



Great Atlantic Salt

Early Works Water Resources
Management Plan

Great Atlantic Salt

Early Works Water Resources Management Plan

Atlas Salt Inc.

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Acronyms and Definitions

| Acronym/Word | Title or Definition |
|------------------|--|
| Catchment ditch | Ditching inside the mine surface site that will capture water from the various on-site features and direct the water into an on-site settling basin. |
| Contact Water | Water that has the potential to have been in contact with salt in the mine access declines or underground mine site. |
| DEM | Digital Elevation Model |
| Diversion ditch | Ditching outside of the mine surface site that will direct water from land adjacent and outside of the mine surface site around the site and disperse at intervals outside of the mine surface site. |
| DFO | Department of Fisheries and Oceans, Government of Canada |
| Drainage Basin | Area within which surface water drainage will occur and is topographically constrained from other areas. |
| Drainage Channel | Path that water will travel over land (excluding ponds/lakes and watercourses). |
| EA | Environmental Assessment |
| EAR | Environmental Assessment Registration |
| EPP | (Atlas GAS Early Works) Environmental Protection (and Mitigation) Plan (Atlas, 2025a) |
| GAS | Great Atlantic Salt |
| km ² | Square kilometer |
| m ² | Square metre |
| NL | Newfoundland and Labrador |
| NLDECC | Newfoundland and Labrador Department of Environment and Climate Change |
| Off-Site | Outside the boundaries of the Mine Surface Site |
| On-Site | Within the boundaries of the Mine Surface Site |



| | |
|---------------------------|--|
| Ponds/Lakes | A surface source of fresh water within the jurisdiction of the province, whether that source usually contains liquid or frozen water or not, and includes water above the bed of the sea that is within the jurisdiction of the province, and is a lake, pond, lagoon, ravine, gully, canal, and other standing water and the land occupied by that body of water. Typically, a water feature that appears as polygon on an NTS (National Topographic Series) map and includes ponds, lakes, and water reservoirs. |
| Site | The area within the boundary fence surrounding the operation and stockpiles. |
| Surface drainage boundary | Boundary of drainage basin. Boundary that defines an area within which surface water drainage will occur and is topographically constrained from other areas. |
| TDS | Total Dissolved Solid |
| TSS | Total Suspended Solid |
| Waterbody | Statutory definition from the Act: “body of water” means a surface or subterranean source of fresh or salt water within the jurisdiction of the province, whether that source usually contains liquid or frozen water or not, and includes water above the bed of the sea that is within the jurisdiction of the province, a river, stream, brook, creek, watercourse, lake, pond, spring, lagoon, ravine, gully, canal, wetland and other flowing or standing water and the land occupied by that body of water. |
| Watercourse | Fresh water within the jurisdiction of the province, whether that source usually contains liquid or frozen water or not, and includes water above the bed of the sea that is within the jurisdiction of the province and is a river, stream, brook, creek, or watercourse. Typically, a linear feature on a 1:50,000 NTS map that connects to a pond/lake or wetland. Watercourses are typically characterized by waterflow year-round. |
| Wetland | Statutory definition from the Act: “wetland” means land that has the water table at, near or above the land surface and includes bogs, fens, marshes, swamps and other shallow open water areas. |
| WCP | (Atlas GAS Early Works) Wetland Conservation Plan (Atlas 2025b) |



| | |
|------|--|
| WRMD | Water Management Resources Division, Department of Environment and Climate Change, Newfoundland and Labrador |
| WRMP | (Atlas GAS Early Works) Water Resources Management Plan |



1 Introduction

This Water Resources Management Plan (WRMP) establishes the water management approach by which Atlas Salt Inc. (Atlas) will minimize environmental effects to water quantity and quality during the Early Works phase of the Great Atlantic Salt (GAS) Project. Developed in accordance with federal and provincial regulations, this Plan builds on the Project's overall environmental commitments, outlining key strategies to manage on-site and off-site runoff, to minimize disturbance to residents and surrounding habitats in the area, and to maintain ecological integrity. The Plan integrates with the Atlas GAS Early Works Environmental Protection and Mitigations Plan (EPP) (Atlas, 2025a) and the Atlas GAS Early Works Wetland Conservation Plan (WCP) (Atlas, 2025b) to ensure all wetland-related activities are coordinated, consistently applied, and clearly documented throughout construction.

1.1 Overview of Atlas Great Atlantic Salt Project

Atlas Salt Inc. (Atlas) is proposing to develop the Great Atlantic Salt Project (GAS Project), located on the west coast of the Island of Newfoundland within the municipal boundaries of the Town of St. George's.

The Project will produce and export crushed salt for the road de-icing market, with an initial production capacity of 2.5 million tonnes of rock salt per year. The GAS Project will extract underground salt ore that is approximately 96% pure using electric continuous miner excavation. The ore will be crushed underground using conventional dry crushing and screening methods in three crushing stages and four screening stages. All processing activities will be completed underground.

The final salt product will be conveyed from the underground mine to the mine surface site, then overland on a covered or enclosed conveyor to the Turf Point storage and Marine Terminal facility. From there, it will be loaded onto ships for destination markets in the Maritime Provinces, Quebec and Eastern United States.

The approximate central point of the Project Area is at longitude 58.49184, latitude 48.41892, or 387,550 E, 5,362,650 N (NAD83 Zone 21 North).

The core components are presented in Figure 1 below and include:

- An underground salt mine and ore processing (crushing and screening) facilities
- Mine surface site infrastructure
- An overland conveyor system routed along the existing Flintkote Road



- Use of the existing Turf Point marine facility, with some planned modifications and upgrades to the storage facilities
- Associated, ancillary infrastructure including access roads, water and sewer systems, and power supply

Commencing Q4 2024 with detailed permitting, engineering and the procurement of key long-lead components, the current Project schedule would see construction activity in the field beginning in Q2 2025 and continuing year-round. The operations phase of the Project will commence upon completion of construction and associated commissioning, with initial (capital development) mining commencing in Q4 2025 and extending to approximately Q2 2029. This will be followed by the installation of underground infrastructure, after which mine production will ramp up to commercial production levels in Q4 2029 and extend for an operational period of at least 34 years. Progressive rehabilitation activities will occur throughout the life of the mine with final closure and rehabilitation activities after the operations have ceased.

NOTE: The project dates represent the schedule as it is currently understood. Actual start dates are dependant on Project Financing. Once the start date is defined, all other dates will move relative to that date in the schedule as outlined.

1.2 Company Information

Atlas owns 100 percent of the Great Atlantic salt deposit, North America's premier undeveloped salt project, which is strategically located on the west coast of Newfoundland.

Atlas is a Canadian-based resource development company listed on the Toronto Venture Exchange under the trading symbol SALT (TSXV:SALT) and headquartered in St. John's Newfoundland and Labrador. Atlas is the 100% owner of the Great Atlantic Salt Project.

| | |
|------------------------|--|
| Name of Corporate Body | Atlas Salt Inc. |
| Address | 100 New Gower Street, Suite 910 St. John's, Newfoundland and Labrador Canada A1C 6K3 Tel (709) 754-3186 |



| | |
|---|---|
| | Email. info@atlassalt.com |
| Chief Executive Officer | Patrick Laracy, LL.B., PGeo CEO and Director |
| Principal Contact Person for Engineering and Construction | Robert Booth Vice-President, Engineering and Construction |
| Principal Contact Person for Corporate Issues | Alasdair Federico Chief Financial Officer |

Additional information on Atlas can be found at: [AtlasSalt.com](https://atlassalt.com)



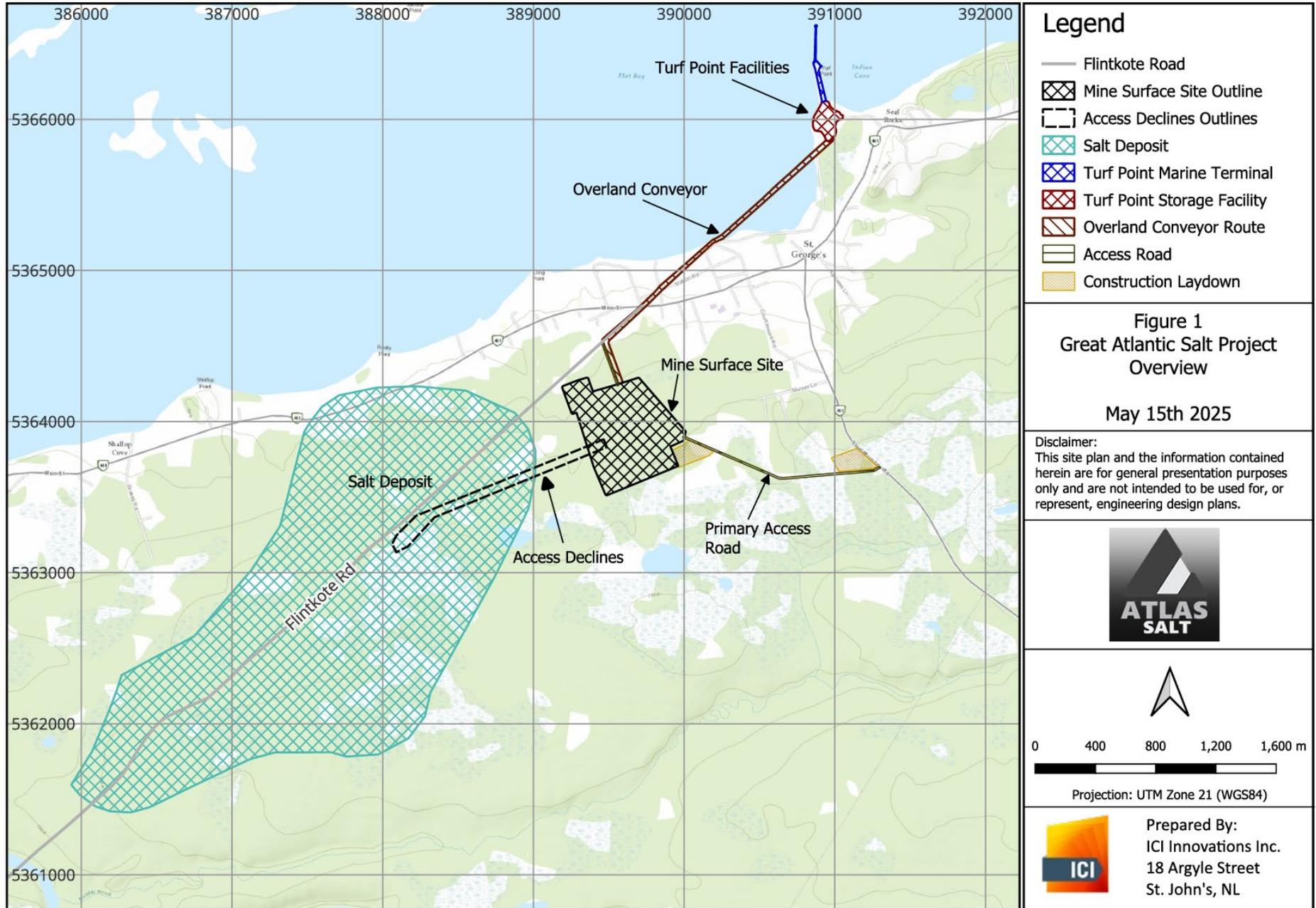


Figure 1: Great Atlantic Salt Project Overview



1.3 Planned Activities and Phases

Atlas completed a feasibility study in 2023 (SLR, 2023) and submitted the required EA Registration in February 2024 (NLDECC, 2024). The project was subsequently released from EA April 19, 2024. Atlas has defined a construction plan to achieve salt production and start of mine ramp up by Q2 2029 (Figure 2).

To achieve the defined schedule Atlas must complete the detailed engineering of the subsurface mine components which is dependent on the completion and reporting of a geotechnical program and groundwater assessment. In an effort to maintain the overall construction schedule Atlas is planning to phase activities as follows:

- Pre-Early Works Activities (September 2024 – April 2025) – completion of a survey of the crown lands to be included in the surface lease for the mine site, survey of the mine surface site footprint and mine site components, acquisition of the required private lands, clearing of brush and forest within the mine surface footprint, and acquisition of the mine surface lease.
- Early Works Activities (April 2025 – October 2026) – Earthworks, roads and terrace construction and surface construction activities related to the primary and secondary access roads, and stockpile platforms.
- Capital Construction Activities (May 2026 – March 2029) – construction of on-site infrastructure, declines, all underground components, the overland conveyor and the upgrade of the turf point facilities.
- Operations Activities (October 2028 onward) – update the mine development plan to include all required operations components and details

This Water Resources Management Plan is focussed on the Early Works construction which is for mine site surface construction only. It is anticipated that this plan and the water resources management practices and policies required for the next phase of the Project, and the Capital Works including underground construction, will require alterations to address underground mine water management and discharge. This document will be reviewed as



each phase of the Project approaches and Atlas will work with the Water Resources Management Division to address the scope of this plan.

1.4 Overview of Early Works Activities

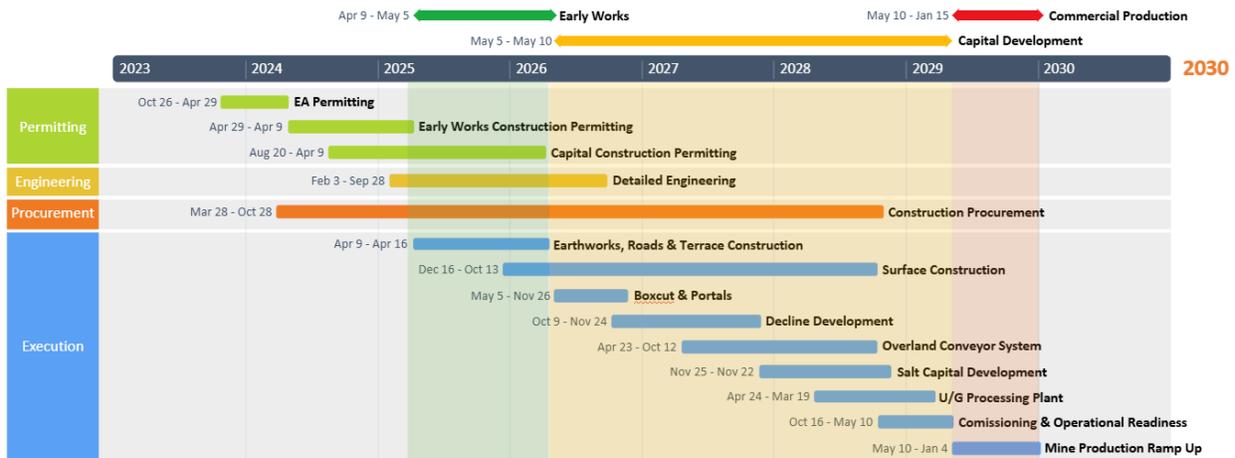


Figure 2: High Level Project Schedule

This Water Resources Management Plan covers the early works development that includes the components listed below and presented in Figure 3. The area of disturbance of the early works activities is presented in Figure 4 and summarized in Table 1:

- a) Provincial Road Access
- b) Primary Access Road
- c) Construction Laydown Areas
- d) Temporary Construction Facilities
- e) Clearing of Site Overburden
- f) Temporary sediment and erosion control
- g) Peripheral berms / diversion ditches and fencing
- h) Terraces, including the stockpile Pads for the organic, waste and pre-production stockpiles
- i) On-site Catchment Ditches
- j) Temporary Settling Basin
- k) Secondary Access Road



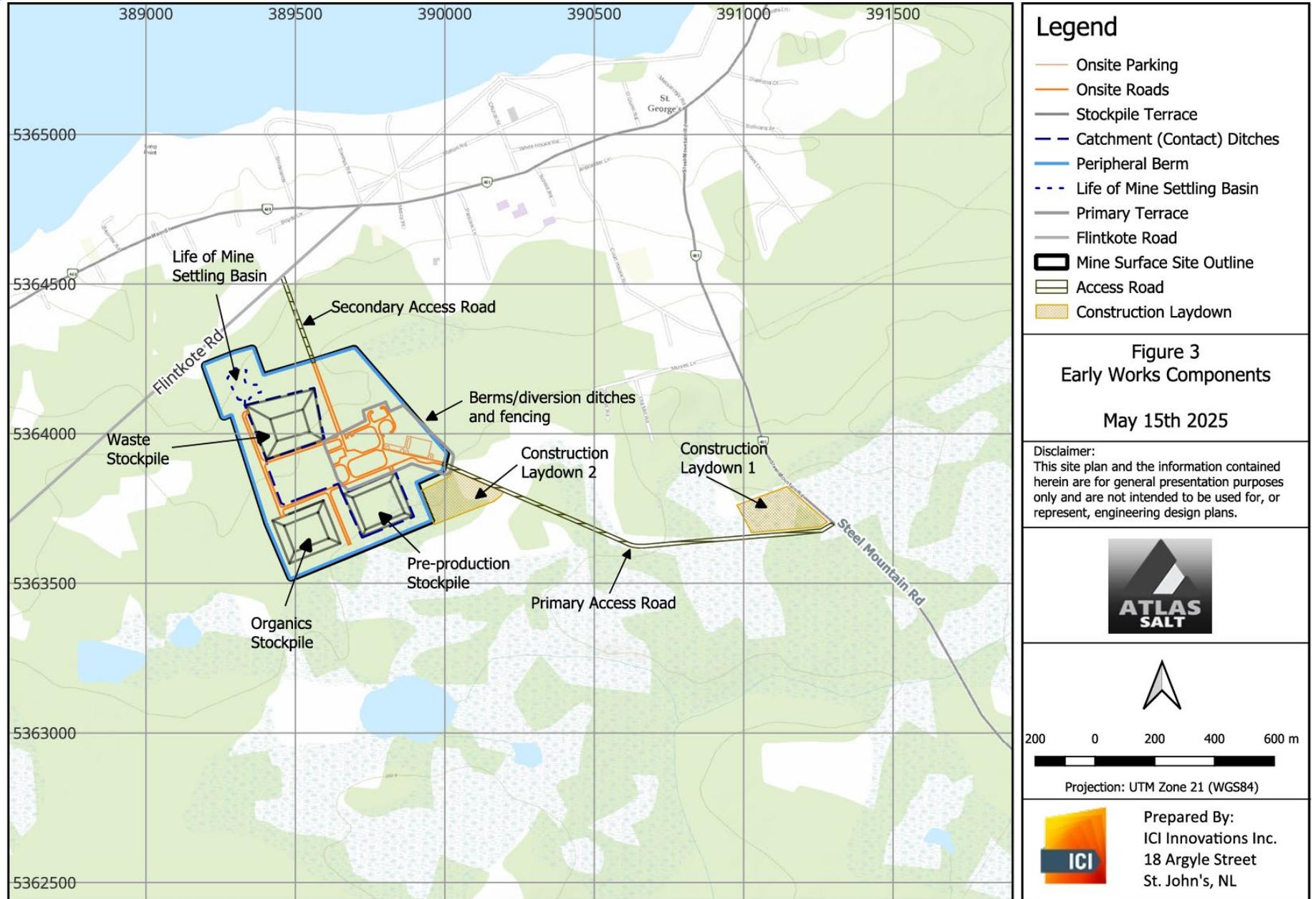


Figure 3: [Early Works Components](#)



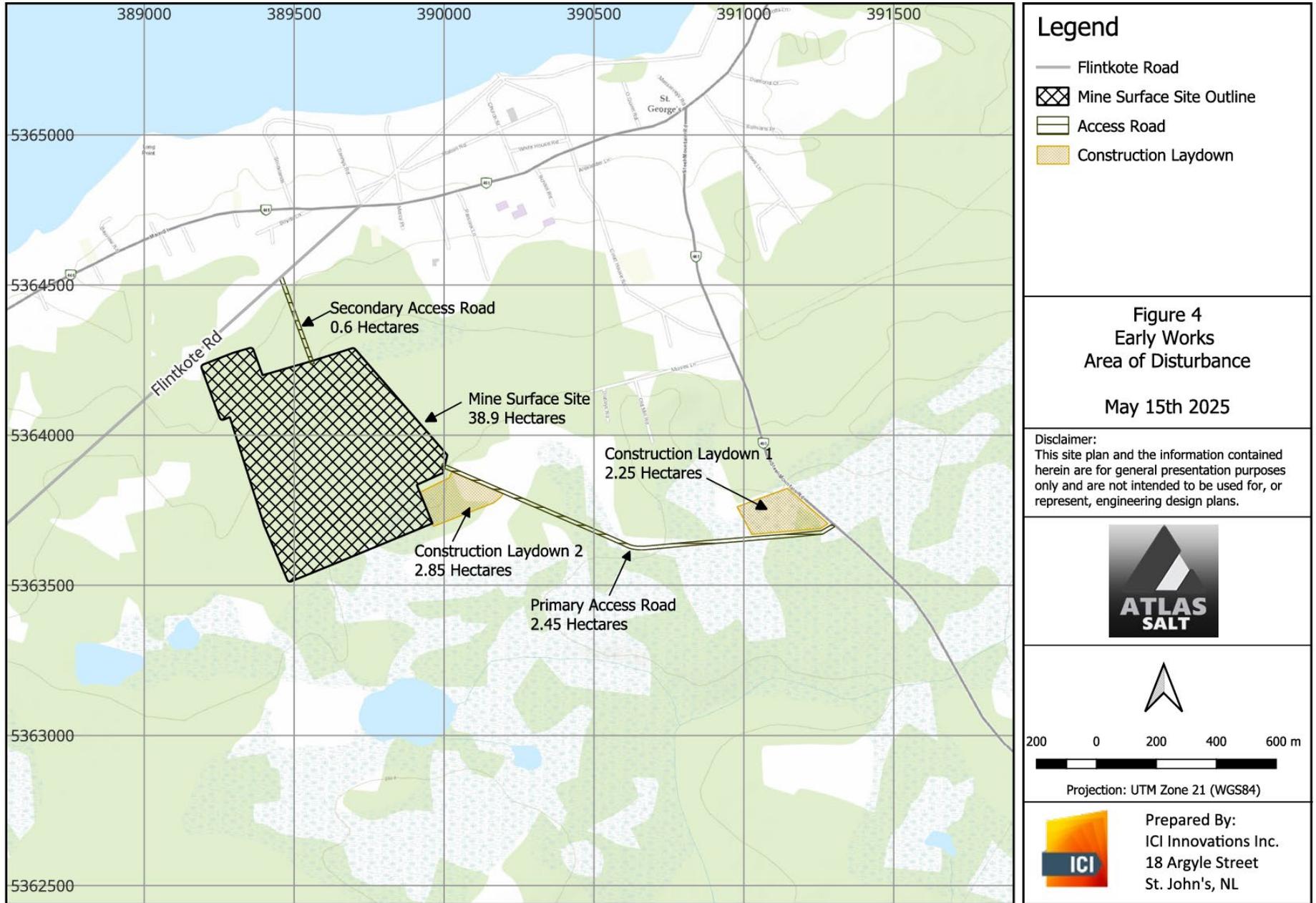


Figure 4: [Early Works Area of Disturbance](#)



Table 1: Summary of Area of Disturbance

| Activity | Area of Disturbance m ² | Tree Clearing Area (% of disturbed area) |
|--------------------------------|---------------------------------------|---|
| Primary Road Construction | 24,500 m ² | 1.0 ha (41%) |
| Construction Laydown Areas | 51,000 m ² | 2.27 ha (45%) |
| Secondary Road Construction | 6,000 m ² | 0.6 ha (100%) |
| Surface Mine Site Construction | 389,000 m ² | 27 ha (69%) |
| Totals | 470,500 m² | 29.97 ha |

1.5 Project History and Current State

The following table summarizes the major milestones completed to date on the Project.

Table 2: Summary of Relevant Project Milestones

| Milestone | Date | Status |
|---|-----------------------------------|-------------------|
| Technical Report on the Great Atlantic Salt Project, Newfoundland and Labrador, Canada Report for NI 43-101 (SLR, 2023) | October 2023, Amended May 2024 | Complete |
| Atlas Great Atlantic Salt EA Registration (NLDECC, 2024) | February 2024 | Submitted |
| Release from EA Registration | April 19, 2024 | Released |
| Mineral Lands Mining Lease (GNL, 2024a) | October 24, 2024 | Approved |
| Mineral Lands Surface Lease (GNL, 2024b) (GNL, 2024c) | October 24, 2024 | Approved |
| Geotechnical Program (Declines) | November 2024 | Commenced |
| Early Works Environmental Protection Plan | January 14, 2025 | Submitted |
| Early Works Waste Management Plan | January 15, 2025 | Approved |
| Early Works Mine Development and Rehabilitation and Closure Plan | February 28, 2025 | Submitted |
| Early Works Bat Preventative Measures Plan | March 24, 2025 | Submitted |
| Geotechnical Program (Declines) – Drilling | April 4, 2025 | Drilling Complete |



| | | |
|--|-------------|-------------------------|
| Early Works Wetland Conservation Plan Approved | May 7, 2025 | Approved |
| Early Works Mine Development and Rehabilitation and Closure Plan | May 7, 2025 | Updated and Resubmitted |

1.6 Objectives of this Plan

The key objectives of this Water Resources Management Plan are to minimize environmental effects from Early Works construction on Water Resources including:

- Minimize any off-site, clean water from periodic overland water flow from entering the mine site by developing a series of diversion ditches along the perimeter of the mine site
- Help conserve nearby wetlands by maintaining hydrologic connectivity across the access road to the mine site
- Direct all water within the mine site using gravitational drainage to settling basins. Allow collected water to flow overland through natural vegetation towards Man O'War watershed.

1.7 Surface Water Quality Regulatory Criteria

For the Early Works construction phase of the Project the primary water quality concern is for suspended solids in surface water runoff due to site clearing activities and on-site surface storm water management. There is no underground construction during Early works construction and no mine water discharge.

Water use and management in Newfoundland & Labrador is regulated by the Department of Environment and Climate Change (NLDECC). The following legislation is applicable to water management during Early Works construction including:

- **Fisheries Act of Canada** – General provisions of this act, including section 36 (3) concerning the deposition of deleterious substances in water frequented by fish, are applicable and the EPP outlines specific mitigations to be implemented.



- **NL Mining Act (GNL, 1999) and NL Water Resources Act (GNL, 2002)** - The design criteria for the settling basins and ditches will comply with the NL Mining Act and the NL Water Resources Act and at this stage in engineering design do not include any dams as defined in the Acts.
- **NL Environmental Control Water and Sewer Regulations, 2003 under the Water Resources Act (GNL 2003)**– surface water runoff from the site will comply with the provisions of the regulations.
- **NLDECC Policy for Development in Wetlands** - Permitting requirements under Section 48 of the Water Resources Act 2002 apply for development activities within 15m of a waterbody and for development in wetlands (GNL, 2002). It is recognized that wetlands will be affected during Early Works construction, however development of the mine surface site is not expected to affect flooding, and mitigations will be applied to protect the water quality and hydrologic connectivity of adjacent wetlands.
- **Certificate of Approval (COA), Pollution Prevention Division of NLDECC.** The conditions of any COA will be complied with during Early Works construction.

2 Project Details

The following section provides an overview of activities planned for early works construction. Specific details for components that affect water resources are defined in this Section 2. Activities specific to water resources management activities are detailed in Section 4.

2.1 Early Works Activities

The early works development plan includes the following components/activities:

- **Clearing of site grubbing and overburden** – grubbing and clearing of organic and non-organic material across the mine surface site, access roads, and construction laydown areas (See *Figure 4* above).
- **Provincial Road Access** - construction of the access off Provincial Route 461 (Steel Mountain Road) onto the primary access road, including the installation of a culvert, modifications to the existing road shoulder and correct grading and turning radius to meet NL Provincial requirements (Section 2.2 below).



- **Primary Access Road** – construction of the 1,360m long primary access road into the site, including required culverts, ditches, site access controls and signage. The primary access is to be a 13.3-meter-wide gravel surface allowing two-way traffic (Section 2.3 below).
- **Construction Laydown Areas** – includes two construction laydown areas; Construction Laydown 1 will be adjacent to the access point on Steel Mountain Road, and Construction Laydown 2 will be at the entrance to the mine surface site. (Section 2.6 below).
- **Temporary Construction Facilities** – temporary buildings and related services for a wash trailer, lunchroom, and temporary site office space. These are to be placed in the temporary construction laydown area adjacent to the mine site (Section 2.6 below).
- **Temporary sediment and erosion control** – implement temporary measures including temporary ditching and silt fencing to ensure Site surface water is directed away from the wetlands and provides interim protection of adjacent wetlands until the on-site ditching and settling pond are in place (discussed below in Section 4 of this document).
- **Life of Mine Settling Basin/Sump** – creation of temporary basins and on-site catchment ditches for surface mine site water containment associated with early works activities (discussed below in Section 4 of this document).
- **Terraces** – construction of specific engineered areas for specified activities (Section 2.4 below)
- **Stockpile Pads** – grading / construction of the pads for the pre-production and waste rock stockpile on Terraces 2, 3 and respectively (Section 2.4 below)
- **On-site Collection Ditches** – construction of the permanent on-site ditches that bring water from the perimeter of the terraces to settling basins and then direct clean water to the Man O'War watershed (discussed below in Section 4 of this document).
- **Secondary Access Road** – construction of the 300m long secondary access road from Flintkote Road into the site, including required culverts, ditches, site access controls and signage. The secondary access is to be a 5m wide gravel surface allowing one-way traffic (Section 2.5 below).
- **On-site Roads and Parking** – construction of 2,125 meters of 8.9-meter-wide gravel roads within the mine surface site and parking adjacent to the future administration and support buildings (Section 2.7 below).
- **Peripheral berms / diversion ditches and fencing** – the berms and ditching required around the mine surface site to ensure water from outside of the mine site is diverted around the mine site, and fencing adjacent to the berm/diversion ditches to keep people off the mine site (discussed below in Section 4 of this document).



2.3 Primary Access Road

The primary access road presented in *Figure 7* below is a 2-way compacted gravel surfaced roadway (civil design criteria are included in Appendix A). The road will be a 13.3-meter-wide 2-lane roadway. The road will be graded from the centre line on each lane at 2% to allow water to flow to 1.2-meter ditches on each side of the road (Appendix A). From Steel Mountain Road to the Site, the road has a grade of between 1% and 4%. The primary access road will be constructed with 500 mm depth of compacted granular B (Class B as defined by Government of Newfoundland and Labrador, Department of Highways and Infrastructure).



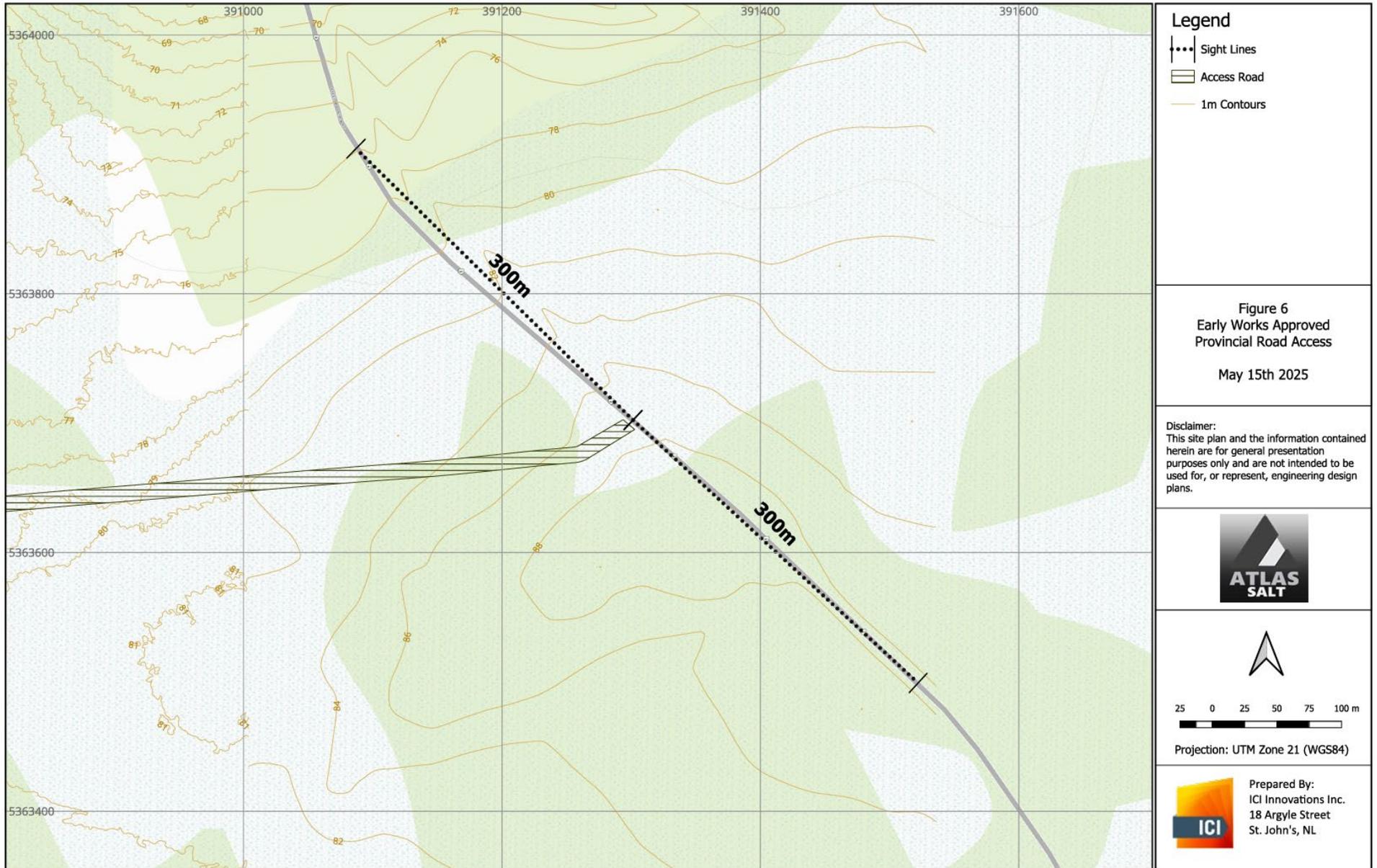


Figure 6: Provincial Road Access Location





Figure 7: [Early Works Access Roads](#)



2.4 On-Site Terraces and Stockpiles

A significant component of early works is the grading of the four engineered terraces and the construction of engineered pads on each terrace. The following provides relevant details on planned terrace and stockpiles.

Terraces

Each terrace will be excavated to the required elevations and graded for later construction of the required component pads. *Table 3* and *Figure 8* below provide details on the elevations and grade requirements for each terrace. The 4 terraces cover an area of 16.9 hectares

Table 3: Terrace Dimensions

| Terrace | Purpose | Area | Elevations on Finished Terrace | Slope on Finished Terrace |
|---------|---|--------|--------------------------------|---------------------------|
| 1 | Shops and Administrative Infrastructure | 7.3 ha | 47-48m | <1% |
| 2 | Pre-Production Stockpile | 2.9 ha | 56-58m | <1% |
| 3 | Waste Rock Stockpile | 3.9 ha | 34-36m | <1% |
| 4 | Organics Stockpile | 2.8 ha | 51-53 m | <1% |

Terrace 1 - Shops and Administrative Infrastructure

Once all construction is complete the Shops and Administrative Infrastructure terrace will contain on-site parking, administrative buildings, substation, mine dry, on-site laydown, truck repair, and related on-site components. During the early works construction, the engineered pad will be constructed. This is a 7.3-hectare-pad with 600mm of compacted crushed rock and gravel graded to specifications as in *Figure 8* below and *Table 3: Terrace Dimensions* above.



Life of Mine Stockpile Terraces and Pads

The life of mine stockpiles are on the terraces 2, 3 and 4 as defined in *Table 3* above and presented in *Figure 8*. The Stockpiles will have engineered foundations as defined in *Table 4* below. Additionally, the pre-production stockpile will have a geotextile membrane to protect the underlying ground from water leaching from the pre-production salt waste material and direct the water to the catchment ditching.

Table 4: Stockpile Dimensions

| Stockpile | Area | Design | Stockpile Dimensions | Storage Used at end of Early Works | Maximum Storage Capacity |
|--------------------------|--------|--|--|------------------------------------|--------------------------|
| Organic Stockpile | 2.8 ha | Footprint of approximately 150 m x 180 m with an average height of 19.5 m. Foundation of 600 mm compacted till and crushed rock | Max Slope: 2H:1V Max Height: 19.5 m | 185,626 m ³ | 187,800 m ³ |
| Waste Rock Stockpile | 3.9 ha | Footprint of approximately 215 m x 185 m with an average height of 28 m. Prepared foundation of 600 mm compacted crushed rock and gravel | Max Slope: 3H:1V Max Height: 28 m | 287,000 m ³ | 570,000 m ³ |
| Pre-Production Stockpile | 2.9 ha | Footprint of approximately 150 m x 180 m with an maximum height of 15 m. Prepared foundation of 600 mm compacted crushed rock and gravel | Max Slope: 1.5H:1V Max Height: 15 m | 0 | 291,000 m ³ |



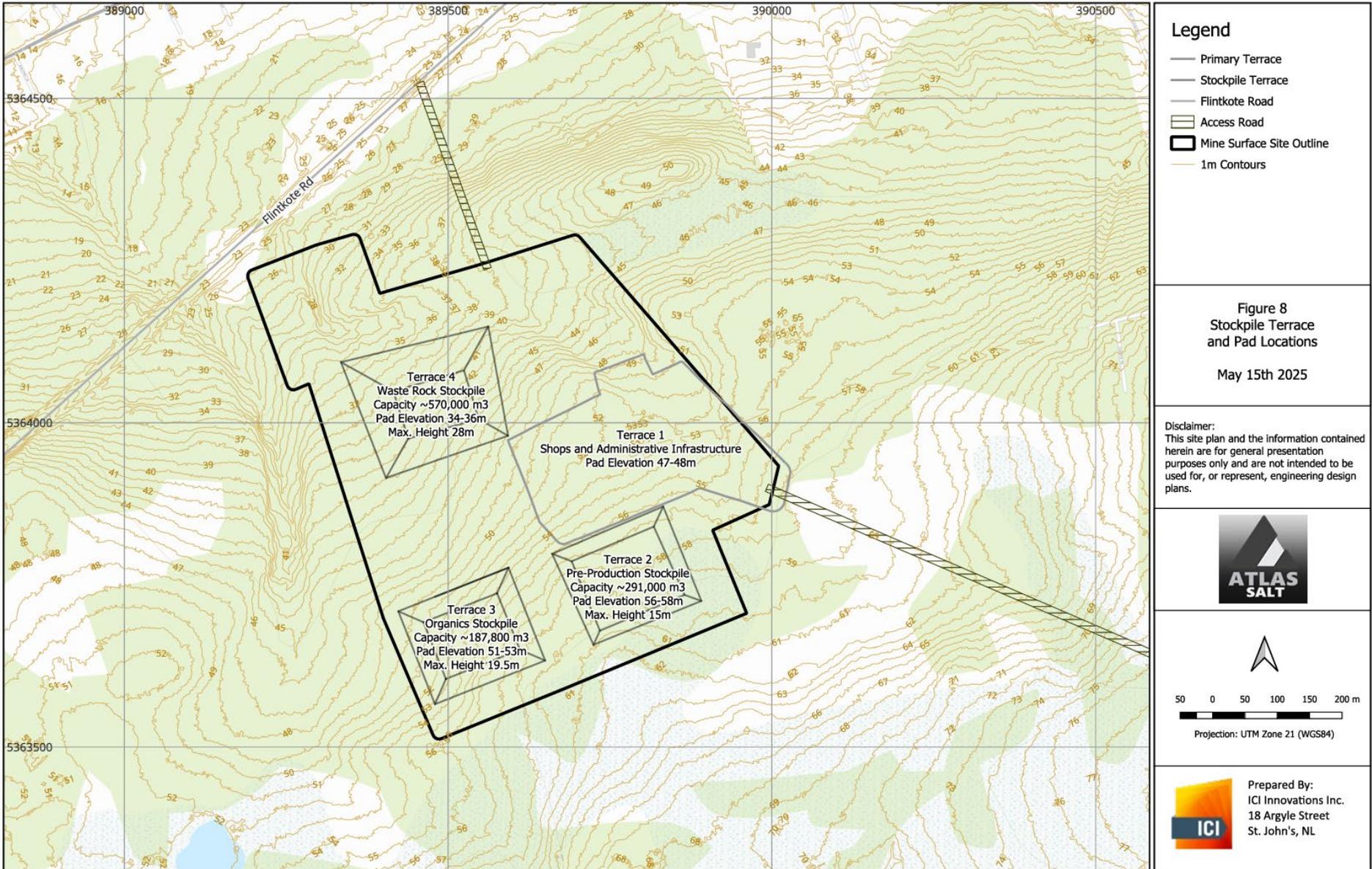


Figure 8: Stockpile Terrace and Pad Locations



2.5 Secondary Access Route

A secondary access road will be established from the historical haul road (Flintkote Road) and along the planned conveyor route at the north side of the Project (*Figure 10* below). This access will be a 300 m long gravel road from Flintkote Road to the Site boundary (fence) and will then travel another 250 m to the service roads on Terrace 1. It will extend from an elevation of 26 m at the Flintkote Road, to an elevation of 39 m as it enters the Site. This access road will be 5 meters wide with a ditch on the eastern side, be suitable for manoeuvring heavy machinery, and will provide additional access for construction.

2.6 Construction Laydown Areas

The early works construction will provide two construction laydown areas (*Figure 9*). Details on grading and dimensions are presented in *Figure 4* and *Figure 9* and *Table 5*. Construction laydown 1, adjacent to Steel Mountain Road, will be graded 1% and sloped generally toward the north and west. Construction laydown 2, adjacent to the mine surface site, will be graded to 1% and be sloped generally to the north. Each laydown area will be constructed with a pad of 600mm of compacted crushed rock and stone.

Table 5: Construction Laydown Dimensions

| Construction Laydown Location | Area |
|--|---|
| Construction Laydown 1 - Initial Construction Laydown at Steel Mountain Road | 22,500 m ² |
| Construction Laydown 2 - Primary Construction Laydown Adjacent to Mine Site | 28,500 m ² |
| Total Area | 51,000 m ² (5.1 hectares) |

The construction laydown areas will each contain a temporary organics stockpile that will store root/root-mat and tree remnants produced from grubbing the construction laydowns, and the organic soil stripped from the primary access road and the construction laydowns. *Figure 9* below shows the location of these stockpiles. Each will be 65mx65m with a maximum height of 8.5m allowing for ~20,400 cubic meters of storage capacity. It is anticipated that the organic material contained in these stockpiles will be used to rehabilitate the construction laydowns once all mine construction is completed.



2.7 On-Site Roads and Parking

There are 2,125 meters of road on the mine site at a width of 10.90 meters including an 8.5-meter roadway and 1.2-meter ditching (design criteria and standard specification in Appendix A). *Figure 10* provides the location and extent of on-site roads. The on-site roads are to be 2-lane compacted gravel roads to allow two-way traffic within the mine site.





Figure 9: [Construction Laydowns](#)



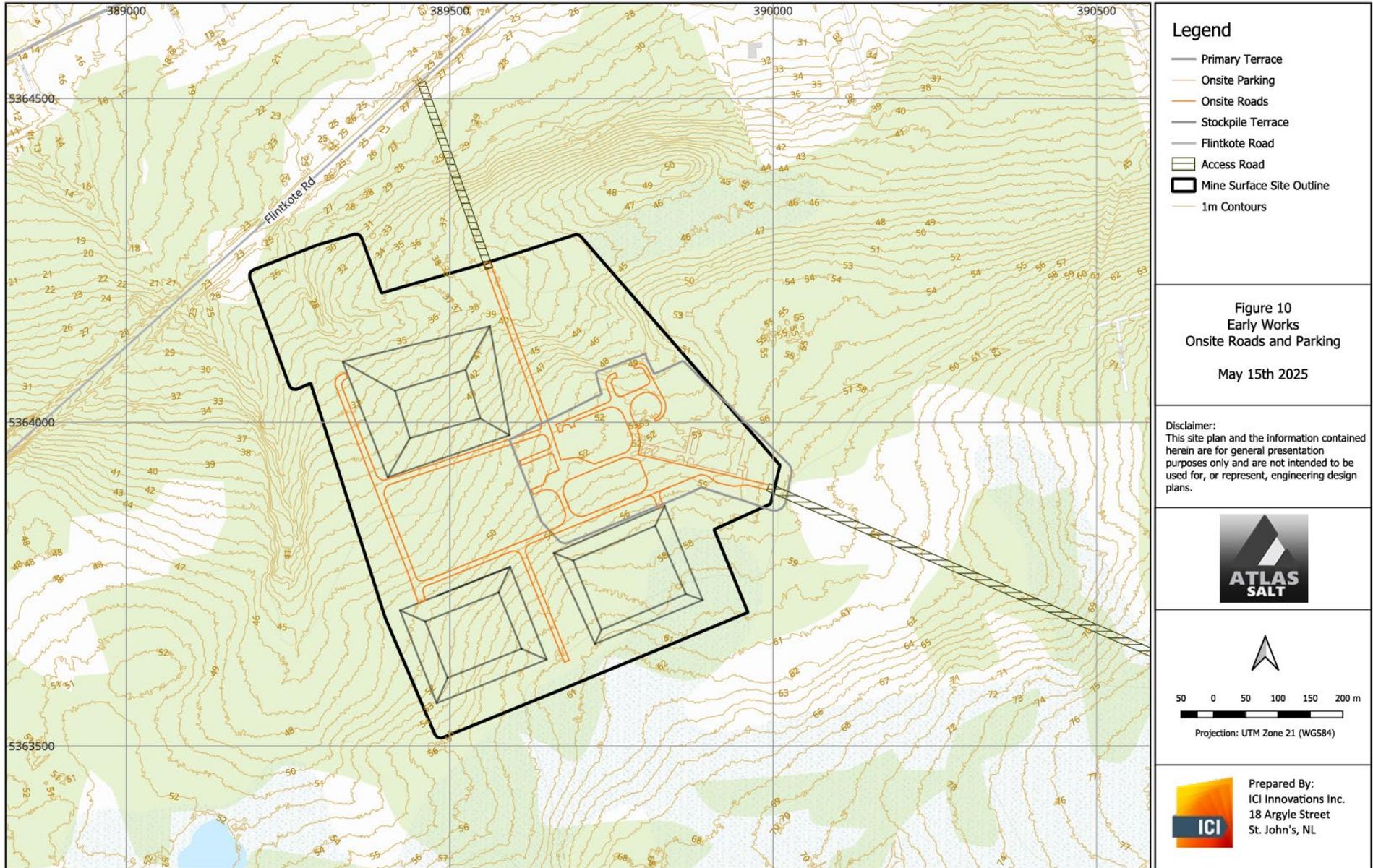


Figure 10: [Early Works Onsite Roads and Parking](#)



3 Physical Environment

3.1 Topographic Setting

The early works activities all occur in the project area between Steel Mountain Road and Flintkote Road (See *Figure 4* above). The site is characterized by a continuous low slope with very little undulation across the area. The topography generally slopes downward from a high point where the primary access route leaves Steel Mountain Road, towards the northwest (*Figure 11*).

Directly to the south of the Project site there is a drainage divide that runs east to west (*Figure 11*). The area to the north of this line faces north and generally slopes towards the ocean and across the mine site. The area to the south of the line generally slopes to the south towards the intermittent streams that flow seasonally to the south through a flat section of land that drains into Dribble Brook.

Using the detailed elevation data produced from LiDAR data captured in the summer of 2022 (Pioneer Exploration, 2022), the surface flow patterns were determined in the project area. The drainage channels in *Figure 12* depict the areas where water will flow over the mine surface Site. Using the drainage channels and the detailed elevation data, the Project area can be delineated into a series of watersheds and divides.

Figure 12 shows the resulting watersheds within and near the early works project area. These watersheds are summarized in *Table 6*. Of the 7 watersheds identified, Watershed 1, Watershed 2, Watershed 3, and Watershed 6 overlap the early works activities. Watershed 2 captures an area that crosses the primary access road and the construction laydown area adjacent to Steel Mountain Road. Watershed 3 captures an area that drains across the mine surface site, 865 meters of the primary access road, and the construction laydown adjacent to the mine surface site. Watershed 6 captures an area that partially drains across the mine surface site. The secondary access road is within Watershed 1. Watersheds 4, 5 and 7 are not affected by the early works activities.



Table 6: Watersheds in the Project Area

| ID | Surface Flow | Project Area Components |
|-------------|---|---|
| Watershed 1 | Surface flow is to the north of the Project Area, across the residential land of Parsons Road and Muisés Lane | Secondary access road |
| Watershed 2 | East of the surface mine site, surface flow is generally north and towards Steel Mountain Road | Primary access road |
| Watershed 3 | Sloped from east to west across the surface mine site | This basin flows across the surface mine site and includes a portion of the primary access road |
| Watershed 4 | Surface water flows south from the divide identified in <i>Figure 11</i> , into tributaries that feed Dribble Brook | NO early works project components within this drainage basin |
| Watershed 5 | Surface water flows south and west from the divide identified in <i>Figure 11</i> , and feeds Man O'War Brook | NO early works project components within this drainage basin |
| Watershed 6 | Surface water flows into Man O'War Brook from the southwest corner of the surface mine site | The basin flows across the southwest corner of the surface mine site |
| Watershed 7 | Surface water flows west of Man O'War Brook away from all project activities | NO early works project components within this drainage basin |

3.2 Waterbodies

For the purposes of discussion, it is recognized that waterbodies as defined by Water Resources Management Division include ponds/lakes, streams and wetlands. *Figure 13* depicts the distances to ponds and watercourses in the project area. There are wetlands, but no ponds/lakes or streams within the area of disturbance (*Figure 14*). The Atlas GAS - Wetland Conservation Plan outlines policies, procedures and mitigations for wetlands.



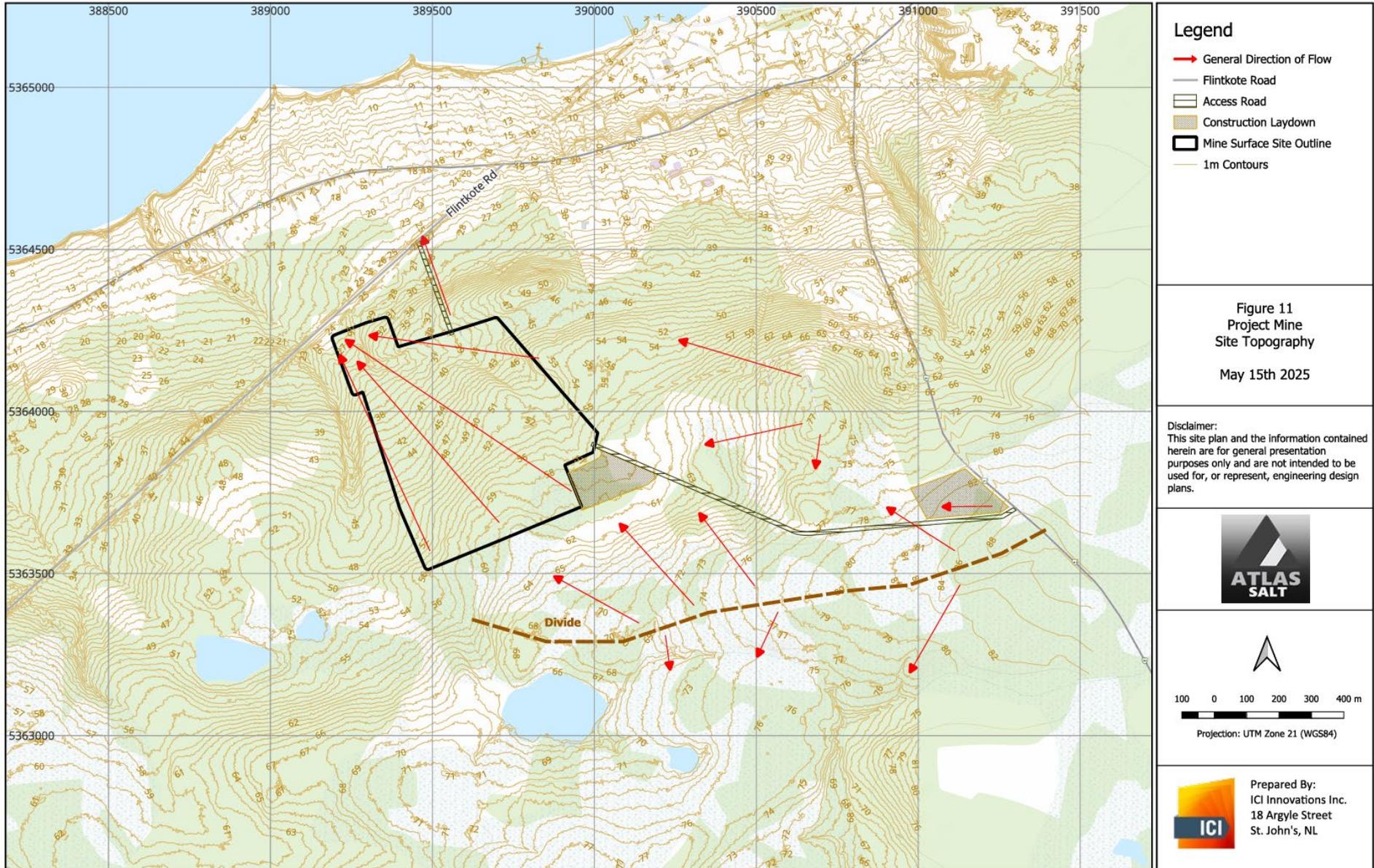


Figure 11: [Project Topography](#)



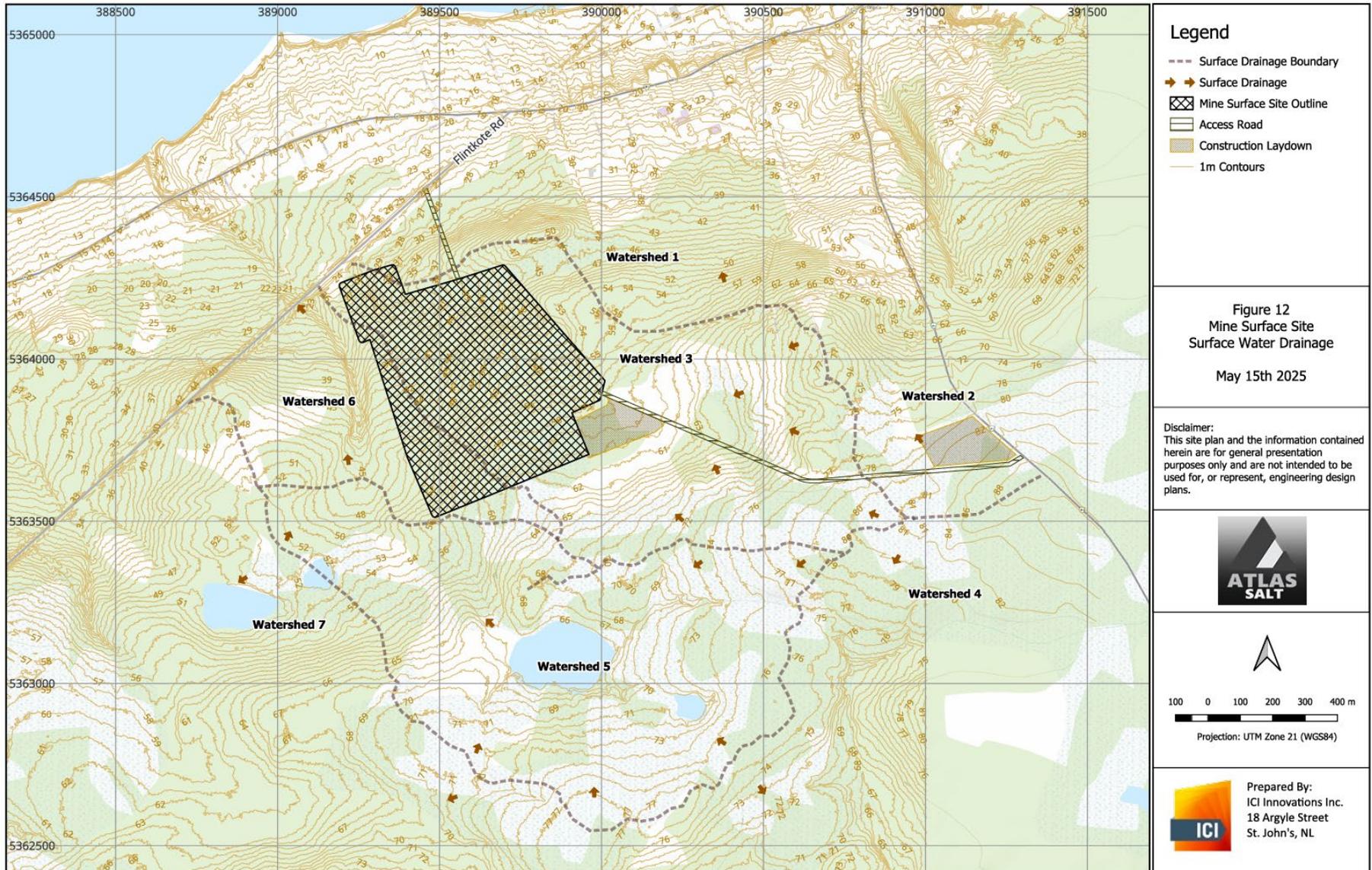


Figure 12: *Mine Surface Site Surface Water Drainage*



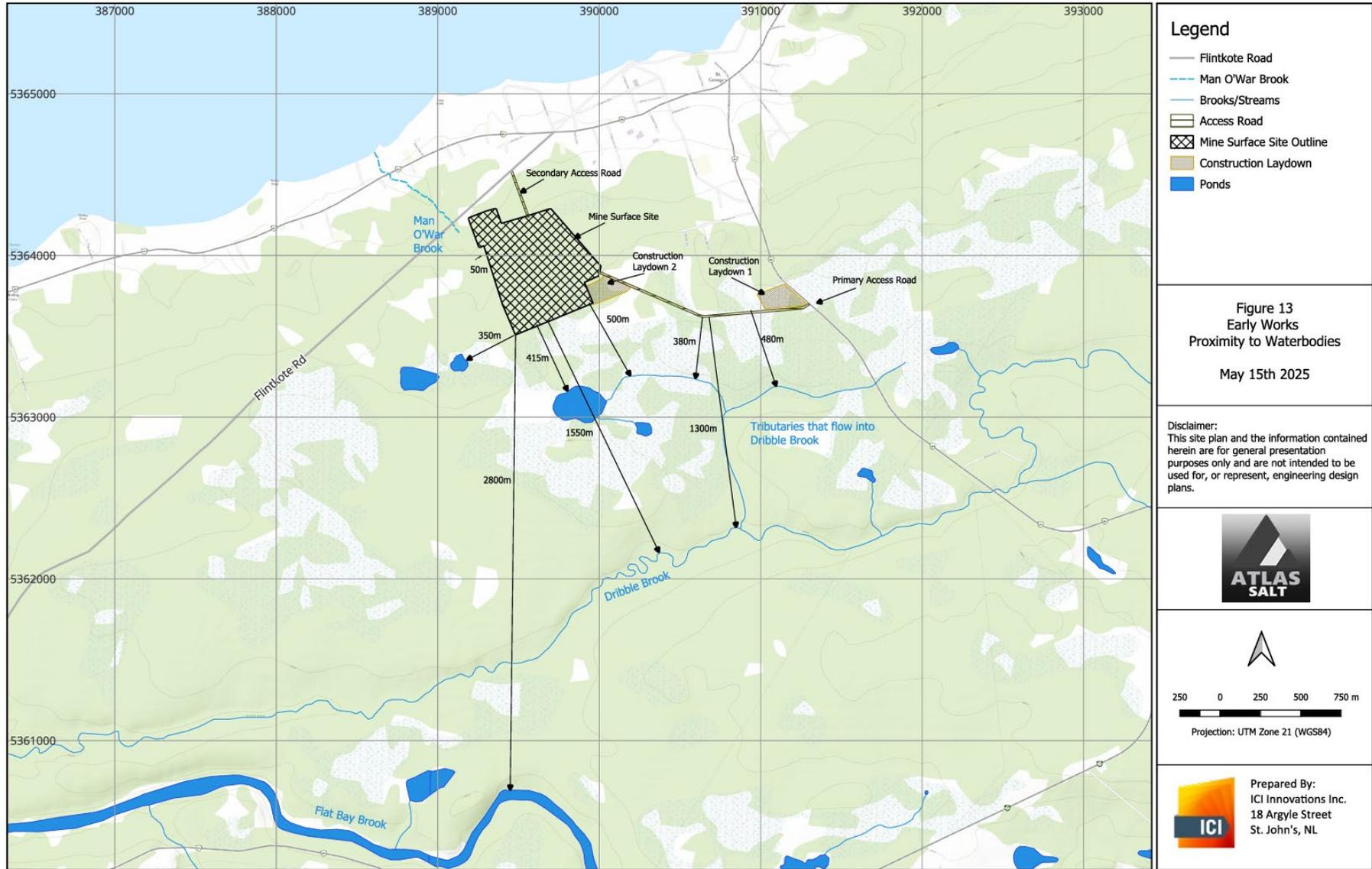


Figure 13: Early Works Proximity to Waterbodies



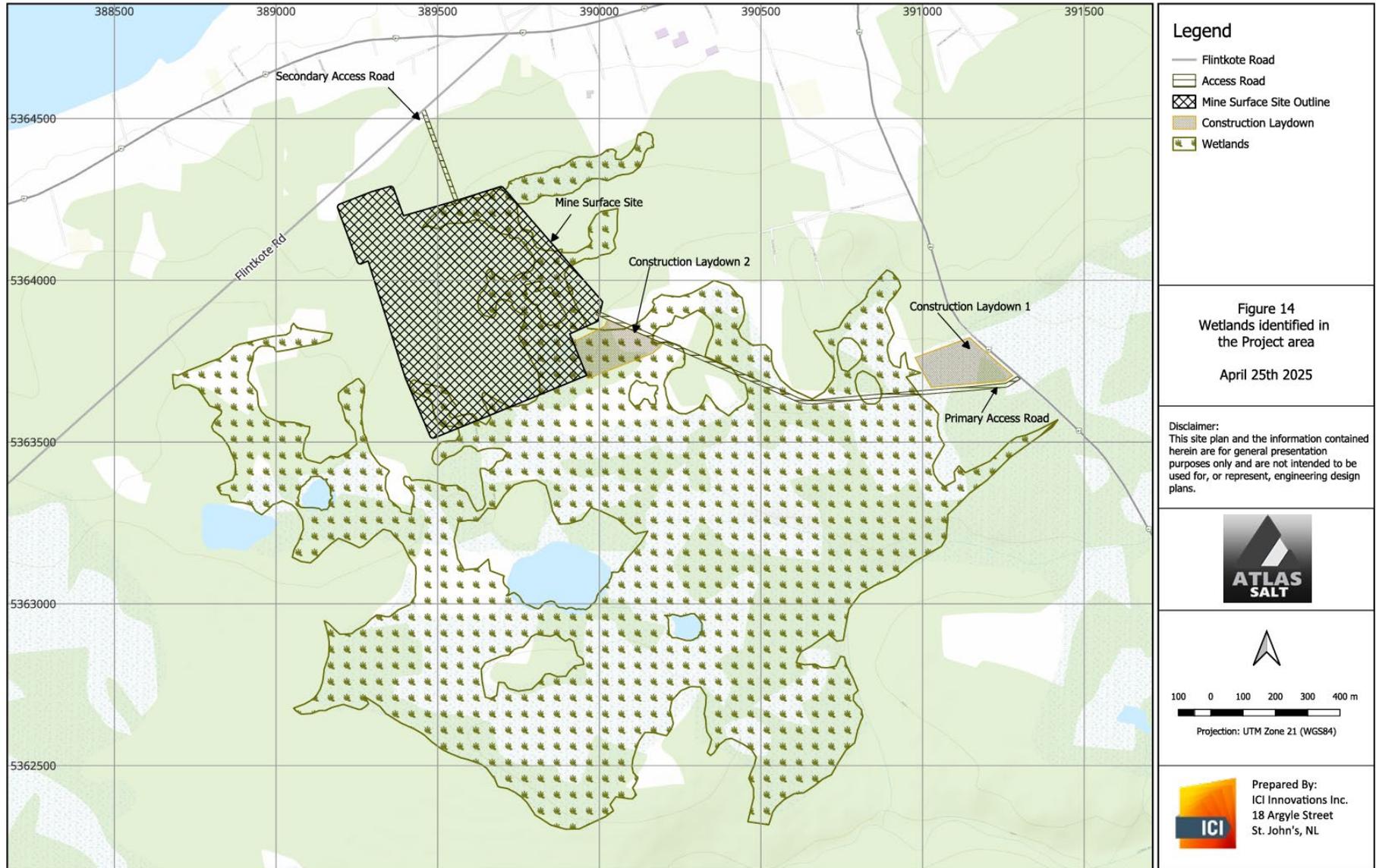


Figure 14: [Wetlands identified in the project area](#)



3.3 Surface and Site Geology

Within the mine surface site, three test holes were drilled, in the area of the proposed portal box cut to depths ranging from 12.2 m to 28.9 m, in order to evaluate geotechnical conditions. Organics, consisting of a thin layer of rootmat followed by peat and topsoil, were encountered at all drill hole locations, with a total thickness ranging from 0.25 m to 1.0 m. Glacial till was encountered underlying the organic layers extending to depths ranging from 8.8 m to 12.4 m below ground surface. Standard penetration tests completed on the till rated the material as compact to very dense. Bedrock was encountered in all holes below the till. Inferred sandstone bedrock that was disintegrated, highly weathered, and very weak was encountered in one hole and extended to end of hole. This hole was drilled to a depth of 28.9 m. In the other two shorter holes, a thin layer of fair quality mudstone was encountered before the rock transitioned to a good to excellent quality, moderate to strong sandstone that continued until end of boreholes at 12 m.

The physiographic area under consideration is in the St. George's Lowlands which comprises an undulating till plain bordered by glaciofluvial sand and gravel deposits. Soil within the Site area consists of a well graded diamicton ranging in particle size from clay, silt, sand, gravel, cobbles and boulders overlaying bedrock. Soil particles generally reflect the lithologies of the underlying bedrock. However, harder more durable particles may have been transported from outside of the area into the site by glacial action. The till thickness described in the reviewed data varies from 9 m to 27 m with an average of 21 m. Bedrock outcrop exists about 1.0 km northwest of the development area.

Dissecting the till plain in the area, many meltwater channels exist. These are channels cut into the soil or bedrock by high volume melted glacial water at the end of the last glaciation. They may contain modern streams that appear to be much too small to have carved out these valleys. Adjacent to and 100 m west of the Site, is a meltwater channel that is a north-south trending, steep sided V-shaped valley over 1.5 km long and 8 m deep. Man O'War Brook is contained in the lower reaches of this channel, north of Flintkote Road. This channel has very little water other than during high runoff events. Another poorly developed meltwater channel also exists on the Site at the location of a future settling pond for mine operations. This feature is also a steep sided, V-shaped valley that is only recognisable for about 80 m.



The existing ground will be disturbed to a maximum depth of 8.0 m (at the northeast portion of the area). Bedrock is not expected. Materials to be excavated include organics (185,626 m³ onsite and 40,250 m³ offsite) and till (337,140 m³). All materials will be removed to the appropriate stockpiles and used for future reclamation. If bedrock is encountered, it will also be removed to stockpile.

3.4 Climate and Meteorology

Section 3.4 provides a summary of the precipitation, evaporation, and rainfall events considered in the development of this plan. The information contained is extracted from Appendix B.

3.4.1 Annual and Monthly Precipitation

Environment and Climate Change Canada (ECCC) has been operating 12 different weather stations over time within a 40 km radius of the Project site. The Stephenville A (ID: 8403800 and 8403801) weather station, located 13.5 km away from the Project site at an elevation of 24.7 MASL, was selected to characterize the precipitation of the site as it has available long-term climate records with a period up to 2022 (1942-2022).

The ground elevation of the ECCC weather station is comparable to the range of elevations at the Project site (25 MASL to 60 MASL within the local watershed).

The 1981–2010 Climate Normals published by ECCC for the Stephenville A weather station (ECCC, 2022a) were used to characterize the average monthly and annual precipitation conditions at the Site (*Table 7*). The 1981–2010 Climate Normals were used instead of the long-term climate records for the full available period (1942–2022) and matching record (1981–2010) as they provide higher average annual precipitation, which is considered more conservative from the perspective of surface runoff volumes to be collected and managed at the Project Site.



Table 7: 1981-2010 Climate Normals for the Stephenville A Weather Station

| Month | Rainfall (mm) | Precipitation Snowfall (cm) | Precipitation (mm) |
|--------------|---------------|-----------------------------|--------------------|
| January | 28.9 | 113.3 | 124.6 |
| February | 27.2 | 90.1 | 105.3 |
| March | 36.9 | 54.4 | 86.2 |
| April | 61.5 | 17.0 | 77.7 |
| May | 94.0 | 3.3 | 97.4 |
| June | 104.1 | 0.0 | 104.1 |
| July | 118.4 | 0.0 | 118.4 |
| August | 130.4 | 0.0 | 130.4 |
| September | 127.5 | 0.1 | 127.6 |
| October | 124.0 | 2.9 | 126.9 |
| November | 93.8 | 26.2 | 118.4 |
| December | 48.6 | 86.0 | 123.4 |
| Total | 995.3 | 393.2 | 1,340.4 |

Source: ECCC (2022a)

For water balance modelling purposes, a wet annual precipitation condition (i.e., annual precipitation above the historic average) was simulated assuming 50% higher precipitation than the average year. Accordingly, the total annual precipitation for a wet year used in the water balance model is 2,010.6 mm. For context, the maximum annual precipitation on record based on the data from the Stephenville A weather station, for the period 1942 through 2022, is 1,660.5 mm.

3.4.2 Short Term Rainfall Events

Rainfall storm frequency values were taken from the short duration rainfall Intensity-Duration- Frequency (IDF) data derived by ECCC using recorded data at the Stephenville RCS (ID: 8403820) weather station (ECCC, 2022b). Stephenville RCS weather station was the only station evaluated with IDF data available. Storm durations under an hour for the 1 in 2 years and 1 in 100 years storm event were selected for design (Table 8). The storm intensities were adjusted for climate change using the IDF_CC Tool Version 6.5 developed by Western University Facility for Intelligent



Decision Support and Institute for Catastrophic Loss Reduction (Simonovic et al, 2015). The most severe climate change scenario, SSP5.85, was selected over the period of 2023–2053 resulting in an average intensity increase of 8% and 19% for the 2-year and 100-year storm, respectively.

Table 8: Summary of Intensity-Duration-Frequency for the Stephenville RCS Weather Station With and Without Climate Change Impacts

| Duration (min) | Historic IDF Intensity (mm/hr) | | Climate Impact SSP5.85 (2023-2053) Intensity (mm/hr) | |
|----------------|--------------------------------|----------------|--|----------------|
| | 2-Year Storm | 100-Year Storm | 2-Year Storm | 100-Year Storm |
| 5 | 52.79 | 141.07 | 56.72 | 162.17 |
| 10 | 39.00 | 108.15 | 41.82 | 127.9 |
| 15 | 32.97 | 85.48 | 35.45 | 100.78 |
| 30 | 23.12 | 63.49 | 24.83 | 73.66 |
| 60 | 16.54 | 38.54 | 17.81 | 45.72 |

Source: ECCC (2022b) and Simonovic (2015)

3.4.3 Evaporation

No ECCC-operated weather station measuring evaporation data was available within proximity to the Project site. Long-term temperature data was used from the Stephenville A weather station to characterize average monthly potential evapotranspiration conditions at the site using the Thornthwaite method (*Table 9*).

Table 9: Estimated Monthly and Annual Potential Evapotranspiration (ECCC 2022b)

| Month | Estimated Monthly Potential Evapotranspiration |
|----------|--|
| January | 0.0 |
| February | 0.0 |
| March | 0.4 |
| April | 15.7 |
| May | 55.2 |



| | |
|--------------|--------------|
| June | 88.1 |
| July | 116.3 |
| August | 108.1 |
| September | 71.0 |
| October | 38.9 |
| November | 12.0 |
| December | 0.8 |
| Total | 507.5 |

4 Water Management Design

This plan aims to provide guidance for the work to manage water for the Early Works at the Site with the objective to reduce or eliminate any impacts on the adjoining lands and receiving waters downstream of the early works program. It will reduce, where possible, the entry of unwanted water into the work area and divert it into the natural environment. It will manage on-site waters to aid construction and provide TSS settlement before it leaves the Site.

Several types of water are identified and will be discussed separately below. They are:

- Overland flow - water that naturally flows overland toward the Site and will be diverted away where possible.
- Site construction water - approximately 39 ha will be cleared to enable earth moving to take place. About 30% of the Site is classified as wetlands. Both surface and seepage water will require controlling during the Early Works program.
- Post construction water - immediately after Site construction, significant soil will be exposed. Drainage systems made to facilitate the construction must be aligned with proposed permanent drainage to ensure continuity throughout the process. Permanent ditching and settling basins will be installed to provide settlement of TSS.
- Toe of slope seepage water - relatively deep excavations will be required to construct the terrace (10 m max). Seepage from the expected till soil is expected and will be controlled by ditches at toe of the slope. Any seepage occurring higher up on the slopes will be controlled by filter blankets and riprap leading down to the toe ditch.



Throughout the early works construction “Best Practices” will be employed. Some of these practices are suggested in the “Prime Guidelines from DFO - Best Management Practices for Protection of Fish Habitat in Newfoundland and Labrador” (DFO, 2022).

Previous work for water management has been provided by SLR and Halyard for the site hydrology and preliminary design of ditches, settling ponds, etc. These reports are attached in Appendix B.

4.1 Off-Site Water Management

Off-site water is defined as water existing or flowing in natural catchments or overland flow. Some of this water flows naturally downward toward and onto the Site. This water is not required for the operation of the Site therefore, it will be intercepted, where possible, by diversion ditches outside the proposed Site perimeter fence and directed into natural receiving areas or via existing ditches off-site. A review of data and photographs of the existing soil in the area shows that the natural till soil throughout the area is a mix of silt, sand, and gravel with varying amounts of small boulders, cobbles and clay size material. The grading of this material suggests that the exposed soil will “self armor” i.e. after initial erosion of the finer clay, silt and finer sand, the remaining gravel, cobbles, and small boulders will reduce further erosion.

There are several locations where water will be discharged from the ditches into the natural vegetation. These will be limited to low volume flows and will be located at several locations on the proposed ditches where grade conditions allow. Both off-site diversion ditches will lead to natural vegetation and will be a gradual blending of the ditch into the vegetation.

Locations discussed in Sections 4.1.1 refer to Figure 15.



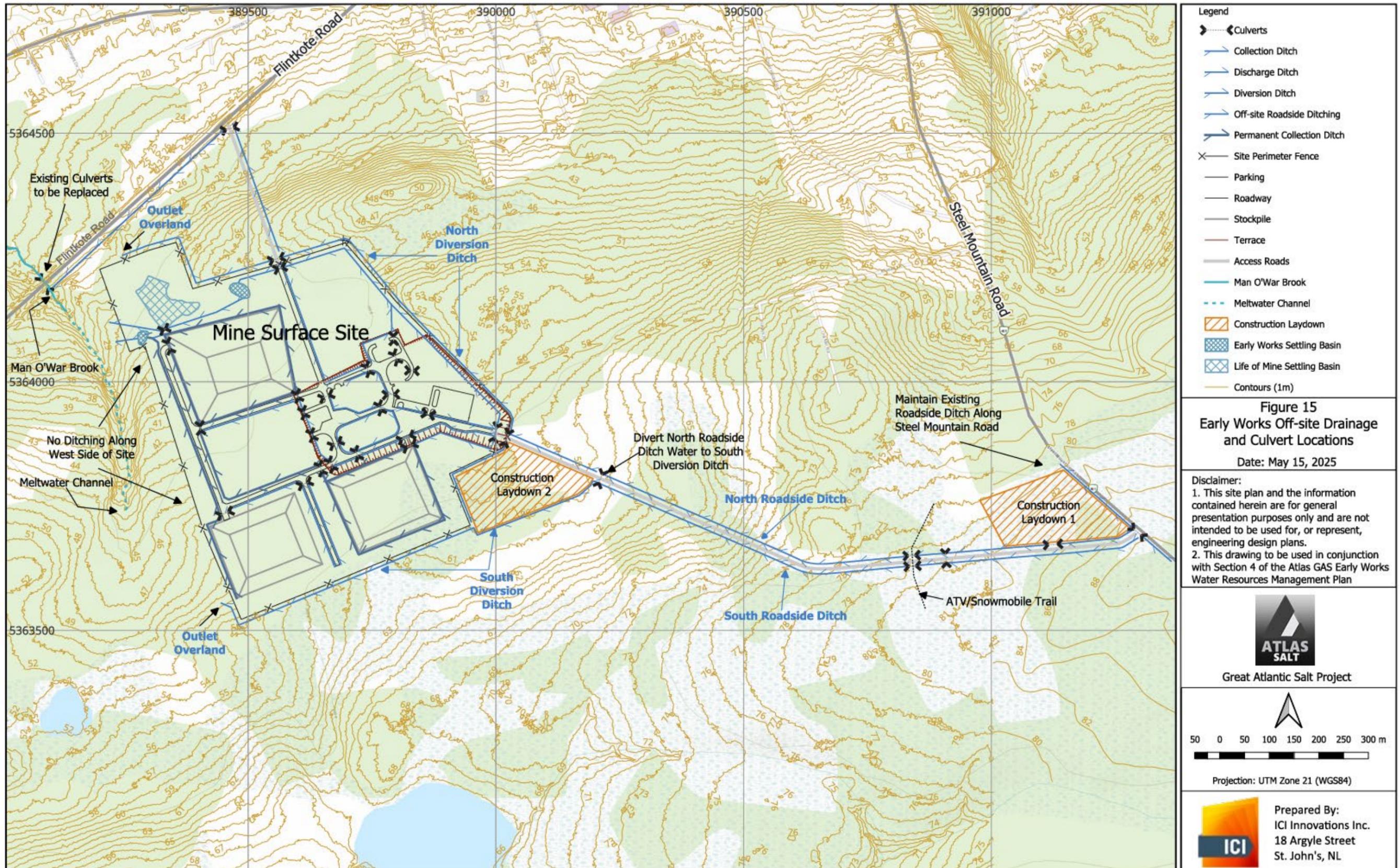


Figure 15: *Early Works Offsite Drainage and Culvert Location*



4.1.1 Off-Site Ditching

Off-site areas under consideration include all areas where access and preparation work will be performed outside the “Site” perimeter fencing/berm. These areas are outlined below.

4.1.1.1 *Laydown Area 1*

At Laydown area 1 there is already an existing roadside ditch adjacent to Steel Mountain Road (Route 461). This ditch will be maintained as per present design and cleaned out as necessary. No access directly from Steel Mountain Road to Laydown Area 1 is planned, with access only from the Primary Access Road. Note that the proposed Laydown area 1 will be constructed by grubbing existing vegetation and unsuitable soil and placing on the natural ground surface a minimum of 0.45 m of Class B material finished to a grade of ~1% downward towards the north and west away from Steel Mountain Road. Runoff from this Site will directly enter the adjoining undergrowth without the use of ditches.

4.1.1.2 *Laydown Area 2*

Laydown area 2 is located immediately adjacent to the Site on the south side of the Primary Access Road. Note that this proposed laydown area will be constructed by grubbing existing vegetation and unsuitable soil and placing on the natural ground surface a minimum of 0.45 m of Class B material finished to a grade of 1% downward towards the north and west towards the Site. Surface runoff from this area will run onto the Site and be collected with on-site ditches.

4.1.1.3 *Flintkote Road (south side only)*

The roadside ditch from the Secondary Access Road will join the existing ditch on the south side of Flintkote Road. Grading on this ditch will be checked and regraded where necessary to ensure drainage flows towards Man O'War Brook. The ditch will be rehabilitated where necessary to ensure no obstructions or excessive vegetation restricts efficient flow.



4.1.1.4 *Primary Access Road Ditches*

The Primary Access Road will be approximately 1.3 km long and will traverse a side hill and shallow valley. Where practical, roadside ditches along both sides of the road will discharge overland into natural vegetation. Three of these locations have been identified from the contour maps. Cross drainage culverts will be installed across the access road at these locations to divert any flow from the north side of the road to the south. Near the Site boundary, at Construction Laydown Area 1, both ditches will end and connect into the diversion ditch south of the Site (Diversion Ditch 1). Grubbing for this road will be completed with waste material wind-rowed adjacent to road. Catchment areas are low near the Primary Access Road, and shallow roadside ditches as described in the SLR report (Appendix A) will be sufficient.

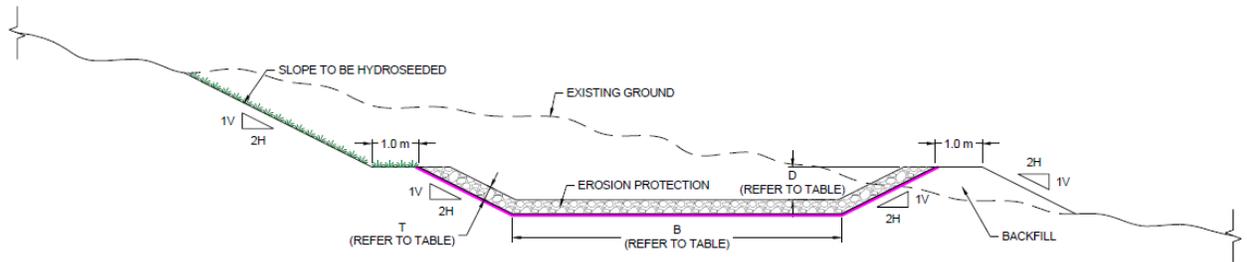
4.1.1.5 *Diversion Ditches*

Two diversion ditches are planned to cut off and divert water away from the Site. These ditches will be shallow, generally less than one metre deep, with the excavated material mounded on the ditch sides and flattened (Figure 16 as taken from Appendix B).

Diversion Ditch 1 will join the South Roadside Ditch just east and adjacent to the proposed Laydown 2. It will lead along the south side of Laydown 2 and the South Boundary of the Site. It will empty overland into existing vegetation approximate 75 m north along the West Boundary.

Diversion Ditch 2 will incorporate approximately 150 m of the north side of the Primary Access Road and lead around the east and north sides of the Site. This ditch will end in the lower elevations near the northwest area of the Site and empty overland into existing vegetation.





**DITCH TYPICAL CROSS-SECTION
RIPRAP EROSION PROTECTION**

Figure 16: Diversion Ditch Design (Appendix B)

4.2 On-Site Water Management

It is the intention of the engineering team that the whole Site will be cleared of organic material and stored on the organics stockpile for future reclamation efforts. An area of approximately 39 ha has been identified to be cleared. Early works drainage ditch construction must take into consideration the final collection (conveyance) ditch design concepts and ensure that they are compatibly located to blend in with them.

Note that the final entrance to the Site is subject to change due to grading requirements for mine operations. Detailed engineering will confirm this. Assumptions made while preparing this section include:

- A. The elevation of the access road where it enters the Site is 58 m. This road will maintain a maximum grade of 2% until it reaches the southwest corner of Terrace 1 at finished elevation 48 m.
- B. The exact location of the Access Road on Site is subject to change and will most likely shift slightly toward the south to accommodate grades required for mine equipment operations at the Site.
- C. Four distinct terraces will be constructed on the Site:
 - a) Terrace 1 - a cleared and prepared area for industrial activities and operations buildings with completed highest elevation 48.61 m located just north of the proposed Maintenance/Truck Shop. This area will slope downward to 48.48 m at the southeast corner, 48.00 m at the southwest corner at the end of the Access Road, 48.08 m at the northwest corner and 48.13 at the northeast corner.



Proposed elevations are contained in Halyard's design brief, however, final grades will be determined during detailed engineering. This Site has an existing elevation differential of about 9 m with an elevation of 58 m on the southeast boundary down to 49 m on its northwest boundary area. Overall, Terrace 1 will be a trapezoidal shaped area that will be a bowl form with lowest elevations just northeast of the proposed 66kV Substation and the northwest corner. About 50% of Terrace 1 has an existing surficial classification of wetlands.

- b) Terrace 2 - a pad with storage capacity of 291,000 m³ will be constructed for Pre-production Stockpile. Upon completion of grubbing and soil removal, a bowl shaped and lined excavation into the existing soil will slope downward toward the northeast corner. Proposed elevations are contained in Halyard's design brief. This Site has an existing elevation differential of about 5 m with elevation 61 m on the south boundary down to elevation 56 m on its north boundary. Overall, Terrace 2 will be a rectangle shaped basin with lowest elevation at the northwest corner. About 40% of Terrace 2 has an existing surficial classification of wetlands.
- c) Terrace 3 - a pad with storage capacity of 187,000 m³ will be constructed to store organics. It is proposed that this area will be excavated down to elevation 53 on the southeast corner and to elevation 51 on the northwest corner. This site has an existing elevation differential of about 10 m with elevation 60 m on the southeast boundary area down to elevation 50 m on its northwest boundary area. Overall, Terrace 3 will be a trapezoidal shaped area with lowest elevations at the northwest corner. About 25% of Terrace 3 has a surficial classification of wetlands.
- d) Terrace 4 - a pad with storage capacity of 570,000 m³ will be constructed. Excavation grades for this area will be determined during final engineering design. This site has an existing elevation differential of about 14 m with an elevation of 48 m on the southeast boundary area down to 34 m on its northwest boundary area. Overall, Terrace 4 will be a trapezoidal shaped area with lowest elevations at the northwest corner. None of Terrace 4 has a surficial classification of wetlands.

Locations discussed in Sections 4.2.1 and 4.2.2 refer to Figure 17.



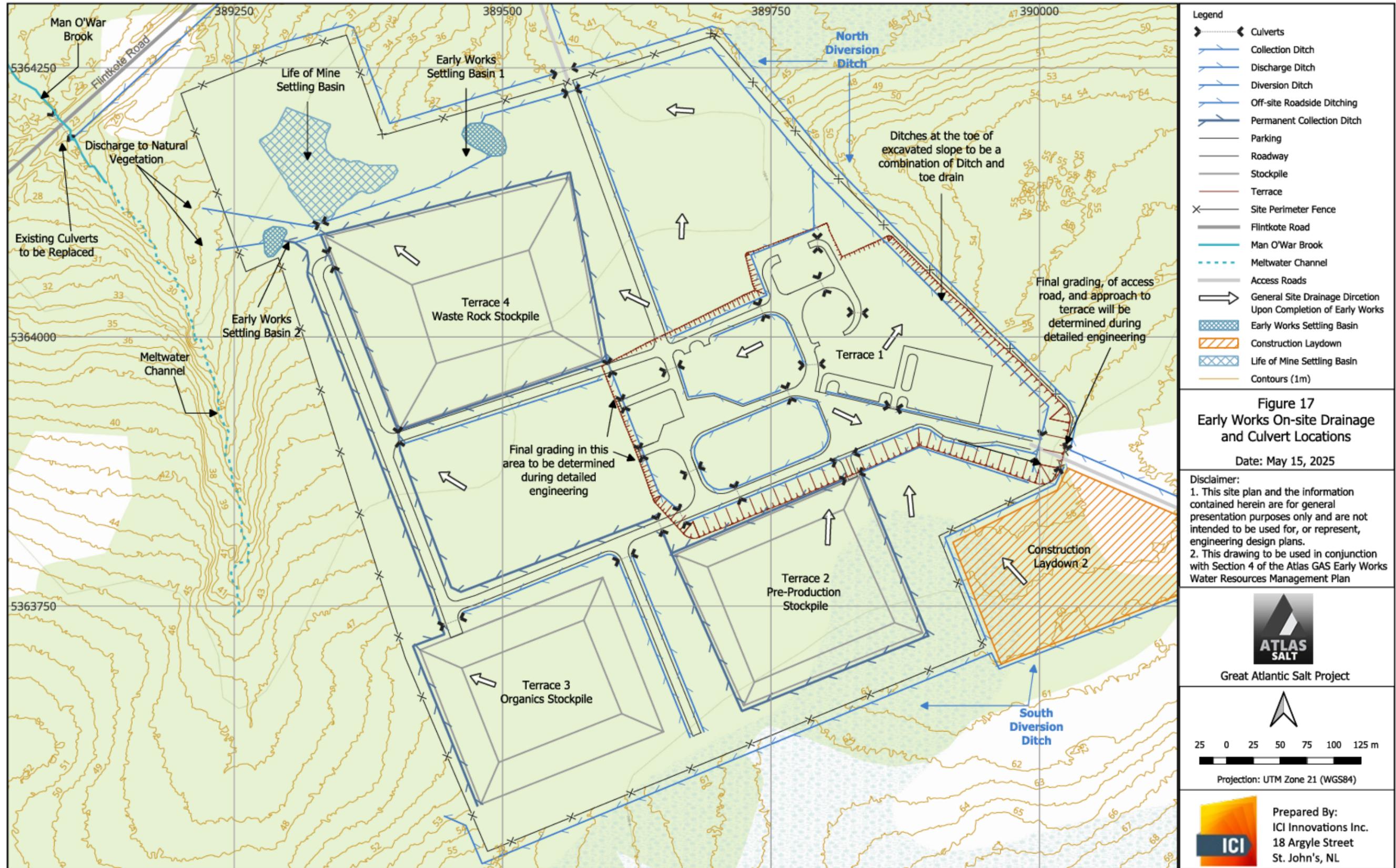


Figure 17: [Early Works Onsite Drainage and Culvert Location](#)



4.2.1 On-Site Drainage Ditching

Much of the Site will be initially wet as evidenced by the extensive wetlands that have been identified in the area. A review of the LiDAR imagery provided shows extensive bog or wetlands over about 1/3 of the Site. Development plans show that the main area to be excavated to create a flat surface, "Terrace 1" for mine surface facilities, will be located in an area at the southeast of the Site and has about 40% cover of wetlands. Nearby geotechnical borehole logs show about 1 m of "organics" may exist on those sites.

In order to reduce the impacts of water on construction activities and off-site impacts the following early construction ditching is proposed:

- As soon as practical, the perimeter diversion ditches will be constructed to reduce overland and other water entering the Site.
- Final engineering for Early Works must take into consideration that the location for the early works Site collection ditches will coincide with Site permanent collection ditches. Where possible the early ditches should match these final ditch locations.

4.2.2 Stripping and Excavation

The construction schedule indicates that the Site will be entered via the Main Access Road leading directly to the Box Cut area. To reduce the overland flow to the Site, the diversion ditches will be installed early in the construction schedule.

Construction ditches or swales will be provided to channel water away from active excavation areas and lead to temporary settling basins or discharge points.

It is probable that organic stripping and till removal will proceed at the same time. In that case the ditches must be maintained and carried down to the final lower elevations to ensure that areas being excavated remain as dry as possible to facilitate construction.

Culverts will be installed where construction haul roads cross these ditches so that equipment does not operate in flowing water. Where possible, tracked equipment will be used to reduce disturbance of the underlying till.

All Site construction water from disturbed areas will initially have elevated levels of total suspended solids (TSS). Two settling basins are proposed for



the northwest portion of the Site. All Site construction water will be directed to these basins for TSS removal.

4.3 Early Works Settling Basins

All surface water collected on the Project site for early works will be conveyed through two separate early works settling basins before being discharged into the natural environment. (see Figure 16 above). The settling basins will each flow through a low-level outlet constructed of cobbles and small boulders on natural soil and two conveyance ditches prior to discharge through existing vegetation before entering Man O'War meltwater channel.

The location of the settling basins will take advantage of the natural topography to maximize gravity drainage and facilitate the discharge through existing vegetation. Nearby geotechnical boreholes suggests that as much as 10 m of till may exist in this area. If the till blanket persists, then construction of the settling basins should be straightforward. This will allow for a reasonable depth of discharge ditches towards Man O'War meltwater channel. Side slopes within the early works settling basins will be formed from the natural till and will maintain a one vertical to two horizontal (1V:2H) for stability.

4.3.1 Early Works Basin Design

The hydraulic retention times from the SLR report indicated typical retention times to promote settling of solid particles in settling basins ranged from one to 3 days. Adequacy of retention times for life of mine settling basin will be determined during detailed engineering. For early works, two small settling basins and drainage channels will be excavated to direct surface water through natural vegetation.

4.3.2 Early Works Basin Discharge

An overflow section, lined with cobbles and small boulders for slope erosion protection, will be constructed at the outlet of Early Works Settling Basin 1 with discharge into a drainage channel before entry into natural vegetation. The drainage channel will be excavated into existing ground with silt fences constructed with filter fabric and/or straw bail structures installed in series along the channel for sediment control. Exact locations will be determined in the field. Early Works Settling Basin 2 will also have an overflow section, lined with cobbles and small boulders for slope



erosion protection, and will discharge through existing vegetation prior to entry into Man O'War meltwater channel. Location of Settling Basins and collection/conveyance ditches is shown in Figure 16.

4.4 Culverts

About 37 culverts will be provided for the early works for the project (See Figure 15 and 16 above). Specified culverts will provide cross drainage for the access road, at public road intersections, including the proposed ATV road crossing(s) and on-Site roads. During construction, the final culvert locations will be determined in the field to reflect existing site conditions.

Temporary culverts will also be installed early in the construction period to allow for construction equipment to pass without entering any flowing water.

The culverts were sized to convey the same design flow for the contact water ditches as indicated in the SLR report, assuming the use of high-density polyethylene (HDPE) circular pipes.

A preliminary table of culvert requirements is provided in Table 10 below.

Table 10: Culverts Required for Early Works

| Location | Diameter (mm)** | Length (m) | Number Required |
|--|------------------------|-------------------|------------------------|
| Intersection of Steel Mountain Road and Access Road* | 600 | 15 | 1 |
| Cross drainage along Access Road | 450 | 12 | 3 |
| Utility Service Road | 450 | 10 | 4 |
| Permanent site roads | 450 | 12 | 15 |
| Site construction roads - estimate | 450 | 12 | 10 |
| Intersection of Overland Feed Conveyor Road and Flintkote Road | 600 | 12 | 1 |
| Man O'War Brook at Flintkote Road** | 1500 | 15 | 2 |
| At proposed ATV trail(s) | 450 | 6 | 1 |

* The Government of Newfoundland and Labrador, Department of Transportation and Infrastructure have approved Provincial Road Access based on drawing (Figure 5 above) of the intersection of Steel Mountain Road (Route 461) and the Site Access Road. This drawing shows a proposed culvert location.

**Previously identified in the SLR report.



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