.e., QAQC 04 [duplicate of SED3]) were submitted for SAR analysis. There are no criteria for SAR for sediments under NS Tier I EQS; therefore, the results were compared with the CCME SQG for the protection of environmental and human health. Findings indicate SAR values were either below the laboratory detection limit and/or below the CCME SQG.

3.2.3 BTEX and Modified TPH

One (1) sediment sample (i.e., SED7), was submitted for BTEX and Modified TPH analysis. Results for BTEX were below laboratory detection limits and below the Tier I EQS. While a detected petroleum hydrocarbon fraction, resembling lube oil fraction, was reported for the C21-C32 range, the modified TPH results were below the Tier I EQS.

3.2.4 Polycyclic Aromatic Hydrocarbons

One (1) sediment sample (i.e., SED3), was submitted for PAH analysis. Findings indicate that PAH concentrations were below laboratory detection limits and below the Tier I EQS in the analyzed samples.

3.3 Soil Quality

Soil analytical results are presented in Tables D-5 through D-9, Appendix D and are summarized in the sections below. Laboratory certificates of analysis are provided in Appendix E. Soil sample locations are presented on Figure 6, appended.

3.3.1 Metals

Twenty-four (24) soil samples (and three (3) field duplicate samples (i.e., QAQC 01, QAQC 02 and 25Dup A, collected at BH2, BH7 and BH18, respectively) were submitted for metals (including mercury and sulphur) analysis.

Metals exceeded the applicable Tier I EQS for at least one (1) parameter in each of the analyzed samples. When compared to background concentrations, the number of parameters exceeding at each location is generally reduced. Notable, widespread exceedances are summarized below:

- Aluminum concentrations, with exceedances ranging from 16,000 mg/kg to 26,400 mg/kg (the highest concentration at BH3 0.34 m), exceeded the applicable NS Tier I EQS (15,400 mg/kg) in ten (10) of the analyzed samples. When compared to background (i.e., 28,000 mg/kg), no exceedances were noted.
- Beryllium concentrations, with exceedances ranging from 1.08 mg/kg to 1.86 mg/kg (the highest concentration at BH19 0-0.15 m), exceeded the applicable Tier I EQS and background value of 1 mg/kg in four (4) of the analyzed samples (i.e., BH10 (0-0.15 m), BH10 (1.0 m), BH12 (0-0.15 m) and BH19 (0-0.15 m)).
- Iron concentrations, with exceedances ranging from 13,200 mg/kg to 36,200 mg/kg (the highest concentration at BH3 0-0.15 m) exceeded the applicable NS Tier I EQS of 11,000 mg/kg in nineteen (19) samples (including one (1) duplicate sample). It is noted that while an iron exceedance was reported from BH7 0-0.15 m, the duplicate sample at this location did not exceed the comparison criteria for iron. When compared to background (i.e., 52,000 mg/kg), no iron exceedances remain.
- Each of the twenty-seven (27) analyzed soil samples (including three (3) duplicate samples) exceeded the Tier I EQS for manganese of 360 mg/kg; however, when compared to background (i.e., 4,340 mg/kg), no exceedances were identified.
- Vanadium concentrations in nine (9) samples, with exceedances ranging from 39.1 mg/kg to 59 mg/kg (the highest concentration at BH3 0.34 m), exceeded the applicable NS Tier I EQS of 39 mg/kg. When compared to background (i.e., 86 mg/kg), no exceedances remain.
- Zinc concentrations in eight (8) samples, with exceedances ranging from 223 mg/kg to 631 mg/kg (the highest concentration at BH1 0-0.15 m), exceeded the applicable NS Tier I EQS of 200 mg/kg. When compared to background (i.e., 270 mg/kg), six (6) exceedances remain (i.e., BH1 (0-0.15 m), BH1 (0.30 m), BH3 (0-0.15 m), BH14 (0.90 m), BH18 (0-0.15 m) and BH18 duplicate 25DUPA (0-0.15 m)).

Although not widespread, exceedances of the Tier I EQS and background were also reported for cadmium (i.e., BH14 (0-0.15 m and 0.90 m)), copper (i.e., BH1 (0-0.15 m), BH14 (0.90 m), BH18 (0-0.15 m) and the BH18 duplicate 25DUPA (0-0.15 m)), selenium (i.e., BH10 (0-0.15 m and 1.0 m)), and uranium (i.e., BH10 (0-0.15 m)). While there is no Tier I EQS for sulphur, the concentration (i.e., 4,600 mg/kg) at BH10 (1.0 m) exceeded the Sulphide Bearing Material Disposal Regulation guideline of 4,000 mg/kg (which was referenced for comparison purposes in absence of a Tier I EQS). There were mercury exceedances.

3.3.2 Sodium Adsorption Ratio (SAR)

Three (3) soil samples and one (1) field duplicate sample were submitted for SAR analysis. There are no criteria for SAR under Tier I EQS; therefore, the results were compared with the CCME SQG. Findings indicate that SAR values were either below laboratory detection limit and/or below the CCME soil quality guidelines for the protection of environmental and human health.

3.3.3 BTEX and Modified TPH

A total of nine (9) soil samples, and one (1) field duplicate sample were submitted for BTEX/TPH analysis. Findings indicate that BTEX concentrations were below laboratory detection limits and below the Tier I EQS in the analyzed samples. The modified TPH results for soil were below the Tier I EQS. Of note, where modified TPH was reported, the most relevant criteria for comparison was lube oil. One (1) modified TPH result at BH3 (0-0.15 m) indicated no resemblance. Follow up with lab indicated the sample did not resemble a petroleum hydrocarbon pattern. Nine (9) of the analyzed soil samples did not reach baseline at C32; however, did reach baseline at C50.

3.3.4 Polycyclic Aromatic Hydrocarbons

A total of seven (7) soil samples and one (1) field duplicate sample were submitted for PAH analysis. Findings indicate that PAH concentrations were below laboratory detection limits and below the Tier I EQS in the analyzed samples.

There were no exceedances of the Benzo(a)pyrene Total Potency Equivalents (B(a)P), which is the sum of estimated cancer potency relative to B(a)P for all potentially carcinogenic unsubstituted PAHs.

The IACR assesses potential threats to potable groundwater from leaching of carcinogenic PAH mixtures from soil. There is no Tier I EQS for IACR as NSECC deemed that specific provincial standards were not warranted in instances where appropriate guidelines were available from the CCME or other Canadian and international jurisdictions. Therefore, for comparison purposes, the CCME IACR of 1 mg/kg was used. In comparison to the CCME criteria, none of the samples exhibit a detectable concentration or exceeded the IACR. It is further noted that no potable wells are located on-site.

3.3.5 Polychlorinated Biphenyls

A total of five (5) soil samples and one (1) field duplicate sample were submitted for PCB analysis. Findings indicate that PCB concentrations were below laboratory detection limits and below the Tier I EQS in the analyzed samples.

3.3.6 Gross Alpha Beta Analysis for NORM

One soil sample (i.e., BH16 0-0.15 m) was submitted for gross alpha beta analysis to assess the potential for NORM. For NORM there are Health Canada/Environment and Climate Change Canada guidelines that identify Unconditional Derived Release Limits (UDRLs) for Diffuse NORM sources. The UDRLs for the individual isotopes range from 300 Bq/kg to 10,000 Bq/kg, depending on the relative radiological activity of the isotope. Initial screening can be completed without the detailed isotopic analysis, using the gross alpha and beta values of the samples, which was the initial approach used. As the gross alpha beta results exceeded the lowest isotope (i.e., UDRL 300 Bq/kg), more detailed individual isotope analysis was completed to assess whether or not there were isotopes above the UDRLs, and to assess if there was a potential issue requiring mitigation. The detected isotope concentrations were below the Health Canada Guidelines for the Management of Naturally Occurring Radioactive Materials. According to Canadian Guidelines for the Management of Naturally Occurring Radioactive Materials "Where more than one long-lived radionuclide is present in a sample, the appropriate sum of the ratios of the activity of each long-lived radionuclide and its corresponding Release limit, must not exceed 1". The sum of ratios is 0.8 and does not exceed the release limit of 1.

Each NORM isotope values were screened against the derived release limits (Table 5.1 – Unconditional Derived Release Limits – Diffuse NORM Sources). Each NORM isotope was then divided by its corresponding release limit and a sum of the ratios was calculated using the formula below:

$$\frac{\text{Concentration NORM Isotope A}}{\text{Derived Release Limit A}} + \frac{\text{Concentration NORM Isotope B}}{\text{Derived Release Limit B}} + \dots + \frac{\text{Concentration NORM Isotope N}}{\text{Derived Release Limit N}} \leq 1$$

3.4 Quality Assurance and Quality Control

A program to ensure quality assurance and control (QA/QC) was implemented throughout the Phase II ESA. The QA/QC program consisted of a number of elements:

- Collection of samples using protocols consistent with Dillon Standard Environmental Field Procedures and/or industry standards.
- Use of dedicated sampling equipment and/or adherence to established equipment cleaning protocols, where applicable.
- Use of laboratory supplied containers.
- Collection of blind field duplicates.
- Implementation of laboratory QA/QC procedures including analysis of reference standards, laboratory blanks and replicates.

Validation criteria were established that required the analytical data to have an acceptable and documented level of precision, accuracy, representativeness, comparability and completeness (the PARCC criteria). The precision of the data for the samples collected was evaluated by calculating the Relative Percent Difference (RPD) between the original samples and its duplicate when the samples had

concentrations greater than 5x the laboratory Reportable Detection Limit (RDL). A summary of the PARCC criteria comparison and calculated RPD values are presented below.

Laboratory QA/QC was performed on the following samples:

- Surface water sample SW6 and its field duplicate QAQC 03.
- Sediment sample SED3 and its field duplicate QAQC 04.
- Soil samples BH2 (0-0.15 m), BH7 (0-0.15 m) and BH18 (0-0.15 m) and their corresponding field duplicates QAQC 01, QAQC 02 and 25Dup A, respectively.

In order to assess the precision and accuracy of the laboratory results, the RPD was calculated for each parameter, where acceptable limits for field duplicate RPD in sediment and soil is 60%, and for surface water it is 40%. RPD values were not calculated for parameters that had concentrations that were less than five (5) times the RDL. Calculated RPD values are presented in Tables D-10 through Table D-12 (see Appendix D) for surface water, sediment and soil, respectively. A summary of RPD results, where calculated, is presented below:

- RPDs for surface water were below 40% for each parameter where they were calculated.
- RPDs for sediment were generally below 60% for each parameter where they were calculated, with some exceptions. The RPDs calculated for arsenic, copper and lead had RPDs of 114%, 94% and 85%, respectively. It is noted the arsenic, copper and lead concentrations in both the parent sample and the duplicate sample were both below the regulatory comparison criteria. Elevated RPD values for sediment may also be attributed to the heterogeneity of sediment.
- RPDs for soil were below 60% for each parameter where they were calculated.

The data is considered valid. Laboratory certificates of analysis are presented in Appendix E.

4.0 Phase II Conceptual Site Model

4.1 Description of Contaminants

Surface water concentrations of metals (i.e., aluminum, copper, iron, and/or manganese) have been detected above Tier I EQS based on samples collected from on-site watercourses.

Sediment concentrations of metals (i.e., lead, manganese and/or zinc) have been detected above Tier I EQS based on samples collected on-site from on-site watercourses. One sulphur exceedance of the Sulphide Bearing Material Disposal Regulations was also identified in sediment (noting that there is no Tier I EQS for sulphur).

Soil concentrations of metals (i.e., aluminum, beryllium, cadmium, copper, iron, manganese, selenium, uranium, vanadium, and/or zinc) have been detected above Tier I EQS. Some of these metals may be attributed to natural background concentrations of till and underlying bedrock. When compared to

background, the aluminum, iron, manganese and vanadium exceedances are removed. While there is no Tier I EQS for sulphur, the concentration (i.e., 4,600 mg/kg) at BH10 (1.0 m) exceeded the Sulphide Bearing Material Disposal Regulation guideline of 4,000 mg/kg (which was referenced for comparison purposes in absence of a Tier I EQS).

4.2 Receptors

The most applicable site use is considered commercial, and neighbouring properties are zoned for resource and residential land use. The site is currently vacant, with no buildings present. Potential receptors include workers (should intrusive work be conducted on-site) who may come in contact with metals soil in the subsurface or potential recreational users (on-site).

No potable wells are currently located on site; however, the surrounding developed properties are serviced by individual potable wells, with nearest residential building located approximately 114 m northeast and up gradient of the south site boundary. The nearest potable well (based on the Nova Scotia Groundwater Atlas) is located approximately 60 m northeast, and upgradient, of the site.

The closest ecological receptor is Gouthro Lake, located immediately east to southeast and downgradient, of the site.

4.3 Operable Pathways

4.3.1 Surface Water

Results of the Phase II ESA activities conducted for the site indicate that the documented residual metals impacts (i.e., aluminum, copper, iron, and/or manganese) pose a potential unacceptable risk to commercial receptors via surface water based on the applicable Tier II pathway specific standards (PSS) (which are the same standard as the Tier I EQS for surface water). As noted previously, multiple watercourses intersect the site; therefore, this pathway would be considered operable.

4.3.2 Sediment

Results of the Phase II ESA activities conducted for the site indicate that the documented residual metals impacts (i.e., lead, manganese, and/or zinc) pose a potential unacceptable risk to commercial receptors via freshwater sediment based on the applicable Tier II PSS (which are the same standard as the Tier I EQS for sediment).

4.3.3 Soil

Results of the Phase II ESA activities conducted for the site indicate that documented residual metals impacts (i.e., aluminium, iron, manganese, and vanadium⁴) pose a potential unacceptable risk to

⁴ Noting that the remaining Tier I EQS metals exceedances in soil are screened out when compared to the Tier II PSS for soil contact/ingestion.

commercial receptors via soil contact or ingestion based on the applicable Tier II PSS. Although the site is currently vacant and historical on-site buildings have been removed, the site is not secure and as a such the pathway of soil contact or ingestion is considered operable.

Documented residual metals impacts (i.e., beryllium, cadmium, copper, manganese, selenium, uranium and zinc⁵) also pose a potential unacceptable risk to commercial receptors via soil leaching to potable groundwater based on the applicable Tier II PSS. No potable wells are located on-site; therefore, this pathway is not currently considered operable. If there were to be a potable well installed on-site in the future, this pathway would be considered operable.

5.0

Summary and Conclusions

The Phase II ESA included the surface water and sediment sampling, advancement of shallow boreholes and soil sampling. Media analysis included: metals (including mercury and sulphur), BTEX/TPH, PAHs, PCBs, pH, conductivity, and general chemistry (water only). Potential NORM was assessed for by collection of one sample for gross alpha beta and isotope analysis. Pre-screening for ARD was completed by assessing concentrations of sulphur, chloride, electrical conductivity, SAR, and pH at select surface soil and sediment sample locations in areas where overburden piles and waste rock had been identified. Two representative soil samples were submitted for grain size analysis. For comparison to the NS CSRs, the site is considered to be commercial, potable with coarse-grained soil conditions (based on finding of the grain size analysis completed on two representative soil samples).

Findings of the Phase II ESA are as follows:

- Based on the analytical results for surface water samples collected from on-site watercourses, aluminum concentrations exceeded the Tier I EQS at each sample location. In addition, copper, iron and manganese concentrations exceeding the Tier I EQS were noted at one surface water sample location (i.e., SW8). Some of the metals exceedances in surface water may be attributed to background; however, off-site sampling would be required to confirm⁶. Surface water exceedances have not been delineated. Collection of a surface water sample from the near shoreline of Gouthro Lake is recommended⁷.
- Based on the analytical results, metals concentrations in sediment were within the applicable Tier I EQS, with the exception of lead, manganese and/or zinc at two sample locations (i.e., SED8 and SED9). It is noted that the highest arsenic and mercury concentrations were also reported at the SED8 location, although these were below the Tier I EQS. Further, the only detected sulphur

⁵ Noting that the remaining Tier I EQS metals exceedances in soil are screened out when compared to the Tier II PSS for Leaching to Potable Water.

⁶ Based on the findings of the Phase I ESA, the majority of the site was historically used/disturbed as part of the historical mine activities. Therefore, background concentrations could not be assessed within the site limits.

⁷ Sampling near shoreline of Gouthro Lake was planned as part of the Phase II ESA; however, could not be completed due to site conditions at the time of the January 2025 field program (ice/snow).

concentration was at SED8, with a concentration of 5,500 mg/kg. While there is no Tier I EQS for sulphur, the concentration at SED8 exceeded the Sulphide Bearing Material Disposal Regulation guideline of 4,000 mg/kg (which was referenced for comparison purposes in absence of a Tier I EQS). Sampling for ARD at SED8 is recommended. Metals exceedances in sediment are located on the northeast portion of the site and are not delineated to the north or south. Collection of a sediment sample within Gouthro Lake is recommended.⁷ No exceedances were identified for BTEX/TPH or PAH parameters for sediment.

- Metals (i.e., beryllium, cadmium, copper, selenium, uranium and zinc) exceedances in soil above the Tier I EQS, and above the Environment Canada Background Soil Database concentrations (Dillon, 2011), are present at site. Lateral delineation of metals impacts in soil has been achieved to the north. Lateral delineation has not been achieved to the east, south or west. Vertical delineation has not been achieved. Further soil sampling is recommended to obtain delineation of the identified metals impacts. While there is no Tier I EQS for sulphur, the concentration (i.e., 4,600 mg/kg) at BH10 (1.0 m) exceeded the Sulphide Bearing Material Disposal Regulation guideline of 4,000 mg/kg (which was referenced for comparison purposes in absence of a Tier I EQS). It is recommended that sampling for ARD be completed at BH10. No BTEX/TPH, PCB, or PAH exceedances were identified in soil.
- As noted above, pre-screening of select soil and sediment samples for ARD was completed. Samples analysed for SAR were below the CCME SQG for the Protection of Environmental and Human Health (used in the absence of a Tier I EQS for SAR). Review of the pre-screening data indicates a low potential for ARD. Therefore, assessment for ARD is only recommended at SED8 and BH10, as noted above.
- Based on the analytical results for one soil sample submitted for Gross Alpha-Beta and Isotope analysis to assess the potential for NORM, concentrations remain below the applicable Health Canada Guidelines for the Management of NORM. Therefore, no further assessment related to NORM is recommended.

5.1 Notification of Contamination Protocol

As per the NS CSRs, a FRM-100 Notification of Contamination Form has been prepared for the site (Appendix F).

5.2 Discussion and Recommendations

At this stage of the assessment, we recommend the following supplemental studies be undertaken:

- Obtain supplemental surface soil data to establish lateral and vertical delineation of metals impacts in soil.
- Obtain samples for ARD analysis from sediment at SED8 and soil at BH10.
- Complete additional near shoreline surface water and sediment sampling in Gouthro Lake (when site conditions allow [e.g., Spring 2025]).

- Complete additional soil sampling along the southwest site boundary to further assess potential background metals concentrations in soil.
- Complete a Human Health and Ecological Risk Assessment (HHERA).

6.0

Limitations

This report was prepared exclusively for the purposes, project and site location(s) outlined in the report. The report is based on information provided to or obtained by Dillon Consulting Limited (Dillon) as indicated in the report and applies solely to site conditions existing at the time of the site investigation(s). Although a reasonable investigation was conducted by Dillon, Dillon's investigation was by no means exhaustive and cannot be construed as a certification of the absence of any contaminants from the site(s). Rather, Dillon's report represents a reasonable review of available information within an agreed work scope, schedule and budget. It is therefore possible that currently unrecognized contamination or potentially hazardous materials may exist at the site(s), and that the levels of contamination or hazardous materials may vary across the site(s). Further review and updating of the report may be required as local and site conditions, and the regulatory and planning frameworks, change over time.

This report was prepared by Dillon for the sole benefit of our client Build Nova Scotia. The material in the report reflects Dillon's judgment in light of the information available to Dillon at the time of preparation. Any use which a third party (i.e., a party other than our Client or our Client's lending institution) makes of this report, or any reliance on or decisions made based on it, are the responsibilities of such third parties. Dillon accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

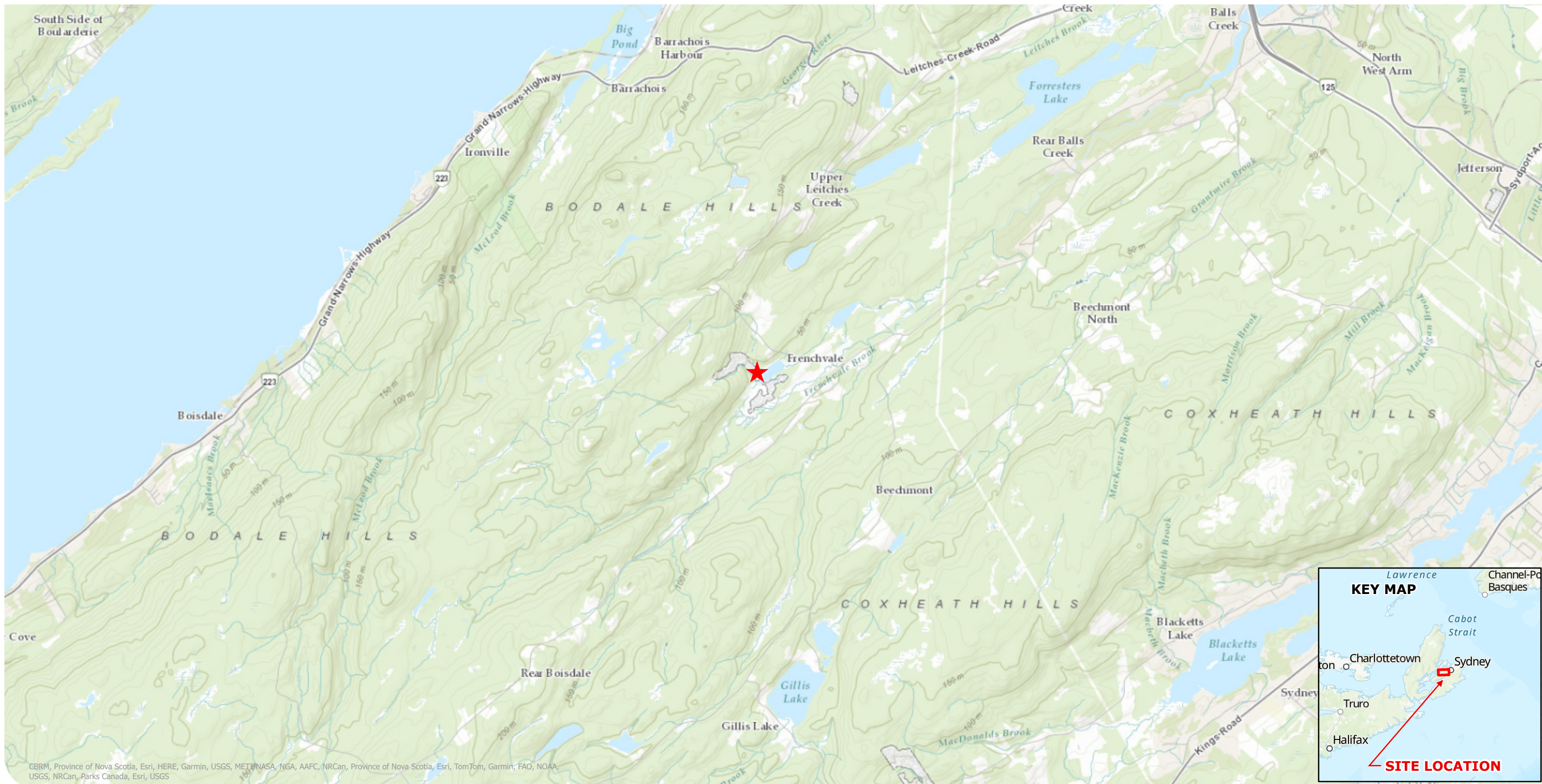
Respectfully Submitted,

DILLON CONSULTING LIMITED

Nadine Wambolt, B.Tech, CET
Project Manager

Susan Barfoot, P.Eng.
Site Professional

Figures



CBRM, Province of Nova Scotia, Esri, HERE, Garmin, USGS, METI/NASA, NGA, AAFC, NRCAN, Province of Nova Scotia, Esri, TomTom, Garmin, FAO, NOAA, USGS, NRCAN, Parks Canada, Esri, USGS

BUILD NOVA SCOTIA

Former Frenchvale Mine Site
Phase II ESA

 Site Location

SITE LOCATION MAP

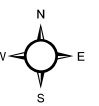
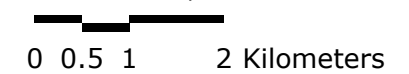
FIGURE 1



MAP DRAWING INFORMATION:
DATA PROVIDED BY ESRI & Dillon consulting Ltd.

MAP CREATED BY: CHM
MAP CHECKED BY: NJW
MAP PROJECTION: WGS 1984 Web Mercator Auxiliary Sphere

SCALE 1:80,000



PROJECT: 24-8606 STATUS: FINAL DATE: 2025-04-10



Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

BUILD NOVA SCOTIA

Former Frenchvale Mine Site
Phase II ESA

- Subject Property Boundary
- Adjacent Parcels
- Culvert

- APEC (Area of Potential Environmental Concern)
- Weigh Scale Foundation
- Watercourse (GeoNova)

- Wetland (GeoNova)
- Waterbody (GeoNova)

IDENTIFIED APECS

FIGURE 2



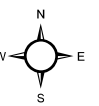
MAP DRAWING INFORMATION:
DATA PROVIDED BY ESRI, GeoNova, Build NS & Dillon Consulting Ltd.

MAP CREATED BY: CHM
MAP CHECKED BY: NJW
MAP PROJECTION: NAD 1983 CSRS UTM Zone 20N

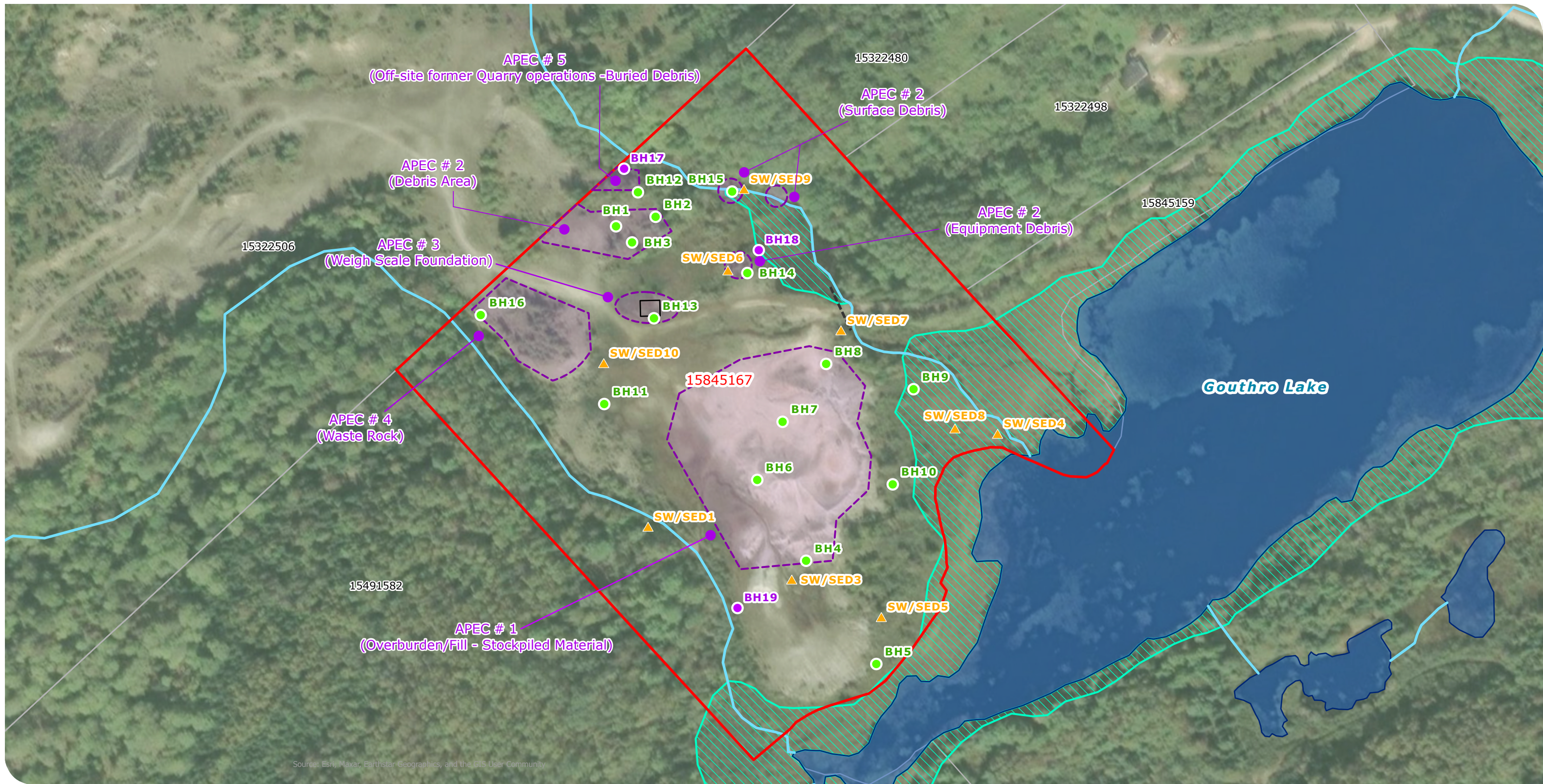
Note:
Areas of partially buried debris were observed across the site. Based on interview information, there is potential for on-site buried debris (exact location, if present, is unknown). Assessment of APEC #3 was across the site as applicable.

SCALE 1:1,900

0 15 30 60 Metres



PROJECT: 24-8606 STATUS: FINAL DATE: 2025-04-10



Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

BUILD NOVA SCOTIA

Former Frenchvale Mine Site
Phase II ESA

- Shallow Test Hole Sample (2024)
- Step Out Sample (2025)
- ▲ Surface Water and Sediment Sample (2024)

- Subject Property Boundary
- Adjacent Parcels
- Culvert

- Watercourse (GeoNova)
- Wetland (GeoNova)
- Waterbody (GeoNova)

- APEC (Area of Potential Environmental Concern)
- Weigh Scale Foundation

SAMPLE LOCATIONS

FIGURE 3



MAP DRAWING INFORMATION:
DATA PROVIDED BY ESRI, GeoNova, Build NS & Dillon Consulting Ltd.

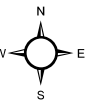
MAP CREATED BY: CHM
MAP CHECKED BY: NJW
MAP PROJECTION: NAD 1983 CSRS UTM Zone 20N

Note:

Areas of partially buried debris were observed across the site. Based on interview information, there is potential for on-site buried debris (exact location, if present, is unknown). Assessment of APEC #3 was across the site as applicable.

SCALE 1:1,900

0 15 30 60 Metres



PROJECT: 24-8606

STATUS: FINAL

DATE: 2025-04-10



Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

BUILD NOVA SCOTIA

Former Frenchvale Mine Site
Phase II ESA

- ▲ Surface Water and Sediment Sample (2024)
- Subject Property Boundary
- Adjacent Parcels

- Culvert
- Watercourse (GeoNova)
- Wetland (GeoNova)

- Waterbody (GeoNova)
- Metals Exceedance of Tier I EQS and Background

SURFACE WATER METAL EXCEEDANCES

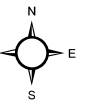
FIGURE 4



MAP DRAWING INFORMATION:
DATA PROVIDED BY ESRI, GeoNova, Build NS & Dillon Consulting Ltd.

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MAP CHECKED BY: NJW
MAP PROJECTION: NAD 1983 CSRS UTM Zone 20N

SCALE 1:1,900



PROJECT: 24-8606 STATUS: FINAL DATE: 2025-04-10



Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

BUILD NOVA SCOTIA

Former Frenchvale Mine Site
Phase II ESA

- ▲ Surface Water and Sediment Sample (2024)
- Subject Property Boundary
- Adjacent Parcels

- Culvert
- Watercourse (GeoNova)
- Wetland (GeoNova)

- Waterbody (GeoNova)
- Metals Exceedance of Tier I EQS and Background

SEDIMENT METAL EXCEEDANCES

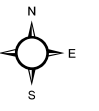
FIGURE 5



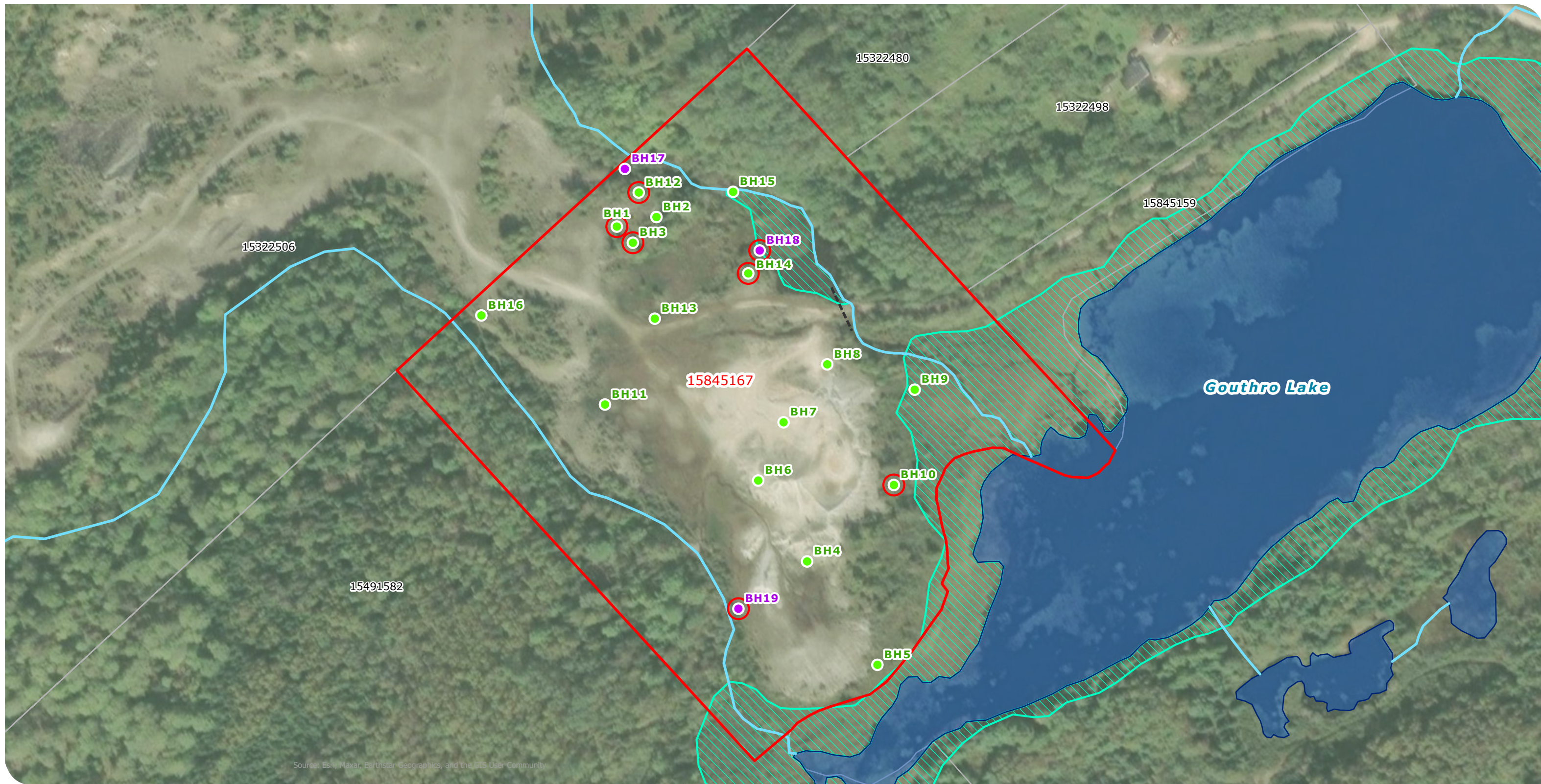
MAP DRAWING INFORMATION:
DATA PROVIDED BY ESRI, GeoNova, Build NS & Dillon Consulting Ltd.

MAP CREATED BY: CHM
MAP CHECKED BY: NJW
MAP PROJECTION: NAD 1983 CSRS UTM Zone 20N

SCALE 1:1,900



PROJECT: 24-8606 STATUS: FINAL DATE: 2025-04-10



Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

BUILD NOVA SCOTIA

Former Frenchvale Mine Site
Phase II ESA

- Shallow Test Hole Sample (2024)
- Step Out Sample (2025)
- Metals Exceedance of Tier I EQS and Background

- Subject Property Boundary
- Adjacent Parcels
- Culvert

- Watercourse (GeoNova)
- Wetland (GeoNova)
- Waterbody (GeoNova)

METALS EXCEEDANCES IN SOIL

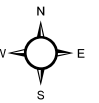
FIGURE 6



MAP DRAWING INFORMATION:
DATA PROVIDED BY ESRI, GeoNova, Build NS & Dillon Consulting Ltd.

MAP CREATED BY: CHM
MAP CHECKED BY: NJW
MAP PROJECTION: NAD 1983 CSRS UTM Zone 20N

SCALE 1:1,900



PROJECT: 24-8606 STATUS: FINAL DATE: 2025-04-10