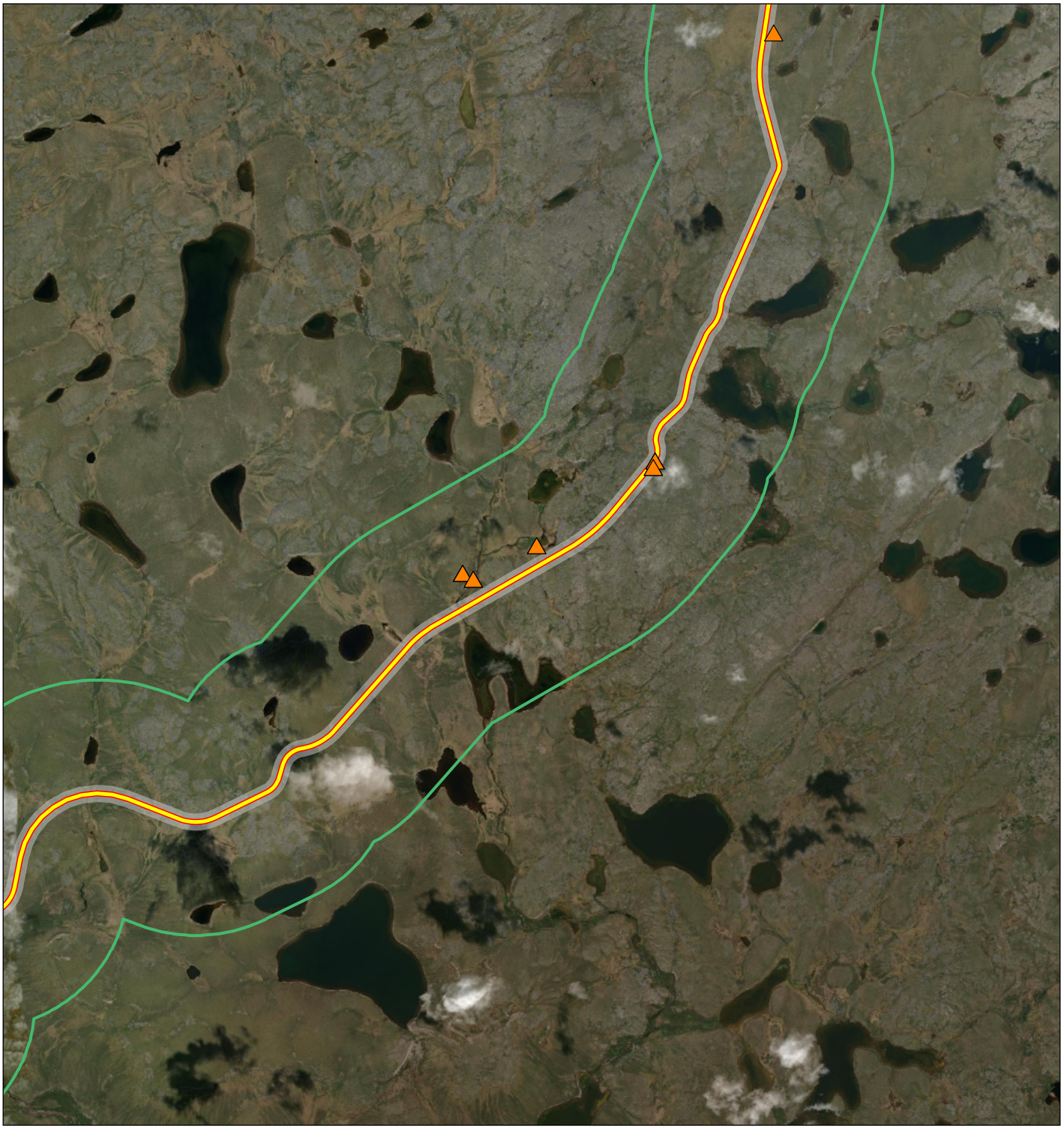
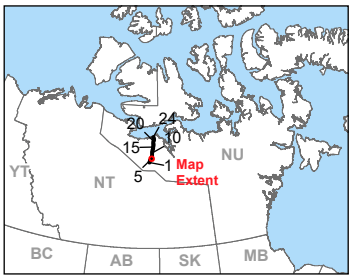




2024 SOCC Occurrence

- arctic dock
- Pumpelly's brome
- beach pea
- Historical SOCC Occurrence
- Local Assessment Area (LAA)
- Grays Bay Road

Project Development Area (PDA)

- Aerodrome
- Jericho Station
- Port (Landside Infrastructure)
- Port (Marine-based Infrastructure)
- Road
- Tibbitt to Contwoyto Winter Road

0 500 1,000 Metres

(At original document size of 8.5x11) 1:50,000

N

NUNAMI STANTEC LIMITED

WEST KITIKMEOT RESOURCES CORP

Project Location
Kitikmeot Region, Nunavut

Prepared by DSPRY on 2026-02-03
TR by SL on 2026-02-03

Client/Project
123514868_090

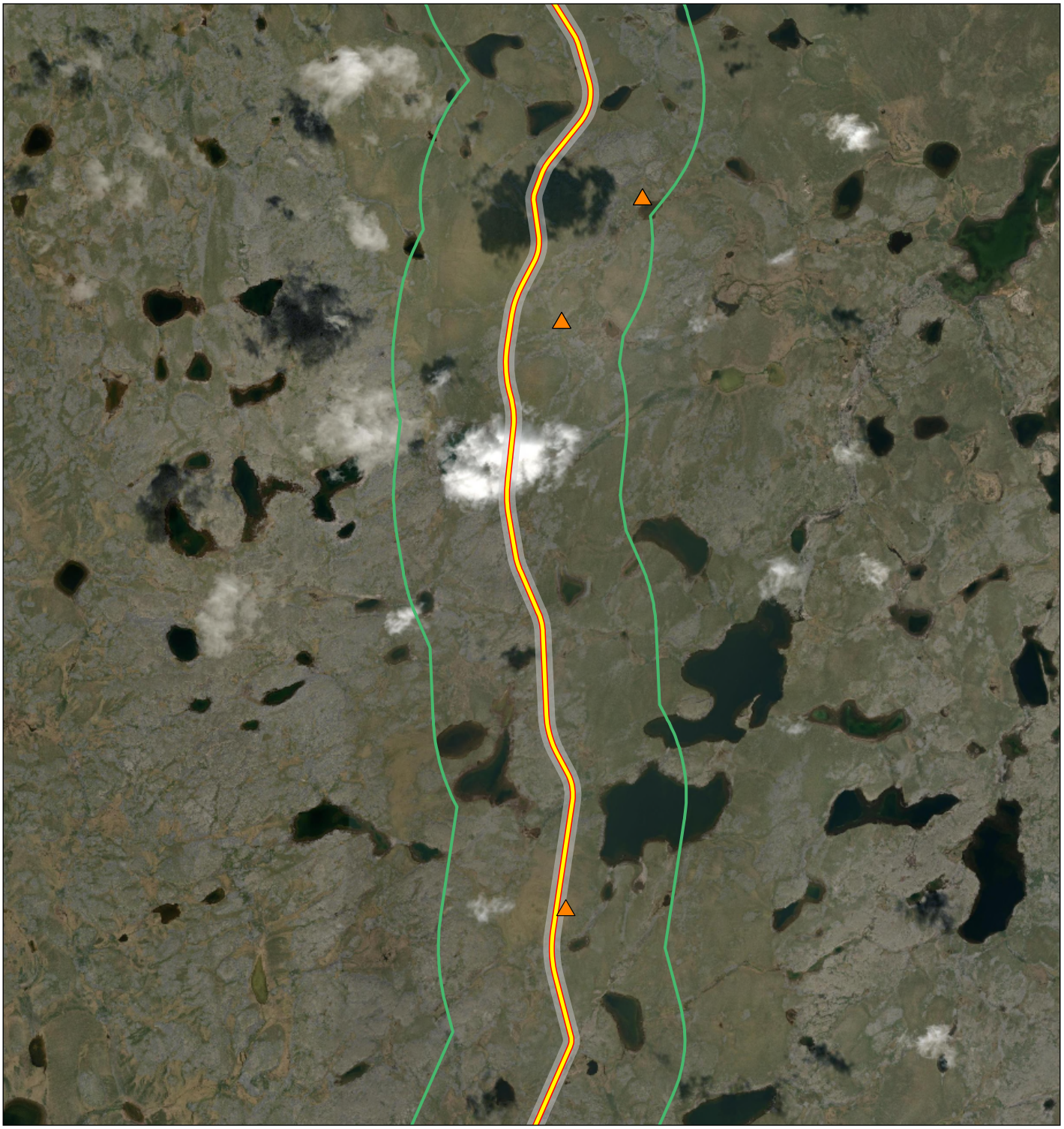
West Kitikmeot Resources Corp
Grays Bay Road and Port

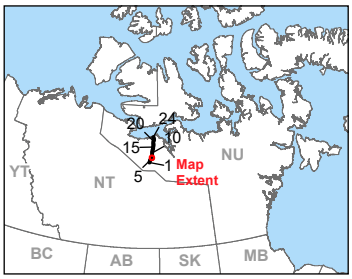
Figure No.
A.3

Title
Plant and Lichen SOCC Occurrences

Notes

1. Coordinate System: WGS 1984 UTM Zone 12N
2. Data Sources: Governments of Nunavut and Canada, Stantec, MMG
3. Service Layer Credits: World Imagery: Earthstar Geographics





2024 SOCC Occurrence

- arctic dock
- Pumpelly's brome
- beach pea
- Historical SOCC Occurrence
- Local Assessment Area (LAA)
- Grays Bay Road

Project Development Area (PDA)

- Aerodrome
- Jericho Station
- Port (Landside Infrastructure)
- Port (Marine-based Infrastructure)
- Road
- Tibbitt to Contwoyto Winter Road

0 500 1,000 Metres

(At original document size of 8.5x11) 1:50,000

N

NUNAMI STANTEC LIMITED

WEST KITIKMEOT RESOURCES CORP

Project Location
Kitikmeot Region, Nunavut

Prepared by DSPRY on 2026-02-03
TR by SL on 2026-02-03

Client/Project
123514868_090

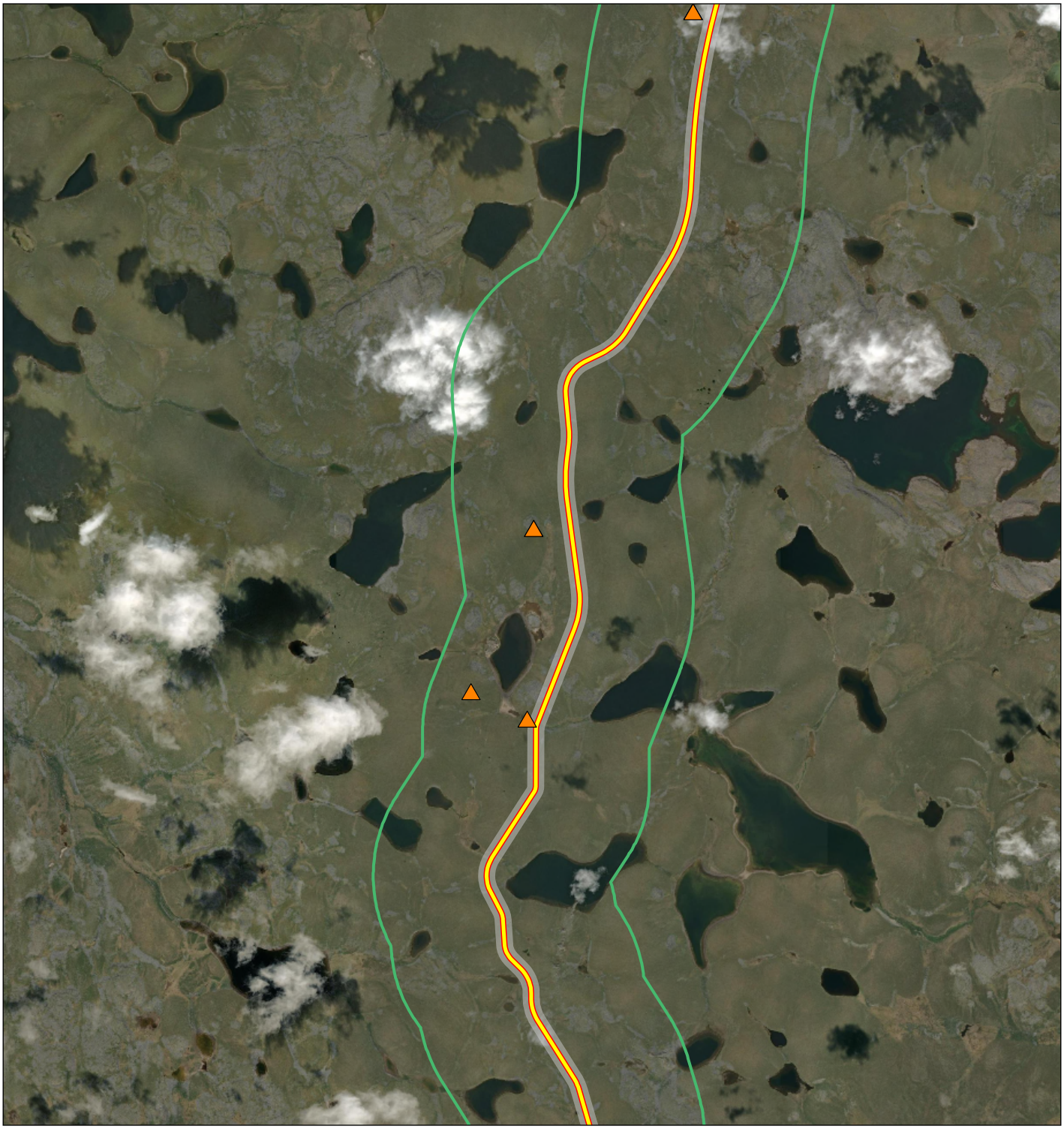
West Kitikmeot Resources Corp
Grays Bay Road and Port

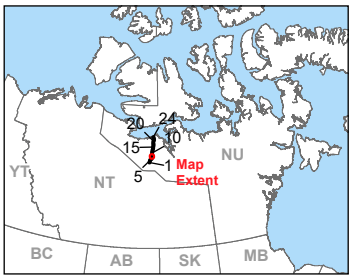
Figure No.
A.3

Title
Plant and Lichen SOCC Occurrences

Notes

1. Coordinate System: WGS 1984 UTM Zone 12N
2. Data Sources: Governments of Nunavut and Canada, Stantec, MMG
3. Service Layer Credits: World Imagery: Vantor





2024 SOCC Occurrence

- arctic dock
- Pumpelly's brome
- beach pea
- Historical SOCC Occurrence
- Local Assessment Area (LAA)
- Grays Bay Road

Project Development Area (PDA)

- Aerodrome
- Jericho Station
- Port (Landside Infrastructure)
- Port (Marine-based Infrastructure)
- Road
- Tibbitt to Contwoyto Winter Road

0 500 1,000 Metres

(At original document size of 8.5x11) 1:50,000

N

NUNAMI STANTEC LIMITED

WEST KITIKMEOT RESOURCES CORP

Project Location
Kitikmeot Region, Nunavut

Prepared by DSPRY on 2026-02-03
TR by SL on 2026-02-03

Client/Project
123514868_090

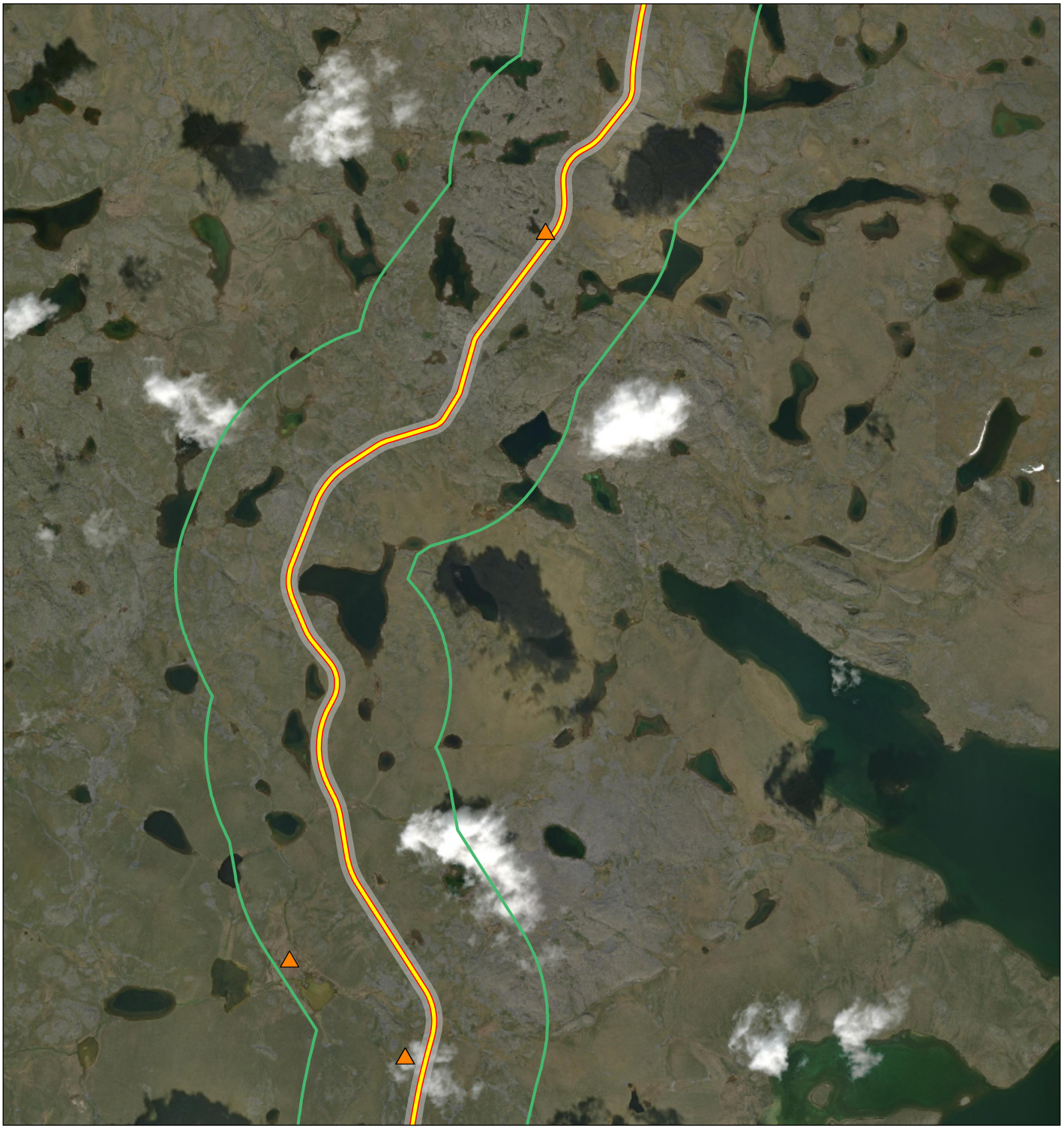
West Kitikmeot Resources Corp
Grays Bay Road and Port

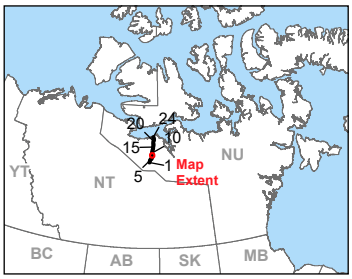
Figure No.
A.3

Title
Plant and Lichen SOCC Occurrences

Notes

1. Coordinate System: WGS 1984 UTM Zone 12N
2. Data Sources: Governments of Nunavut and Canada, Stantec, MMG
3. Service Layer Credits: World Imagery: Earthstar Geographics





2024 SOCC Occurrence

- arctic dock
- Pumpelly's brome
- beach pea
- Historical SOCC Occurrence
- Local Assessment Area (LAA)
- Grays Bay Road

Project Development Area (PDA)

- Aerodrome
- Jericho Station
- Port (Landside Infrastructure)
- Port (Marine-based Infrastructure)
- Road
- Tibbitt to Contwoyto Winter Road

0 500 1,000 Metres

(At original document size of 8.5x11) 1:50,000

N

NUNAMI STANTEC LIMITED

WEST KITIKMEOT RESOURCES CORP

Project Location
Kitikmeot Region, Nunavut

Prepared by DSPRY on 2026-02-03
TR by SL on 2026-02-03

Client/Project
123514868_090

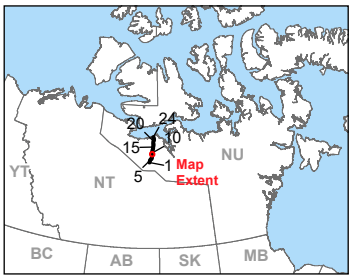
West Kitikmeot Resources Corp
Grays Bay Road and Port

Figure No.
A.3

Title
Plant and Lichen SOCC Occurrences

Notes

1. Coordinate System: WGS 1984 UTM Zone 12N
2. Data Sources: Governments of Nunavut and Canada, Stantec, MMG
3. Service Layer Credits: World Imagery: Earthstar Geographics



2024 SOCC Occurrence

- arctic dock
- Pumpelly's brome
- beach pea
- Historical SOCC Occurrence
- Local Assessment Area (LAA)
- Grays Bay Road

Project Development Area (PDA)

- Aerodrome
- Jericho Station
- Port (Landside Infrastructure)
- Port (Marine-based Infrastructure)
- Road
- Tibbitt to Contwoyto Winter Road

0 500 1,000 Metres

(At original document size of 8.5x11) 1:50,000

N

NUNAMI STANTEC LIMITED

WEST KITIKMEOT RESOURCES CORP

Project Location
Kitikmeot Region, Nunavut

Prepared by DSPRY on 2026-02-03
TR by SL on 2026-02-03

Client/Project
123514868_090

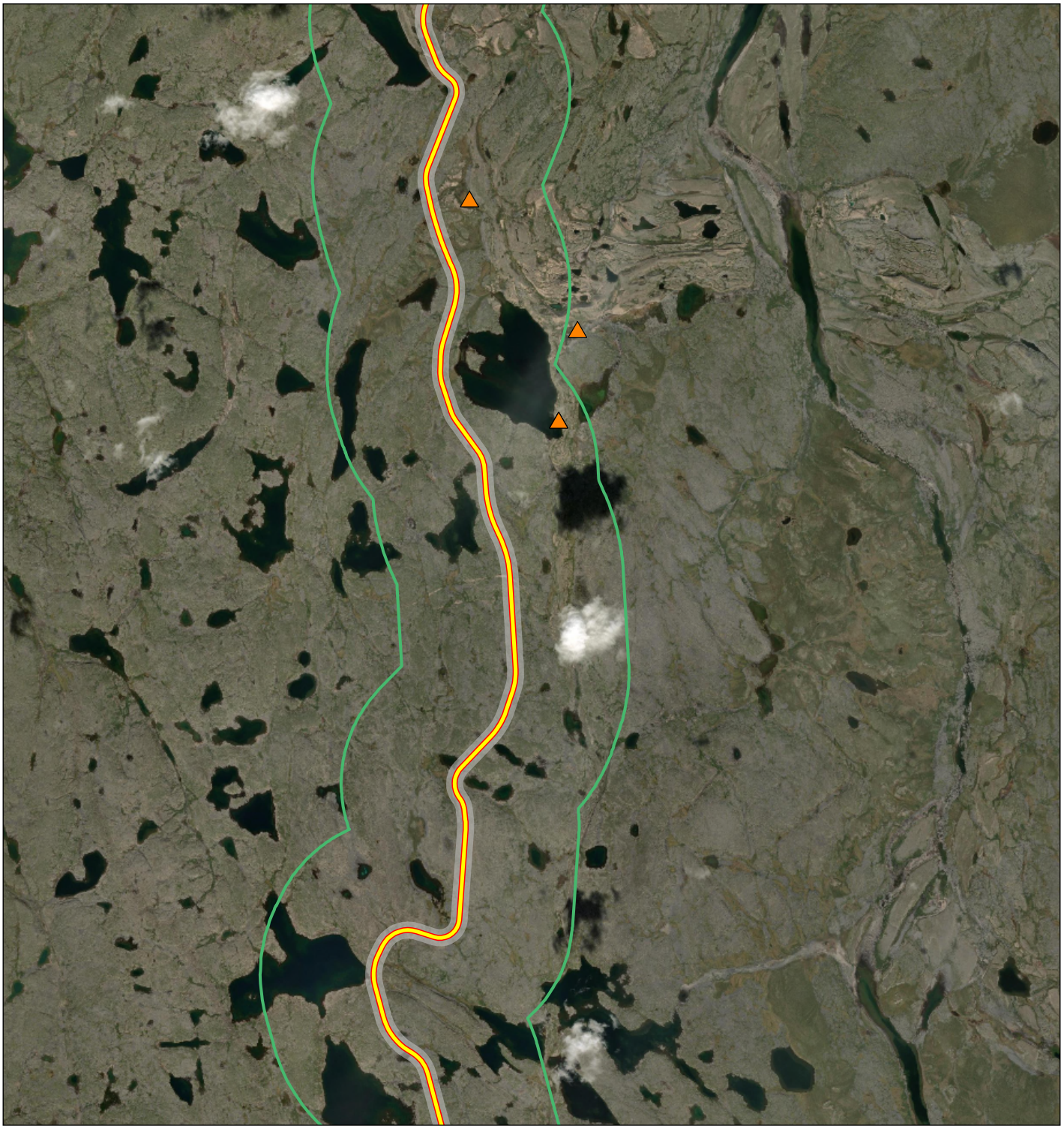
West Kitikmeot Resources Corp
Grays Bay Road and Port

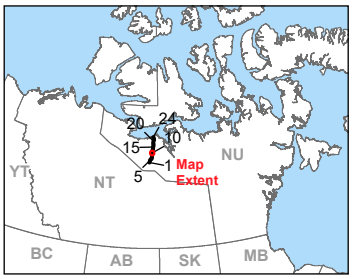
Figure No.
A.3

Title
Plant and Lichen SOCC Occurrences

Notes

1. Coordinate System: WGS 1984 UTM Zone 12N
2. Data Sources: Governments of Nunavut and Canada, Stantec, MMG
3. Service Layer Credits: World Imagery: Earthstar Geographics





2024 SOCC Occurrence

- arctic dock
- Pumpelly's brome
- beach pea
- Historical SOCC Occurrence
- Local Assessment Area (LAA)
- Grays Bay Road

Project Development Area (PDA)

- Aerodrome
- Jericho Station
- Port (Landside Infrastructure)
- Port (Marine-based Infrastructure)
- Road
- Tibbitt to Contwoyto Winter Road

0 500 1,000 Metres

(At original document size of 8.5x11) 1:50,000

N

NUNAMI STANTEC LIMITED

WEST KITIKMEOT RESOURCES CORP

Project Location
Kitikmeot Region, Nunavut

Prepared by DSPRY on 2026-02-03
TR by SL on 2026-02-03

Client/Project
123514868_090

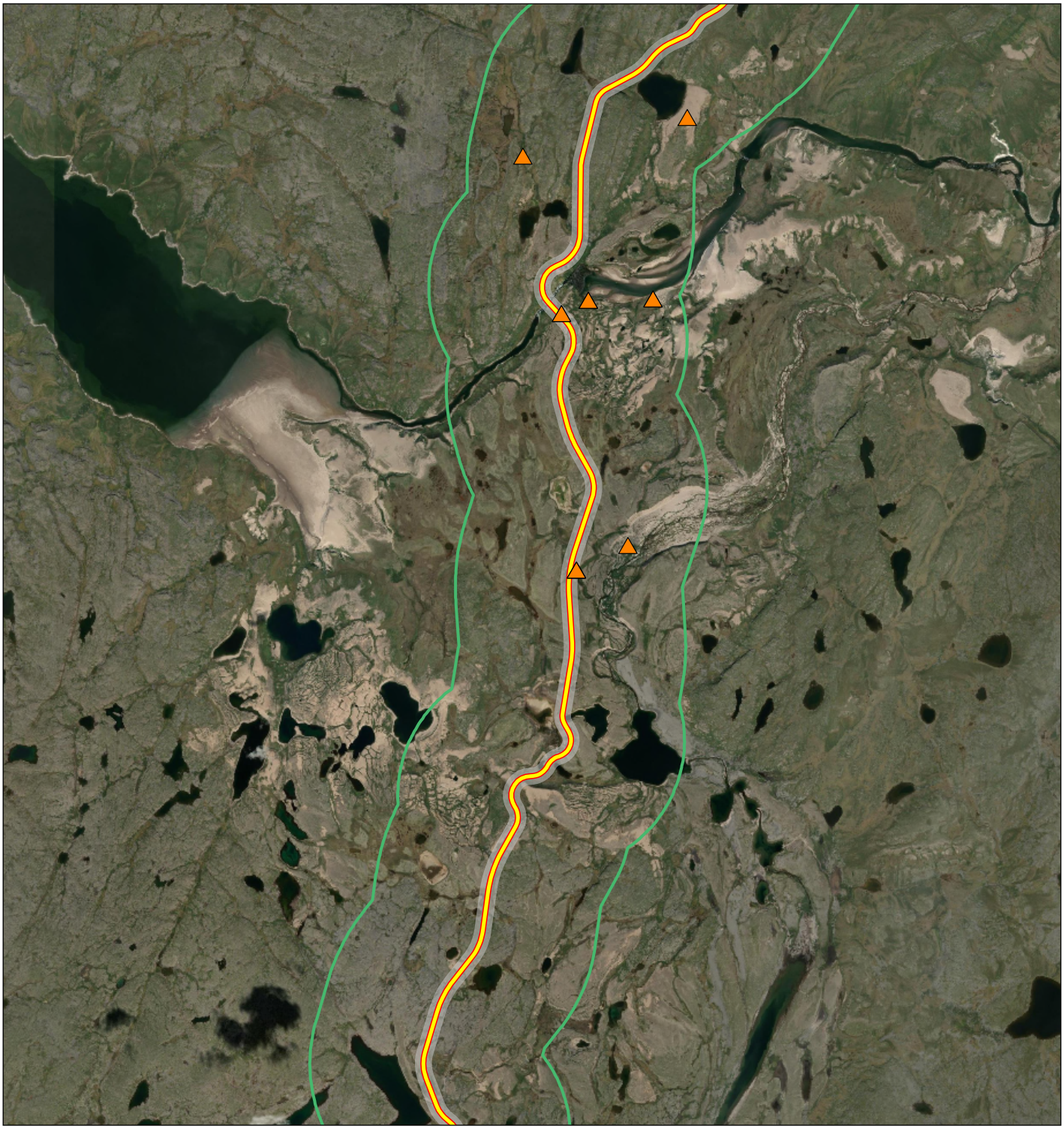
West Kitikmeot Resources Corp
Grays Bay Road and Port

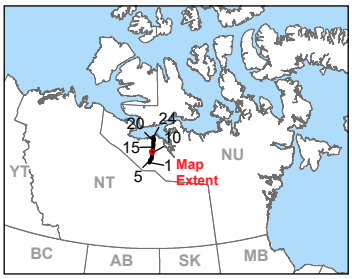
Figure No.
A.3

Title
Plant and Lichen SOCC Occurrences

Notes

1. Coordinate System: WGS 1984 UTM Zone 12N
2. Data Sources: Governments of Nunavut and Canada, Stantec, MMG
3. Service Layer Credits: World Imagery: Vantor





2024 SOCC Occurrence

- arctic dock
- Pumpelly's brome
- beach pea
- Historical SOCC Occurrence
- Local Assessment Area (LAA)
- Grays Bay Road

Project Development Area (PDA)

- Aerodrome
- Jericho Station
- Port (Landside Infrastructure)
- Port (Marine-based Infrastructure)
- Road
- Tibbitt to Contwoyto Winter Road

0 500 1,000 Metres

(At original document size of 8.5x11) 1:50,000

N

NUNAMI STANTEC LIMITED

WEST KITIKMEOT RESOURCES CORP

Project Location
Kitikmeot Region, Nunavut

Prepared by DSPRY on 2026-02-03
TR by SL on 2026-02-03

Client/Project
123514868_090

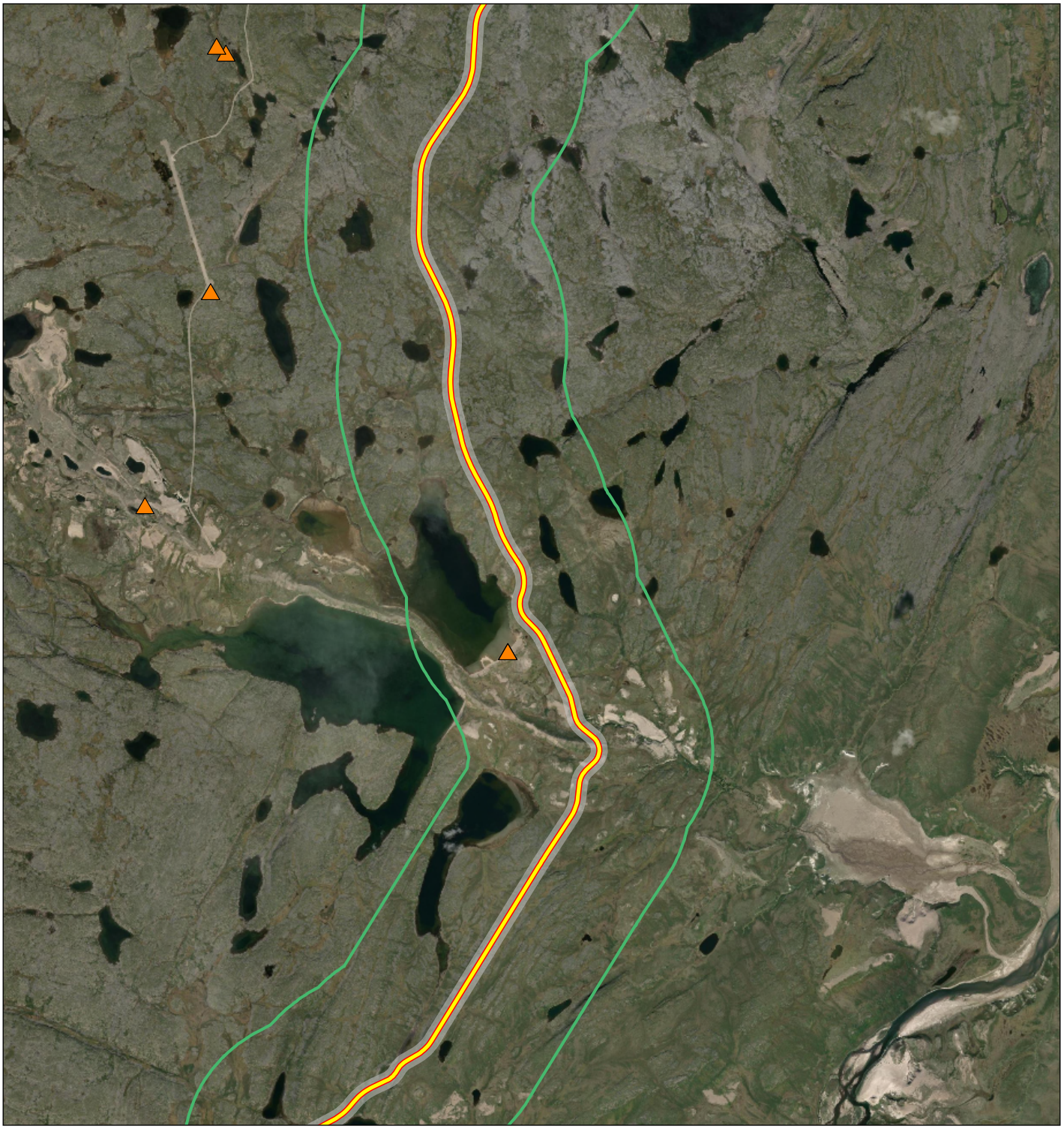
West Kitikmeot Resources Corp
Grays Bay Road and Port

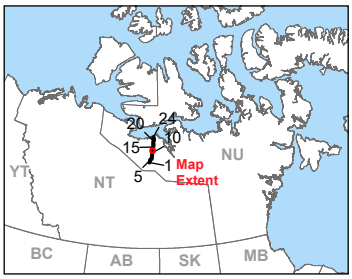
Figure No.
A.3

Title
Plant and Lichen SOCC Occurrences

Notes

1. Coordinate System: WGS 1984 UTM Zone 12N
2. Data Sources: Governments of Nunavut and Canada, Stantec, MMG
3. Service Layer Credits: World Imagery: Earthstar Geographics





2024 SOCC Occurrence

- arctic dock
- Pumpelly's brome
- beach pea
- Historical SOCC Occurrence
- Local Assessment Area (LAA)
- Grays Bay Road

Project Development Area (PDA)

- Aerodrome
- Jericho Station
- Port (Landside Infrastructure)
- Port (Marine-based Infrastructure)
- Road
- Tibbitt to Contwoyto Winter Road

0 500 1,000 Metres

(At original document size of 8.5x11) 1:50,000

N

Notes

1. Coordinate System: WGS 1984 UTM Zone 12N
2. Data Sources: Governments of Nunavut and Canada, Stantec, MMG
3. Service Layer Credits: World Imagery: Earthstar Geographics

NUNAMI STANTEC LIMITED

WEST KITIKMEOT RESOURCES CORP

Project Location
Kitikmeot Region, Nunavut

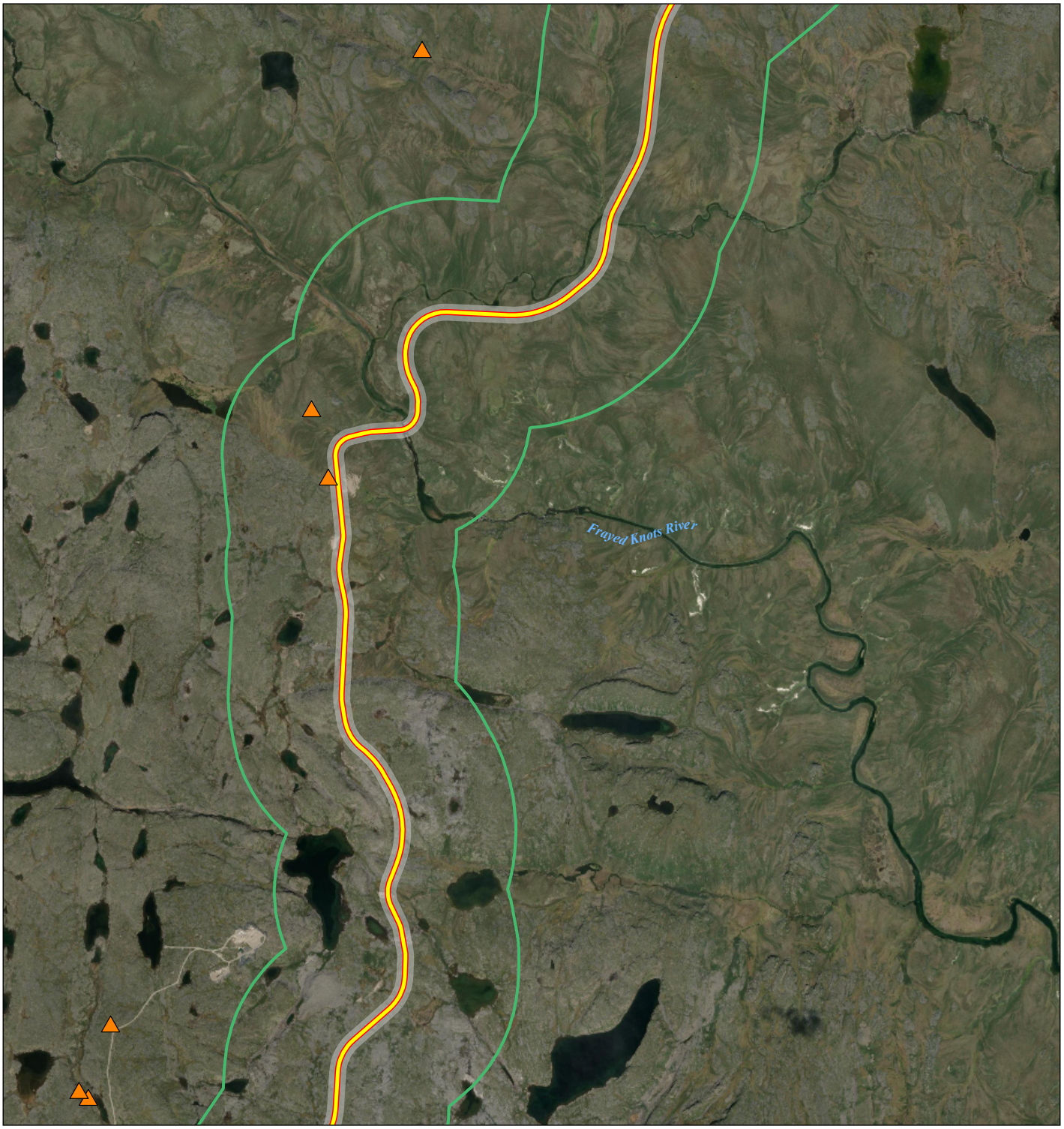
Prepared by DSPRY on 2026-02-03
TR by SL on 2026-02-03

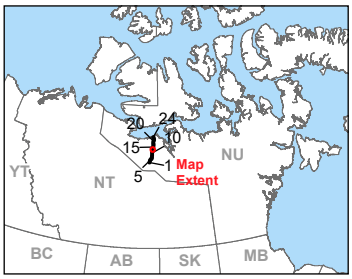
Client/Project
123514868_090

West Kitikmeot Resources Corp
Grays Bay Road and Port

Figure No.
A.3

Title
Plant and Lichen SOCC Occurrences





2024 SOCC Occurrence

- arctic dock
- Pumpelly's brome
- beach pea
- Historical SOCC Occurrence
- Local Assessment Area (LAA)
- Grays Bay Road

Project Development Area (PDA)

- Aerodrome
- Jericho Station
- Port (Landside Infrastructure)
- Port (Marine-based Infrastructure)
- Road
- Tibbitt to Contwoyto Winter Road

0 500 1,000 Metres

(At original document size of 8.5x11) 1:50,000

N

NUNAMI STANTEC LIMITED

WEST KITIKMEOT RESOURCES CORP

Project Location
Kitikmeot Region, Nunavut

Prepared by DSPRY on 2026-02-03
TR by SL on 2026-02-03

Client/Project
123514868_090

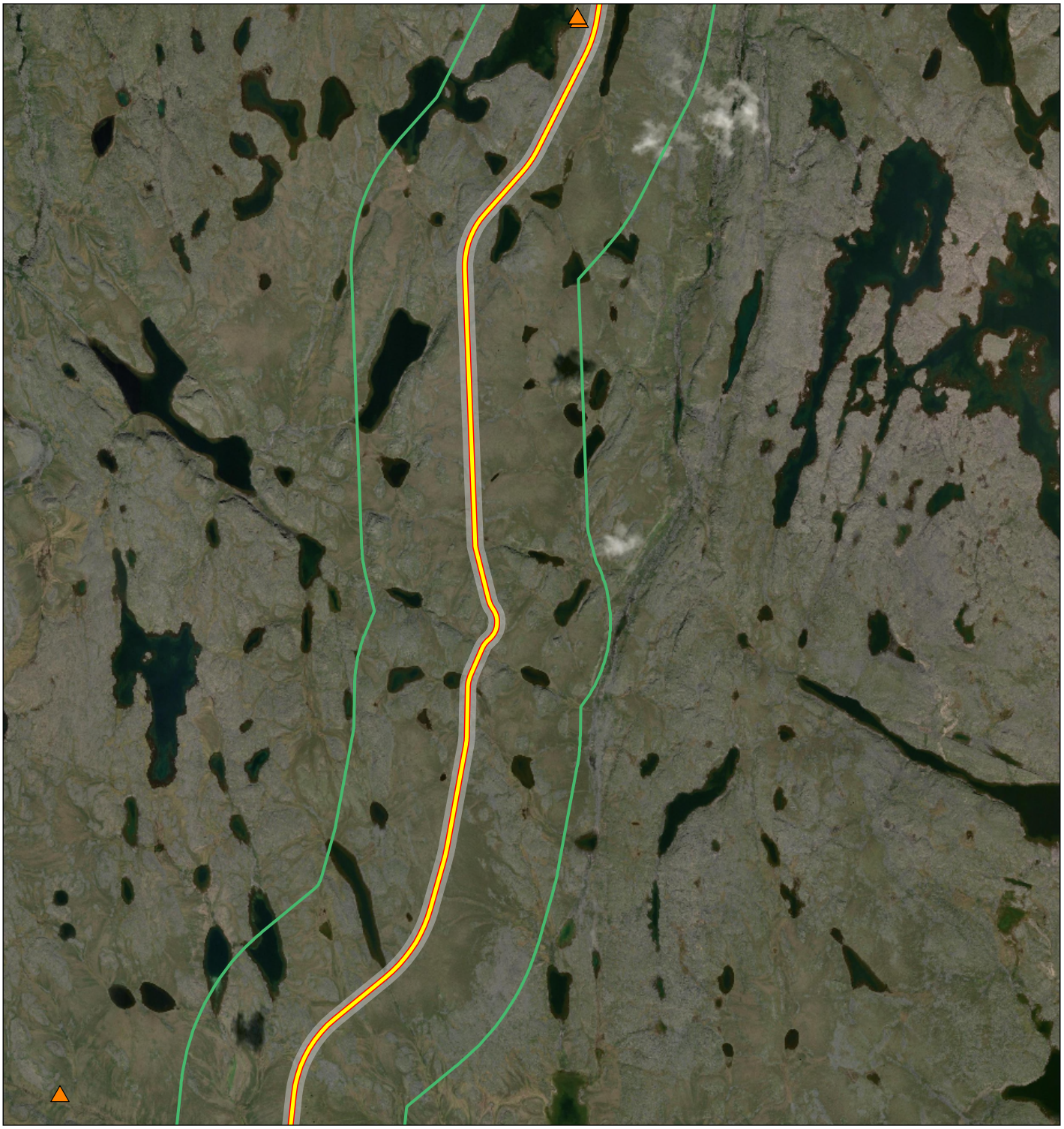
West Kitikmeot Resources Corp
Grays Bay Road and Port

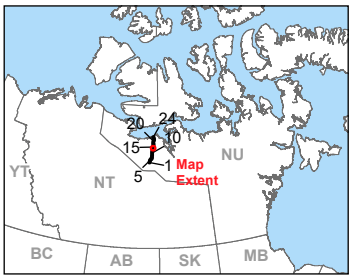
Figure No.
A.3

Title
Plant and Lichen SOCC Occurrences

Notes

1. Coordinate System: WGS 1984 UTM Zone 12N
2. Data Sources: Governments of Nunavut and Canada, Stantec, MMG
3. Service Layer Credits: World Imagery: Earthstar Geographics





2024 SOCC Occurrence

- arctic dock
- Pumpelly's brome
- beach pea
- Historical SOCC Occurrence
- Local Assessment Area (LAA)
- Grays Bay Road

Project Development Area (PDA)

- Aerodrome
- Jericho Station
- Port (Landside Infrastructure)
- Port (Marine-based Infrastructure)
- Road
- Tibbitt to Contwoyto Winter Road

0 500 1,000 Metres

(At original document size of 8.5x11) 1:50,000

N

NUNAMI STANTEC LIMITED

WEST KITIKMEOT RESOURCES CORP

Project Location
Kitikmeot Region, Nunavut

Prepared by DSPRY on 2026-02-03
TR by SL on 2026-02-03

Client/Project
123514868_090

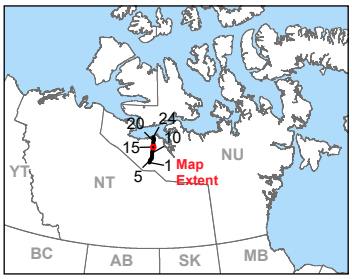
West Kitikmeot Resources Corp
Grays Bay Road and Port

Figure No.
A.3

Title
Plant and Lichen SOCC Occurrences

Notes

1. Coordinate System: WGS 1984 UTM Zone 12N
2. Data Sources: Governments of Nunavut and Canada, Stantec, MMG
3. Service Layer Credits: World Imagery: Earthstar Geographics



2024 SOCC Occurrence

- arctic dock
- Pumpelly's brome
- beach pea
- Historical SOCC Occurrence
- Local Assessment Area (LAA)
- Grays Bay Road

Project Development Area (PDA)

- Aerodrome
- Jericho Station
- Port (Landside Infrastructure)
- Port (Marine-based Infrastructure)
- Road
- Tibbitt to Contwoyto Winter Road

0 500 1,000 Metres

(At original document size of 8.5x11) 1:50,000

N

NUNAMI STANTEC LIMITED

WEST KITIKMEOT RESOURCES CORP

Project Location
Kitikmeot Region, Nunavut

Prepared by DSPRY on 2026-02-03
TR by SL on 2026-02-03

Client/Project
123514868_090

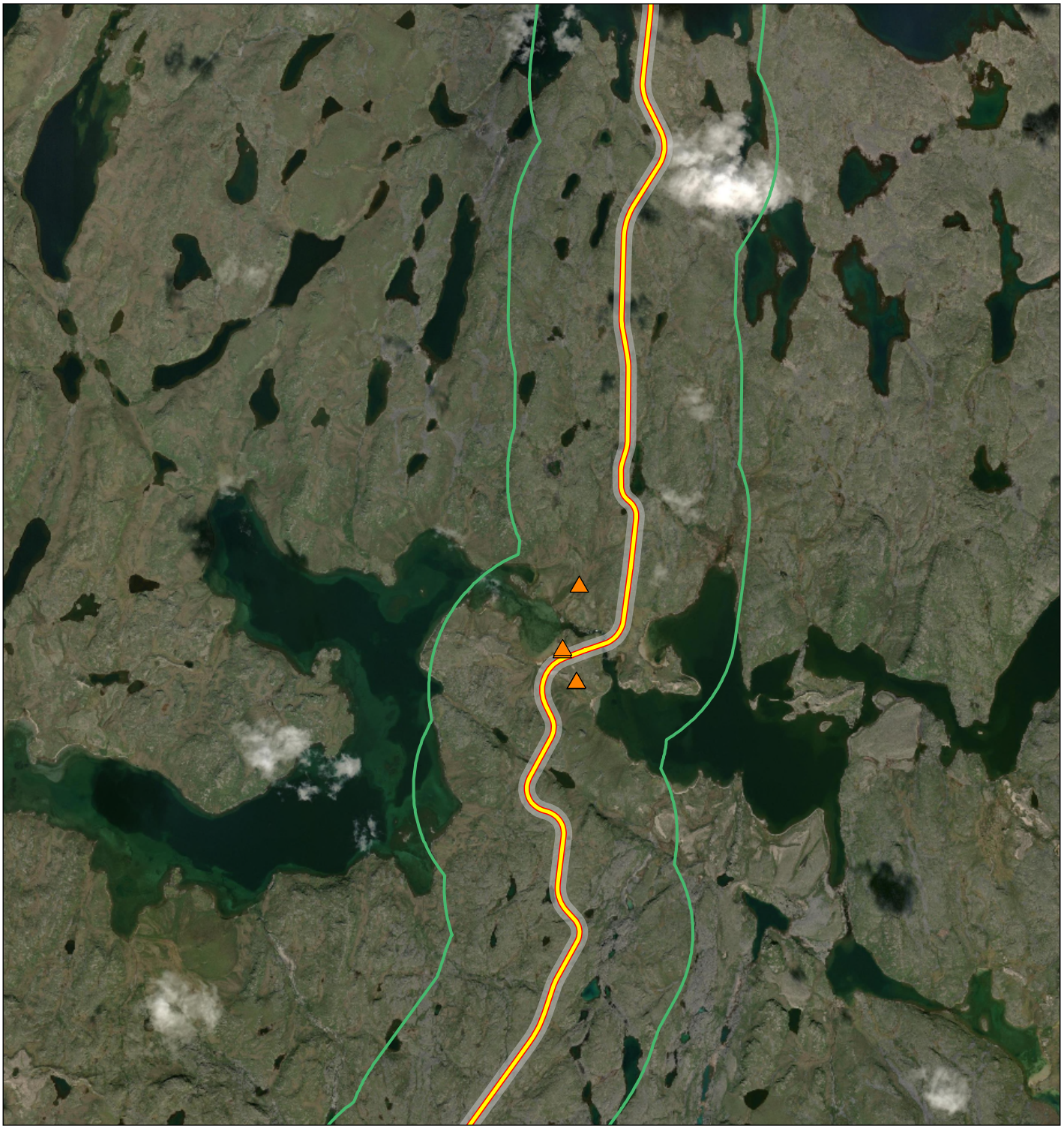
West Kitikmeot Resources Corp
Grays Bay Road and Port

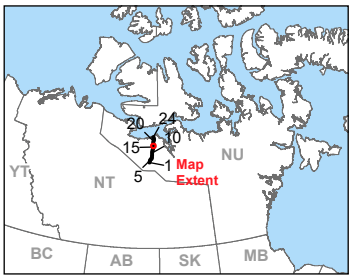
Figure No.
A.3

Title
Plant and Lichen SOCC Occurrences

Notes

1. Coordinate System: WGS 1984 UTM Zone 12N
2. Data Sources: Governments of Nunavut and Canada, Stantec, MMG
3. Service Layer Credits: World Imagery: Earthstar Geographics





2024 SOCC Occurrence

- arctic dock
- Pumpelly's brome
- beach pea
- Historical SOCC Occurrence
- Local Assessment Area (LAA)
- Grays Bay Road

Project Development Area (PDA)

- Aerodrome
- Jericho Station
- Port (Landside Infrastructure)
- Port (Marine-based Infrastructure)
- Road
- Tibbitt to Contwoyto Winter Road

0 500 1,000 Metres

(At original document size of 8.5x11) 1:50,000

N

NUNAMI STANTEC LIMITED

WEST KITIKMEOT RESOURCES CORP

Project Location
Kitikmeot Region, Nunavut

Prepared by DSPRY on 2026-02-03
TR by SL on 2026-02-03

Client/Project
123514868_090

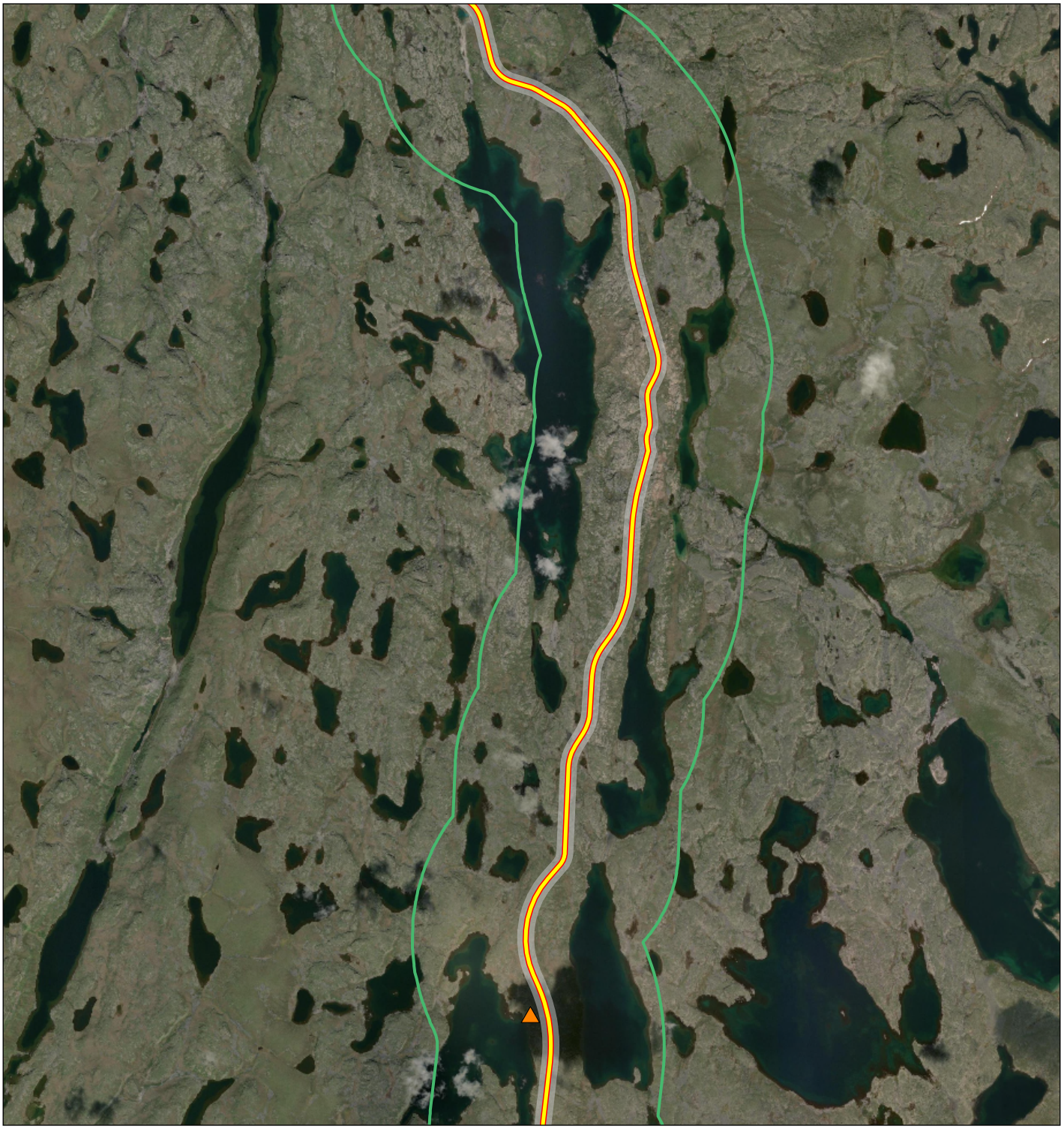
West Kitikmeot Resources Corp
Grays Bay Road and Port

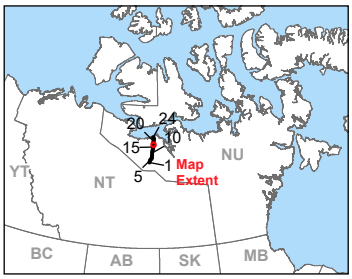
Figure No.
A.3

Title
Plant and Lichen SOCC Occurrences

Notes

1. Coordinate System: WGS 1984 UTM Zone 12N
2. Data Sources: Governments of Nunavut and Canada, Stantec, MMG
3. Service Layer Credits: World Imagery: Earthstar Geographics





2024 SOCC Occurrence

- arctic dock
- Pumpelly's brome
- beach pea
- Historical SOCC Occurrence
- Local Assessment Area (LAA)
- Grays Bay Road

Project Development Area (PDA)

- Aerodrome
- Jericho Station
- Port (Landside Infrastructure)
- Port (Marine-based Infrastructure)
- Road
- Tibbitt to Contwoyto Winter Road

0 500 1,000 Metres

(At original document size of 8.5x11) 1:50,000

N

NUNAMI STANTEC LIMITED

WEST KITIKMEOT RESOURCES CORP

Project Location
Kitikmeot Region, Nunavut

Prepared by DSPRY on 2026-02-03
TR by SL on 2026-02-03

Client/Project
123514868_090

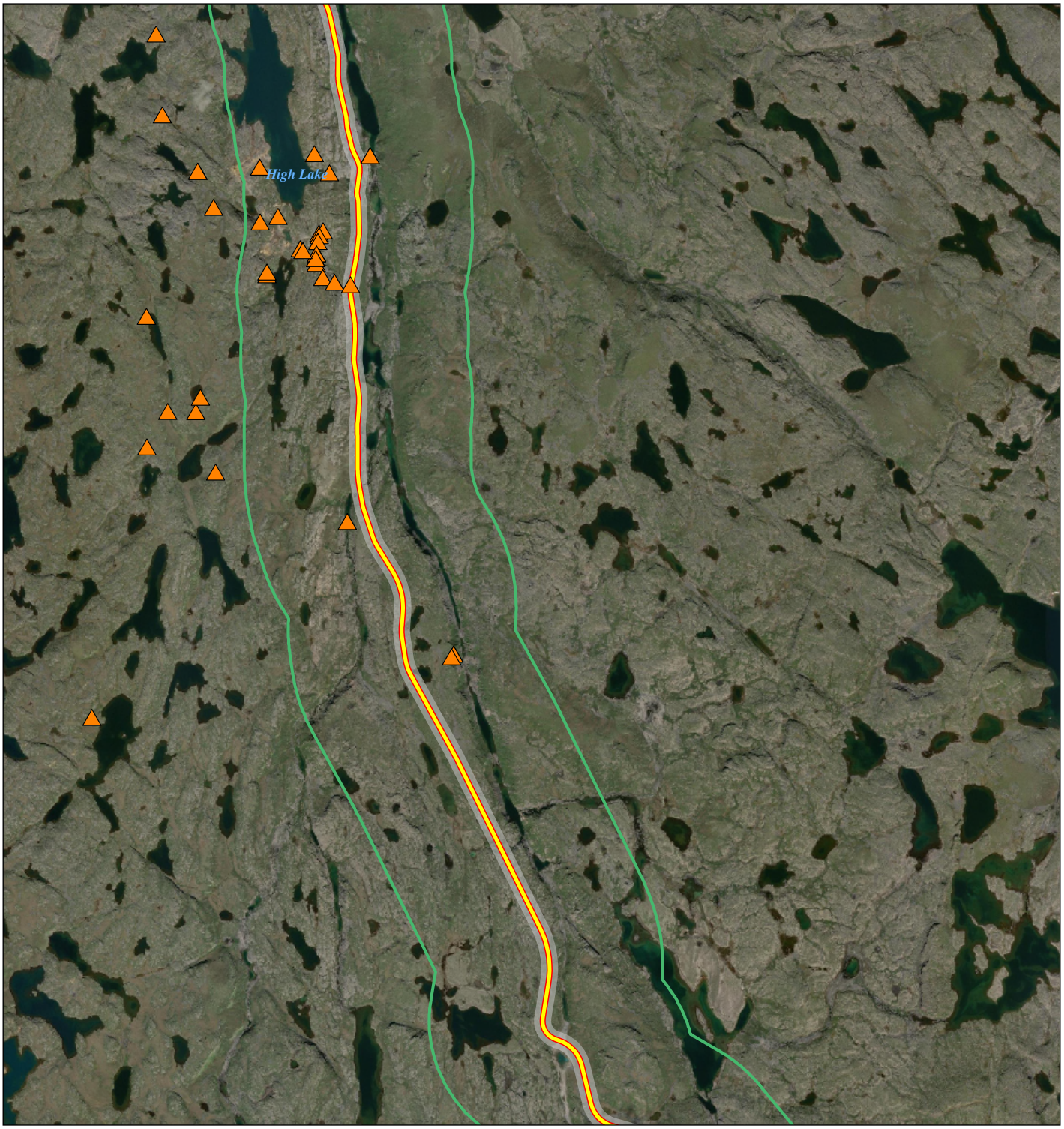
West Kitikmeot Resources Corp
Grays Bay Road and Port

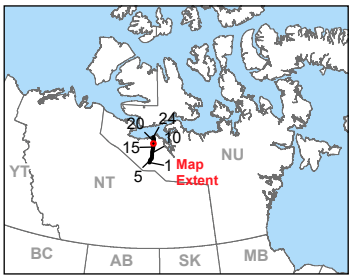
Figure No.
A.3

Title
Plant and Lichen SOCC Occurrences

Notes

1. Coordinate System: WGS 1984 UTM Zone 12N
2. Data Sources: Governments of Nunavut and Canada, Stantec, MMG
3. Service Layer Credits: World Imagery: Earthstar Geographics





2024 SOCC Occurrence

- arctic dock
- Pumpelly's brome
- beach pea
- Historical SOCC Occurrence
- Local Assessment Area (LAA)
- Grays Bay Road

Project Development Area (PDA)

- Aerodrome
- Jericho Station
- Port (Landside Infrastructure)
- Port (Marine-based Infrastructure)
- Road
- Tibbitt to Contwoyto Winter Road

0 500 1,000 Metres

(At original document size of 8.5x11) 1:50,000

N

NUNAMI STANTEC LIMITED

WEST KITIKMEOT RESOURCES CORP

Project Location
Kitikmeot Region, Nunavut

Prepared by DSPRY on 2026-02-03
TR by SL on 2026-02-03

Client/Project
123514868_090

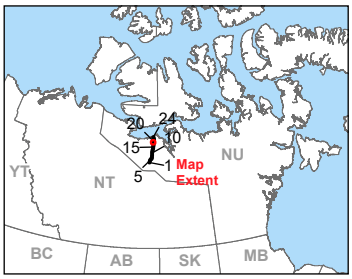
West Kitikmeot Resources Corp
Grays Bay Road and Port

Figure No.
A.3

Title
Plant and Lichen SOCC Occurrences

Notes

1. Coordinate System: WGS 1984 UTM Zone 12N
2. Data Sources: Governments of Nunavut and Canada, Stantec, MMG
3. Service Layer Credits: World Imagery: Earthstar Geographics



2024 SOCC Occurrence

- arctic dock
- Pumpelly's brome
- beach pea
- Historical SOCC Occurrence
- Local Assessment Area (LAA)
- Grays Bay Road

Project Development Area (PDA)

- Aerodrome
- Jericho Station
- Port (Landside Infrastructure)
- Port (Marine-based Infrastructure)
- Road
- Tibbitt to Contwoyto Winter Road

0 500 1,000 Metres

(At original document size of 8.5x11) 1:50,000

N

NUNAMI STANTEC LIMITED

WEST KITIKMEOT RESOURCES CORP

Project Location
Kitikmeot Region, Nunavut

Prepared by DSPRY on 2026-02-03
TR by SL on 2026-02-03

Client/Project
123514868_090

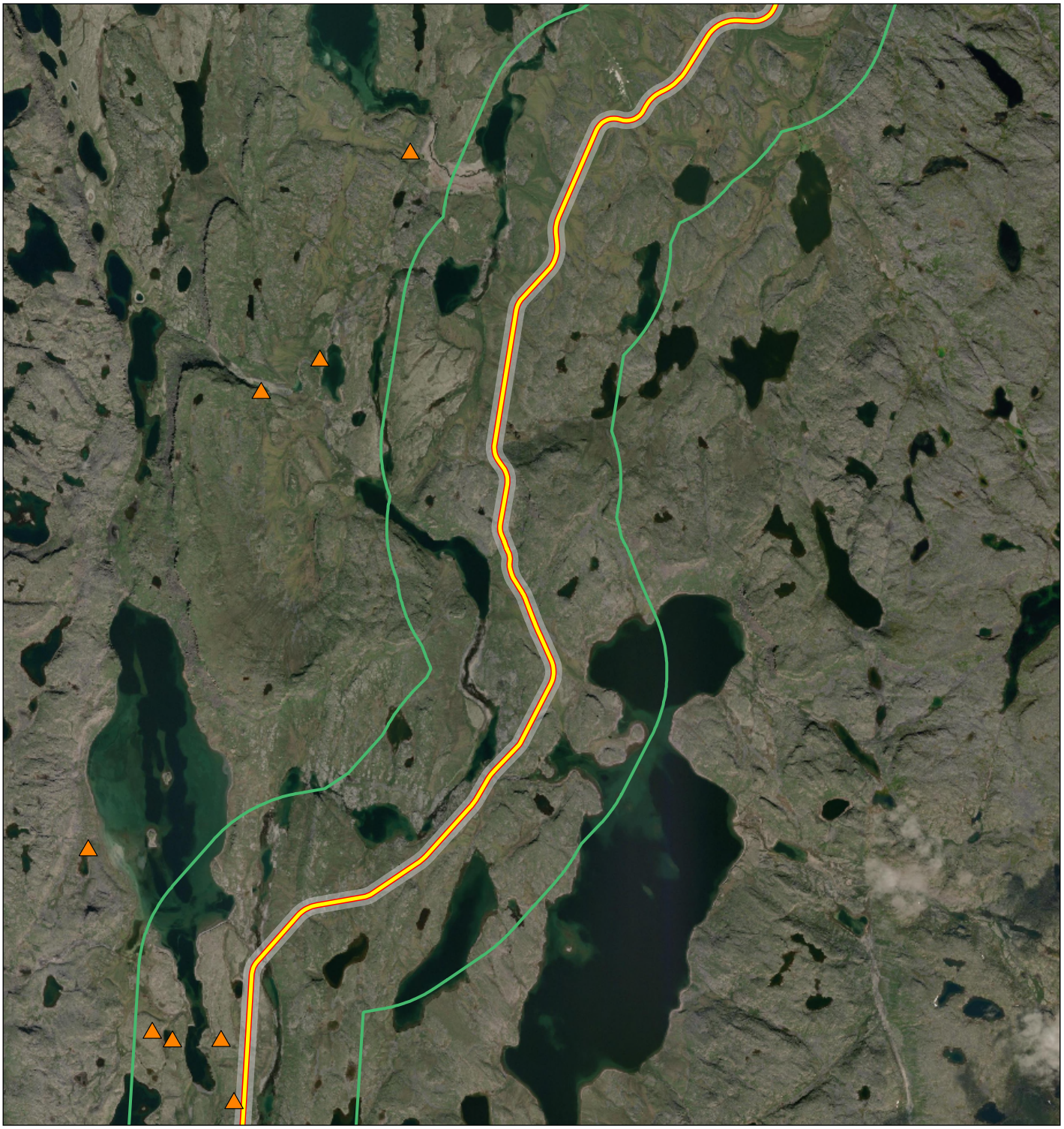
West Kitikmeot Resources Corp
Grays Bay Road and Port

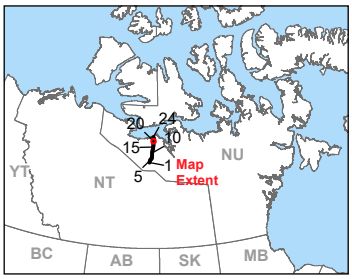
Figure No.
A.3

Title
Plant and Lichen SOCC Occurrences

Notes

1. Coordinate System: WGS 1984 UTM Zone 12N
2. Data Sources: Governments of Nunavut and Canada, Stantec, MMG
3. Service Layer Credits: World Imagery: Earthstar Geographics





2024 SOCC Occurrence

- arctic dock
- Pumpelly's brome
- beach pea
- Historical SOCC Occurrence
- Local Assessment Area (LAA)
- Grays Bay Road

Project Development Area (PDA)

- Aerodrome
- Jericho Station
- Port (Landside Infrastructure)
- Port (Marine-based Infrastructure)
- Road
- Tibbitt to Contwoyto Winter Road

0 500 1,000 Metres

(At original document size of 8.5x11) 1:50,000

N

NUNAMI STANTEC LIMITED

WEST KITIKMEOT RESOURCES CORP

Project Location
Kitikmeot Region, Nunavut

Prepared by DSPRY on 2026-02-03
TR by SL on 2026-02-03

Client/Project
123514868_090

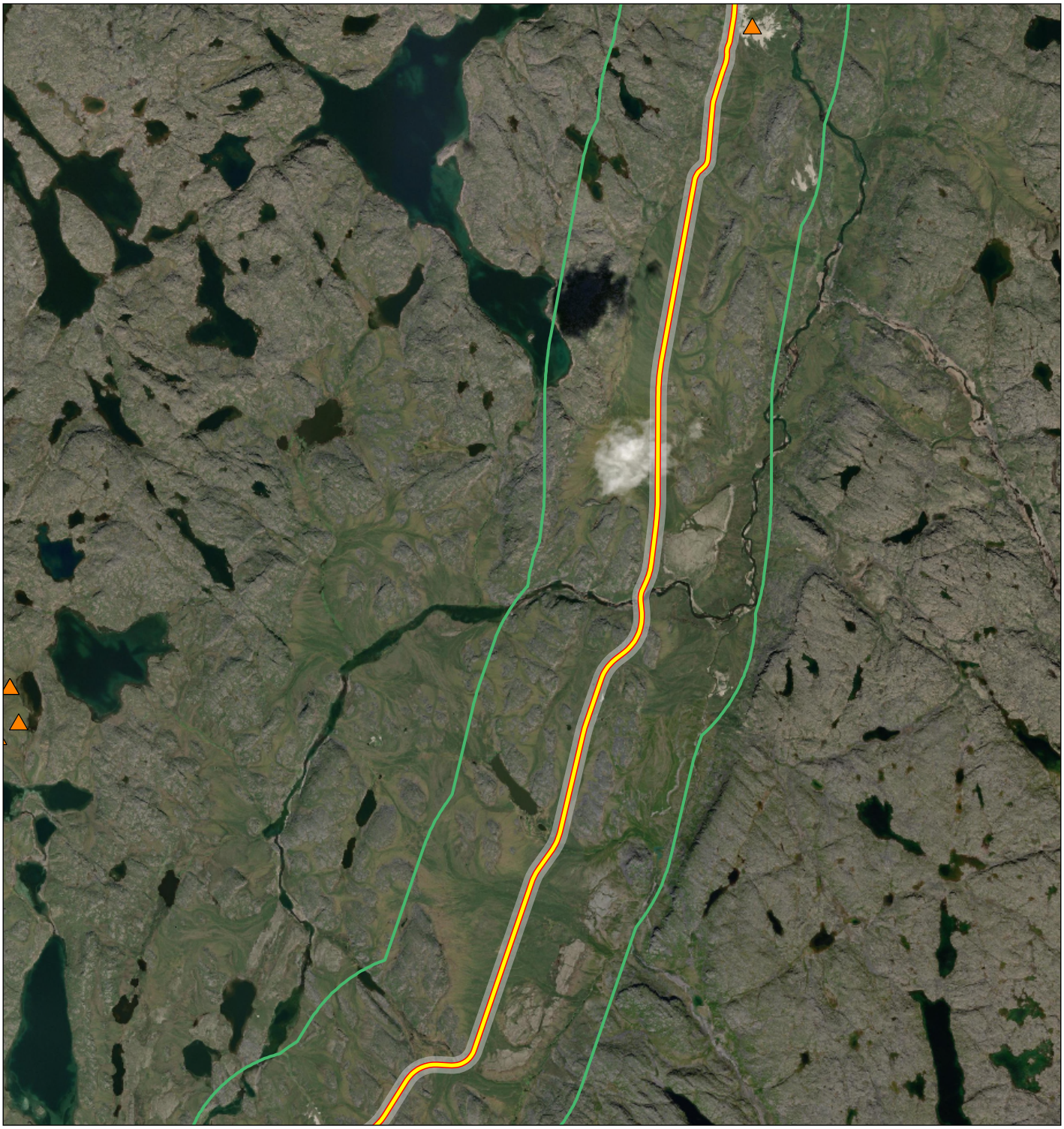
West Kitikmeot Resources Corp
Grays Bay Road and Port

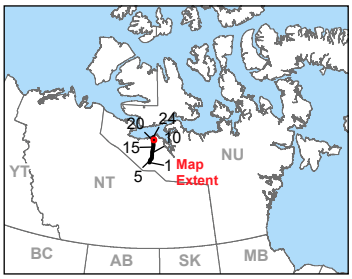
Figure No.
A.3

Title
Plant and Lichen SOCC Occurrences

Notes

1. Coordinate System: WGS 1984 UTM Zone 12N
2. Data Sources: Governments of Nunavut and Canada, Stantec, MMG
3. Service Layer Credits: World Imagery: Earthstar Geographics





2024 SOCC Occurrence

- arctic dock
- Pumpelly's brome
- beach pea
- Historical SOCC Occurrence
- Local Assessment Area (LAA)
- Grays Bay Road

Project Development Area (PDA)

- Aerodrome
- Jericho Station
- Port (Landside Infrastructure)
- Port (Marine-based Infrastructure)
- Road
- Tibbitt to Contwoyto Winter Road

0 500 1,000 Metres

(At original document size of 8.5x11) 1:50,000

N

NUNAMI STANTEC LIMITED

WEST KITIKMEOT RESOURCES CORP

Project Location
Kitikmeot Region, Nunavut

Prepared by DSPRY on 2026-02-03
TR by SL on 2026-02-03

Client/Project
123514868_090

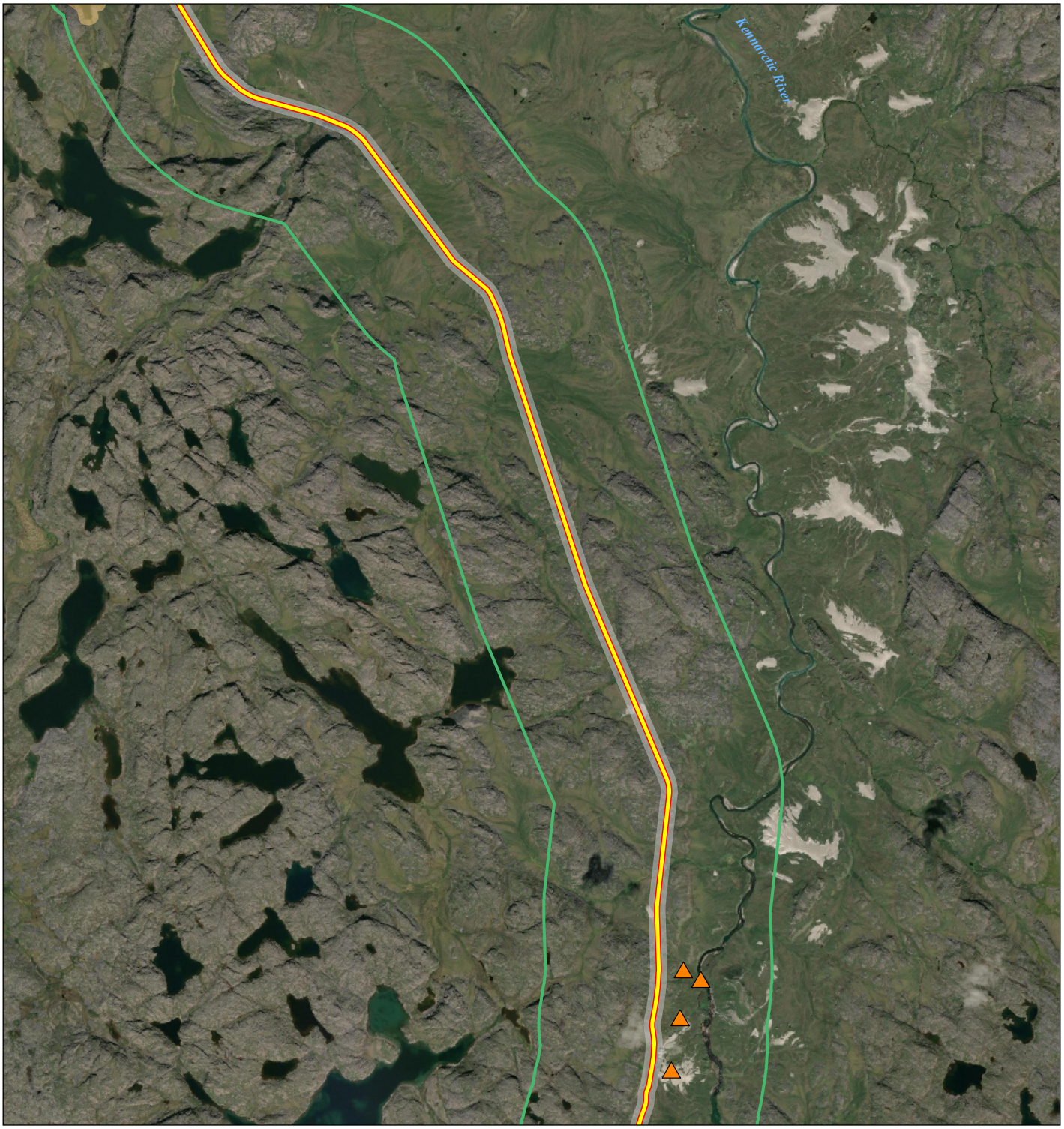
West Kitikmeot Resources Corp
Grays Bay Road and Port

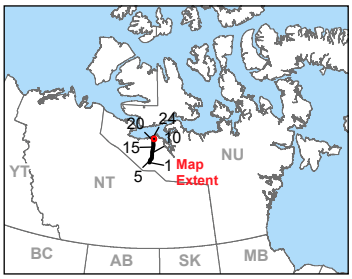
Figure No.
A.3

Title
Plant and Lichen SOCC Occurrences

Notes

1. Coordinate System: WGS 1984 UTM Zone 12N
2. Data Sources: Governments of Nunavut and Canada, Stantec, MMG
3. Service Layer Credits: World Imagery: Earthstar Geographics





2024 SOCC Occurrence

- arctic dock
- Pumpelly's brome
- beach pea
- Historical SOCC Occurrence
- Local Assessment Area (LAA)
- Grays Bay Road

Project Development Area (PDA)

- Aerodrome
- Jericho Station
- Port (Landside Infrastructure)
- Port (Marine-based Infrastructure)
- Road
- Tibbitt to Contwoyto Winter Road

0 500 1,000 Metres

(At original document size of 8.5x11) 1:50,000

N

NUNAMI STANTEC LIMITED

WEST KITIKMEOT RESOURCES CORP

Project Location
Kitikmeot Region, Nunavut

Prepared by DSPRY on 2026-02-03
TR by SL on 2026-02-03

Client/Project
123514868_090

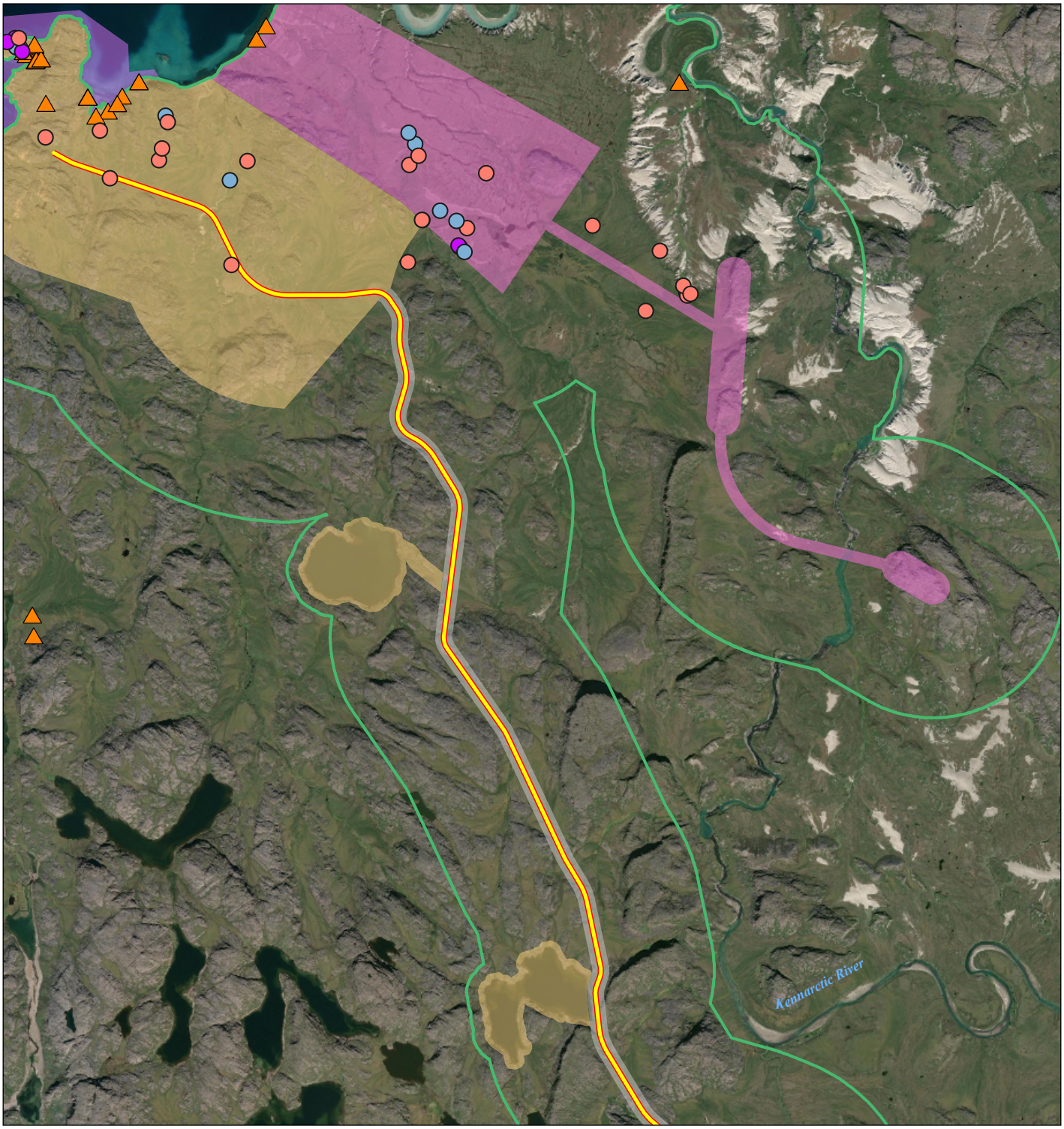
West Kitikmeot Resources Corp
Grays Bay Road and Port

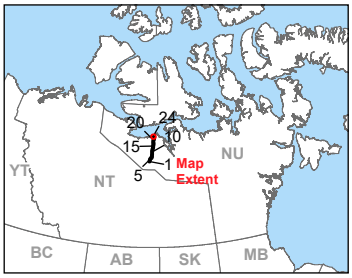
Figure No.
A.3

Title
Plant and Lichen SOCC Occurrences

Notes

1. Coordinate System: WGS 1984 UTM Zone 12N
2. Data Sources: Governments of Nunavut and Canada, Stantec, MMG
3. Service Layer Credits: World Imagery: Earthstar Geographics





2024 SOCC Occurrence

- arctic dock
- Pumpelly's brome
- beach pea
- Historical SOCC Occurrence
- Local Assessment Area (LAA)
- Grays Bay Road

Project Development Area (PDA)

- Aerodrome
- Jericho Station
- Port (Landside Infrastructure)
- Port (Marine-based Infrastructure)
- Road
- Tibbitt to Contwoyto Winter Road

0 500 1,000 Metres

(At original document size of 8.5x11) 1:50,000

N

NUNAMI STANTEC LIMITED

WEST KITIKMEOT RESOURCES CORP

Project Location
Kitikmeot Region, Nunavut

Prepared by DSPRY on 2026-02-03
TR by SL on 2026-02-03

Client/Project
123514868_090

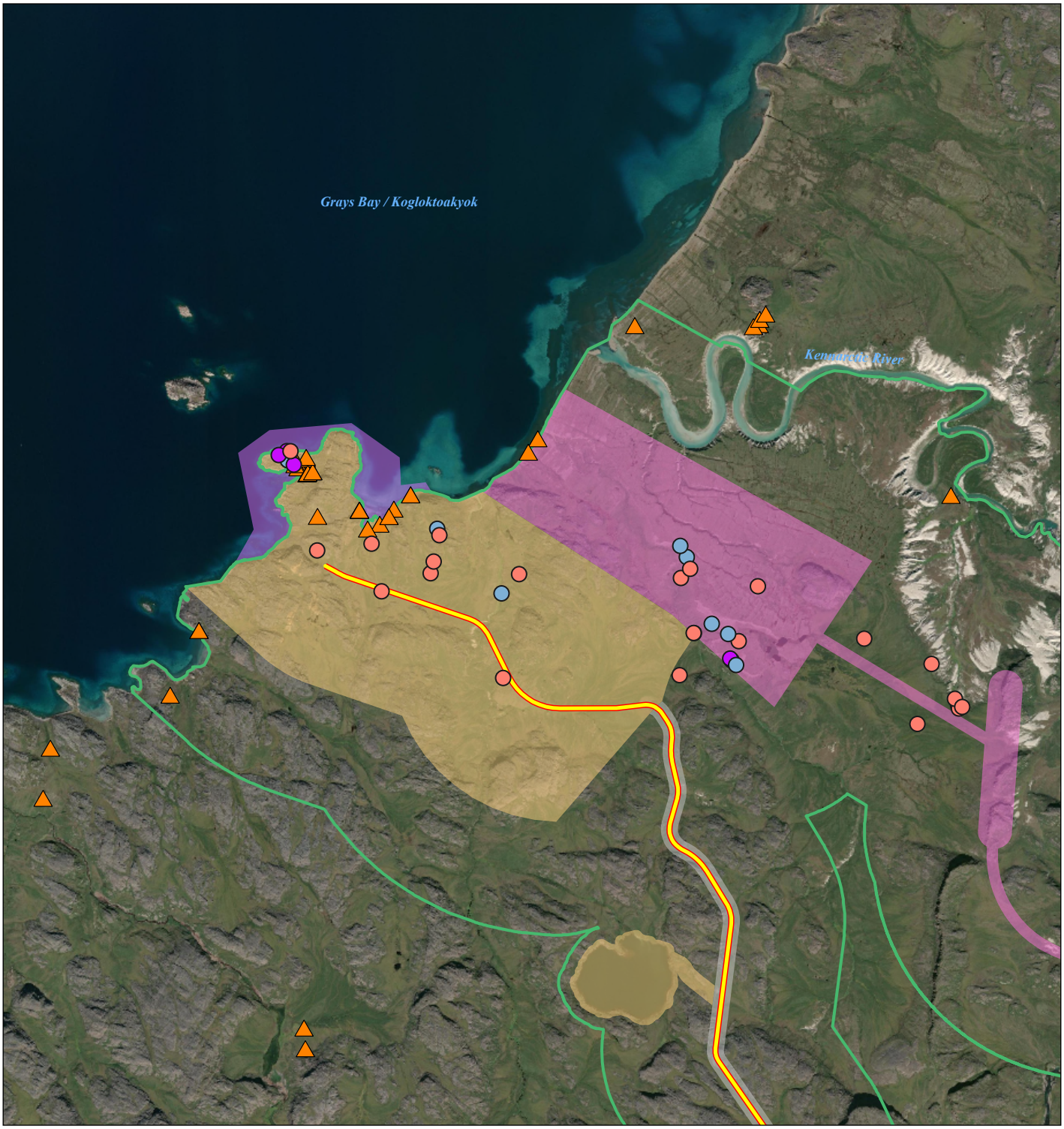
West Kitikmeot Resources Corp
Grays Bay Road and Port

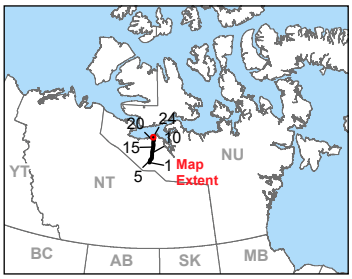
Figure No.
A.3

Title
Plant and Lichen SOCC Occurrences

Notes

1. Coordinate System: WGS 1984 UTM Zone 12N
2. Data Sources: Governments of Nunavut and Canada, Stantec, MMG
3. Service Layer Credits: World Imagery: Earthstar Geographics





2024 SOCC Occurrence

- arctic dock
- Pumpelly's brome
- beach pea
- Historical SOCC Occurrence
- Local Assessment Area (LAA)
- Grays Bay Road

Project Development Area (PDA)

- Aerodrome
- Jericho Station
- Port (Landside Infrastructure)
- Port (Marine-based Infrastructure)
- Road
- Tibbitt to Contwoyto Winter Road

0 500 1,000 Metres

(At original document size of 8.5x11) 1:50,000

N

NUNAMI STANTEC LIMITED

WEST KITIKMEOT RESOURCES CORP

Project Location
Kitikmeot Region, Nunavut

Prepared by DSPRY on 2026-02-03
TR by SL on 2026-02-03

Client/Project
123514868_090

West Kitikmeot Resources Corp
Grays Bay Road and Port

Figure No.
A.3

Title
Plant and Lichen SOCC Occurrences

Notes
1. Coordinate System: WGS 1984 UTM Zone 12N
2. Data Sources: Governments of Nunavut and Canada, Stantec, MMG
3. Service Layer Credits: World Imagery: Earthstar Geographics

Appendix B Land Cover Class Descriptions

B.1 Heath Tundra Land Cover Classes

B.1.1 Bedrock/Boulder Heath Tundra Class

The Bedrock/Boulder Heath Tundra class occurs where soils are thin, heath tundra becomes patchy, and bedrock/boulder exposures occur. Separation of two distinct heath boulder and heath bedrock classes was not achieved during the mapping exercise. The LAA and RAA have large areas of exposed bedrock partially covered in veneers of till and littered with boulders at different densities and sizes. In the combined Heath Bedrock/Boulder class, exposed bedrock and/or boulders make up between and 30% and 80% of the ground surface. Boulders can range from the size of a melon to that of a house.

Vegetation cover in the Bedrock/Boulder Heath Tundra 90% to 95% covered with crustose lichens in open areas, with small interspersed areas of heath tundra present on patches of finer substrates around the rock (see heath tundra land cover class description). Thin dry soils support a dense cover of moss and lichen which was captured as lichen veneer in the classified satellite image.

B.1.2 Cryoturbated Heath Tundra Class

The Cryoturbated Heath Tundra class is characterized by hummocky microrelief (frost boils) caused by cryoturbation. Within this class, ground shrubs tend to establish on undisturbed soil between frost boils while lichens flourish on exposed soil caused by cryoturbation. The Cryoturbated Heath Tundra class contains an average of 29% groundcover of heaths (i.e., dwarf members of the *Ericaceae* or heath family) and prostrate shrubs. Prominent heath species include northern Labrador Tea, bog bilberry (*Vaccinium uliginosum*), mountain cranberry (*V. vitis-idaea*), and black crowberry (*Empetrum nigrum*). Common prostrate shrubs include glandular birch (*Betula glandulosa*), tea-leaved willow (*Salix planifolia*) and grey-leaved willow (*S. glauca*). Glandular birch is the dominant erect shrub in the class with an average cover of 19%. Graminoid cover is very limited on these sites. Lichens, including Iceland lichens, snow lichens (*Flavocetraria* spp.), and club lichens (*Cladonia* spp.) are present at average cover levels of 12% in the groundcover of the Cryoturbated Heath Tundra class. Mosses are a minor component of the functional vegetation cover at an average cover of 10%.

The Cryoturbated Heath Tundra class is most common on morainal till blankets and till veneers. It is typically found on drier slopes with a submesic to mesic moisture regime that shed water. The surface shape and micro-relief are variable. Slopes range from 0 to 45% with median slope 5%.

B.1.3 Graminoid Heath Tundra Class

The Graminoid Heath Tundra class is characterized by an average graminoid cover of 40% and has similar average cover (25%) of heaths and prostrate shrubs as the Heath Tundra class. The most prominent graminoids are sedges (*Carex* spp.), including Bigelow's sedge (*Carex bigelowii*) and alpine sweetgrass (*Anthoxanthum monticola*). Prominent heath species include bog bilberry, mountain cranberry, and four-angled mountain heather. Common prostrate shrubs include glandular birch and low willows such as net-veined willow (*Salix reticulata*) and snowbed willow (*S. herbacea*). Glandular birch is the dominant erect shrub in the Graminoid Heath Tundra class with an average cover of 5%. Litter

buildup is primarily by annual senescence of leaves from graminoid plants with some because of leaf drop from shrubs. Lichens ground cover is low within the graminoid heath tundra class, including snow lichen species at average cover levels of 5%. Moss cover is dominated by turgid Aulacomnium moss (*Aulacomnium turgidum*) at an average cover of 21% and is slightly higher than that of the Heath Tundra class.

The Graminoid Heath Tundra class is most common on morainal till blankets in the sourthern half of the RAA. It typically occurs on long, straight moist slopes with a mesic moisture regime. The surface shape is generally straight with a hummocky micro-relief. Slopes range from 0 to 5%, with a median slope of 3%.

B.1.4 Heath Tundra Class

The Heath Tundra class is characterized by the presence of dwarf heaths (e.g. four-angled mountain heather [*Cassiope tetragona*], mountain cranberry, and northern Labrador tea) as well as other dwarf or low shrubs. It occurs on well drained areas, on mid-slope to upper slope positions on uplands and plateaus, and in areas with thin soils, shallow permafrost, or a high percentage of boulders. It occurs on several landforms on substrates including glacial till, glaciofluvial outwash, glaciolacustrine sediment, weathered bedrock, and raised beach sand. Glandular birch is prevalent, sometimes growing as small upright bushes and sometimes prostrate, due to thin snow cover and wind effects.

Permafrost features are often present in this class, including solifluction slopes, frost boils, frost mounds, frost scars, and unsorted stone circles. They create a variety of growth conditions, often resulting in patterning and a mosaic of different component communities. There is often a component of glacial erratic boulders, felsenmeer, or rock outcrops in the heath tundra class, but the percentage of the ground occupied by rock or boulders is less than 30%. If the percentage of ground covered with boulders or rock is between 30 and 80%, a separate class of heath bedrock/boulder can be distinguished.

B.2 Lichen Veneer Land Cover Class

B.2.1 Lichen Veneer Class

Lichen veneer forms on relatively level, dry, well drained substrates including glaciofluvial outwash terraces, raised beaches and thin dry soils associated with bedrock outcrops. Areas of lichen veneer are exposed to wind and accumulate relatively little snow in winter. Substrates are variable and include bedrock, gravel, sand, cobbles and glacial till.

Lichen veneer is characterized by a low, thin plant cover including a high percentage of ground lichens, especially crinkled snow lichen (*Flavocetraria nivalis*), reindeer cup lichen (*Cladonia rangiferina*), and star-tipped cup lichen (*Cladonia stellaris*). Other common lichens include witch's-beard lichen (*Gowardia nigricans*), green witch's hair lichen (*Alectoria ochroleuca*), and foam lichens (*Stereocaulon* spp.). Mountain avens (*Dryas* spp.) can be a common component of lichen veneer, forming up to 25% of the surface cover. Other woody species that can form a sparse cover seldom exceeding 5 cm to 10 cm in height include mountain cranberry, black crowberry, bog bilberry, and northern Labrador tea. Shrub cover is sparse and limited to depressions in the terrain. Species include glandular birch, grey-leaved willow,

northern willow (*Salix arctophila*), and occasionally tea-leaved or arctic willow (*S. arctica*). A diversity of forbs is characteristic of lichen veneer. Members of the pea family found in the lichen veneer class include Maydell's locoweed (*Oxytropis maydelliana*), arctic locoweed (*O. arctica*), and alpine milk-vetch (*Astragalus alpinus*). Moss campion (*Silene acaulis*), alpine pussytoes (*Antennaria alpina*), long-stalked starwort (*Stellaria longipes*), arctic firmoss (*Huperzia selago*), and alpine bistort (*Bistorta vivipara*) are often present in low numbers. Graminoid species are also present at low cover values. Dry land sedges such as rock sedge (*Carex rupestris*), single-spike sedge (*Carex scirpoidea*), and sheathed sedge (*C. vaginata*) are present. Grasses include alpine sweetgrass, narrow false oats (*Koeleria spicata*), short-leaved fescue (*Festuca brachyphylla*), purple reedgrass (*Calamagrostis purpurascens*), and wide-leaved polargrass (*Arctagrostis latifolia*).

Raised beaches are found in the Izok Corridor Project regional study area inland at higher elevations along the arctic coast. Raised beaches consisting of gravel support a groundcover mat of lichens: mostly star-tipped cup lichen, snow lichens, club lichens, and other light-coloured lichens. On coarser rock substrates, a thick growth of black rock tripe (*Umbilicaria* spp.) or hoary rock moss (*Racomitrium lanuginosum*) may occur. Lichen veneer on sandy raised beaches is characterized by patches of low-lying heath, grasses, and lichen interspersed with patches of exposed substrates. A variety of prostrate shrubs and forbs are found on raised beaches. Low willows, glandular birch, paintbrushes (*Castilleja* spp.), cloudberry (*Rubus chamaemorus*), and other species establish in the depressions between the ridges.

Thin, dry soils associated with bedrock outcrops can also support a dense cover of moss and lichen which was captured as lichen veneer in the classified satellite image. Common lichen species on thin dry soils include club lichens, snow lichens, Iceland lichens, and several species of witch's hair lichens (*Alectoria* spp.). Hoary rock moss and mountain avens are also common. Several other characteristic higher plants are associated with lichen and moss mats, including three-toothed saxifrage (*Saxifraga tricuspidata*), river beauty (*Chamaenerion latifolium*), black crowberry, and heaths. A few sedges can become established here including rock sedge and single-spike sedge.

B.3 Rock Land Cover Class

B.3.1 Bedrock/Boulders Class

In the bedrock boulder class, exposed rock makes up more than 80% of the inorganic material on the ground surface. Material size varies from talus to small boulders to large bedrock outcrops.

Most boulders and bedrock exposures in the RAA are 90% to 95% covered with crustose lichens. There is little exposed rock surface on the tops and sides of rocks. The lichens on bedrock and boulders vary according to the rock composition and amount of nutrients deposited by animals. Between the bedrock and boulders, patches of heath tundra and lichen veneer are present.

B.4 Sedge Land Cover Classes

Sedge and cover classes characterized by sedges and cottongrasses (*Eriophorum* spp.) are common in areas where fresh water collects or moves; either above the ground surface in ponds, lakes and streams; or beneath the ground surface on top of the permafrost boundary, such as on lower slopes and valley floors. There are two sedge land cover classes. Non-tussock sedges occupy areas of standing or flowing surface water and occasionally lower slopes where water moves beneath the ground surface. The tussock sedge class is located on poorly drained higher ground, blending into upland classes on the slopes.

B.4.1 Non-tussock Sedge Class

The non-tussock sedge class typically occurs on the edges of lakes and in shallow, slow-moving water in streams and rivers. Moisture levels are typically hygric. Vegetation consists of a sparse to dense growth of emergent sedges and other rooted aquatic vegetation. At water depths of 20 cm to 40 cm, dominant species are water sedge (*Carex aquatilis*) and narrow-leaved cottongrass (*Eriophorum angustifolium*), mostly in pure stands. In shallower water, there can be a mixture of sedges, including dark-brown sedge (*Carex atrofusca*) and Bigelow's sedge, as well as tussock-forming cottongrasses such as tussock cottongrass (*Eriophorum vaginatum*). In water less than 20 cm deep vegetation is made up mostly of water sedge and single-spike sedge mixed with narrow-leaved cottongrass. These three species are often accompanied by a number of other sedges. Low willows, including tea-leaved willow and northern willow may also be present.

B.4.2 Tussock Sedge Class

The Tussock Sedge class includes the tussock sedge ecosite and the marine tussock sedge ecosite identified in the Izok Corridor Project local study area mapping. Slope position, water regime and dominant species composition are essentially the same between these two ecosites. The tussock sedge class is typically located on shallow, water receiving lower slopes and basins, where sub-surface flow of water occurs on top of the permafrost boundary. Sheathed cottongrass is the most prominent species, providing approximately 50% to 70% cover and forming tough fibrous clumps or tussocks. Hummocky peat mounds developed through cryoturbation are common throughout the tussock sedge class. Shrub and heath vegetation grows on and between the mounds and provides approximately 20% to 40% cover, with shrubs typically forming less than 20% of the cover. Low shrubs commonly include glandular birch, grey-leaved willow, arctic willow, net-veined willow, and tea-leaved willow. Heaths include mountain cranberry, northern Labrador tea, bog rosemary (*Andromeda polifolia*), bog bilberry, black crowberry, and red bearberry (*Arctous rubra*). Typical non-woody species include reedgrasses (*Calamagrostis* spp.), Labrador lousewort (*Pedicularis labradorica*), cloudberry, and pelt lichens (*Peltigera* spp.). Lichen cover is relatively sparse in the tussock sedge class. Mosses, including peat mosses (*Sphagnum* spp.), and *Aulacomnium* species form the understory layer.

B.5 Shrub Land Cover Classes

Within the LAA, a Low Shrub and Tall Shrub land cover class were able to be mapped using the higher resolution data sets. However, for the RAA, these two classes were amalgamated into a “Shrub” land cover class that can be assumed to be a combination of both Tall Shrub and Low Shrub land cover classes. Additionally, in both the RAA and LAA mapping, the Riparian Tall Shrub class was unable to be distinguished, and is amalgamated within the Tall and Low Shrub land cover classes in the RAA and LAA mapping.

B.5.1 Low Shrub Class

Prostrate or low shrubs are present throughout the landscape. In the low shrub class, birch and willows are the most prominent species, reaching heights of between 0.2 m and 1.5 m and forming between 30% and 90% of the cover. The low shrub class is associated with sheltered lee slopes, lower slopes, and seeps. It is also associated with water receiving lower slopes and basins, where sub-surface flow or ponding of water occurs on top of the permafrost boundary. It often occurs with the tussock sedge class, the two appearing as a striped pattern running downslope. Shrub cover varies from 50% to 90% and shrubs reach 0.2 m to 1.5 m in height. Patches within this class can be predominantly glandular birch, predominantly willow, or a combination thereof. Glandular birch is the most prominent species. Common willows include grey-leaved willow, Richardson’s willow (*Salix richardsonii*), barren-ground willow (*S. niphoclada*), tea-leaved willow and prostrate species such as net-veined willow and arctic willow. Cover of heaths, herbaceous plants, and litter varies greatly with shrub density. Heaths include mountain cranberry and bog bilberry. Grasses, sedges, and cottongrasses are typically present at low cover values. Litter and mosses, including peat mosses and *Aulacomnium* species, form the understory layer.

B.5.2 Riparian Tall Shrub Class

Although not discretely mapped within the RAA and LAA, the riparian tall shrub class is associated with standing or flowing water such as streams or small rivers, but also with the base of seasonal drainages, downslope of persistent snowbanks or where water flows beneath a layer of rocks or boulders. Willows and birches are the dominant tall shrubs. Dominant species are glandular birch, grey-leaved willow, and tea-leaved willow. Shrub density is sufficient to form a relatively continuous canopy. Shrub height varies considerably with water availability and exposure to wind, but is generally greater than shrubs in surrounding drier areas. If the shrub canopy is high enough and dense enough, a ground cover can develop in the understory. Black crowberry, mountain cranberry, long-leaved arnica (*Arnica lonchophylla*), Lapland lousewort (*Pedicularis lapponica*), mosses, and grasses often establish. If there is sufficient shelter, the ground is sometimes covered with leaf litter.

B.6 Tall Shrub Class

Tall shrub thickets occur predominately near the southern tree line. In the tall shrub class, birches and willows are the most prominent species, reaching up to 1.5 m in height and forming discontinuous to continuous cover. This transition shrub community replaces heath tundra on drier upland sites closer to the southern tree line. Shrub cover varies from 10% to 70% cover and from 0.2 m to 1.5 m in height. Glandular birch is the most prominent species, and common willows include grey-leaved willow and tea-leaved willow. Heath, herbaceous plant, and litter cover varies greatly with shrub density. Prostrate species include black crowberry, alpine azalea (*Kalmia procumbens*), northern Labrador tea, mountain cranberry and bog bilberry. Grasses and sedges are typically present at low cover values. Mosses and lichens including broom mosses (*Dicranum* spp.), *Aulacomnium* species, witch's hair lichens, and Iceland lichens (*Cetraria* spp.) form an understory layer.

B.6.1 Treed Land Cover Class

B.6.1.1 Open Conifer Forest Class

The open conifer forest class is present approximately 30 km south and west of the proposed Izok mine site. Average tree cover is 20% and tall shrub cover is 23%. White spruce (*Picea glauca*) is the dominant tree species with tall shrub species such as soapberry (*Shepherdia canadensis*) and alder (*Alnus* spp.) also occurring. The increased shrub content results in an increased amount of litter (36%). This class exhibits a high graminoid cover (25%) and moss cover (36%) consisting mainly of feather mosses. The open conifer forest class generally has a hummocky to smooth microrelief and a mesic moisture regime. Slope gradient on the three survey sites is relatively low, ranging from 1% to 10%.

B.7 Unvegetated Sediment Land Cover Classes

Unvegetated sediment land cover classes generally contain less than 20% vegetation cover. Exposed substrate is greater than 80% of ground cover and is caused through seasonal flooding or freezing, steep slopes causing erosion, and wind and water erosion

B.7.1 Unvegetated Exposed Cobble/Gravel Class

The Unvegetated Exposed Cobble/Gravel class occurs in areas where moving water has eroded away finer materials and sorted the substrates, leaving exposed cobbles and coarse gravel deposits. This land cover class typically occurs at the edges of rivers, lakes, drained lakes, and areas affected by seasonal flooding and freezing. This class occurs predominately on glaciofluvial outwash parent material with a xeric moisture regime. Ground shrubs occasionally establish on these sites including bog bilberry, mountain cranberry, and multiple willow species. Forbs are limited; however, river beauty is common on these sites. Vegetation cover is limited within this class due to flooding and erosion experienced during the growing season.

B.7.2 Unvegetated Exposed Sand/Silt/Gravel Class

The Unvegetated Exposed Sand/Silt/Gravel class occurs on fine, light grey, silty sediments of marine origin are common on mid to lower slopes and basins within approximately 13 km of the Arctic coast within the RAA and LAA. Along the edges of the Kennarctic River and Hood River valleys, there are numerous eroding slopes and crests that are mostly unvegetated. These sites have less than 20% vegetation cover, including a very sparse cover of willows, grasses, sedges, and forbs. The crests and steeply sloping sides are mostly unvegetated.

Areas of exposed silt, sand, and gravel also occur on glaciolacustrine or marine sediment deposits and glaciofluvial outwash where wind, rain, and frost action maintain erosional processes. These actions result in exposures of finer substrates. Vegetation cover is limited due to these erosional processes; however, moss campion and three-toothed saxifrage can be observed on these sites. Graminoids tolerant of wind and dry conditions can also establish including short-leaved fescue, purple reedgrass, and weak arctic sedge (*Carex supina*).

Appendix C Ecosite Descriptions

C.1 Bedrock and Boulders Ecosite Group

C.1.1 Bedrock Association Ecosite

The Bedrock Association Ecosite occurs on crest to upper slope positions with moderately steep slopes, where exposed bedrock is the dominant cover. Shrub, herbaceous, and graminoid cover is limited due to the inadequate amount of substrate available. Glandular birch is the dominant shrub and forms an open discontinuous cover. Mountain cranberry is the common understory shrub occurring with this ecosite. Non-vascular groundcover species are mainly curled snow lichen (*Flavocetraria cucullata*), crinkled snow lichen, whiteworm lichen (*Thamnolia subuliformis*), juniper hair-cap moss (*Polytrichum juniperinum*), and rock mosses (*Racomitrium* spp.).

This ecosite occurs mainly on hummocky to rolling bedrock landforms with a xeric soil moisture regime and a poor to very poor nutrient regime. Drainage at this ecosite is very rapid to rapid. Where substrate is present, soils are mainly Brunisolic Eutric Static Cryosols. Static Cryosols are developed in a wide range of recently deposited or disturbed sediments with no evident cryoturbation. Brunisolic Eutric Static Cryosols have a high degree of base saturation (Soil Classification Working Group 1998).

C.1.2 Bedrock Cliffs Ecosite

The Bedrock Cliffs Ecosite occurs on ledges and cliffs that provide flat spaces where plants can become established. Some ledges and cliffs may offer rich habitats due to nesting of raptors or other birds, and consequent deposit of nutrients. Some ledges support a diverse flora, including three-toothed saxifrage, snow saxifrage (*Micranthes nivalis*), Nelson's saxifrage (*Micranthes nelsoniana*), snow cinquefoil (*Potentilla nivea*), Pallas' wallflower (*Erysimum pallasii*), northern buttercup (*Ranunculus arcticus),* narrow-leaved arnica (*Arnica angustifolia*), heaths, and occasionally native dandelions (*Taraxacum* spp.). Other ledges offer only a thin soil substrate where a mixture of foliose lichens becomes established, including snow lichens and star-tipped cup lichen. Hoary rock moss may also be present. Cliff faces offer precarious habitat for plants; however, most cliffs support a variety of plants clinging to cracks in the rocks. Lichens also occupy these rock faces, but diminished exposure to sunlight decreases the number of species and the percent of cover of the rock. Elegant sunburst lichen (*Rusavskia elegans*) is common near raptor nests. Usually, cliff faces are about 30 to 50% covered with lichens.

C.2 Boulder Field/Felsenmeer Ecosite

The Boulder Field/Felsenmeer Ecosite occurs on lower slope to depressions, where water flows or collects under the boulders with little opportunity for the accumulation of mineral soil. Boulders make up approximately 85% of ground cover with very limited cover of shrubs, herbaceous plants, graminoids and non-vascular species. Understory shrubs within this ecosite are mainly bog bilberry and mountain cranberry. River beauty is often found within this ecosite in low abundance. Lichen occurring is mainly crinkled snow lichen with the bryophyte layer dominated hoary rock moss.

This ecosite occurs primarily on bouldery till veneer and bouldery undifferentiated channel shaped landforms. Soil moisture regime is predominately xeric with a poor to very poor nutrient regime. These sites are generally well drained with a depth to permafrost range of 0 to 40 cm. Where substrate does accumulate, soils are variable and consist mainly of Turbic Cryosols including Brunisolic Eutric Turbic Cryosol, Regosolic Turbic Cryosol, Brunisolic Dystric Turbic Cryosol and Gleysolic Turbic Cryosol. Turbic Cryosols are developed on recently deposited or strongly cryoturbated soil (Soil Classification Working Group 1998).

C.3 Esker/Outwash Complex Ecosite Group

C.3.1 Outwash Diverse Ecosite

The Eskers and Glacio-fluvial Outwash Terraces Ecosite occurs typically on coarse gravel, cobbles, and sand along valleys. The well-drained substrates support a thin plant cover with a high percentage of groundcover lichens including club and reindeer lichens (*Cladonia* spp.), Iceland lichens, and witch's hair lichens. The vegetation of this ecosite is low, and shrub cover, if present, is prostrate or limited to depressions in the terrain and side slopes of the terraces. A diverse cover of herbaceous plants grows on eskers, including several members of the pea family. These landforms encompass a combination of ecosites including low shrub, lichen heath, and exposed sediment ecosites.

C.3.2 Outwash Lichen Heath Ecosite

The Outwash Lichen Heath Ecosite occurs on dry south to west facing, level to gently sloping terrain. Lichen species cover approximately half of this ecosite. Heaths dominate vascular cover with heights generally not exceeding 20 cm. Shrubs commonly occurring within this ecosite are glandular birch, bog bilberry, and mountain cranberry with minor components of black crowberry and northern Labrador tea. Graminoids commonly occurring are Bigelow's sedge and alpine sweetgrass. Common lichens occurring are green witch's hair lichen, witch's-beard lichen, curled snow lichen, crinkled snow lichen, reindeer lichen (*Cladonia mitis*), star-tipped cup lichen, club lichens, arctic tumbleweed lichen (*Masonhalea richardsonii*), Iceland lichens, Bryocaulon lichens (*Bryocaulon* spp.), and arctic finger lichen (*Dactylina arctica*). Bryophyte cover is limited and consists mainly of hair-cap mosses (*Polytrichum* spp.).

This ecosite is associated with plain, delta, fan and complex glaciofluvial landforms. Soil moisture regime is xeric with a poor to very poor nutrient regime. Sites are rapidly to well drained with permafrost depth ranging from 30 to 60 cm. Soils commonly found within the ecosite were Brunisolic Eutric Turbic Cryosols and Brunisolic Dystric Static Cryosols. Brunisolic Eutric Turbic Cryosols are developed on recently deposited or strongly cryoturbated soil materials having a high degree of base saturation, as indicated by their pH levels. Brunisolic Dystric Static Cryosols are developed in a wide textural range of recently deposited or disturbed sediments where evidence of cryoturbation is absent and containing a low degree of base saturation (Soil Classification Working Group 1998).

C.4 Heath Tundra Ecosite Group

C.4.1 Cryoturbated Heath Tundra Ecosite

The Cryoturbated Heath Tundra Ecosite occurs predominately on mid slope positions on gentle slopes with variable aspects, where the substrate has been forced upward and outward from freezing creating a frost boil. Cryoturbation, or frost action, is a common form of mechanical disturbance in the southern arctic. It produces sorted and non-sorted circles, stripes and nets, earth hummocks, or patterned ground. This terrain can be quite hummocky in areas close to tree line.

Vegetation growth in the center of the frost boil is limited due to soil movement and tends to support colonizing species such as grasses. Growing conditions are more favorable around the edges of the frost boils where vegetation is abundant. Glandular birch is the dominant shrub which may reach heights between 0.2 m and 1.5 m tall. Understory shrubs are abundant on these sites and consist of bog bilberry, mountain cranberry, black crowberry, northern Labrador tea, tea-leaved willow, and grey-leaved willow. Graminoids commonly observed are Bigelow's sedge, reedgrasses, and alpine sweetgrass in low percent cover (<2%). Lichens most commonly occurring include snow lichens, whiteworm lichen, club and reindeer lichens, Iceland lichens, and arctic finger lichen. Bryophyte species observed on these sites are turgid Aulacomnium moss and juniper hair-cap moss with minor components of stairstep moss (*Hylocomium splendens*) and hoary rock moss.

The Cryoturbated Heath Tundra Ecosite occurs mainly on till blanket landforms with a submesic to mesic soil moisture regime and a poor nutrient regime. Sites are well to moderately well drained with depth of permafrost ranging from 20 cm to 60 cm. Soils classifications common for this ecosite are Orthic and Brunisolic Eutric Turbic Cryosols. These soils are developed on recently deposited or strongly cryoturbated soil materials having a high degree of base saturation, as indicated by their pH (Soil Classification Working Group 1998).

C.4.2 Graminoid Heath Tundra Ecosite

The Graminoid Heath Tundra Ecosite occurs predominately on long gentle slopes with northwesterly to northeasterly aspects. Graminoid cover is relatively high (44% on average) compared to other ecosites in the Heath Tundra Ecosite Group (Heath Tundra and Cryoturbated Heath Tundra Ecosites). Understory shrubs are abundant on these ecosites and consist of bog bilberry, mountain cranberry, glandular birch, four-angled mountain heather, entire-leaved mountain avens (*Dryas integrifolia*), little-tree willow (*Salix arbusculoides*), snowbed willow, and net-veined willow. Forb cover is dominated by locoweed species (*Oxytropis* spp.) and purple-haired groundsel (*Tephroseris frigida*). Graminoids commonly observed are Bigelow's sedge, alpine sweetgrass, and other sedge species. Snow lichens are the most commonly occurring lichens. Bryophyte species observed on this ecosite are stairstep moss with minor components of turgid Aulacomnium moss.

This ecosite occurs on till blanket landforms with a mesic soil moisture regime and a poor to very poor nutrient regime. Sites are well to moderately well drained with depth of permafrost ranging from 23 cm to 40 cm. Soils common for the graminoid heath tundra ecosite are Regosolic Turbic Cryosols. These soils are developed on recently deposited or strongly cryoturbated soil materials lacking B horizons and having little to no organic matter (Soil Classification Working Group 1998).

C.4.3 Heath Bedrock Ecosite

The Heath Bedrock Ecosite occurs on crest to mid slope positions, where approximately 50% of overall cover is exposed bedrock. Vascular plant establishment is found only in pockets where soil collects and provides substrate. Birch (*Betula* spp.) is the dominant low shrub which reaches heights up to 1.5 m tall and forms discontinuous cover. Cover of heaths (i.e., ericaceous shrubs), herbaceous plants, and litter is relatively low compared to the heath tundra ecosite due to the increased amount of exposed bedrock. Ground shrubs consist mainly of black crowberry, northern Labrador tea, alpine bearberry (*Arctous alpina*), bog bilberry, and mountain cranberry. Graminoid cover is very low with alpine sweetgrass occurring in most sites. Common lichens found on this ecosite are reindeer lichen (*Cladonia mitis*), Iceland lichens, witch's-beard lichen, green witch's hair lichen, and snow lichens. The bryophyte layer is dominated by juniper hair-cap moss and hoary rock moss.

This ecosite is generally associated with rolling, hummocky or steep bedrock and till veneer landforms with a xeric soil moisture regime and a poor to very poor nutrient regime. These ecosites are generally well drained with permafrost at a depth of 20 cm to 60 cm. Soil subgroups common for this ecosite are Orthic Eutric and Brunisolic Eutric Turbic Cryosols. These soils are developed on recently deposited or strongly cryoturbated soil materials having a high degree of base saturation, as indicated by their pH (Soil Classification Working Group 1998).

C.4.4 Heath Boulders Ecosite

The Heath Boulder Ecosite occurs on mid gentle to moderately steep slopes with a variable aspect. Surface boulders cover approximately 40% of the ground within the ecosite. Glandular birch is the dominant shrub which reaches heights of up to 1.5 m tall and forms an open discontinuous cover. Understory shrubs abundant within this ecosite are mountain cranberry, black crowberry, northern Labrador tea, bog bilberry, and alpine bearberry with four-angled mountain heather and net-veined willow occurring in lower abundance. Graminoids commonly observed are Bigelow's sedge and alpine sweetgrass in relatively low cover. Lichens occurring are mainly crinkled snow lichen, curled snow lichen, witch's-beard lichen, Bryocaulon lichens, reindeer lichens club lichens, and arctic finger lichen. The bryophyte layer consists mainly of hoary rock moss, juniper haircap moss, and broom mosses.

This ecosite occurs primarily on thin, bouldery till veneer with a subxeric soil moisture regime and a poor to very poor nutrient regime. Soils are rapidly drained with depth to permafrost at approximately 40 cm. Soil subgroups common for this ecosite are Brunisolic Eutric Turbic Cryosols. These soils are developed on recently deposited or strongly cryoturbated soil materials having a high degree of base saturation, as indicated by their pH (Soil Classification Working Group 1998).

C.4.5 Heath Tundra Ecosite

The Heath Tundra Ecosite occurs predominately on upper to mid gentle slopes at variable aspects, where the substrate is relatively homogenous. Bare ground, exposed boulder, and bedrock cover is low (<10%) compared to the heath rock and heath boulder ecosites. Glandular birch is the dominant shrub which may reach heights between 0.2 m and 1.5 m tall. Cover of understory heaths dominates overall vascular cover whereas cover of herbaceous plants and litter is variable. Understory shrubs consist of bog bilberry, mountain cranberry, black crowberry, northern Labrador tea, four-angled mountain heather, entire-leaved mountain avens, and net-veined willow. Forb cover is sparse with moss campion occurring sporadically. Graminoids commonly observed are Bigelow's sedge and alpine sweetgrass in low percent cover (<3%). Lichens most commonly occurring include snow lichens, whiteworm lichen, reindeer lichens, and arctic finger lichen. Bryophyte species observed on these sites are turgid Aulacomnium moss and juniper hair-cap moss.

This ecosite occurs on till veneer landforms within the southern portion of the Izok Corridor Project LAA, and on both till blanket and veneer landforms in the northern portion of the LAA. Soil moisture regime is predominately mesic with a poor to very poor nutrient regime. Within this ecosite, soil moisture increases further north along the LAA with several heath tundra sites exhibiting pooling water yet still containing similar vegetation species composition as sites in the southern portion of the LAA. Drainage ranges from well to imperfect with depth of permafrost ranging from 30 cm to 65 cm. Soils common for this ecosite are Brunisolic Eutric Turbic Cryosols. These soils develop on recently deposited or strongly cryoturbated soil materials having a high degree of base saturation, as indicated by their pH (Soil Classification Working Group 1998).

C.4.6 Snowbank Community Ecosite

The Snowbank Community Ecosite occurs mainly on mid steep slopes and occupies small areas on the landscape, many of them too small to map at a 1:20,000 scale. This ecosite is associated with hummocky bedrock, steep bedrock and undulating bouldery colluvium landforms. Deep snowbanks develop on the lee side of ridges, cliffs, eskers or outwash plain slopes, or along the sides of river canyons. Snow accumulates in deep drifts that begin in September and may remain into August. Snowbanks melt slowly throughout the summer, which provides a reliable water source and causes the underlying soil to become saturated. This results in a unique and diverse plant assemblage. Dominant shrubs are mainly four-angled mountain heather, arctic willow, bog bilberry, mountain cranberry, northern Labrador tea, and snowbed willow. Although this ecosite has low abundance of herbaceous plants; it has the highest forb species diversity of any of the other ecosites. Forbs commonly occurring include pussy-toes (*Antennaria* spp.), chickweeds (*Stellaria* spp.), Richardson's anemone (*Anemonastrum richardsonii*), mountain-sorrel (*Oxyria digyna*), field horsetail (*Equisetum arvense*), and narrow-leaved sawwort (*Saussurea angustifolia*). Due to the increased moisture during the growing season, this ecosite also has favorable conditions in which plant SOCC may establish.

Graminoids commonly observed in the snowbank community ecosite are alpine sweetgrass, narrow false oats, arctic bluegrass (*Poa arctica*), wide-leaved polargrass, and dark-brown sedge. Lichens occurring are foam lichens, club lichens, and snow lichens with the bryophyte layer dominated by broom mosses, stairstep moss, liverworts (*Ptilidium* spp.) and juniper haircap moss.

C.5 Marine Sediments Ecosite Group

C.5.1 Marine Heath Tundra Ecosite

The Marine Heath Tundra Ecosite occurs on mid-slope to upper slope positions on uplands near the coast, where fine marine sediments have been deposited. It is characterized by a 20% to 90% cover of heaths and prostrate to low shrubs. Northern Labrador tea, bog bilberry, and mountain cranberry are prominent heath species. Common shrubs include glandular birch, net-veined willow, and grey-leaved willow of low stature. Forb diversity is higher than other tundra ecosites including Maydell's locoweed, purple-haired groundsel, wintergreens (*Pyrola* spp.), alpine milk-vetch (*Astragalus alpinus*), Labrador lousewort, Lapland buttercup (*Coptidium lapponicum*), and alpine bistort. Tussock cottongrass is a common component of marine heath tundra, with cover values of approximately 2% to 10%. Other graminoids commonly occurring include Bigelow's sedge, reedgrasses, bluegrasses (*Poa* spp.), wide-leaved polargrass, and alpine sweetgrass. Lichens are more common than in the wetter marine tussock sedge ecosite, including snow lichens, pelt lichens, witch's hair lichens, and arctic finger lichen. Mosses common on these ecosites are *Aulacomnium* species and hoary rock moss with minor components of stairstep moss and juniper hair-cap moss.

These ecosites are associated with long gentle marine slopes and marine blanket landforms. Soil moisture regime is predominately submesic to mesic with a poor to medium nutrient regime. Drainage is generally well drained with depth of permafrost ranging from 45 cm to 48 cm. Soils subgroups common for this ecosite are Orthic Eutric Turbic Cryosols and Orthic Dystric Turbic Cryosols. Orthic Eutric Turbic Cryosols have a relatively high degree of base saturation, unlike Orthic Dystric Turbic Cryosols, which have acidic with a low degree of base saturation (Soil Classification Working Group 1998).

C.5.2 Marine Low Shrub Ecosite

The Marine Low Shrub Ecosite is associated with shallow, water receiving lower slopes and basins, where sub-surface flow or ponding of water occurs on top of the permafrost boundary. It often co-occurs with the tussock sedge ecosite, the two appearing as a striped pattern running downslope. Shrub cover varies from 25% to 90% cover and from 0.2 to 1.0 m in height. Glandular birch is the most prominent species. Common willows include grey-leaved willow and tea-leaved willow. Cover of heaths, herbaceous plants, and litter varies with shrub density. Heaths include northern Labrador tea, mountain cranberry, and bog bilberry. Grasses, sedges, and cottongrasses are typically present at low cover values including wide-leaved polargrass, tussock cottongrass, and various reedgrasses. Litter and bryophytes, including peat mosses, stairstep moss, and *Aulacomnium* species form the understory layer.

Common landforms associated with marine low shrub ecosite include marine blankets, marine long gentle slopes, and channel-shaped marine deposits. Soil moisture regime is predominately subhygric with a poor to medium nutrient regime. Drainage on this ecosite is moderately well to imperfect with depth to permafrost (15 cm to 30 cm). Gleysolic Turbic Cryosols are the dominate soil type present with the ecosite. These soils are developed on recently deposited or strongly cryoturbated soil materials and have developed under poorly drained areas under reducing conditions (Soil Classification Working Group 1998).

C.5.3 Marine Tussock Sedge Ecosite

The Marine Tussock Sedge Ecosite is typically located on shallow, water receiving lower slopes and basins, where sub-surface flow of water occurs on top of the permafrost boundary. Tussock cotton-grass is the most prominent species, providing about 20 to 40% of ground cover and forming tough fibrous clumps or tussocks. Hummocky peat mounds developed through cryoturbation are common throughout this ecosite. Shrub and heath vegetation grows on and between the mounds and provides approximately 20% to 30% cover. Shrubs commonly include glandular birch, grey-leaved willow, and tea-leaved willow. Heaths include mountain cranberry, black crowberry, northern Labrador tea, bearberries (*Arctous* spp.), and bog bilberry. Typical non-woody species include round-fruited sedge (*Carex rotundata*), wide-leaved polargrass, louseworts (*Pedicularis* spp.), and pelt lichens. Mosses, including peat mosses and *Aulacomnium* species, form the understory layer.

Landforms commonly associated with marine tussock sedge ecosite include marine long, gentle slopes and marine blankets. Soil moisture regime is predominately hygric to subhygric with a poor to medium nutrient regime. These sites are poorly to imperfectly drained with permafrost relatively close to the surface (3 cm to 30 cm). Gleysolic Turbic Cryosols are the dominate soil type present in the ecosite. These soils have developed under poorly drained areas under reducing conditions (Soil Classification Working Group 1998).

C.6 Raised Beach Ecosite Group

C.6.1 Raised Beach Cobble Ecosite

The Raised Beach Cobble Ecosite is composed of ridged deposits on coarse gravel and cobbles deposited by wave action on elevated areas above sea level near the arctic coast. The cobble and coarse gravel support a groundcover mat of lichens including reindeer lichens, snow lichens, and other light-coloured lichens. A thick growth of black rock tripe or a carpet of hoary rock moss occurs on coarser rock substrates. Where these beaches occur close to the modern shoreline, such as at the sand beaches at the mouth of the Kennarctic River, colonizers such as sea lymegrass (*Leymus mollis*), beach pea (*Lathyrus japonicus*), and seabeach sandwort (*Honckenya peploides*) occur. Higher on the raised beaches, lichens (especially snow lichens) and bryophytes (such as rock moss) take hold in the depressions between beach ridges. Further inland, the beaches have a more consistent cover of rooted plants, including glandular birch, prostrate willows, black cowberry, sea lymegrass, and a variety of forbs. These ecosites occur predominately on bouldery marine discontinuous sediment with a xeric soil moisture regime and a poor to very poor nutrient regime. These sites are rapidly to well drained.

C.6.2 Raised Beach Lichen Heath

The Raised Beach Lichen Heath Ecosite occurs on level to gentle sloping terrain on sand and gravel substrates. They are characterized by patches of low-lying heath, graminoids, and lichen interspersed with patches of exposed substrates. Graminoids include sea lymegrass, arctic bluegrass, alpine sweetgrass, northern woodrush (*Luzula confusa*), and various sedges. Sea lymegrass dominates on sand substrates. Over time, mats of arctic willow and heaths such as mountain cranberry, black crowberry, and bearberries establish among the lichen cover. Other rooted plants including three-toothed saxifrage and chickweeds may also be present. Higher on these beaches, mats of heath tundra develop on the accumulated soil. Common lichens occurring are green witch's hair lichen, witch's-beard lichen, curled snow lichen, crinkled snow lichen, reindeer lichen, star-tipped cup lichen, arctic tumbleweed lichen, Iceland lichens, Bryocaulon lichens, and arctic finger lichen. This ecosite occurs primarily on flat and ridged marine sand with a subxeric to mesic moisture regime and a poor to medium nutrient regime

C.7 Sedge Ecosite Group

C.7.1 Non-tussock Sedge Ecosite

The Non-Tussock Sedge Ecosite occurs in low depressions where the water table sits at or just below the surface and there is standing or flowing water. This wetland ecosite consists of a sparse to dense growth of emergent sedges, aquatic mosses, and other rooted aquatic vegetation. Shrubs and herbaceous plants are sparse, providing less than 10% of the ground cover. Alaska bog willow (*Salix fuscescens)* occurs within most sites. Dominant graminoids are russet cottongrass (*Eriophorum russeolum*), narrow-leaved cottongrass, water sedge, fragile sedge (*Carex membranacea*), and creeping sedge (*C. chordorrhiza*). The moss layer is dominated by peat mosses with minor components of turgid Aulacomnium moss.

This ecosite is predominantly found within till depressions with a hydric soil moisture regime and a medium to very poor nutrient regime. It is common on poorly to very poorly drained sites with permafrost generally encountered close to the surface (15 cm to 40 cm). Gleysolic Turbic Cryosols are the dominant soil type present within the ecosite. These soils are developed on recently deposited or strongly cryoturbated soil materials and have developed under poorly drained areas under reducing conditions (Soil Classification Working Group 1998).

C.7.2 Tussock Sedge Ecosite

The Tussock Sedge Ecosite occurs where fresh water collects or moves; either above the ground surface in ponds, lakes and streams; or beneath the ground surface, on top of the permafrost boundary, such as on lower slopes and valley floors. This ecosite is characterized by tussocks formed from various cottongrasses and sedges with shrubs and herbaceous plants establishing on dry microsites on the tussocks. Dry microsites are dominated by ground shrubs including bog rosemary, northern Labrador tea, bog bilberry, and mountain cranberry. Glandular birch occurs in both the ground shrub and low shrub layers reaching heights of 0.2 m to 1.5 m. Herbaceous plant species are limited within the ecosite and consist mainly of cloudberry, which occurs frequently. Graminoids abundant on these ecosites include tussock cottongrass, russet cottongrass, water sedge, round-fruited sedge, and Bigelow's sedge. Lichens

are found in low abundance; however, if present consisted of snow lichens, club lichens, and reindeer lichens. The bryophyte layer consists mainly of peat mosses, turgid Aulacomnium moss, juniper hair-cap moss, and hamatocaulis moss (*Hamatocaulis* spp.).

This ecosite is predominately found within till depressions occurring occasionally on till long gentle slopes with a hygric to subhydric soil moisture regime and a poor nutrient regime. These sites are imperfectly to poorly drained with permafrost relatively close to the surface (20cm to 50 cm). Gleysolic Turbic Cryosols are the dominant soil type present with the ecosite. These soils are developed on recently deposited or strongly cryoturbated soil materials and have developed under poorly drained areas under reducing conditions (Soil Classification Working Group 1998).

C.8 Shrub Ecosite Group

C.8.1 Birch Seep Ecosite

The Birch Seep Shrub Ecosite occurs on slightly steep slopes, where water flows on or under boulders and rocks. Low (65%) and ground (54%) shrubs dominate vascular cover with moss species (56%) occupying within portions of the site. Birches and willows, including glandular birch and tea-leaved willow dominant the shrub layer which can reach heights of between 0.2 m and 1.5 m tall forming continuous cover. Abundant understory shrubs are northern Labrador tea, bog bilberry and mountain cranberry with minor components of black crowberry. Graminoids and forbs are sparse; however, cloudberry dominates the forb layer when present. Lichens occurring in low abundance are mainly curled snow lichen and reindeer lichen. The moss layer is dominated by stairstep moss, turgid Aulacomnium moss, with minor components of juniper hair-cap moss, broom mosses, and peat mosses.

Common landforms that this ecosite occurs on are till veneer, bouldery till veneer, till depressions and hummocky colluvium areas. Soil moisture regime is typically subhygric with a poor to very poor nutrient regime. These ecosites are poorly drained with an average depth to permafrost of 43 cm ranging from 30 to 60 cm. Soils for this ecosite are variable with Regosolic Turbic Cryosols, Brunisolic Eutric Turbic Cryosols, Gleysolic Turbic Cryosols and Orthic Regosols all occurring. Turbic Cryosol soils have developed on recently deposited or strongly cryoturbated soils (Soil Classification Working Group 1998).

C.8.2 Low Shrub Ecosite

The Low Shrub Ecosite occurs on mid to lower slope positions on long gentle slopes, where water flows or collects on the surface or on top of the permafrost or bedrock boundary. Birches and willows, including glandular birch and tea-leaved willow, are the dominant shrubs which may reach heights of up to 1.5 m tall and form a relatively continuous cover. Cover of understory heaths, herbaceous plants, and litter varies greatly with shrub density and substrate. Abundant understory shrubs are black crowberry, northern Labrador tea, bog bilberry, and mountain cranberry with minor components of four-angled mountain heather. Graminoids commonly observed are Bigelow’s sedge and alpine sweetgrass in relatively low cover. Lichens occurring are mainly club lichens and arctic finger lichen with the bryophyte layer dominated by turgid Aulacomnium moss, stairstep moss, ciliate fringewort (*Ptilidium ciliare*), and peat mosses with minor components of juniper hair-cap moss and broom mosses.

This ecosite typically occurs on long gentle till slopes, depressions and veneers. Soil moisture regime is predominately subhygric with a poor nutrient regime. Drainage on low shrub sites is moderately well to imperfect with depth to permafrost ranging from 25 cm to 120 cm. Soils are commonly Brunisolic Eutric and Brunisolic Dystric Turbic Cryosols. Brunisolic Eutric Turbic Cryosols have a relatively high degree of base saturation unlike Brunisolic Dystric Turbic Cryosols which are acidic with a low degree of base saturation. Each of these soil subgroups has a Bm horizon at least 10 cm thick (Soil Classification Working Group 1998).

C.8.3 Riparian Tall Shrub Ecosite

The Riparian Tall Shrub Ecosite occurs on level to lower gentle slopes, and is predominately associated with riparian areas along creeks, streams and rivers. Overall cover for tall shrubs is 49% with low shrub cover at 42% and sparse ground shrub cover (22%). Due to high cover of shrubs limiting amount of light penetration, lichen (2%), bryophyte (15%) and forb (14%) cover is relatively low with graminoid cover around 30%. Both tea-leaved willow and glandular birch occur in the majority of shrub layers with bog bilberry present at lower heights. Diamond-leaved willow (*Salix pulchra*) and shrubby cinquefoil (*Dasiphora fruticosa*) are occasionally present within the shrub layer. Willows and birch within this ecosite can reach heights of three metres tall and form a continuous cover along riparian areas. Cover of understory heaths, herbaceous plants and litter varies greatly with shrub density and substrate. Sedges are the dominating graminoids including water sedge with minor components of blue-joint reedgrass (*Calamagrostis canadensis*).

This ecosite commonly occurs within till depressions as well as bouldery undifferentiated channel shaped landforms and fluvial plans. Soil moisture regime is typically hygric with a medium to poor nutrient regime. Drainage within the tall riparian shrub ecosite is imperfectly to poorly drained with an average depth to permafrost around 35 cm. Soil classifications common for these ecosites are Gleysolic Turbic Cryosols and Gleysolic Static Cryosols. Static Cryosols develop mainly within recently deposited or disturbed sediments where evidence of cryoturbation is reasonably absent. Turbic Cryosols develop primarily in mineral material with evidence of cryoturbation and occur on patterned ground. Gleysolic Static and Turbic Cryosols generally develop within poorly drained sites under reducing conditions (Soil Classification Working Group 1998).

C.8.4 Riparian Willow Ecosite

The Riparian Willow Ecosite occurs on lower topographic positions on long gentle slopes; typically, water flows on or under the surface. This wetland ecosite contains higher graminoid (24%) and moss (40%) content than that of the tall riparian shrub ecosite and shrub heights are typically about 1 m tall. The riparian willow ecosite primarily occurs within the northern portion of the Izok Corridor Project study areas and often exhibits a graminoid zone surrounded by willows and birch. Shrubs including glandular birch and tea-leaved willow are dominant. Understory shrubs abundant within this ecosite are grey-leaved willow, bog bilberry, and other willow species. Graminoids species frequently observed are sedges and bluegrasses with Lapland lousewort dominating the forb layer.

The riparian willow ecosite occurs predominately on shallow channel shaped marine sediments and bouldery undifferentiated shallow channel-shaped landforms. The soil moisture regime is subhygric to hydric with a medium to poor nutrient regime and poorly to very poorly drained. Soils for this ecosite are variable and include Brunisolic Dystric Turbic Cryosols, Gleysolic Static Cryosols and Orthic Regosols. (Soil Classification Working Group 1998).

C.8.5 Steep Shrub Slopes Ecosite

The Steep Shrub Slopes Ecosite occurs on upper to mid steep slopes, where water flows on the side of steep rock outcrops, and are mainly located on west-facing slopes. Ground shrubs (64%) dominate the overall vascular cover with a minor component of low shrubs (39%). Birches and willows, including glandular birch and grey-leaved willow dominant the shrub layer which may reach heights of 1.5 m tall and form an open to continuous cover. Cover of understory shrubs, heaths, herbaceous plants and litter varies with shrub density, presence of bedrock and boulders and stability of slope substrate. Understory shrubs abundant within this ecosite are black crowberry, northern Labrador tea, four-angled mountain heather, alpine bearberry, bog bilberry, and mountain cranberry. Alpine sweetgrass dominates the graminoid layer with forb cover relatively low in abundance. Lichen cover is somewhat low; however, when lichens do occur, species include curled snow lichen, crinkled snow lichen, arctic tumbleweed lichen, and arctic finger lichen. Accompanying the lichens is a bryophyte layer dominated by juniper hair-cap moss, turgid Aulacomnium moss, broom mosses, and stairstep moss.

This ecosite is commonly found on steep bedrock slopes and hummocky bedrock landforms. Soil moisture regime is predominately mesic with a poor nutrient regime. Drainage within these sites is well to moderately well with a depth to permafrost of approximately 45 cm, ranging from 40 cm to 50 cm. Soils common for the steep shrub slope ecosite are Regosolic Turbic Cryosols. These soils are developed on recently deposited or strongly cryoturbated soil materials lacking B horizons and having little to no organic matter (Soil Classification Working Group 1998).

C.8.6 Transitional Tall Shrub Ecosite

The Transitional Tall Shrub Ecosite occurs on upper to mid gentle slopes. This is a transition shrub community that replaces heath tundra on upland sites closer to the southern tree line. It is found mainly near the proposed Izok mine site. Glandular birch is the dominant shrub on these sites and can reach heights up to approximately 1.5 m tall forming a discontinuous to continuous cover. Shrub cover and height increases on warm sites and with closer proximity to the southern tree line. Cover of understory heaths, herbaceous plants, and litter can vary depending on the density of birch within the lower shrub layer. Understory shrubs abundant within this ecosite are black crowberry, northern Labrador tea, bog bilberry, and mountain cranberry with minor components of alpine azalea. Grey-leaved willow and tea-leaved willow occur on all the Transitional Tall Shrub sites in very low density and cover. Maydell's locoweed, Labrador lousewort, and small tofieldia (*Tofieldia pusilla*) are commonly present on these sites. Graminoids present are Bigelow's sedge and alpine sweetgrass in relatively low cover. Lichens present within the majority of sites are alpine foam lichen (*Stereocaulon alpinum*), witch's hair lichens, Iceland lichen (*Cetraria ericetorum*), curled snow lichen, crinkled snow lichen, reindeer lichen, heath foxhair lichen

(*Bryocaulon divergens*), pelt lichens, and arctic finger lichen. The moss layer consists mainly of turgid Aulacomnium moss, common broom moss (*Dicranum scoparium*), stairstep moss, and peat mosses.

This ecosite occurs mainly on till blankets and undulating till landforms with a soil moisture regime of submesic and a poor nutrient regime. Sites are well to poorly drained with an average depth to permafrost of 43 cm. Soils common for this ecosite are Brunisolic Eutric Turbic Cryosols. These soils are developed on recently deposited or strongly cryoturbated soil materials having a high degree of base saturation, as indicated by their pH (Soil Classification Working Group 1998).

C.9 Unvegetated Terrain Ecosite Group

C.9.1 Exposed Cobble and Coarse Gravel Ecosite

The Exposed Cobble and Coarse Gravel Ecosite occurs on lower to level slopes, where environment factors such as water erosion have removed finer sediments, resulting in limited vegetation establishment. Exposed sediment dominates the cover of these sites at approximately 99%. Shrubs abundant on these sites include northern Labrador tea and bog bilberry. Forbs such as river beauty may be found on these sites as well as tufted clubrush (*Trichophorum cespitosum*). Common landforms for this ecosite are river valleys and outwash on lower slopes. Soil moisture regime ranges from subxeric to subhydric with a poor to very poor nutrient regime and drainage ranging from rapid to poor.

C.9.2 Exposed Marine Sediment Ecosite

The Exposed Marine Sediment Ecosite occurs along the edges of the Kennarctic River valley in the northern PDA and LAA, where numerous mostly unvegetated, eroding slopes and crests occur. This exposed marine sediment ecosite has less than 20% vegetation cover, including a sparse cover of willows, grasses, sedges, and forbs. The crests and steeply sloping sides are mostly unvegetated. Middle slopes are occupied solely by tufted grasses, and the lower gentle slopes have mats of prostrate willows. Frost-heaved bottom slopes are occupied by willows, horsetails (*Equisetum* spp.), legumes, and grasses with few to no heath species.

C.9.3 Exposed Silt, Sand and Fine Gravel Ecosite

The Exposed Silt/Sand and Fine Gravel Ecosite occurs mainly on upper to mid slope positions, where environment factors such as wind and water erosion have limited vegetation establishment. Exposed sediment dominates the cover of these sites at approximately 89%. Forbs such as moss campion and three-toothed saxifrage prevail on these sites. Short-leaved fescue, purple reedgrass, and weak arctic sedge are the dominant graminoids found within this ecosite.

This ecosite occurs on delta, fan, and ridged glaciofluvial landforms as well as occasionally on glaciolacustrine genetic material. Soil moisture regime is predominately xeric with a poor to very poor nutrient regime. Drainage on exposed sediment sites is rapid with permafrost not usually encountered. Soils are variable and include both Orthic Humic Regosols and Brunisolic Dystric Turbic Cryosols. Brunisolic Dystric Turbic Cryosols are developed on recently deposited or strongly cryoturbated soil and

have a low degree of base saturation (Soil Classification Working Group 1998). Orthic Humic Regosols are characterized by an Ah horizon at the mineral surface. However, these soils do not have a recognizable B horizon and are therefore considered to be weakly developed (Soil Classification Working Group 1998).

C.10 Small Patch Vegetation Communities

C.10.1 Avens Community

The Avens Small Patch Community occurs on exposed sites on ridge tops, terraces, and esker crests support a sparse carpet of vegetation in which mountain avens are dominant, forming 25% or more of the cover. Avens Small Patch Communities are common, but usually too small to be mappable. Soils are generally thin, sandy, or gravely, well drained and xeric. Other common species include rock sedge, narrow false oats, and black crowberry. Witch's hair lichens and hoary rock moss are the dominant ground cover species. Crinkled snow lichen, star-tipped cup lichen, and whiteworm lichen may also be present.

Glandular birch, grey-leaved willow, and net-veined willow are present but uncommon in this community. Heaths are present in low numbers, including mountain cranberry, bog bilberry, alpine bearberry, and four-angled mountain heather in hollows. Less common herbaceous species in the avens community include Bigelow's sedge, hair-like sedge (*Carex capillaris*), single-spike sedge, northern woodrush, moss campion, three-toothed saxifrage, sea thrift (*Armeria maritima*), alpine pussytoes, alpine milk-vetch, *Hedysarum* species, and arctic locoweed. Arctic bladderpod (*Physaria arctica*) and mouse-tail bog sedge (*Carex myosuroides*) occur in this habitat on calcareous substrates.

C.10.2 Coastal Vegetation Communities

Coastal Small Patch Communities occur in close proximity to the ocean and are affected by salt water. Some communities are affected by daily tides, some only by storm or unusually high tides, and some only by salt spray. The component plants are tolerant of high salt levels.

On the open shore, exposed to long reaches of the sea, beaches have little or no vegetation. Sandy beaches may be colonized by beach pea, seabeach sandwort, sea lymegrass, and sea thrift. In protected coves, gravelly beaches may support small specimens of oysterleaf (*Mertensia maritima*), sea lymegrass, or seabeach sandwort.

The coastal backshore community occurs in areas not inundated except by very high tides or storm surge. It often is affected by wind and includes small sand dunes. Component plants include low willows such as arctic willow and net-veined willow, sea lymegrass, creeping alkaligrass (*Puccinellia phryganodes)*, fescues (*Festuca* spp.), bluegrasses, beach pea, four-parted dwarf-gentian (*Gentianella propinqua*), Greenland silverweed (*Argentina anserina* ssp. *groenlandica*), pretty cinquefoil (*Potentilla pulchella)*, saltmarsh starwort (*Stellaria humifusa*), long-stalked starwort, and Kotzebue's grass-of-Parnassus (*Parnassia kotzebuei*).

C.10.3 Den Site Communities

Den Site Small Communities occur in places where mammals create dens, and are generally disturbed in two ways. First, the vegetation and soil is rearranged due to digging and activities around the opening to a den. Second, organic matter from the inhabitants provides nutrients that otherwise would not be there, resulting in a lush growth of plants.

Arctic ground squirrels (*Spermophilus parryii*) are small and do not stray far from their dens; therefore, they deposit a lot of fecal material and urine around the den. In addition to these contributions, their digging activities and multiple burrow entrances disrupt plant growth, and the addition of nutrients fertilizes the ground and encourages the growth of a fairly characteristic flora around den entrances. Most ground squirrel dens examined were located in dry willow communities, usually occurring on ridges or slopes, and characterized by a localized dense growth of willows. Richardson's willow and grey-leaved willow were the most common species, with glandular birch often co-occurring. Smaller plants of barren-ground willow or little-tree willow (*Salix arbusculoides*) may also be associated with the den site. Common grasses occurring under the willow cover include alpine meadow bluegrass (*Poa pratensis* ssp. *alpigena*), alpine bluegrass (*P. alpina*), arctic bluegrass, purple reedgrass, wide-leaved polargrass, and narrow false oats. Long-stalked starwort and alpine chickweed (*Cerastium alpinum*) are often present.

Den Site Small Communities not associated with dry willow communities are similar but lack the cover of large willow plants. There is usually a stand of tall grass, as well as other smaller grasses such as bluegrasses or alpine sweetgrass. Some sedges may also be present, including Bigelow's sedge, single-spike sedge, and weak arctic sedge. Sea lymegrass acts as the tall grass in marine areas close to the shoreline, while purple reedgrass or slim-stemmed reedgrass (*Calamagrostis stricta*) are more common at inland sites. Mountain avens, Tilesius' wormwood (*Artemisia tilesii*), snow cinquefoil, and alpine pussytoes are almost always present, with river beauty and three-toothed saxifrage often occurring. On many den sites, heaths are present outside the area of recent disturbance, including bog bilberry, mountain cranberry, bearberries, and northern Labrador tea. Occasionally, reddish stitchwort (*Sabulina rubella*), long-leaved arnica (*Arnica lonchophylla*), Pallas' wallflower, or arctic catchfly (*Silene involucrata*) are present as well. Plants growing near the burrows may not have flowers due to ground squirrels feeding selectively on the blooms.

Den sites used by other species such as weasels (*Mustela* spp.), foxes (*Vulpes vulpes*, *V. lagopus*) and wolverines (*Gulo gulo*) develop floras similar to those around ground squirrel dens. The area around wolf (*Canis lupus*) dens is generally not as nutrient-enhanced as the dens of smaller animals. However, due to the digging activity, these sites usually have a lush growth of tall grasses, commonly reedgrasses. Grizzly bear (*Ursus arctos*) dens usually are not surrounded by vegetation encouraged by nutrients. However, grasses tend to establish anywhere where the vegetation is disturbed by digging.

C.10.4 Gossans Community

The Gossan Small Community is characterized by the presence of gossans, which are exposed, oxidized, rust-colored outcrops of mineral veins that occur in the High Lake mine area. These areas support relatively little vegetation cover and only a few species, including northern Labrador tea, arctic water sedge (*Carex aquatilis* var. *minor*), reedgrasses, and mountain cranberry.

C.10.5 Mossy Cliff Base Community

The Mossy Cliff Base Small Community is located along cliffs, especially those facing southeast or facing deep canyons, which occasionally have moss communities at their bases. These communities are usually small but are sufficiently different to warrant mention. They likely occur where water flows down the cliff face and collects in depressions at the base. Peat mosses are common and four-angled mountain heather often grows here, sometimes in pure stands. Northern Labrador tea, bog bilberry, mountain cranberry, and bluegrasses also occur here. Lapland buttercup and other buttercup species (*Ranunculus* spp.) are occasionally present. Northern woodrush and dark-brown sedge are sometimes scattered within the moss carpet.

C.10.6 Mossy Freshwater Shoreline Community

The Mossy Freshwater Shoreline Small Community has a thick growth of peat moss which occasionally occurs along the edges of water bodies and old stream channels or between a shoreline solifluction ridge and the area inshore from the ridge. The peat mosses grow in mounds, which insulates the ground from higher temperatures in summer. The permafrost level tends to be elevated in these mounds, as does acidity, which influences plant communities. Many plant species can become established in peat mounds and a diverse community usually develops. This may include northern Labrador tea, cloudberry, bog bilberry, and bog rosemary. Few birch or willows occur as they are generally less acid-tolerant. Lichens are not as common due to the high moisture levels, but snow lichens and pelt lichens are present. A few sedge species including water sedge and round-fruited sedge are found near the edges of this vegetation community. Mossy shoreline communities are common in the Izok Corridor Project local study area, but are usually small.

C.10.7 Riparian Heath Community

The Riparian Heath Small Community occurs in some small watersheds, primarily in glaciofluvial landforms and downslope of seasonal ponds, an unusual riparian community may occur. Vegetation consists of a collection of heaths, including four-angled mountain heather, northern Labrador tea, mountain cranberry, and bog bilberry. Mounds of peat mosses being colonized by heaths are scattered throughout the drainage channel. There are relatively few tall shrubs such as willows or dwarf birches, and these do not form a dense cover. Sedges are common but do not form a dense cover. Sedges include Bigelow's sedge, arctic marsh sedge (*Carex holostoma*), and sheathed sedge. Small tussocks of tufted clubrush also occur.

C.10.8 Sorted Stone Circle Community

The Sorted Stone Circle Small Community is a periglacial landform, or patterned ground, due to frost heave during freeze-thaw cycles in areas of permafrost. An area of unsorted stone circles was present in a narrow band at the base of a gentle slope next to a sedge wetland. There were at least thirty circles, each with well-defined peat rims approximately 20 cm wide by 15 cm high, with centers of hard silty mud with small gravel. The centers were occupied by small specimens of rock sedge, hair-like sedge, three-flowered rush (*Juncus triglumis*), net-veined willow, entire-leaved mountain avens, and moss campion. The rims supported a typical heath tundra ecosite, including glandular birch, grey-leaved willow, northern willow, mountain cranberry, bog bilberry, northern Labrador tea, long-stalked starwort, and purple-haired groundsel. Single-spike sedge and northern woodrush were also scattered about on the rims of the circles.

Appendix D 2024 Ecosite Survey Photographs

Photo 1 Bedrock and Boulders Ecosite Group

Photo 2 Esker/ Outwash Complex Ecosite Group

Photo 3 Heath Tundra Ecosite Group – Cryoturbated Heath Tundra Ecosite

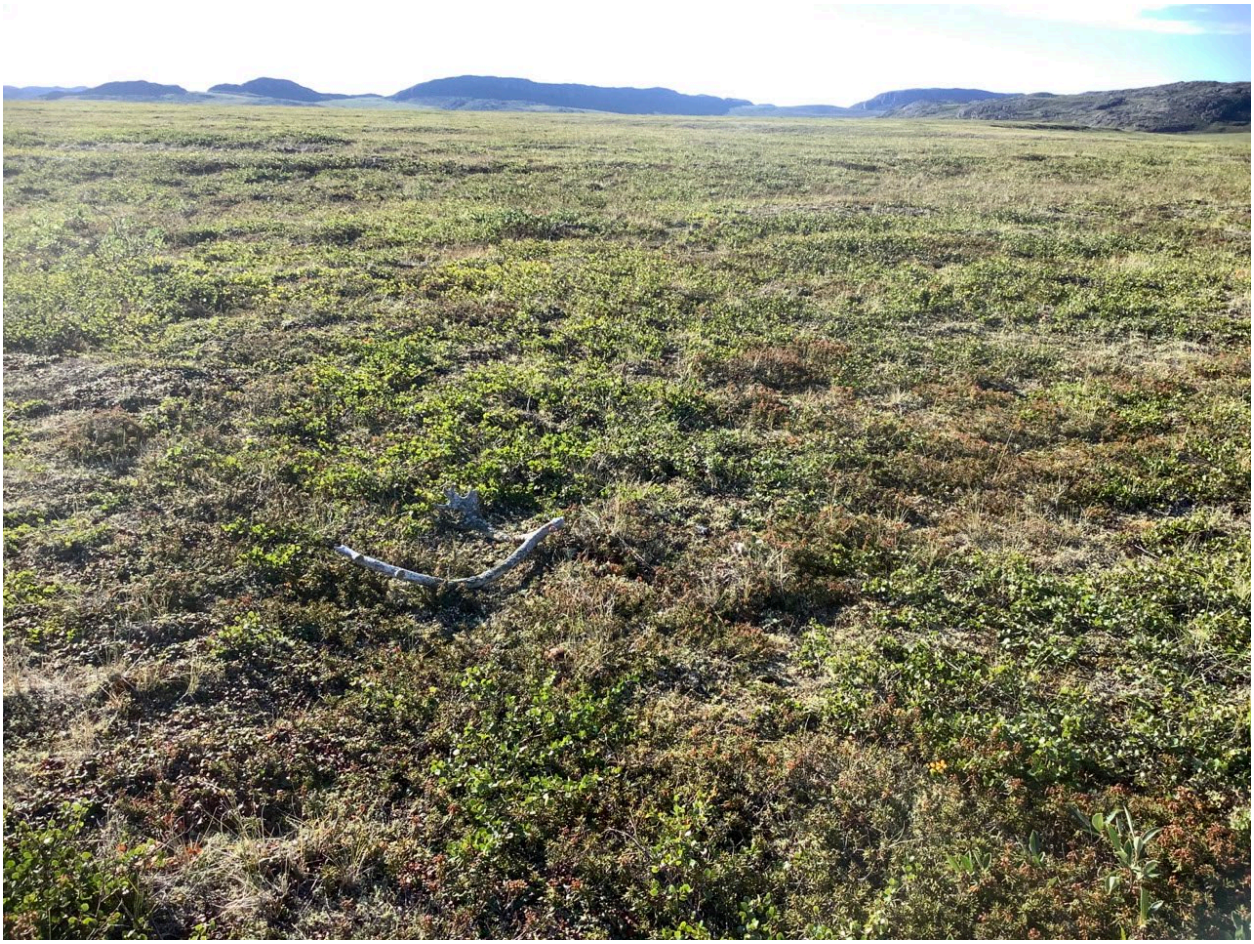


Photo 4 Heath Tundra Ecosite Group – Graminoid Heath Tundra Ecosite

Photo 5 Heath Tundra Ecosite Group – Heath Bedrock Ecosite

Photo 6 Heath Tundra Ecosite Group – Heath Tundra Ecosite

Photo 7 Marine Sediments Ecosite Group – Marine Heath Tundra Ecosite

Photo 8 Marine Sediments Ecosite Group – Marine Low Shrub Ecosite

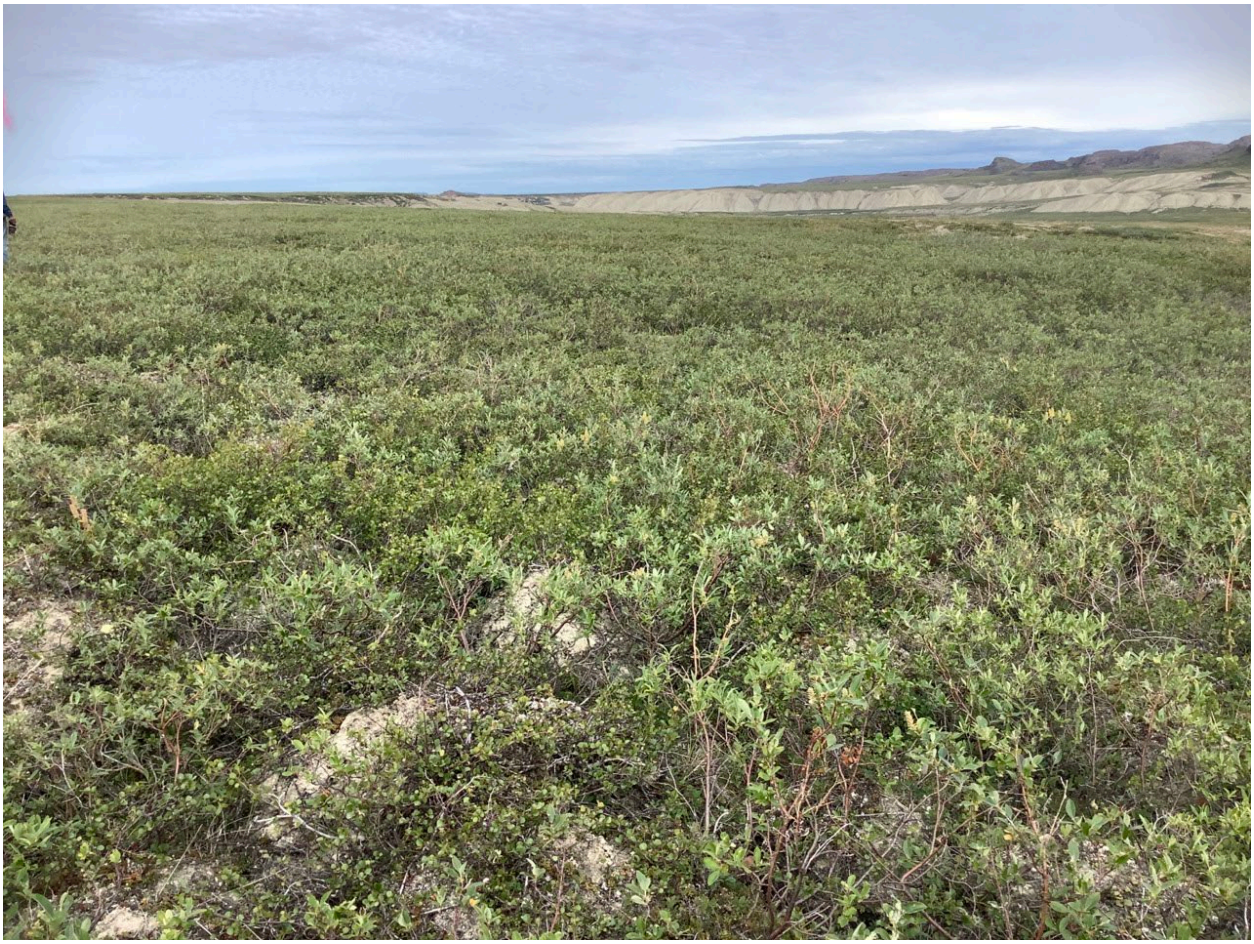


Photo 9 Raised Beach Ecosite Group – Raised Beach Cobble Ecosite

Photo 10 Sedge Ecosite group – Non-tussock Sedge Ecosite

Photo 11 Sedge Ecosite group – Tussock Sedge Ecosite