
**AMENDED EIS/EA REPORT
CHAPTER 2: ENVIRONMENTAL ASSESSMENT METHODS
VERSION 3**



TABLES

AMENDED EIS/EA REPORT
CHAPTER 2: ENVIRONMENTAL ASSESSMENT METHODS
VERSION 3



Table 2-1: Characterization Used in Evaluating Alternatives

Environmental Characterization	Technical Characterization	Project-economics Characterization	Socio-economic Characterization
<ul style="list-style-type: none"> ■ Distance from the Mine/Ore Processing Facility. ■ Topography. ■ Stockpile footprint and dimensions. ■ Failure/poor performance consequences. ■ Removal of vegetation. ■ Effects on aquatic ecology. ■ Effects on terrestrial ecology. ■ Effects on hydrogeology. ■ Effects on hydrology. ■ Effects on water quality. ■ Effects on air quality 	<ul style="list-style-type: none"> ■ Topography/watershed considerations. ■ Hydrological/hydrogeological/watershed considerations. ■ Geotechnical design considerations. ■ Storage capacity. ■ Dumping techniques. ■ Haul distances. ■ Sedimentation and pollution control dam requirements. ■ Tailings discharge methods. ■ Pipeline grades and routes. ■ Closure design. ■ Long-term stability and safety ■ Extent of water treatment infrastructure. ■ Supporting infrastructure (access roads). ■ Ease of construction. 	<ul style="list-style-type: none"> ■ Capital Cost. ■ Operating Cost. ■ Closure Cost. ■ Fish Habitat Compensation. ■ Land use or lease fees 	<ul style="list-style-type: none"> ■ Aesthetics. ■ Community safety. ■ Presence of archaeological sites. ■ Cultural significance. ■ Employment/training opportunities. ■ Effects on cultural heritage sites. ■ Effects on land use.

AMENDED EIS/EA REPORT
CHAPTER 2: ENVIRONMENTAL ASSESSMENT METHODS
VERSION 3



Table 2-2: Biological Criteria for the Selection of Valued Ecosystem Components

Biological Criteria	Rationale
Range	Selection focused on those species with local populations, since these would be more likely to suffer adverse effects at the population level. Broadly distributed populations could withstand localized effects with little or no effect on the population as a whole, and therefore, would not be as sensitive to Project-related effects.
Abundance of the species within the local aquatic community	Effects would be more readily measured and therefore, more readily apparent in those organisms that form a major component of the local community.
Status of the species	Native species (i.e., those that have been well established in the area over a long time period) provide the greatest opportunity to show responses to environmental effects. The responses would not be clouded by population dynamics that may not have reached equilibrium, or that may be influenced by anthropogenic actions such as stocking or management programs.
Habitat use by the species	Species that are permanent residents are more likely to show a response since they are subject to the effect(s) for a much greater percentage of their life history.
Residency sensitivity	The relative effect would be greatest for those organisms using the area during critical life history stages such as those associated with reproduction, or during critical growth periods. Those organisms that use the area only during infrequent periods or as part of a broader feeding range would be less likely to suffer and hence demonstrate effects.
Exposure potential and duration	Those organisms that are closer to the sources of effect, and that are exposed to the effect for extended periods of time would be more suitable for measuring potential effects.
Sensitivity	Those species that are known to be most sensitive to the potential effects would provide the most sensitive measure of effects.
Role of the species in the local food web	While certain species may not be significant under the above selection criteria, they may nonetheless be significant locally as a food source for other organisms. As such, the viability of their populations locally may affect the viability of other species.
Socio-economic importance	Those organisms that are socially or economically important could result in effects that extend beyond the aquatic ecosystem to ultimately affect human uses.
Information availability	Determination of effects depends on detection of changes in an organism's response, either at the level of the individual or the population. In order to reliably detect such changes, the life history of the organism in the area needs to be known in detail. Furthermore, the natural variability of population-level or community-level parameters must be known if Project-related effects are to be distinguished from natural variability.

**AMENDED EIS/EA REPORT
CHAPTER 2: ENVIRONMENTAL ASSESSMENT METHODS
VERSION 3**



Table 2-3: Hammond Reef Gold Project Valued Ecosystem Components/Valued Social Components

VEC/VSC	Rationale for Selection	Indicators
TERRESTRIAL ENVIRONMENT		
Habitat VECs		
Wetlands	<ul style="list-style-type: none"> ■ Support's the ecological integrity of the boreal region ■ Important as wildlife habitat ■ Support migratory waterfowl breeding ■ Supports critical habitats for beaver, moose, others ■ Hydrological functions ■ Supports traditional use plants (e.g., wild rice) 	<ul style="list-style-type: none"> ■ Extent of wetland habitat ■ Composition/diversity of wetland plant communities ■ Hydrological function
Forest Cover	<ul style="list-style-type: none"> ■ Dominant forest plant community that supports the ecological integrity of the boreal region ■ Important as wildlife habitat ■ Supports populations of large carnivores such as black bear, wolves and lynx, as well as prey animals such as hare, marten and red squirrel ■ Abundance of migratory birds utilize habitat for breeding ■ Socio-economic importance 	<ul style="list-style-type: none"> ■ Extent of forested habitat ■ Composition of forest plant community ■ Suitability of habitat in supporting wildlife populations

**AMENDED EIS/EA REPORT
CHAPTER 2: ENVIRONMENTAL ASSESSMENT METHODS
VERSION 3**



Table 2-3: Hammond Reef Gold Project Valued Ecosystem Components/Valued Social Components

VEC/VSC	Rationale for Selection	Indicators
TERRESTRIAL ENVIRONMENT (CONTINUED)		
Group VECs		
Species at Risk	<p>Bald Eagle</p> <ul style="list-style-type: none"> ■ Observed in the vicinity of the Project Site ■ Cultural significance ■ Provincially, bald eagles are designated as Special Concern under Ontario's <i>Endangered Species Act</i> 	<ul style="list-style-type: none"> ■ Habitat suitability and availability for bald eagle
Common Nighthawk	<ul style="list-style-type: none"> ■ Bird SAR observed on and in the vicinity of the Project Site ■ Provincially, Common nighthawk is designated as Special Concern under Ontario's <i>Endangered Species Act</i> ■ Breeding habitat occurs on the Project Site 	<ul style="list-style-type: none"> ■ Habitat suitability and availability for common nighthawk
Canada Warbler	<ul style="list-style-type: none"> ■ Bird SAR observed on and in the vicinity of the Project Site ■ Provincially, Canada warbler is designated as Special Concern under Ontario's <i>Endangered Species Act</i> ■ Breeding habitat occurs on the Project Site 	<ul style="list-style-type: none"> ■ Habitat suitability and availability for Canada warbler
Little Brown Myotis	<ul style="list-style-type: none"> ■ Observed in the vicinity of the Project Site ■ Cultural significance ■ Provincially, little brown myotis are designated as Special Concern under Ontario's <i>Endangered Species Act</i> 	<ul style="list-style-type: none"> ■ Habitat suitability and availability for little brown myotis
Northern Myotis	<ul style="list-style-type: none"> ■ Observed in the vicinity of the Project Site ■ Cultural significance ■ Provincially, northern myotis are designated as Special Concern under Ontario's <i>Endangered Species Act</i> 	<ul style="list-style-type: none"> ■ Habitat suitability and availability for northern myotis
Snapping Turtle	<ul style="list-style-type: none"> ■ Herpetofaunal SAR observed on and in the vicinity of the Project Site ■ One of few reptile species in this northern ecosystem ■ Indicator of wetland function 	<ul style="list-style-type: none"> ■ Habitat suitability and availability for snapping turtle

**AMENDED EIS/EA REPORT
CHAPTER 2: ENVIRONMENTAL ASSESSMENT METHODS
VERSION 3**



Table 2-3: Hammond Reef Gold Project Valued Ecosystem Components/Valued Social Components

VEC/VSC	Rationale for Selection	Indicators
TERRESTRIAL ENVIRONMENT (CONTINUED)		
Group VECs (Continued)		
Furbearers	<ul style="list-style-type: none"> ■ Marten ■ Muskrat <ul style="list-style-type: none"> ■ Common and abundant in the Project Site ■ Important prey species for many carnivores in northern environments ■ May be tolerant of human activities, but may be affected by habitat loss ■ Traditional and non-traditional uses 	<ul style="list-style-type: none"> ■ Presence/persistence of furbearers ■ Habitat suitability and availability for furbearers
Upland Breeding Birds	<ul style="list-style-type: none"> ■ Small territory size and high bird density means large numbers of upland birds may be affected by habitat loss ■ Migratory birds are susceptible to population declines as a result of changing environmental conditions on breeding and overwintering habitats 	<ul style="list-style-type: none"> ■ Relative abundance of breeding birds ■ Habitat suitability and availability for upland breeding birds
Species VECs		
Moose	<ul style="list-style-type: none"> ■ Observed on and in the vicinity of the Project Site ■ Important subsistence and cultural species ■ Large herbivorous mammal requiring a large home range ■ Prey species for large carnivores 	<ul style="list-style-type: none"> ■ Presence/persistence of moose in the area ■ Habitat suitability and availability for moose
Wild rice	<ul style="list-style-type: none"> ■ Traditional use plant (culturally significant to Aboriginal communities) ■ Sensitive to fluctuating water levels 	<ul style="list-style-type: none"> ■ Potential presence/persistence of wild rice in the area ■ Habitat suitability and availability for wild rice

**AMENDED EIS/EA REPORT
CHAPTER 2: ENVIRONMENTAL ASSESSMENT METHODS
VERSION 3**



Table 2-3: Hammond Reef Gold Project Valued Ecosystem Components/Valued Social Components

VEC/VSC	Rationale for Selection	Indicators
AQUATIC ENVIRONMENT		
Lower reaches (e.g., downstream) of small streams draining footprint including any mainstem ponds, and stream crossings	<ul style="list-style-type: none"> ■ Potentially affected (altered, diverted) by Project infrastructure ■ Alteration may result in loss of fish and productivity (e.g., critical habitats, food resources for fish) ■ Changes can be measured using a variety of standard indicators available (e.g., provincial and federal government criteria) 	<ul style="list-style-type: none"> ■ Benthic invertebrate community ■ Fish habitat suitability ■ Fish community (resident assemblages/species present)
Upper Marmion Reservoir (receiver)	<ul style="list-style-type: none"> ■ Socio-economic importance (tourism, angling) ■ Sensitive receiving water environment ■ Receiving Bays (mouths of small streams) potentially affected (altered, diverted) by Project infrastructure ■ Receiving Bays may represent significant habitat for locally important fish species. Alteration of habitats may result in loss of fish and productivity (e.g., critical habitats, food resources for fish) ■ Changes can be measured using a variety of standard indicators available (e.g., provincial and federal government criteria) 	<ul style="list-style-type: none"> ■ Benthic invertebrate community ■ Fish habitat suitability (receiving bays) ■ Fish community (resident assemblages/species present in receiving bays) ■ Contaminants in fish tissue.
Lizard Lake (receiver)	<ul style="list-style-type: none"> ■ Socio-economic importance (tourism, angling) ■ Sensitive receiving water environment ■ Receiving Bays (mouths of small streams) potentially affected (altered, diverted) by Project infrastructure ■ Receiving Bays may represent significant habitat for locally important fish species. Alteration of habitats may result in loss of fish and productivity (e.g., critical habitats, food resources for fish) ■ Changes can be measured using a variety of standard indicators available (e.g., provincial and federal government criteria) 	<ul style="list-style-type: none"> ■ Benthic invertebrate community ■ Fish habitat suitability (receiving bays) ■ Fish community (resident assemblages/species present in receiving bays) ■ Contaminants in fish tissue

**AMENDED EIS/EA REPORT
CHAPTER 2: ENVIRONMENTAL ASSESSMENT METHODS
VERSION 3**



Table 2-3: Hammond Reef Gold Project Valued Ecosystem Components/Valued Social Components

VEC/VSC	Rationale for Selection	Indicators
AQUATIC ENVIRONMENT (CONTINUED)		
Walleye	<ul style="list-style-type: none"> ■ Socio-economic importance (angling) ■ Traditional resource use (First Nation concern) ■ Long lived, top predator species (piscivorous), will accumulate contaminants ■ Human health; consumed by anglers, subsistence fishers 	<ul style="list-style-type: none"> ■ Walleye habitat ■ Contaminants in walleye flesh
Smallmouth Bass	<ul style="list-style-type: none"> ■ Socio-economic importance (angling, Bass Classic fishing derby) 	<ul style="list-style-type: none"> ■ Smallmouth Bass habitat
Northern Pike	<ul style="list-style-type: none"> ■ Socio-economic importance (angling) ■ Long lived, top predator species (piscivorous), will accumulate contaminants ■ Human health; consumed by anglers, subsistence fishers 	<ul style="list-style-type: none"> ■ Northern Pike habitat
Baitfish species	<ul style="list-style-type: none"> ■ Socio-economic importance (commercial baitfish fishery) ■ Important food resource for large fish species (e.g., walleye) 	<ul style="list-style-type: none"> ■ Baitfish habitat
CULTURAL HERITAGE RESOURCES		
Archaeological Sites	<ul style="list-style-type: none"> ■ Possible affect to archaeological sites 	<ul style="list-style-type: none"> ■ Project related changes to archaeological sites and artifacts
Built Heritage	<ul style="list-style-type: none"> ■ Possible affect to late 19th and early 20th century mine sites 	<ul style="list-style-type: none"> ■ Project-related changes to 19th to mid-20th century mine sites
Cultural Heritage Landscapes	<ul style="list-style-type: none"> ■ Possible affect to cultural heritage landscapes 	<ul style="list-style-type: none"> ■ Project-related changes to cultural heritage landscapes

**AMENDED EIS/EA REPORT
CHAPTER 2: ENVIRONMENTAL ASSESSMENT METHODS
VERSION 3**



Table 2-3: Hammond Reef Gold Project Valued Ecosystem Components/Valued Social Components

VEC/VSC	Rationale for Selection	Indicators
ABORIGINAL INTERESTS		
Aboriginal community characteristics	<ul style="list-style-type: none"> ■ Potential changes to economic base and educational attainment of Aboriginal communities 	<ul style="list-style-type: none"> ■ Project Aboriginal employment ■ Project contracts awarded to Aboriginal businesses ■ Education and training of Aboriginal people
Aboriginal heritage resources	<ul style="list-style-type: none"> ■ Importance of Aboriginal heritage resources such as archaeological sites ■ Importance of specific cultural or spiritual sites 	<ul style="list-style-type: none"> ■ Identified archaeological sites and artefacts ■ Identification of Cultural or spiritual sites
Traditional use of land and resources	<ul style="list-style-type: none"> ■ Aboriginal people have traditionally made use of lands and resources for their personal and community needs ■ Importance of plants, animals and fish that have been traditionally harvested and consumed by Aboriginal people 	<ul style="list-style-type: none"> ■ Changes or effects identified on the aquatic environment ■ Changes or effects identified on the terrestrial environment ■ Availability and quality of country foods
SOCIO-ECONOMIC ENVIRONMENT		
Population and demographics	<ul style="list-style-type: none"> ■ Direct job opportunities will attract workers to area for short-term (i.e. construction) and longer term (i.e., operations) ■ Population change may result in changes in demand on social and physical services and infrastructure ■ The influx of workers due to the Project could benefit long-term economic and community development, supporting community vibrancy and improved social infrastructure (e.g., housing, organized recreation, support for local business, etc.) 	<ul style="list-style-type: none"> ■ Population change (historical and projections) ■ Mobility ■ Age and Gender ■ Dependency ratios

**AMENDED EIS/EA REPORT
CHAPTER 2: ENVIRONMENTAL ASSESSMENT METHODS
VERSION 3**



Table 2-3: Hammond Reef Gold Project Valued Ecosystem Components/Valued Social Components

VEC/VSC	Rationale for Selection	Indicators
SOCIO-ECONOMIC ENVIRONMENT (CONTINUED)		
Economics		
Labour market (employment and training)	<ul style="list-style-type: none"> ■ Sustainable employment and training opportunities can develop transferable skills, and long-term regional and local economic benefits ■ Communities are interested in local recruitment, training and employment ■ Timing and number of employment opportunities could offset layoffs in other sectors ■ Loss of employment and income generation at closure may require mitigation measures to avoid adverse effects 	<ul style="list-style-type: none"> ■ Labour force by industry and occupation ■ Employment and Unemployment rates ■ Median Income ■ High school/post-secondary completion rates
Economic development	<ul style="list-style-type: none"> ■ The Project would contribute to diversification of the regional and local economies and either directly or indirectly encourage investment in other business activities, namely through: ■ Creation of opportunities for local contractors and suppliers ■ Encouraging new investment in service capacity ■ Encouraging business creation and expansion ■ Creation of competitive local suppliers ■ Loss of business opportunities at closure (~2030) may require mitigation measures to avoid adverse effects 	<ul style="list-style-type: none"> ■ Regional and local economic base ■ Regional and local supplier base
Local government finances	<ul style="list-style-type: none"> ■ Governments will benefit through increased tax and fee for service revenues ■ Governments may incur costs related to the provision of services 	<ul style="list-style-type: none"> ■ Local government revenues and expenditures

**AMENDED EIS/EA REPORT
CHAPTER 2: ENVIRONMENTAL ASSESSMENT METHODS
VERSION 3**



Table 2-3: Hammond Reef Gold Project Valued Ecosystem Components/Valued Social Components

VEC/VSC	Rationale for Selection	Indicators
SOCIO-ECONOMIC ENVIRONMENT (CONTINUED)		
Services and Infrastructure		
Public services and infrastructure	<ul style="list-style-type: none"> ■ Population increase in the LSA may increase demand on services (health, emergency and protection, education, recreation) and water and waste infrastructure ■ Project activities may increase demand for health, emergency services and waste/water infrastructure 	<p>Protection and Emergency:</p> <ul style="list-style-type: none"> ■ Police capacity ■ Ambulance capacity ■ Fire protection capacity <p>Health Services:</p> <ul style="list-style-type: none"> ■ Number/type of facilities, services and programs ■ Number of medical practitioners per population ■ Capacity/capacity utilization <p>Social Services:</p> <ul style="list-style-type: none"> ■ Capacity/capacity utilization <p>Education:</p> <ul style="list-style-type: none"> ■ School enrolment ■ Capacity utilization <p>Recreation:</p> <ul style="list-style-type: none"> ■ Number/type of recreational facilities ■ Capacity utilization <p>Water, Wastewater and Waste Management:</p> <ul style="list-style-type: none"> ■ Capacity and capacity utilization of infrastructure ■ Solid waste management sites and capacity utilization <p>Utilities:</p> <ul style="list-style-type: none"> ■ Capacity and capacity utilization

**AMENDED EIS/EA REPORT
CHAPTER 2: ENVIRONMENTAL ASSESSMENT METHODS
VERSION 3**



Table 2-3: Hammond Reef Gold Project Valued Ecosystem Components/Valued Social Components

VEC/VSC	Rationale for Selection	Indicators
SOCIO-ECONOMIC ENVIRONMENT (CONTINUED)		
Services and Infrastructure (continued)		
Housing and accommodation	<ul style="list-style-type: none"> ■ Influx of workers and families may lead to changes in demand for, availability and cost for temporary and permanent housing, and tourism accommodation 	<ul style="list-style-type: none"> ■ Permanent and temporary housing supply ■ Occupancy rates ■ Housing costs and availability
Transportation	<ul style="list-style-type: none"> ■ The Project may strain existing road and transportation network due to movement of Project workers, equipment, supplies and products 	<ul style="list-style-type: none"> ■ Traffic volumes (average annual daily traffic counts) and levels of service on relevant access roads and intersections (traffic study to be completed) ■ Existing transportation network
Land Use and Resources		
Outdoor tourism and recreation	<ul style="list-style-type: none"> ■ The Project may affect tourism and recreation activities and opportunities ■ Loss of employment and income generation by tourist operators may require mitigation measures to avoid adverse effects 	<ul style="list-style-type: none"> ■ Crown land and other tenures ■ Tourism activities and specific-use areas ■ Number and types of visitors to the study area ■ Tourism revenue generation
Hunting	<ul style="list-style-type: none"> ■ The Project may occupy or affect the land base which supports hunting ■ Loss of employment and income generation by hunters may require mitigation measures to avoid adverse effects 	<ul style="list-style-type: none"> ■ Hunting areas ■ Wildlife management (e.g., moose, deer, bear) management areas ■ License sales ■ Harvest volumes
Trapping	<ul style="list-style-type: none"> ■ The Project may occupy or affect the land base which supports trapping ■ Loss of employment and income generation by trappers may require mitigation measures to avoid adverse effects 	<ul style="list-style-type: none"> ■ Tenured trapline areas ■ Harvest volumes

**AMENDED EIS/EA REPORT
CHAPTER 2: ENVIRONMENTAL ASSESSMENT METHODS
VERSION 3**



Table 2-3: Hammond Reef Gold Project Valued Ecosystem Components/Valued Social Components

VEC/VSC	Rationale for Selection	Indicators
SOCIO-ECONOMIC ENVIRONMENT (CONTINUED)		
Land Use and Resources (continued)		
Fishing	<ul style="list-style-type: none"> ■ The Project may occupy land base which supports fishing activities ■ Loss of fishing opportunity may require mitigation measures to avoid adverse effects 	<ul style="list-style-type: none"> ■ Recreational fishing participation (e.g., Atikokan Bass Classic) ■ Recreational and commercial fishing areas, licence sales and harvest volumes ■ Baitfish areas and harvest volumes ■ Conduct a biannual fishing questionnaire of the project workforce to estimate the level of fishing pressure resulting from the Project
Water use and access	<ul style="list-style-type: none"> ■ The Project has the potential to influence the use of and access to water bodies such as the Marmion Reservoir ■ The Marmion Reservoir is an important resource for recreational fisheries and tourism, hydro-electric power and other commercial and industrial uses 	<ul style="list-style-type: none"> ■ Recreational fishing participation (e.g., Atikokan Bass Classic) ■ Water use for hydro-electric power and other industrial and commercial uses
Mining	<ul style="list-style-type: none"> ■ The Project may affect current and future mining and aggregate resource activity 	<ul style="list-style-type: none"> ■ Exploration and development projects (current and potential resources) ■ Mining land use, plans
Forestry	<ul style="list-style-type: none"> ■ The Project occupies forested land ■ Disrupting access to existing or future harvest land may require mitigation measures to avoid adverse effects 	<ul style="list-style-type: none"> ■ Timber harvesting land base (harvest area, tenure)

**AMENDED EIS/EA REPORT
CHAPTER 2: ENVIRONMENTAL ASSESSMENT METHODS
VERSION 3**



Table 2-3: Hammond Reef Gold Project Valued Ecosystem Components/Valued Social Components

VEC/VSC	Rationale for Selection	Indicators
ATMOSPHERIC ENVIRONMENT		
Air Quality		
Ambient air quality	<ul style="list-style-type: none"> ■ Air quality is selected as a VEC since it has been identified as an important aspect of the environment by both public and regulators. In addition, emissions from the Site activities have the potential to alter the existing air quality 	<p>The following compounds have been identified, which are expected to be emitted in measureable amounts from the Site, and for which air quality criteria against which the Site effects can be compared are available:</p> <ul style="list-style-type: none"> ■ Particulate matter, including suspended particulate matter (SPM), particles nominally smaller than 10 µm in aerodynamic diameter (PM₁₀), and particles nominally smaller than 2.5 µm in aerodynamic diameter (PM_{2.5}) ■ Oxides of nitrogen (NO_x) and the resulting nitrogen dioxide (NO₂) ■ Sulphur dioxide (SO₂) ■ Carbon monoxide (CO) ■ Metals, including antimony, arsenic, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, mercury, nickel, selenium, silver, tellurium, tin and vanadium

**AMENDED EIS/EA REPORT
CHAPTER 2: ENVIRONMENTAL ASSESSMENT METHODS
VERSION 3**



Table 2-3: Hammond Reef Gold Project Valued Ecosystem Components/Valued Social Components

VEC/VSC	Rationale for Selection	Indicators
ATMOSPHERIC ENVIRONMENT (Continued)		
Noise		
Ambient noise levels	<ul style="list-style-type: none"> ■ Noise levels are selected as a VEC since it has been identified as being important to regulators and stakeholders. In addition, Site activities have the potential to affect existing noise levels. 	<ul style="list-style-type: none"> ■ The effect of the on Site noise sources will be evaluated using the 1-hour equivalent noise level (Leq). The 1-hour Leq is the energy equivalent continuous sound level, which has the same energy as the time varying signal over a one hour period at the same location. ■ Other noise indicators are available that are not appropriate for the evaluation of the Site noise levels, but are appropriate for evaluating the indirect effects of changes in noise levels on other VECs (e.g., ecological effects).
Vibration from Blasting		
Vibration Levels	<ul style="list-style-type: none"> ■ Vibration levels are selected as a VEC since they have been identified as being important to regulators and stakeholders. In addition, Project Site activities have the potential to affect existing vibration levels. 	<ul style="list-style-type: none"> ■ The effect of blasting on air vibrations will be evaluated using Peak Air Pressure Level in dBL. ■ The effect of blasting on ground vibrations will be evaluated using Peak Particle Velocity in mm/s

**AMENDED EIS/EA REPORT
CHAPTER 2: ENVIRONMENTAL ASSESSMENT METHODS
VERSION 3**



Table 2-3: Hammond Reef Gold Project Valued Ecosystem Components/Valued Social Components

VEC/VSC	Rationale for Selection	Indicators
HYDROLOGY		
Surface water quantity	<ul style="list-style-type: none"> ■ The Project may result in changes to surface water quantity within the MSA. 	<ul style="list-style-type: none"> ■ Seasonal stream flow in creeks ■ Seasonal water levels in Marmion Reservoir and Lizard Lake ■ Catchment areas
Navigability	<ul style="list-style-type: none"> ■ The Project may result in the partial obstruction or change to navigable watercourses or waterbodies. ■ Potential for changes in flow, width, depth or gradient of watercourses or waterbodies. 	<ul style="list-style-type: none"> ■ Presence of obstruction. ■ Flow, width, depth or gradient of waterbody or watercourse.
HYDROGEOLOGY		
Groundwater quantity	<ul style="list-style-type: none"> ■ Potential of groundwater flow change within the MSA. 	<ul style="list-style-type: none"> ■ Changes in groundwater levels.
WATER QUALITY		
Surface Water Quality and Quantity	<ul style="list-style-type: none"> ■ Potential changes in surface water quality due to water intake and discharge and/or from alteration of runoff processes within the MSA. 	<ul style="list-style-type: none"> ■ Substrate metal content. ■ Amount of organic material. ■ Dissolved oxygen. ■ pH. ■ Temperature. ■ Total phosphorous. ■ Total and dissolved metal concentrations in water. ■ Nutrient content in water. ■ Total Dissolved Solids. ■ TKN, TP. ■ Anions, cations. ■ Conductivity.

Note:

As per Response to A-6, Common Nighthawk and Canadian Warbler are also federally designed as Threatened under Canada's *Species at Risk Act*.

AMENDED EIS/EA REPORT
CHAPTER 2: ENVIRONMENTAL ASSESSMENT METHODS
VERSION 3



Table 2-4: Assessment Measures Common to Environmental Components

Assessment Criteria	Level	Environmental Component				
		Aquatic Environment	Cultural Heritage Resources	Human Health and Ecological Risk	Socio-Economic Environment	Terrestrial Ecology
Geographic Extent (of effect)	Low	Aquatic Environment	Cultural Heritage Resources	Human Health and Ecological Risk	Socio-Economic Environment	Terrestrial Ecology
		Effect is within the Project Site (i.e. Mine Study Area or Linear Infrastructure Study Area)			Effect extends into the Local Study Area	Effects limited to the Mine Study Area
	Medium	Aquatic Environment	Cultural Heritage Resources	Human Health and Ecological Risk	Socio-Economic Environment	Terrestrial Ecology
		Effect extends into the Local Study Area			Effect extends into Regional Study Area	Effects limited to the Local Study Area
	High	Aquatic Environment	Cultural Heritage Resources	Human Health and Ecological Risk	Socio-Economic Environment	Terrestrial Ecology
		Effect extends into the Regional Study Area			Effect extends beyond Regional Study Area	Effects limited to the Regional Study Area
Frequency (of effect)	Low	Aquatic Environment	Cultural Heritage Resources	Human Health and Ecological Risk	Socio-Economic Environment	Terrestrial Ecology
		Conditions or phenomena causing the effect to occur infrequently (i.e., several times per year)				
	Medium	Aquatic Environment	Cultural Heritage Resources	Human Health and Ecological Risk	Socio-Economic Environment	Terrestrial Ecology
		Conditions or phenomena causing the effect to occur at regular, although infrequent intervals (i.e., several times per month)				
	High	Aquatic Environment	Cultural Heritage Resources	Human Health and Ecological Risk	Socio-Economic Environment	Terrestrial Ecology
		Conditions or phenomena causing the effect to occur at regular and frequent intervals (i.e., daily or continuously)				

**AMENDED EIS/EA REPORT
CHAPTER 2: ENVIRONMENTAL ASSESSMENT METHODS
VERSION 3**



Table 2-4: Assessment Measures Common to Environmental Components

Assessment Criteria	Level	Environmental Component				
		Aquatic Environment	Cultural Heritage Resources	Human Health and Ecological Risk	Socio-Economic Environment	Terrestrial Ecology
Duration (of conditions causing effect)	Low	Aquatic Environment	Cultural Heritage Resources	Human Health and Ecological Risk	Socio-Economic Environment	Duration of effects, which includes reversibility, is a function of ecological resilience, and these ecological principles are applied to the evaluation of significance. Although difficult to measure, resilience is the capacity of the system to absorb disturbance, and reorganize and retain the same structure, function, and feedback responses. Resilience includes resistance, capability to adapt to change, and how close the system is to a threshold before shifting starts (i.e., precariousness).
		Conditions causing effect are evident during site preparation and construction phase, or closure phase				
	Medium	Aquatic Environment	Cultural Heritage Resources	Human Health and Ecological Risk	Socio-Economic Environment	
		Conditions causing effect are evident during the operations phase				
	High	Aquatic Environment	Cultural Heritage Resources	Human Health and Ecological Risk	Socio-Economic Environment	
		Conditions causing effect extend beyond any one phase				

**AMENDED EIS/EA REPORT
CHAPTER 2: ENVIRONMENTAL ASSESSMENT METHODS
VERSION 3**



Table 2-4: Assessment Measures Common to Environmental Components

Assessment Criteria	Level	Environmental Component				
		Aquatic Environment	Cultural Heritage Resources	Human Health and Ecological Risk	Socio-Economic Environment	Terrestrial Ecology
Degree of Reversibility (of effect)	Low	Aquatic Environment	Cultural Heritage Resources	Human Health and Ecological Risk	Socio-Economic Environment	Included within Duration criteria
		Effect is readily (i.e., immediately) reversible				
	Medium	Aquatic Environment	Cultural Heritage Resources	Human Health and Ecological Risk	Socio-Economic Environment	
		Effect is reversible with time				
	High	Aquatic Environment	Cultural Heritage Resources	Human Health and Ecological Risk	Socio-Economic Environment	
		Effect is not reversible (i.e., permanent)				

**AMENDED EIS/EA REPORT
CHAPTER 2: ENVIRONMENTAL ASSESSMENT METHODS
VERSION 3**



Table 2-5: Magnitude Levels for Aquatic Environment Valued Ecosystem Components Indicator Measures

Valued Ecosystem Components	Magnitude		
	Low	Medium	High
Fish species habitat	Less than 10% of the waterbody lengths/surface area lost or disturbed in the LSA and/or 5% to 10% change in stream flow/discharge	10% to 25% of the waterbody lengths/surface are lost or disturbed in the LSA and/or 10% to 25% change in streamflow/discharge/contributing drainage	Greater than 25% of the waterbody lengths/surface area lost or disturbed in the LSA and/or greater than 25% change in streamflow/discharge/contributing drainage
Contaminants in fish tissue	Magnitude is assessed in the Human Health and Ecological Risk Assessment		
Benthic Indices	N/A	N/A	Significant difference from existing conditions for parameters
Aquatic species, populations and communities (including species with special designation)	Less than 10% change	10% to 25% change	Greater than 25% change

AMENDED EIS/EA REPORT
CHAPTER 2: ENVIRONMENTAL ASSESSMENT METHODS
VERSION 3



Table 2-6: Magnitude Levels for Terrestrial Ecology Valued Ecosystem Components

Valued Ecosystem Components	Magnitude			
	Negligible	Low	Medium	High
Wetlands	Effect is <1% change from baseline conditions (in the VEC relevant spatial area)	1-10% change from baseline conditions (in the VEC relevant spatial area)	Greater than 10% to 25% change from baseline conditions (in the VEC relevant spatial area)	Effect is >25% change from baseline conditions (in the VEC relevant spatial area)
Forest Cover	Effect is <1% change from baseline conditions (in the VEC relevant spatial area)	1-10% change from baseline conditions (in the VEC relevant spatial area)	Greater than 10% to 25% change from baseline conditions (in the VEC relevant spatial area)	Effect is >25% change from baseline conditions (in the VEC relevant spatial area)
Species At Risk	Effect is <1% change from baseline conditions (in the VEC relevant spatial area)	1-10% change from baseline conditions (in the VEC relevant spatial area)	Greater than 10% to 25% change from baseline conditions (in the VEC relevant spatial area)	Effect is >25% change from baseline conditions (in the VEC relevant spatial area)
Furbearers	Effect is <1% change from baseline conditions (in the VEC relevant spatial area)	1-10% change from baseline conditions (in the VEC relevant spatial area)	Greater than 10% to 25% change from baseline conditions (in the VEC relevant spatial area)	Effect is >25% change from baseline conditions (in the VEC relevant spatial area)
Upland Breeding Birds	Effect is <1% change from baseline conditions (in the VEC relevant spatial area)	1-10% change from baseline conditions (in the VEC relevant spatial area)	Greater than 10% to 25% change from baseline conditions (in the VEC relevant spatial area)	Effect is >25% change from baseline conditions (in the VEC relevant spatial area)
Moose	Effect is <1% change from baseline conditions (in the VEC relevant spatial area)	1-10% change from baseline conditions (in the VEC relevant spatial area)	Greater than 10% to 25% change from baseline conditions (in the VEC relevant spatial area)	Effect is >25% change from baseline conditions (in the VEC relevant spatial area)

AMENDED EIS/EA REPORT
CHAPTER 2: ENVIRONMENTAL ASSESSMENT METHODS
VERSION 3



Table 2-7: Magnitude Levels for Human Health

Valued Ecosystem Components	Magnitude			
	Negligible	Low	Medium	High
Non-Carcinogenic Compounds	No change from baseline conditions, below applicable guidelines, or $HQ \leq 1$	$1 < HQ \leq 10$	$10 < HQ \leq 100$	$HQ > 100$
Carcinogenic Compounds	No change from baseline conditions, below applicable guidelines, or $ILCR \leq 1 \times 10^{-6}$	$1 \times 10^{-6} < ILCR \leq 1 \times 10^{-5}$	$1 \times 10^{-5} < ILCR \leq 1 \times 10^{-4}$	$ILCR > 1 \times 10^{-4}$

Note:

HQ = Hazard Quotient; represents the target ratio of the predicted chemical exposure relative to its health-based benchmarks.

ILCR = Incremental Lifetime Cancer Risks represents additional risk of developing cancer due to chemical exposure (from the Project) incurred over the lifetime of an individual.

Table 2-8: Magnitude Levels for Cultural Heritage Resources Valued Ecosystem Components

Valued Ecosystem Component	Magnitude			
	Negligible	Low	Medium	High
Population and Demographics	Predicted change in population and demographic indicators <1% of existing conditions	Predicted change in population and demographic indicators of 1% - 4.9% of existing conditions	Predicted change in population and demographic indicators of 5% - 19.9% of existing conditions	Predicted change in population and demographic indicators of $\geq 20\%$ of existing conditions

**AMENDED EIS/EA REPORT
CHAPTER 2: ENVIRONMENTAL ASSESSMENT METHODS
VERSION 3**



Table 2-9: Assessment Criteria and Levels for Determining Significance

Assessment Criteria	Level		
	Low	Medium	High
Geographic Extent (of effect)	Effect extends into the Local Study Area	Effect extends into the Regional Study Area	Effect extends beyond Regional Study Area
Frequency (of effect)	Low Conditions or phenomena causing the effect to occur infrequently (i.e., several times per year)	Medium Conditions or phenomena causing the effect to occur at regular, although infrequent intervals (i.e., several times per month)	High Conditions or phenomena causing the effect to occur at regular and frequent intervals (i.e., daily or continuously)
Duration (of conditions causing effect)	Low Conditions causing effect are evident during the site preparation and construction phase, or decommissioning phase	Medium Conditions causing effect are evident during the operations phase	High Conditions causing effect extend beyond any one phase
Degree of Irreversibility (of effect)	Low Effect is readily (i.e., immediately) reversible	Medium Effect is reversible with time	High Effect is not reversible (i.e., permanent)

**AMENDED EIS/EA REPORT
CHAPTER 2: ENVIRONMENTAL ASSESSMENT METHODS
VERSION 3**



Table 2-10: Magnitude Levels for Socio-economic Valued Ecosystem Components

VECs	Magnitude			
	Negligible	Low	Medium	High
Population and Demographics	Predicted change in population and demographic indicators <1% of existing conditions	Predicted change in population and demographic indicators of 1% - 4.9% of existing conditions	Predicted change in population and demographic indicators of 5% - 19.9% of existing conditions	Predicted change in population and demographic indicators of ≥20% of existing conditions
Labour Market	Predicted change in labour market indicators <1% of existing conditions	Predicted change in labour market indicators of 1% - 4.9% of existing conditions	Predicted change in labour market indicators of 5% - 19.9% of existing conditions	Predicted change in labour market indicators of ≥20% of existing conditions
Government Finances	Predicted change in indicators <1% of existing conditions	Predicted change in indicators of 1% - 4.9% of existing conditions	Predicted change in indicators of 5% - 19.9% of existing conditions	Predicted change in indicators of ≥20% of existing conditions
Public Services and Infrastructure	Utilization does not exceed 75% of capacity	Utilization is between 75% and 90% of capacity	Utilization is greater than 90% of capacity	Utilization exceeds capacity
Housing and Accommodation	Utilization does not exceed 75% of capacity	Utilization is between 75% and 90% of capacity	Utilization is greater than 90% of capacity	Utilization exceeds capacity
Transportation	Level of service (LOS) 'A' or 'B', or volume to capacity ratio (V/C) <0.10	LOS 'C' or V/C 0.10 – 0.49	LOS 'D' or V/C 0.50 – 0.90	LOS 'E' or 'F', or V/C >0.9
Outdoor Tourism and Recreation	Predicted change in indicators <1% of existing conditions	Predicted change in indicators of 1% - 4.9% of existing conditions	Predicted change in indicators of 5% - 19.9% of existing conditions	Predicted change in indicators of ≥20% of existing conditions
Hunting	Predicted change in indicators <1% of existing conditions	Predicted change in indicators of 1% - 4.9% of existing conditions	Predicted change in indicators of 5% - 19.9% of existing conditions	Predicted change in indicators of ≥20% of existing conditions
Trapping	Predicted change in indicators <1% of existing conditions	Predicted change in indicators of 1% - 4.9% of existing conditions	Predicted change in indicators of 5% - 19.9% of existing conditions	Predicted change in indicators of ≥20% of existing conditions
Fishing	Predicted change in indicators <1% of existing conditions	Predicted change in indicators of 1% - 4.9% of existing conditions	Predicted change in indicators of 5% - 19.9% of existing conditions	Predicted change in indicators of ≥20% of existing conditions

**AMENDED EIS/EA REPORT
CHAPTER 2: ENVIRONMENTAL ASSESSMENT METHODS
VERSION 3**



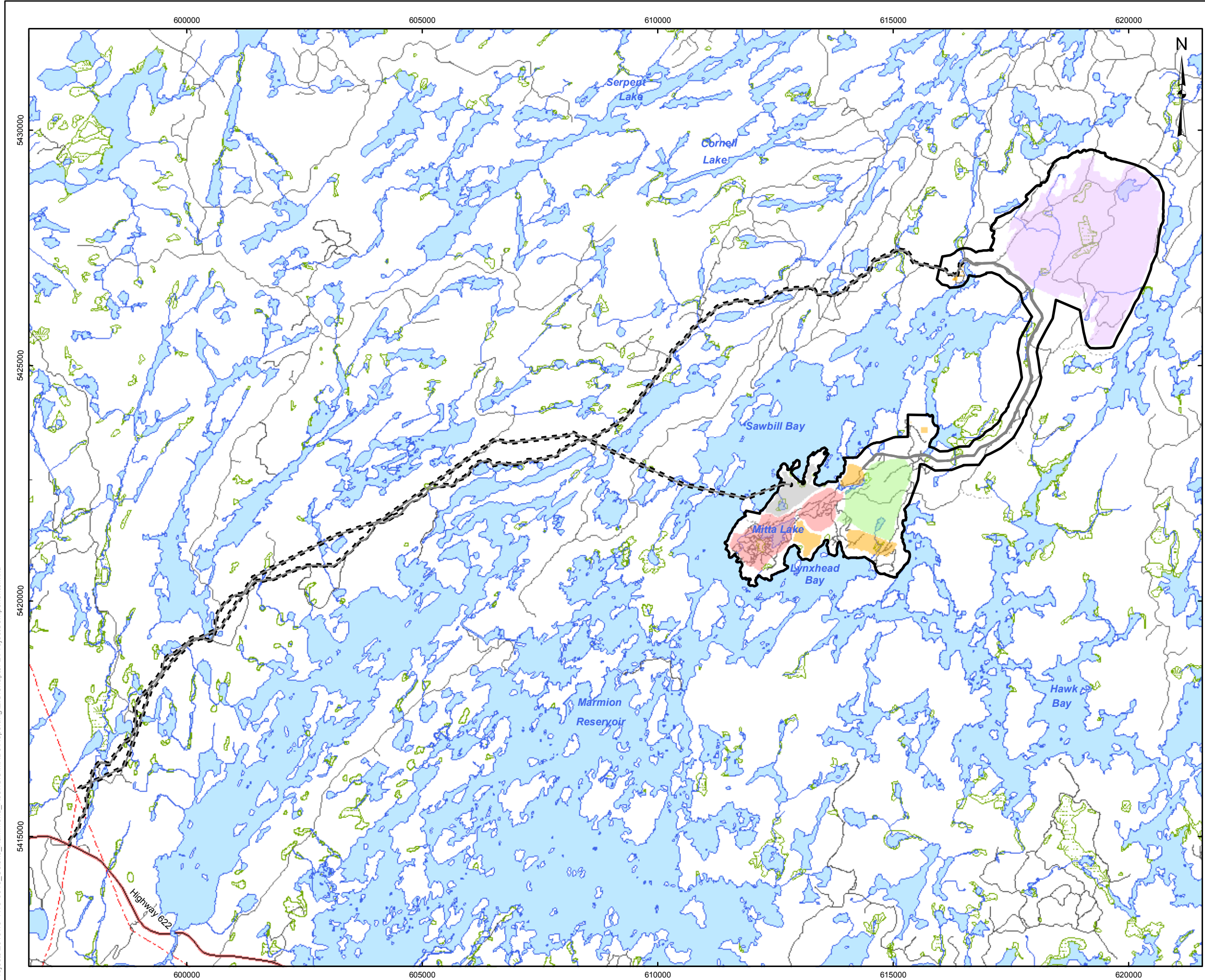
Table 2-10: Magnitude Levels for Socio-economic Valued Ecosystem Components

VECs	Magnitude			
	Negligible	Low	Medium	High
Water Use and Access	Predicted change in indicators <1% of existing conditions	Predicted change in indicators of 1% - 4.9% of existing conditions	Predicted change in indicators of 5% - 19.9% of existing conditions	Predicted change in indicators of ≥20% of existing conditions
Mining	Predicted change in indicators <1% of existing conditions	Predicted change in indicators of 1% - 4.9% of existing conditions	Predicted change in indicators of 5% - 19.9% of existing conditions	Predicted change in indicators of ≥20% of existing conditions
Forestry	Predicted change in indicators <1% of existing conditions	Predicted change in indicators of 1% - 4.9% of existing conditions	Predicted change in indicators of 5% - 19.9% of existing conditions	Predicted change in indicators of ≥20% of existing conditions

**AMENDED EIS/EA REPORT
CHAPTER 2: ENVIRONMENTAL ASSESSMENT METHODS
VERSION 3**



FIGURES

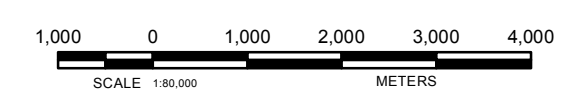


LEGEND

- Provincial Highway
- Road
- - - Power Transmission Line
- River/Stream
- █ Lake
- █ Wetland
- Linear Infrastructure
- █ Mine
- █ Waste Rock Management Facility
- █ Ore Processing Facility
- █ Tailings Management Facility
- █ Support and Ancillary Infrastructure
- Linear Infrastructure Study Area
- Mine Study Area

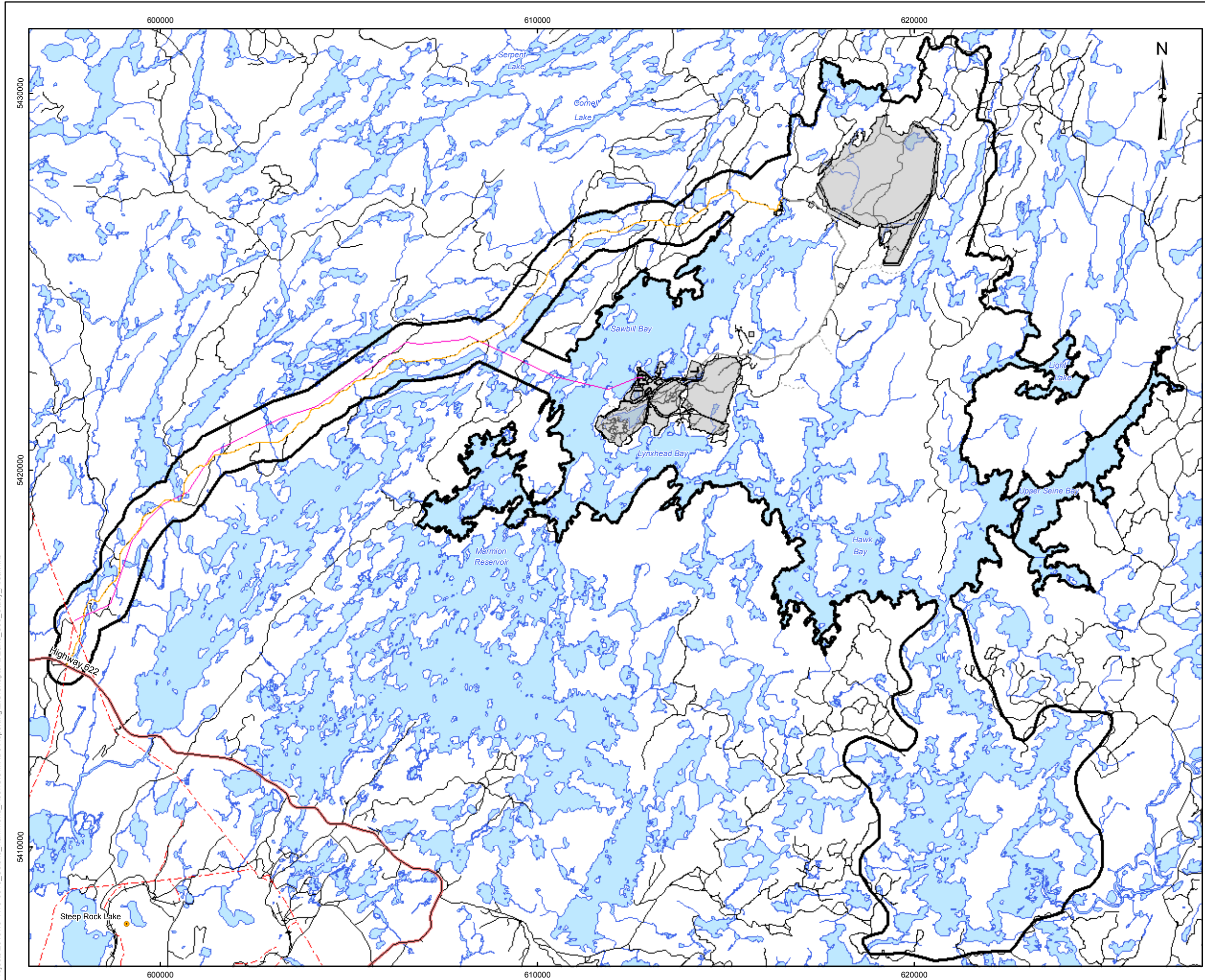
REFERENCE

Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd.
 Base Data - MNR NRVIS, obtained 2004
 Produced by Golder Associates Ltd under licence from
 Ontario Ministry of Natural Resources, © Queens Printer 2008
 Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N



PROJECT	HAMMOND REEF GOLD PROJECT ATIKOKAN, ONTARIO, CANADA		
TITLE	MINE STUDY AREA AND LINEAR INFRASTRUCTURE STUDY AREA		
 Golder Associates Mississauga, Ontario	PROJECT NO. 13-1118-0010	SCALE AS SHOWN	VERSION 2
	DESIGN CGE 14 Nov. 2008		
	GIS JO 2 Dec. 2013		
	CHECK SP 2 Dec. 2013		
	REVIEW SP 2 Dec. 2013		
			FIGURE: 2-1

G:\Projects\2013\13-1118-0010_Osisko_Hammond_Reef\GIS\MapDocs\Reporting\EIS\Chapter 2\ProjectComponents.mxd



LEGEND

- Small Community
- Road
- River/Stream
- Lake
- Mine Site Road
- Access Road (Hardtack / Sawbill)
- Project Transmission Line
- Project Facilities
- ▭ Aboriginal Interests Local Study Area

REFERENCE

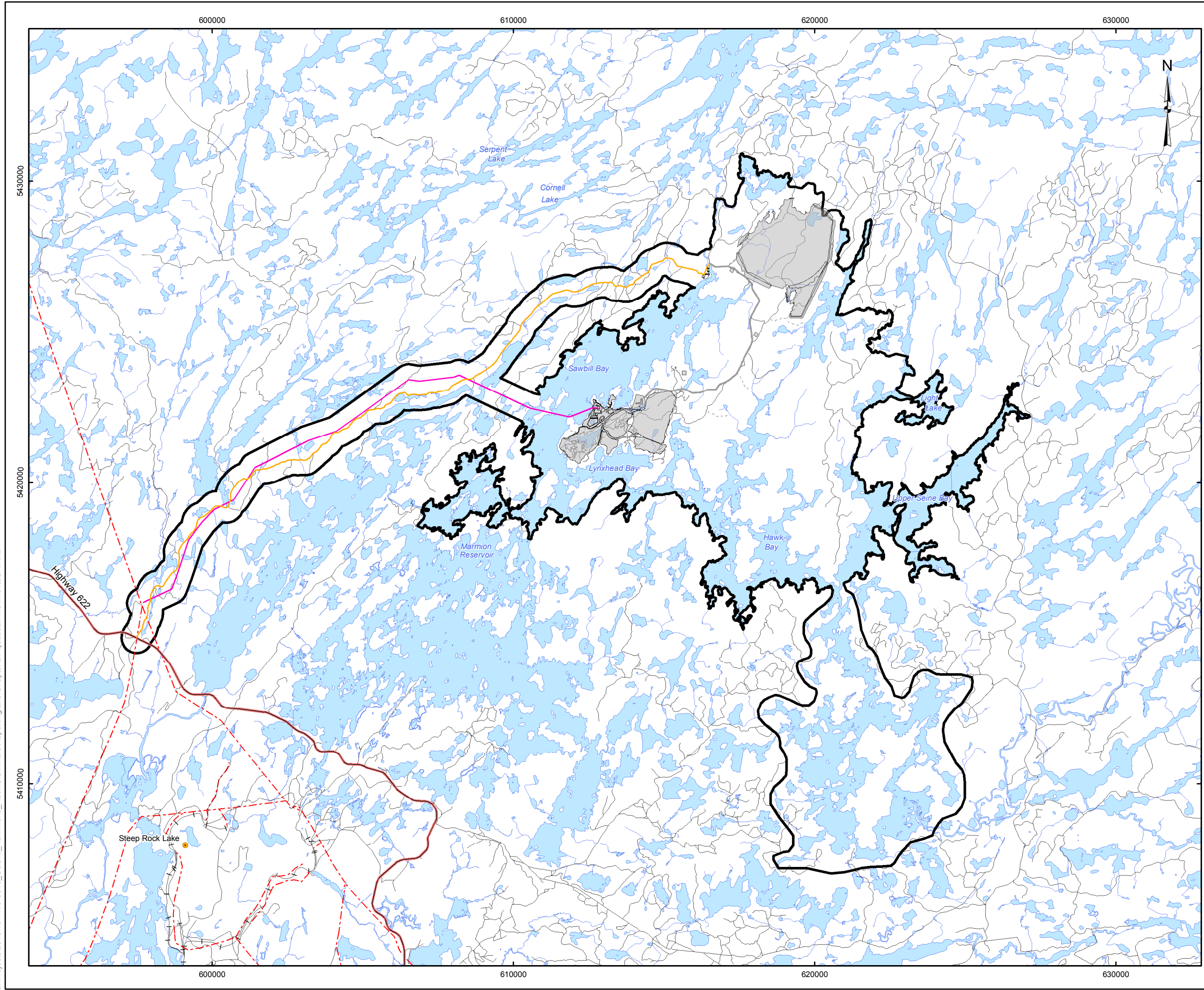
Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd
 Base Data - MNR NRVIS, obtained 2004
 Produced by Golder Associates Ltd under licence from
 Ontario Ministry of Natural Resources, © Queens Printer 2008
 Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N



PROJECT		HAMMOND REEF GOLD PROJECT ATIKOKAN, ONTARIO, CANADA	
TITLE		ABORIGINAL INTERESTS LOCAL STUDY AREA	
PROJECT NO. 13-1118-0010		SCALE AS SHOWN	VERSION 2
DESIGN	CGE	8 Jan. 2013	FIGURE: 2-2A
GIS	JO	2 Dec. 2013	
CHECK	SP	2 Dec. 2013	
REVIEW	SP	2 Dec. 2013	



G:\Projects\2013\13-1118-0010_Osisko_Hammond_Reef\GIS\MXDs\Reporting\EIS\Chapter 2\Land_Use_Study_Area.mxd

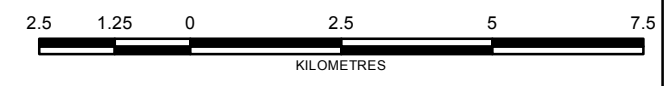


LEGEND

- Small Community
- Provincial Highway
- Road
- Existing Railway
- - - Power Transmission Line
- River/Stream
- Lake
- Mine Site Road
- Access Road (Hardtack / Sawbill)
- Project Transmission Line
- Project Facilities
- ▭ Aquatic Environment Local Study Area

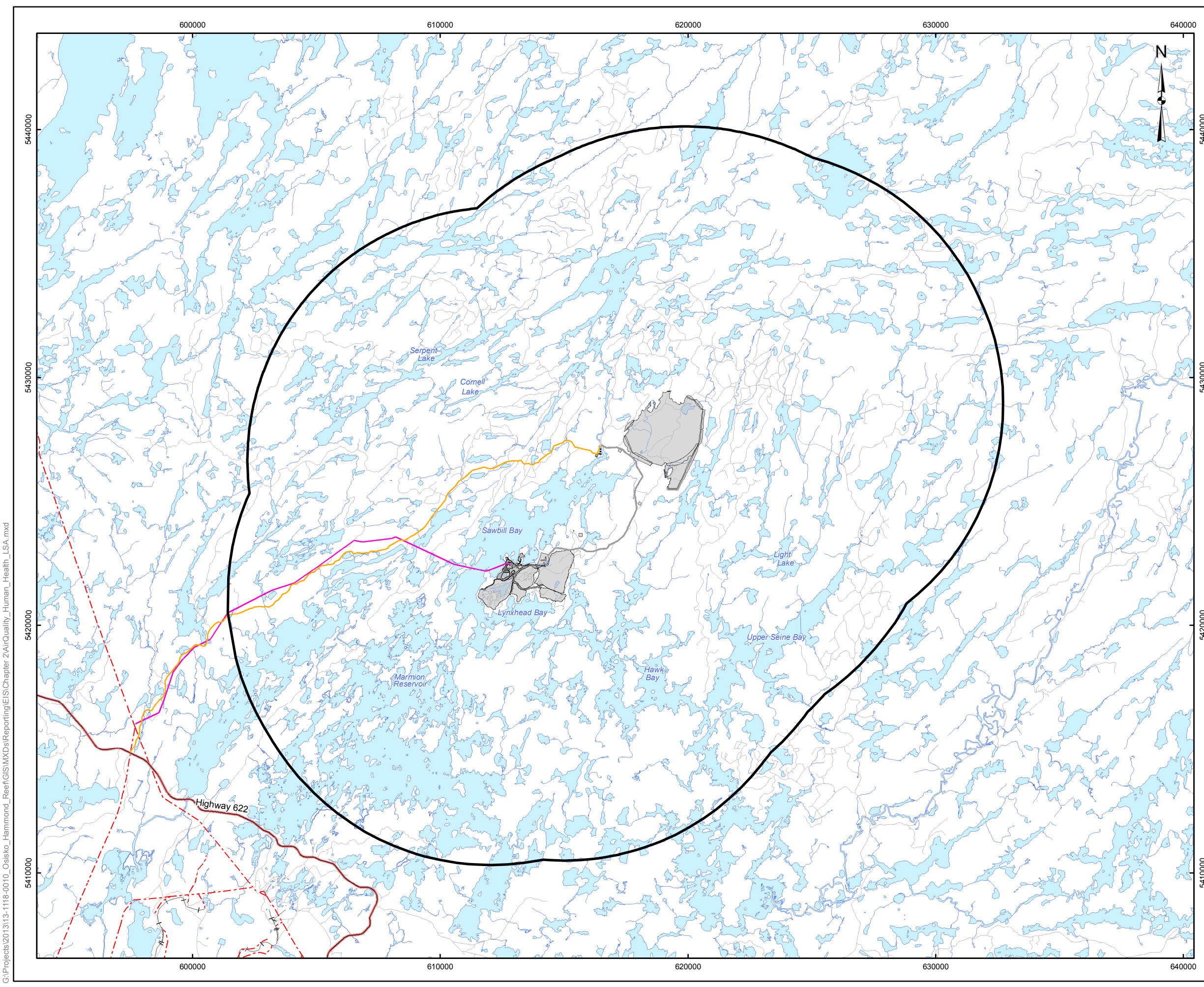
REFERENCE

Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd
 Base Data - MNR NRVIS, obtained 2004
 Produced by Golder Associates Ltd under licence from
 Ontario Ministry of Natural Resources, © Queens Printer 2008
 Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N



PROJECT	HAMMOND REEF GOLD PROJECT ATIKOKAN, ONTARIO, CANADA		
TITLE	AQUATIC ENVIRONMENT LOCAL STUDY AREA		
 Golder Associates Mississauga, Ontario	PROJECT NO. 13-1118-0010	SCALE AS SHOWN	VERSION 2
	DESIGN	CGE	8 Jan. 2013
	GIS	JO	2 Dec. 2013
	CHECK	SP	2 Dec. 2013
	REVIEW	SP	2 Dec. 2013
			FIGURE: 2-2B

G:\Projects\2013\13-1118-0010_Osisko_Hammond_Reef\GIS\MXD\Reporting\EIS\Chapter 2\AquaticEnvironment\LA.mxd

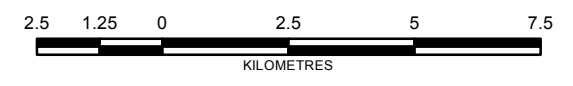


LEGEND

- Provincial Highway
- Road
- Existing Railway
- - - Power Transmission Line
- River/Stream
- █ Lake
- Mine Site Road
- Access Road (Hardtack / Sawbill)
- Project Transmission Line
- █ Project Facilities
- █ Air Quality and Human Health Local Study Area

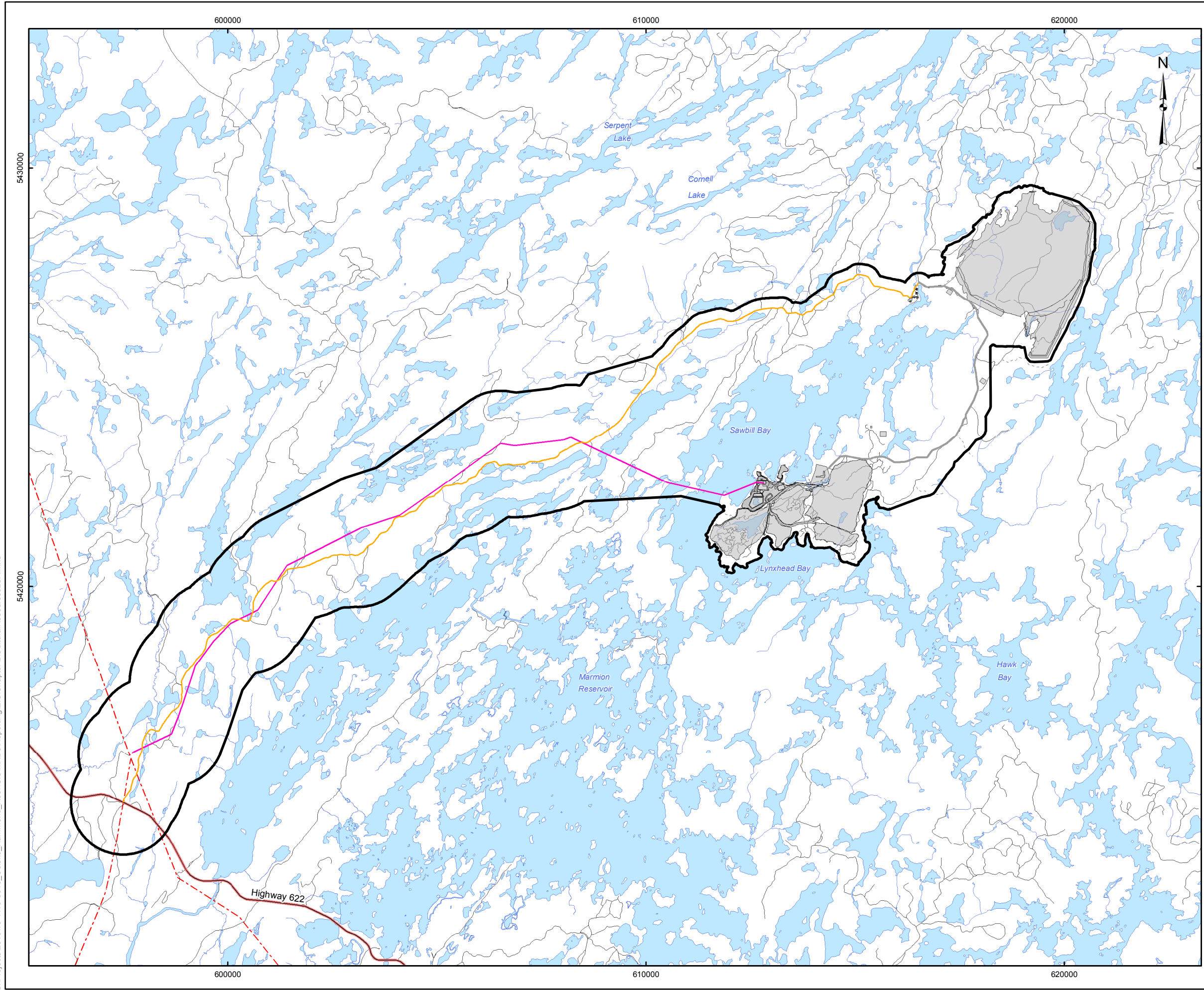
REFERENCE

Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd
 Base Data - MNR NRVIS, obtained 2004
 Produced by Golder Associates Ltd under licence from
 Ontario Ministry of Natural Resources, © Queens Printer 2008
 Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N



PROJECT	HAMMOND REEF GOLD PROJECT ATIKOKAN, ONTARIO, CANADA		
TITLE	AIR QUALITY AND HUMAN HEALTH LOCAL STUDY AREA		
 Mississauga, Ontario	PROJECT NO. 13-1118-0010	SCALE AS SHOWN	VERSION 2
	DESIGN	CGE	14 Nov. 2008
	GIS	JO	2 Dec. 2013
	CHECK	SP	2 Dec. 2013
	REVIEW	SP	2 Dec. 2013
			FIGURE: 2-2C

G:\Projects\2013\13-1118-0010_Osisko_Hammond_Reef\GIS\MapDocs\Reporting\EIS\Chapter 2\AirQuality_Human_Health_LSA.mxd



LEGEND

- Small Community
- Provincial Highway
- Road
- Existing Railway
- River/Stream
- Lake
- Mine Site Road
- Access Road (Hardtack / Sawbill)
- Project Transmission Line
- Project Facilities
- ▭ Cultural Heritage Resources Local Study Area

REFERENCE

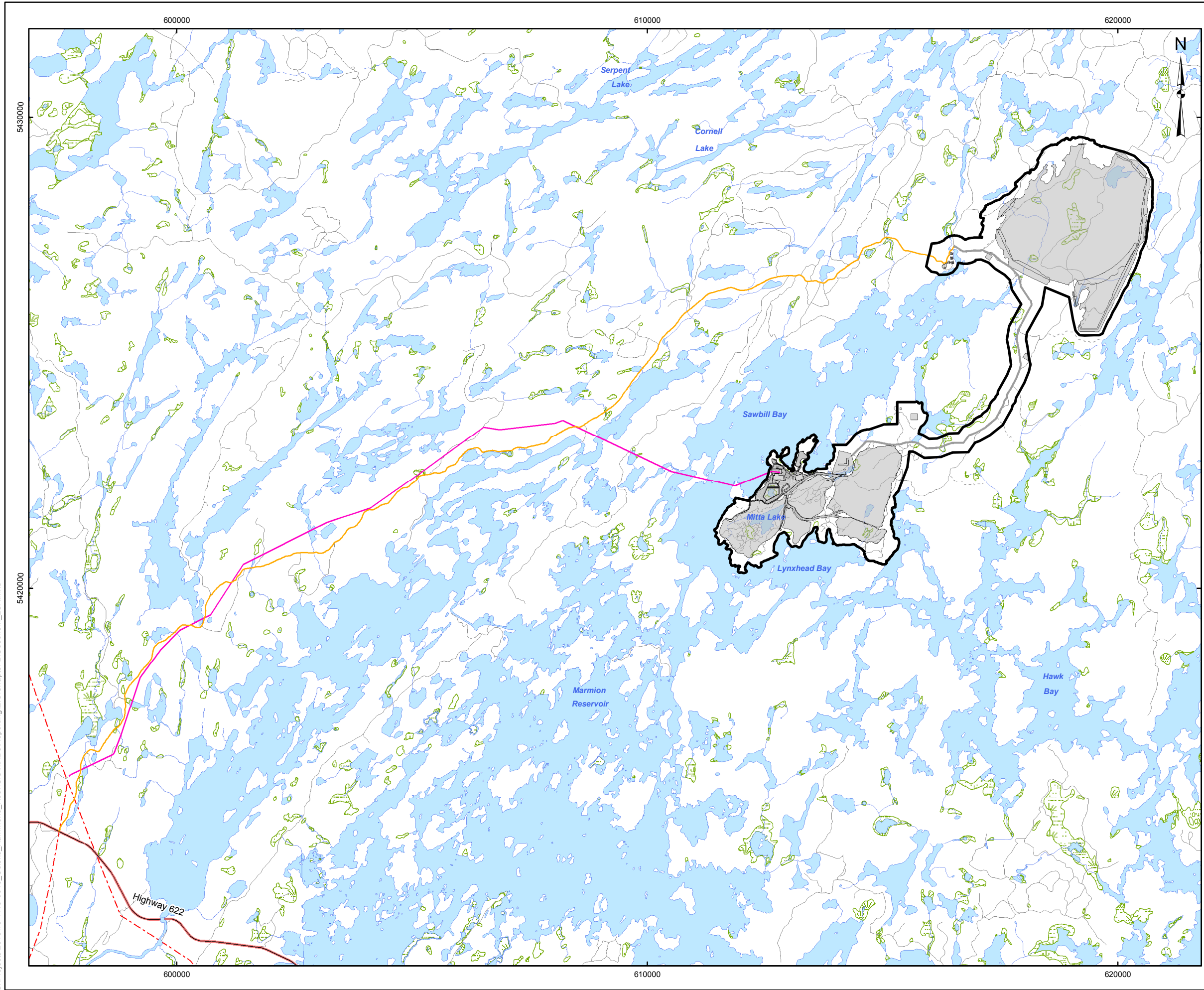
Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd
 Base Data - MNR NRVIS, obtained 2004
 Produced by Golder Associates Ltd under licence from
 Ontario Ministry of Natural Resources, © Queens Printer 2008
 Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N



PROJECT		HAMMOND REEF GOLD PROJECT ATIKOKAN, ONTARIO, CANADA	
TITLE		CULTURAL HERITAGE RESOURCES LOCAL STUDY AREA	
PROJECT NO. 13-1118-0010		SCALE AS SHOWN	VERSION 2
DESIGN	CGE	14 Nov. 2008	FIGURE: 2-2D
GIS	JO	2 Dec. 2013	
CHECK	SP	2 Dec. 2013	
REVIEW	SP	2 Dec. 2013	

Golder Associates
 Mississauga, Ontario

G:\Projects\2013\13-1118-0010_Osisko_Hammond_Reef\GIS\MapDocs\Reporting\EIS\Chapter 2\CulturalResourcesLSA.mxd

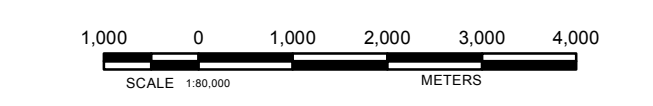


LEGEND

- Provincial Highway
- Road
- - - Trail
- - - Power Transmission Line
- River/Stream
- Lake
- Wetland
- Mine Site Road
- Access Road (Hardtack / Sawbill)
- Project Transmission Line
- Project Facilities
- Geochemistry Local Study Area

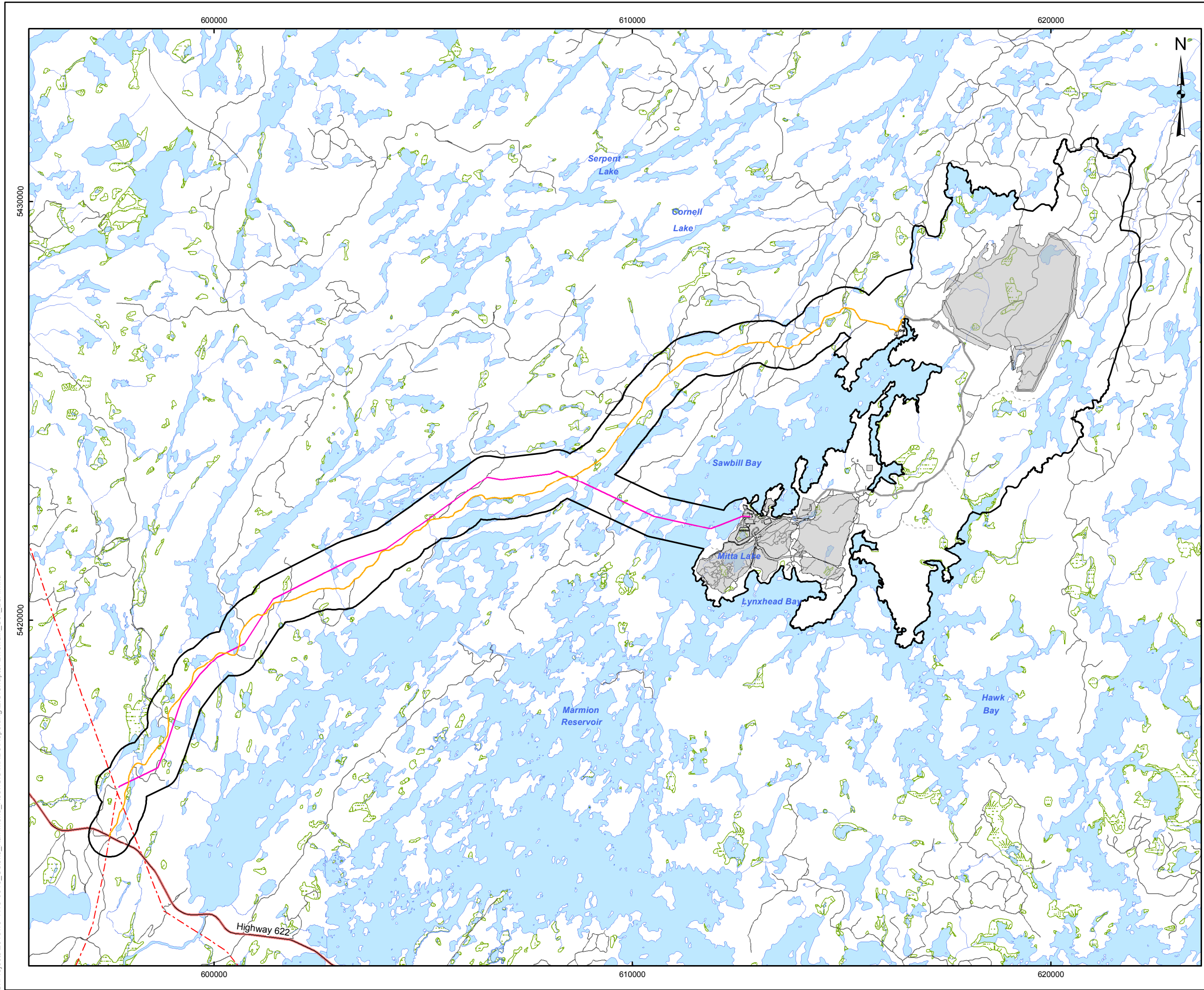
REFERENCE

Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd.
 Base Data - MNR NRVIS, obtained 2004
 Produced by Golder Associates Ltd under licence from
 Ontario Ministry of Natural Resources, © Queens Printer 2008
 Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N



PROJECT		HAMMOND REEF GOLD PROJECT ATIKOKAN, ONTARIO, CANADA	
TITLE		GEOCHEMISTRY LOCAL STUDY AREA	
 Golder Associates Mississauga, Ontario	PROJECT NO. 13-1118-0010	SCALE AS SHOWN	VERSION 2
	DESIGN	CGE	14 Nov. 2008
	GIS	JO	2 Dec. 2013
	CHECK	SP	2 Dec. 2013
	REVIEW	SP	2 Dec. 2013
			FIGURE: 2-2E

G:\Projects\2013\13-1118-0010_Osisko_Hammond_Reef\GIS\MapDocs\Reporting\EIS\Chapter 2\Geochem_LSA.mxd

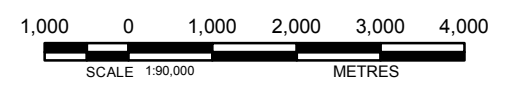


LEGEND

- Provincial Highway
- Road
- - - Trail
- - - Power Transmission Line
- River/Stream
- Lake
- Wetland
- Mine Site Road
- Access Road (Hardtack / Sawbill)
- Project Transmission Line
- Project Facilities
- Terrain and Soil Local Study Area

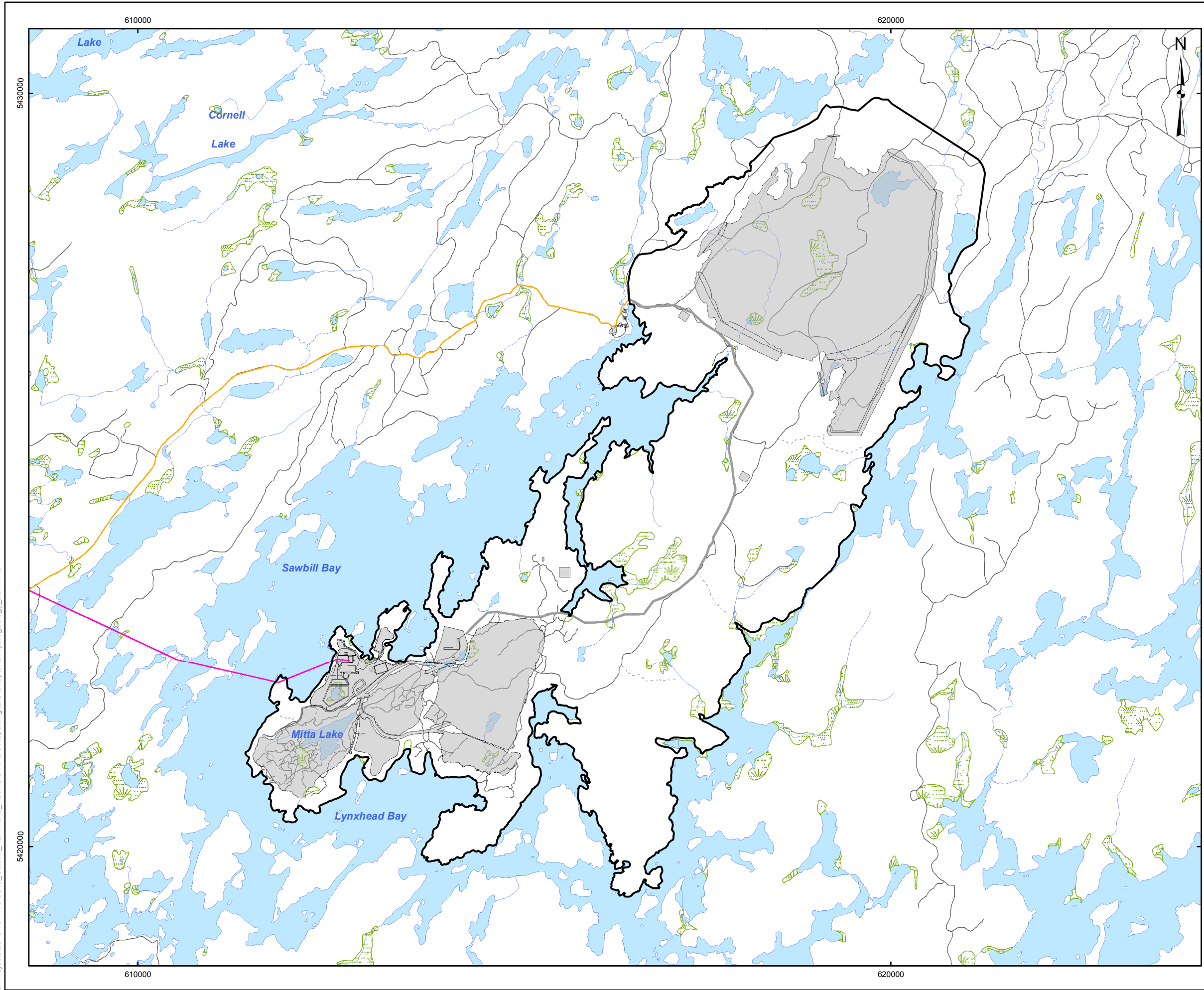
REFERENCE

Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd
 Base Data - MNR NRVIS, obtained 2004
 Produced by Golder Associates Ltd under licence from
 Ontario Ministry of Natural Resources, © Queens Printer 2008
 Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N



PROJECT	HAMMOND REEF GOLD PROJECT ATIKOKAN, ONTARIO, CANADA		
TITLE	TERRAIN AND SOIL LOCAL STUDY AREA		
 Golder Associates Mississauga, Ontario	PROJECT NO. 13-1118-0010	SCALE AS SHOWN	VERSION 2
	DESIGN	CGE	14 Nov. 2008
	CHECK	SP	2 Dec. 2013
	REVIEW	SP	2 Dec. 2013
			FIGURE: 2-2F

G:\Projects\2013\13-1118-0010_Osisko_Hammond_Reef\GIS\MXDs\Reporting\EIS\Chapter 2\Terrain_Soil_L_SA.mxd

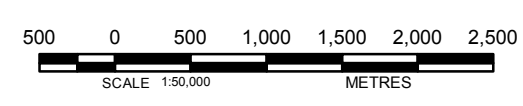


LEGEND

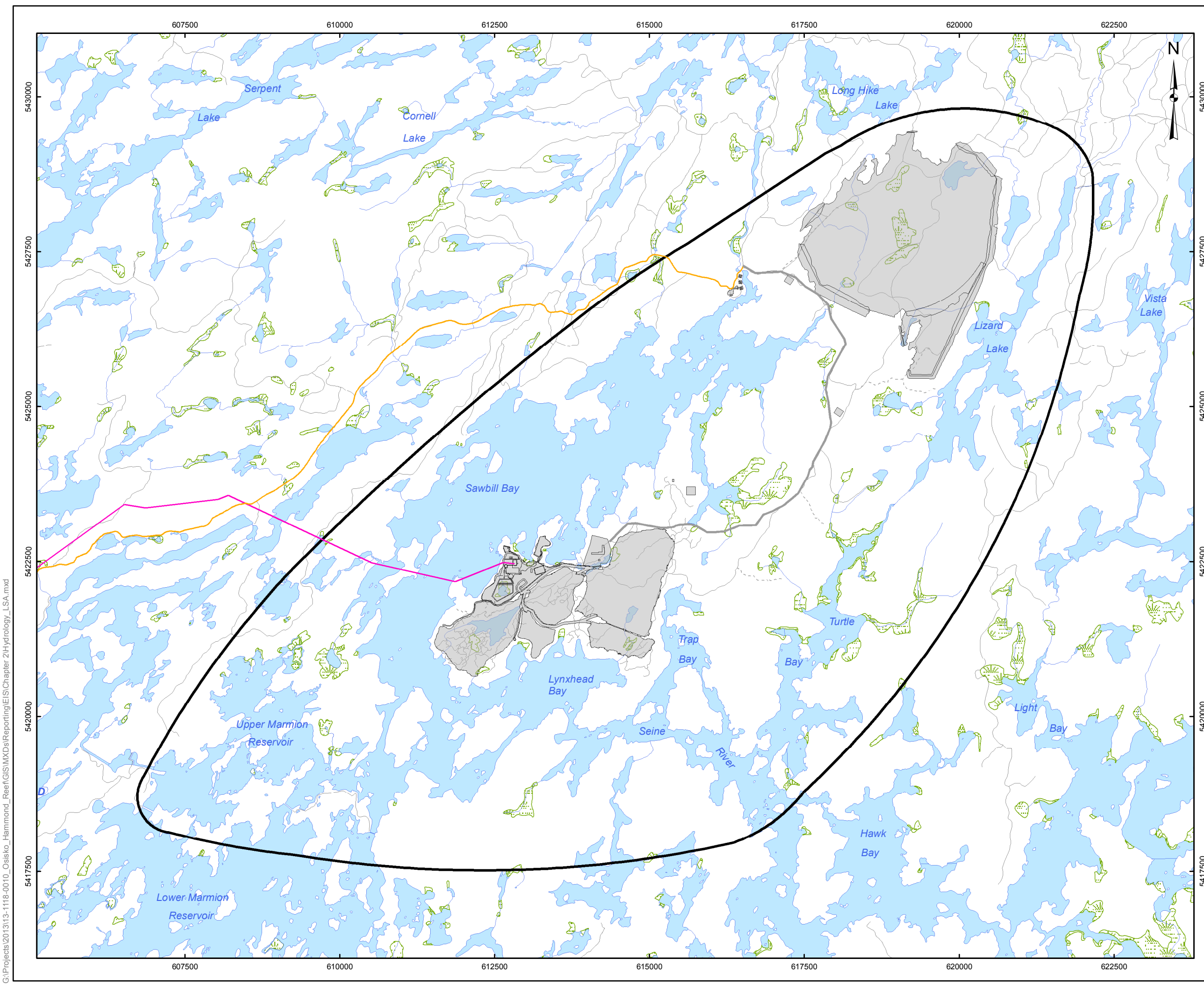
- Provincial Highway
- Road
- - - Trail
- - - Power Transmission Line
- River/Stream
- Lake
- Wetland
- Mine Site Road
- Access Road (Hardtack / Sawbill)
- Project Transmission Line
- Project Facilities
- Hydrogeology Local Study Area

REFERENCE

Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd
 Base Data - MNR NRVIS, obtained 2004
 Produced by Golder Associates Ltd under licence from
 Ontario Ministry of Natural Resources, © Queens Printer 2008
 Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N



PROJECT	HAMMOND REEF GOLD PROJECT ATIKOKAN, ONTARIO, CANADA		
TITLE	HYDROGEOLOGY LOCAL STUDY AREA		
 Golder Associates Mississauga, Ontario	PROJECT NO. 13-1118-0010	SCALE AS SHOWN	VERSION 2
	DESIGN CGE 14 Nov. 2008		
	GIS JO 2 Dec. 2013		
	CHECK SP 2 Dec. 2013		
REVIEW SP 2 Dec. 2013			FIGURE: 2-2G

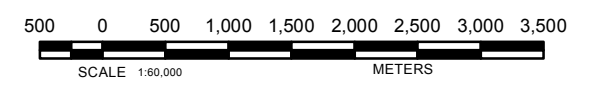


LEGEND

- Road
- - - Trail
- River/Stream
- Lake
- ▨ Wetland
- Mine Site Road
- Access Road (Hardtack / Sawbill)
- Project Transmission Line
- Project Facilities
- Hydrology Local Study Area

REFERENCE

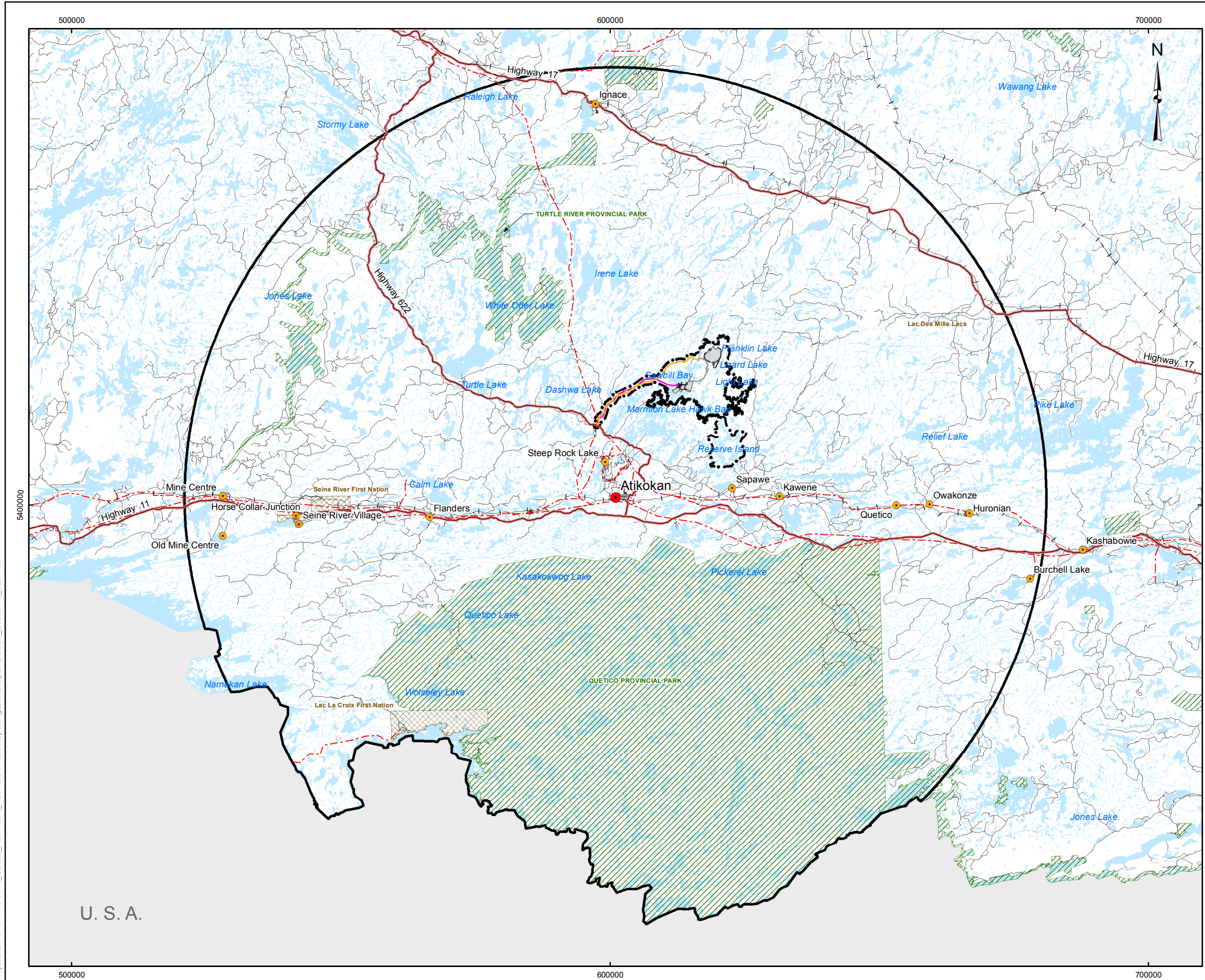
Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd.
 Base Data - MNR NRVIS, obtained 2004
 Produced by Golder Associates Ltd under licence from Ontario Ministry of Natural Resources, © Queens Printer 2008
 Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N



PROJECT		HAMMOND REEF GOLD PROJECT ATIKOKAN, ONTARIO, CANADA	
TITLE		HYDROLOGY LOCAL STUDY AREA	
<p>Golder Associates Mississauga, Ontario</p>	PROJECT NO.	13-1118-0010	SCALE AS SHOWN
	DESIGN	CGE 14 Nov. 2008	VERSION 2
	CHECK	SP 2 Dec. 2013	
	REVIEW	SP 2 Dec. 2013	

FIGURE: 2-2H

G:\Projects\2013\13-1118-0010_Osisko_Hammond_Reef\GIS\MapDocs\Reporting\EIS\Chapter 2\Hydrology_LSA.mxd

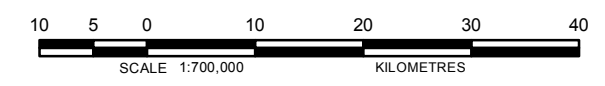


LEGEND

- Local Study Area City/Town
- Small Community
- Provincial Highway
- Road
- Existing Railway
- River/Stream
- Lake
- Provincial Park
- First Nations Reserve
- Mine Site Road
- Access Road (Hardtack / Sawbill)
- Project Transmission Line
- Project Facilities
- Land Use and Resources Local Study Area
- Socio-Economic Local Study Area

REFERENCE

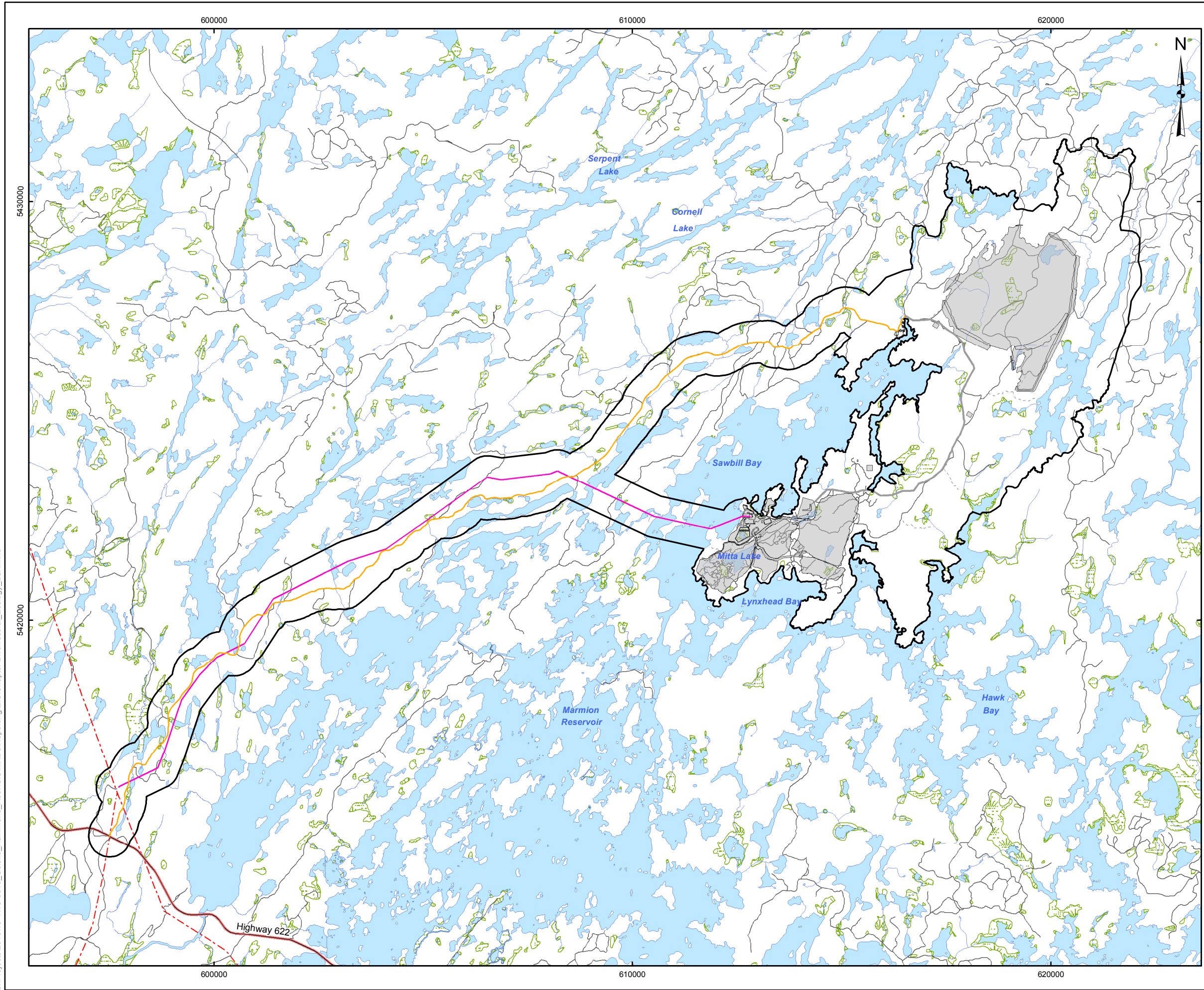
Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd
 Base Data - MNR NRVIS, obtained 2004
 Produced by Golder Associates Ltd under licence from
 Ontario Ministry of Natural Resources, © Queens Printer 2008
 Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N



PROJECT	HAMMOND REEF GOLD PROJECT ATIKOKAN, ONTARIO, CANADA		
TITLE	SOCIO-ECONOMIC LOCAL STUDY AREA		
 Mississauga, Ontario	PROJECT NO. 13-1118-0010	SCALE AS SHOWN	VERSION 2
	DESIGN CGE 14 Nov. 2008		
	GIS JO 2 Dec. 2013		
	CHECK SP 2 Dec. 2013		
	REVIEW SP 2 Dec. 2013	FIGURE: 2-21	

G:\Projects\2013\13-1118-0010_Osisko_Hammond_Reef\GIS\MXD\Reporting\EIS\Chapter 2\Socio_Economic_LSA.mxd

U. S. A.

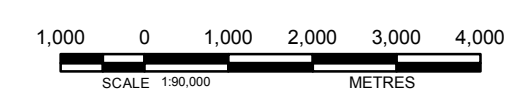



LEGEND

- Provincial Highway
- Road
- Trail
- Power Transmission Line
- River/Stream
- Lake
- ▨ Wetland
- Mine Site Road
- Access Road (Hardtack / Sawbill)
- Project Transmission Line
- Project Facilities
- Terrestrial Ecology Local Study Area

REFERENCE

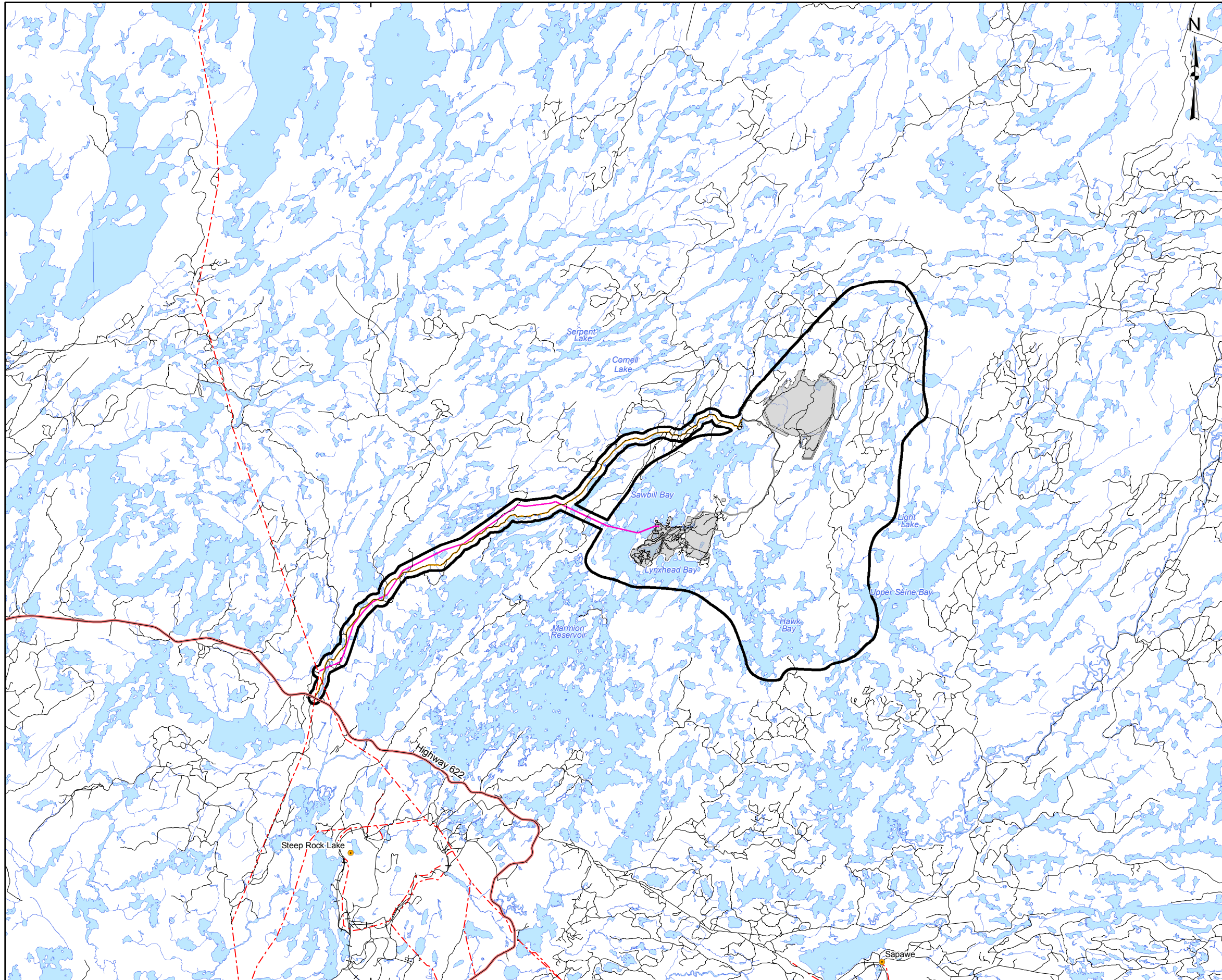
Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd
 Base Data - MNR NRVIS, obtained 2004
 Produced by Golder Associates Ltd under licence from
 Ontario Ministry of Natural Resources, © Queens Printer 2008
 Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N



PROJECT		HAMMOND REEF GOLD PROJECT ATIKOKAN, ONTARIO, CANADA	
TITLE		TERRESTRIAL ECOLOGY LOCAL STUDY AREA	
 Golder Associates Mississauga, Ontario	PROJECT NO.	13-1118-0010	SCALE AS SHOWN
	DESIGN	CGE 14 Nov. 2008	VERSION 2
	CHECK	SP 2 Dec. 2013	FIGURE: 2-2J
	REVIEW	SP 2 Dec. 2013	

G:\Projects\2013\13-1118-0010_Osisko_Hammond_Reef\GIS\MapDocs\Reporting\EIS\Chapter 2\Terrestrial_Ecology_LSA.mxd

600000

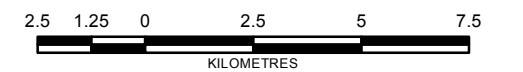


LEGEND

- Small Community
- Provincial Highway
- Road
- + Existing Railway
- River/Stream
- Lake
- Mine Site Road
- Access Road
- Project Transmission Line
- Mine Facilities
- Water Quality Local Study Area

REFERENCE

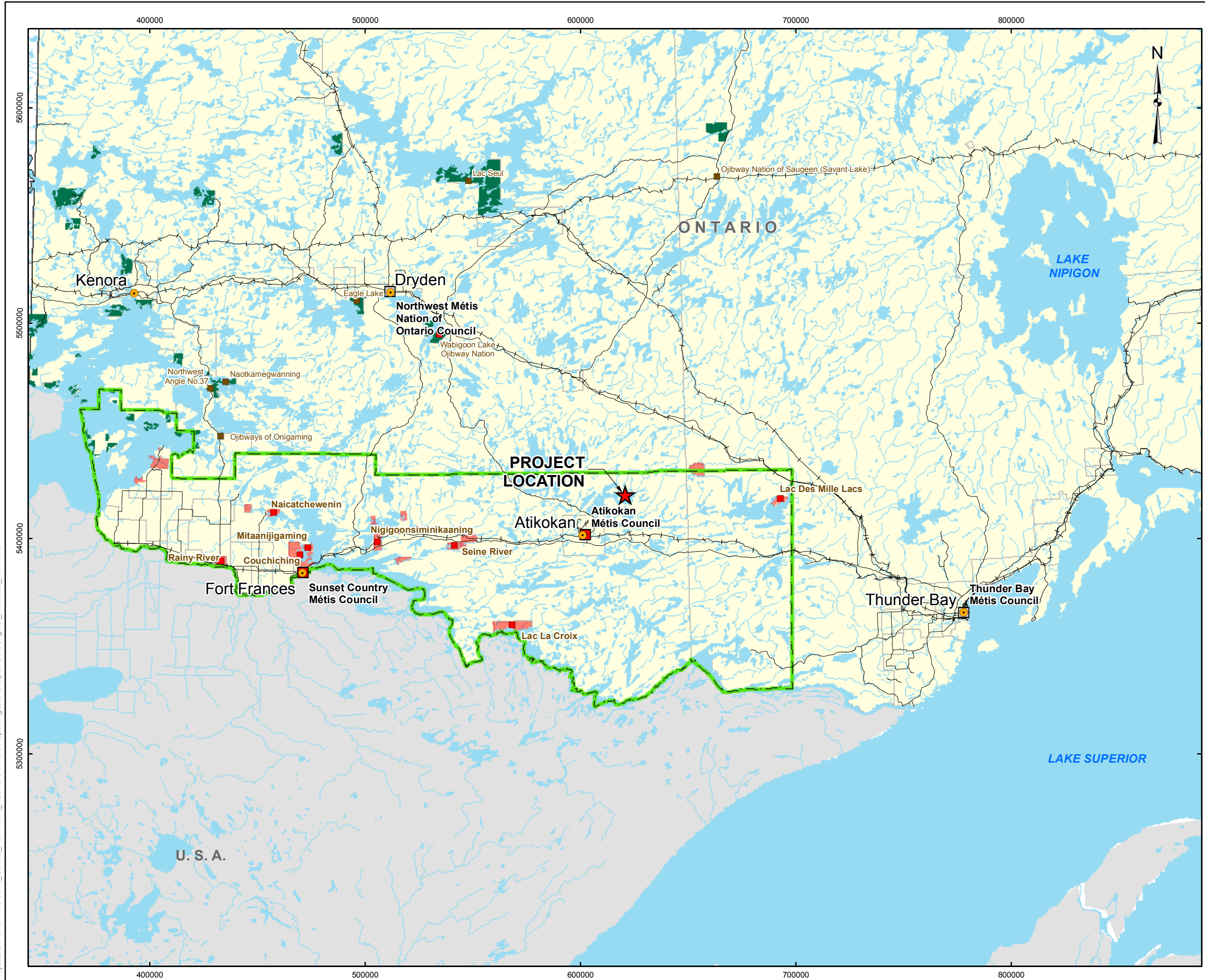
Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd
 Base Data - MNR NRVIS, obtained 2004
 Produced by Golder Associates Ltd under licence from
 Ontario Ministry of Natural Resources, © Queens Printer 2008
 Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N



PROJECT		HAMMOND REEF GOLD PROJECT ATIKOKAN, ONTARIO, CANADA	
TITLE		WATER QUALITY LOCAL STUDY AREA	
 Golder Associates Mississauga, Ontario	PROJECT NO.	13-1118-0010	SCALE AS SHOWN
	DESIGN	CGE 27 Jun. 2012	VERSION 2
	GIS	JO 2 Dec. 2013	
	CHECK	SP 2 Dec. 2013	
	REVIEW	SP 2 Dec. 2013	

FIGURE: 2-2K

600000



LEGEND

- City/Town
- Road
- + Existing Railway
- River
- Waterbody
- First Nation Community
- First Nation Community within the Regional Study Area
- Métis Community Council
- Métis Community Council within the Regional Study Area
- First Nation Reserve
- First Nation Reserve within the Regional Study Area
- Regional Study Area



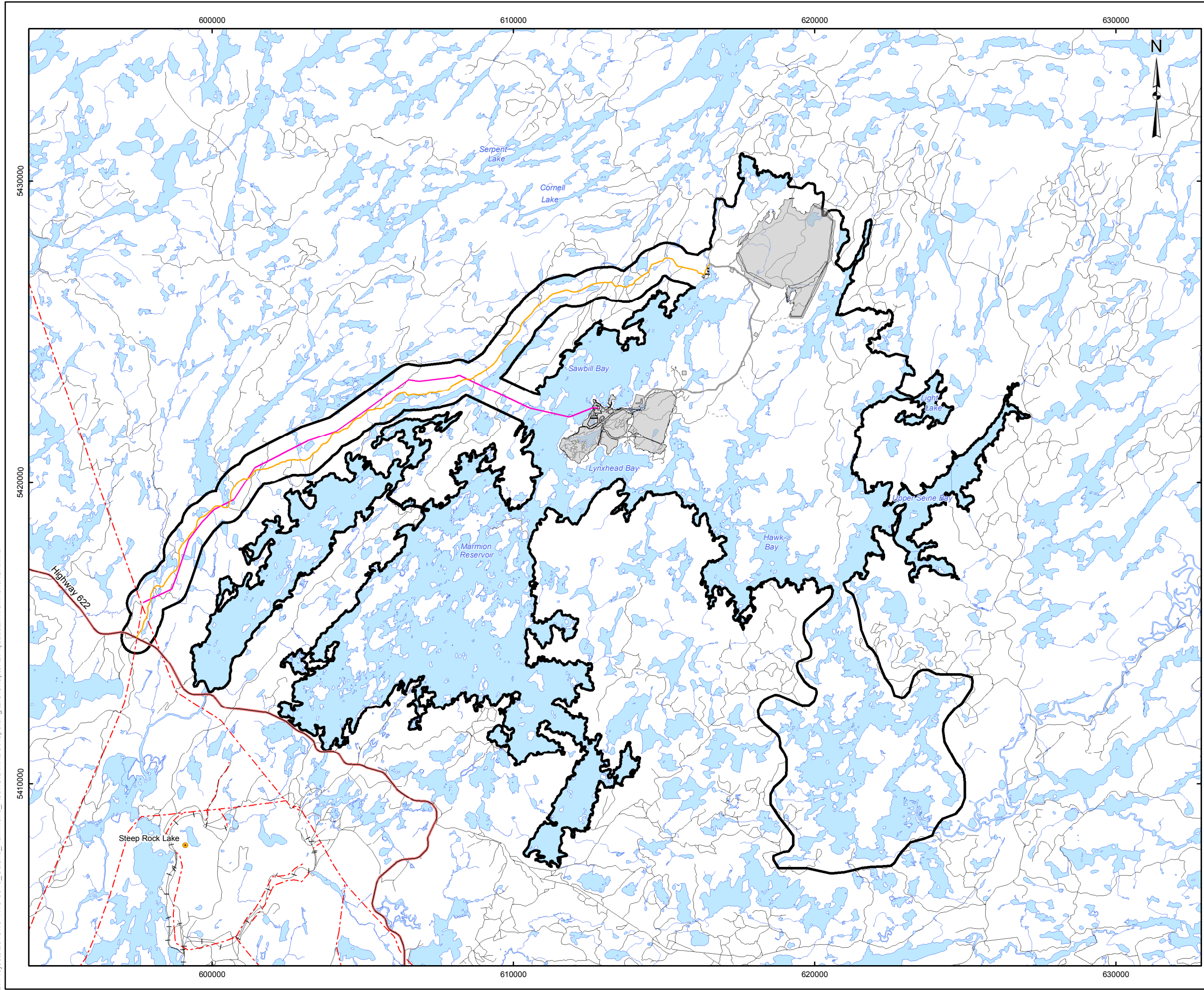
REFERENCE

Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd
 Base Data - MNR NRVIS, obtained 2004
 Produced by Golder Associates Ltd under licence from
 Ontario Ministry of Natural Resources, © Queens Printer 2008
 Historical Indian Treaties obtained from Natural Resources Canada,
 The Atlas of Canada (2010).
 First Nations Communities from Indian and Northern Affairs Canada.
 Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N



PROJECT	HAMMOND REEF GOLD PROJECT ATIKOKAN, ONTARIO, CANADA		
TITLE	ABORIGINAL INTERESTS REGIONAL STUDY AREA		
 Golder Associates Mississauga, Ontario	PROJECT NO. 13-1118-0010	SCALE AS SHOWN	VERSION 2
	DESIGN CGE 11 Nov. 2010		
	GIS JO 2 Dec. 2013		
	CHECK SP 2 Dec. 2013		
	REVIEW SP 2 Dec. 2013	FIGURE: 2-3A	

G:\Projects\2013\13-1118-0010_Osisko_Hammond_Reef\GIS\MXD\Reporting\EIS\Chapter 2\Aboriginal_Interest_RSA.mxd

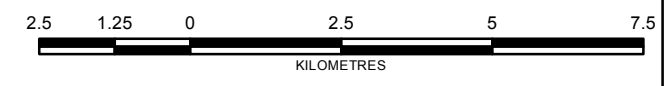


LEGEND

- Small Community
- Provincial Highway
- Road
- Existing Railway
- - - Power Transmission Line
- River/Stream
- Lake
- Mine Site Road
- Access Road (Hardtack / Sawbill)
- Project Transmission Line
- Project Facilities
- Aquatic Environment Regional Study Area

REFERENCE

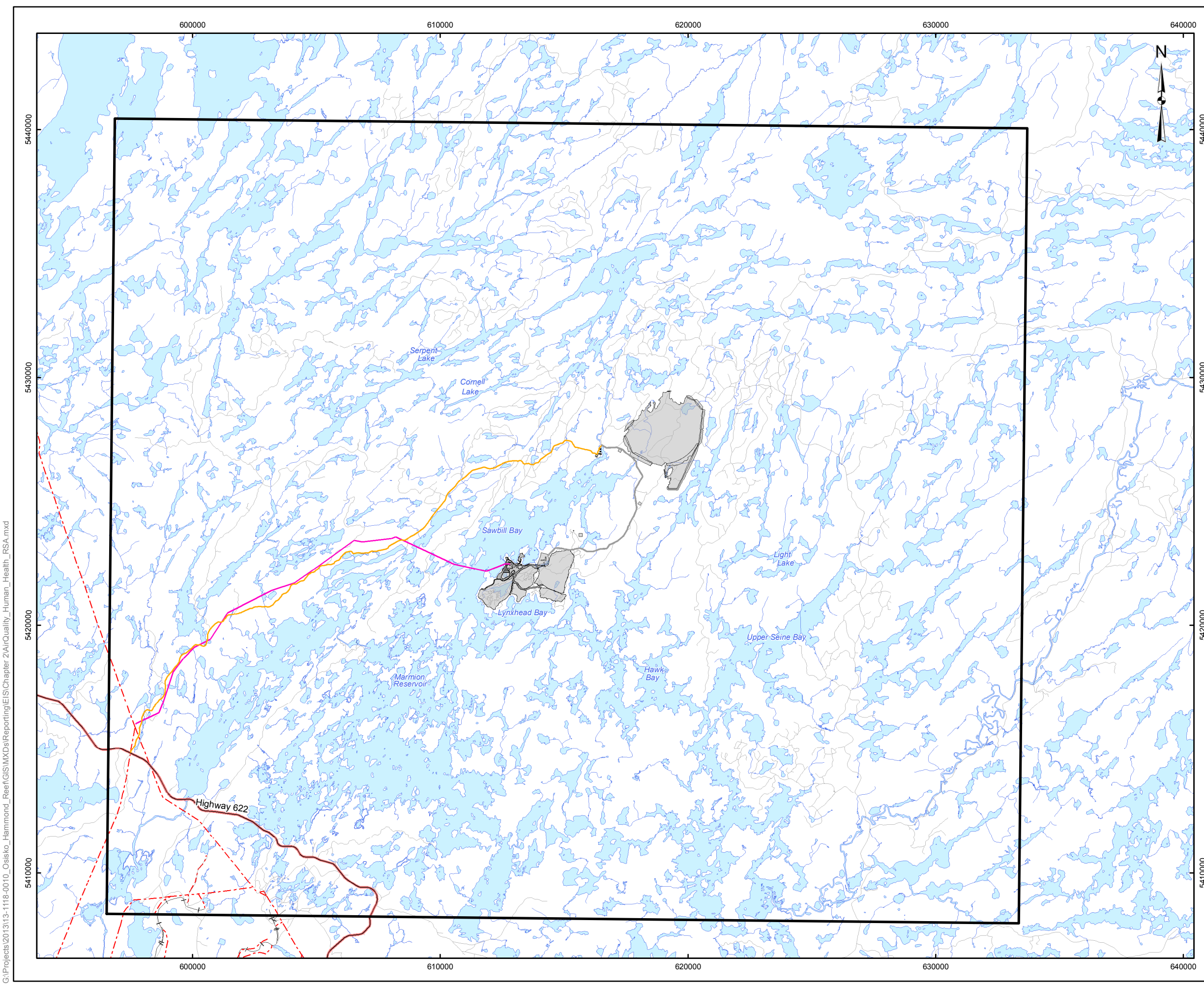
Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd.
 Base Data - MNR NRVIS, obtained 2004
 Produced by Golder Associates Ltd. under licence from
 Ontario Ministry of Natural Resources, © Queens Printer 2008
 Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N



PROJECT	HAMMOND REEF GOLD PROJECT ATIKOKAN, ONTARIO, CANADA		
TITLE	AQUATIC ENVIRONMENT REGIONAL STUDY AREA		
 Mississauga, Ontario	PROJECT NO. 13-1118-0010	SCALE AS SHOWN	VERSION 2
	DESIGN GIS	CGE	8 Jan. 2013
	CHECK	SP	2 Dec. 2013
	REVIEW	SP	2 Dec. 2013

FIGURE: 2-3B

G:\Projects\2013\13-1118-0010_Osisko_Hammond_Reef\GIS\MXD\Reporting\EIS\Chapter 2\AquaticEnvironment\FSA.mxd

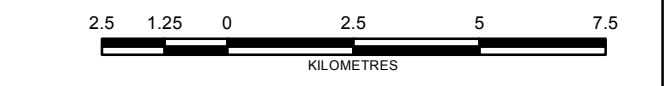


LEGEND

- Provincial Highway
- Road
- Existing Railway
- - - Power Transmission Line
- River/Stream
- Lake
- Mine Site Road
- Access Road (Hardtack / Sawbill)
- Project Transmission Line
- Project Facilities
- Air Quality and Human Health Local Study Area

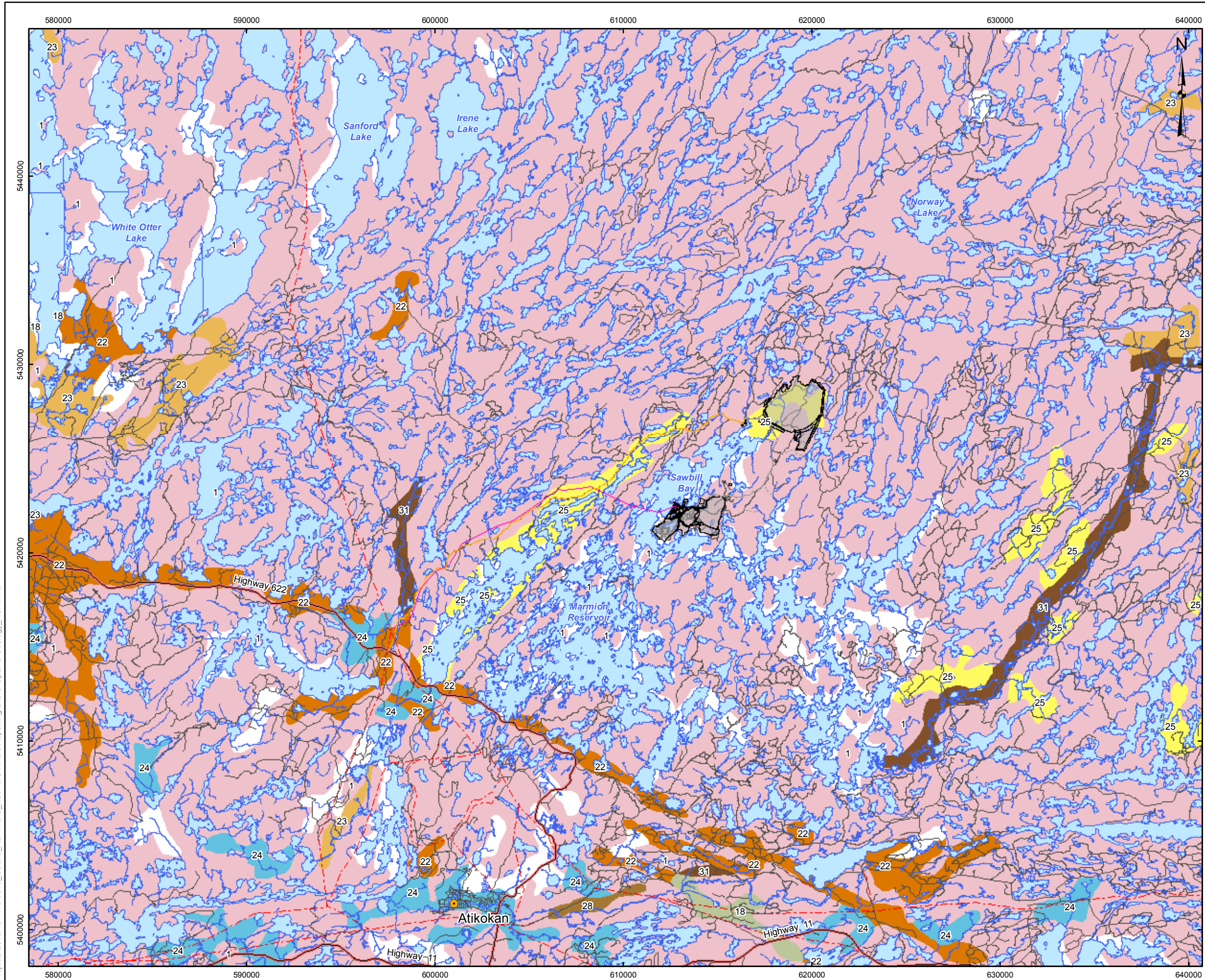
REFERENCE

Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd
 Base Data - MNR NRVIS, obtained 2004
 Produced by Golder Associates Ltd under licence from
 Ontario Ministry of Natural Resources, © Queens Printer 2008
 Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N



PROJECT	HAMMOND REEF GOLD PROJECT ATIKOKAN, ONTARIO, CANADA		
TITLE	AIR QUALITY AND HUMAN HEALTH REGIONAL STUDY AREA		
 Mississauga, Ontario	PROJECT NO. 13-1118-0010	SCALE AS SHOWN	VERSION 2
	DESIGN	CGE	14 Nov. 2008
	GIS	JO	2 Dec. 2013
	CHECK	SP	2 Dec. 2013
	REVIEW	SP	2 Dec. 2013
			FIGURE: 2-3C

G:\Projects\2013\13-1118-0010_Osisko_Hammond_Reef\GIS\MXD\Reporting\EIS\Chapter 2\AirQuality_Human_Health_RSA.mxd



LEGEND

- City/Town
- Provincial Highway
- Road
- Trail
- Power Transmission Line
- River/Stream
- Lake

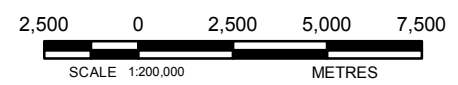
Surficial Geology

- 1 Bedrock
- 18 Till
- 22 Glaciofluvial Ice
- 23 Glaciofluvial Outwash deposits
- 24 Glaciolacustrine deposits: silt and clay, minor sand; basin and quiet water deposits
- 25 Glaciolacustrine deposits: sand, gravelly sand and gravel; nearshore and beach deposits
- 28 Fluvial deposits
- 31 Fluvial deposits

- Mine Site Road
- Access Road (Hardtack / Sawbill)
- Project Transmission Line
- Project Facilities

REFERENCE

Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd.
 Base Data - MNR NRVIS, obtained 2004
 Surficial Geology - Ontario Geological Survey, 1997. Quaternary geology, seamless coverage of the province of Ontario: Ontario Geological Survey, Data Set 14.
 Produced by Golder Associates Ltd under licence from Ontario Ministry of Natural Resources, © Queens Printer 2008
 Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N



PROJECT			
HAMMOND REEF GOLD PROJECT ATIKOKAN, ONTARIO, CANADA			
TITLE			
GEOLOGY REGIONAL STUDY AREA			
 Golder Associates Mississauga, Ontario	PROJECT NO. 13-1118-0010	SCALE AS SHOWN	VERSION 2
	DESIGN	CGE	14 Nov. 2008
	GIS	JO	2 Dec. 2013
	CHECK	SP	2 Dec. 2013
	REVIEW	SP	2 Dec. 2013

FIGURE: 2-3D

G:\Projects\2013\13-1118-0010_Osisko_Hammond_Reef\GIS\MXD\Reporting\EIS\Chapter 2\Geology_RSA.mxd

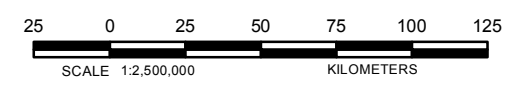


LEGEND

- ★ Project Location
- City/Town
- Provincial Highway
- Road
- Existing Railway
- - - Far North Border
- River/Stream
- Lake
- Region of Kenora
- Region of Rainy River
- Region of Thunder Bay
- Socio-Economic Regional Study Area

REFERENCE

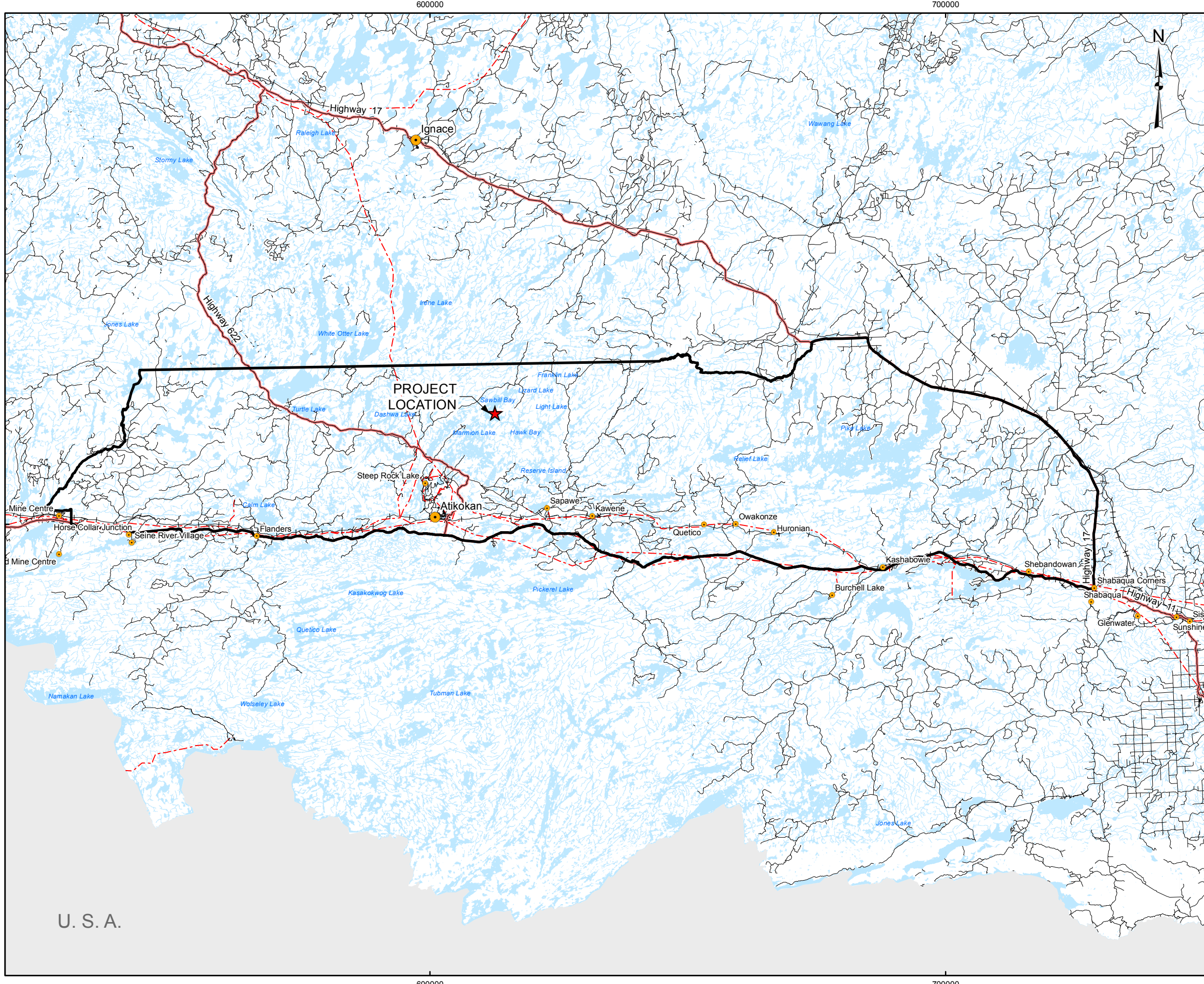
Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd (April, 2010)
 Base Data - MNR NRVIS, obtained 2004
 Produced by Golder Associates Ltd under licence from
 Ontario Ministry of Natural Resources, © Queens Printer 2008
 Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N



PROJECT		HAMMOND REEF GOLD PROJECT ATIKOKAN, ONTARIO, CANADA	
TITLE		SOCIO-ECONOMIC REGIONAL STUDY AREA	
 Golder Associates Mississauga, Ontario	PROJECT NO.	13-1118-0010	SCALE AS SHOWN
	DESIGN	CGE 14 Nov. 2008	VERSION 2
	CHECK	SP 2 Dec. 2013	
	REVIEW	SP 2 Dec. 2013	

FIGURE: 2-3E

G:\Projects\2013\13-1118-0010_Osisko_Hammond_Reef\GIS\MXD\Reporting\EIS\Chapter 2\Social\FSA.mxd

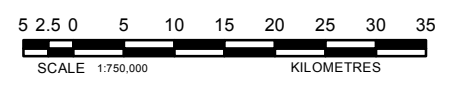



LEGEND

- ★ Project Location
- City/Town
- Small Community
- Provincial Highway
- Road
- Existing Railway
- - - Power Transmission Line
- River/Stream
- Lake
- ▭ Terrestrial Ecology Regional Study Area

REFERENCE

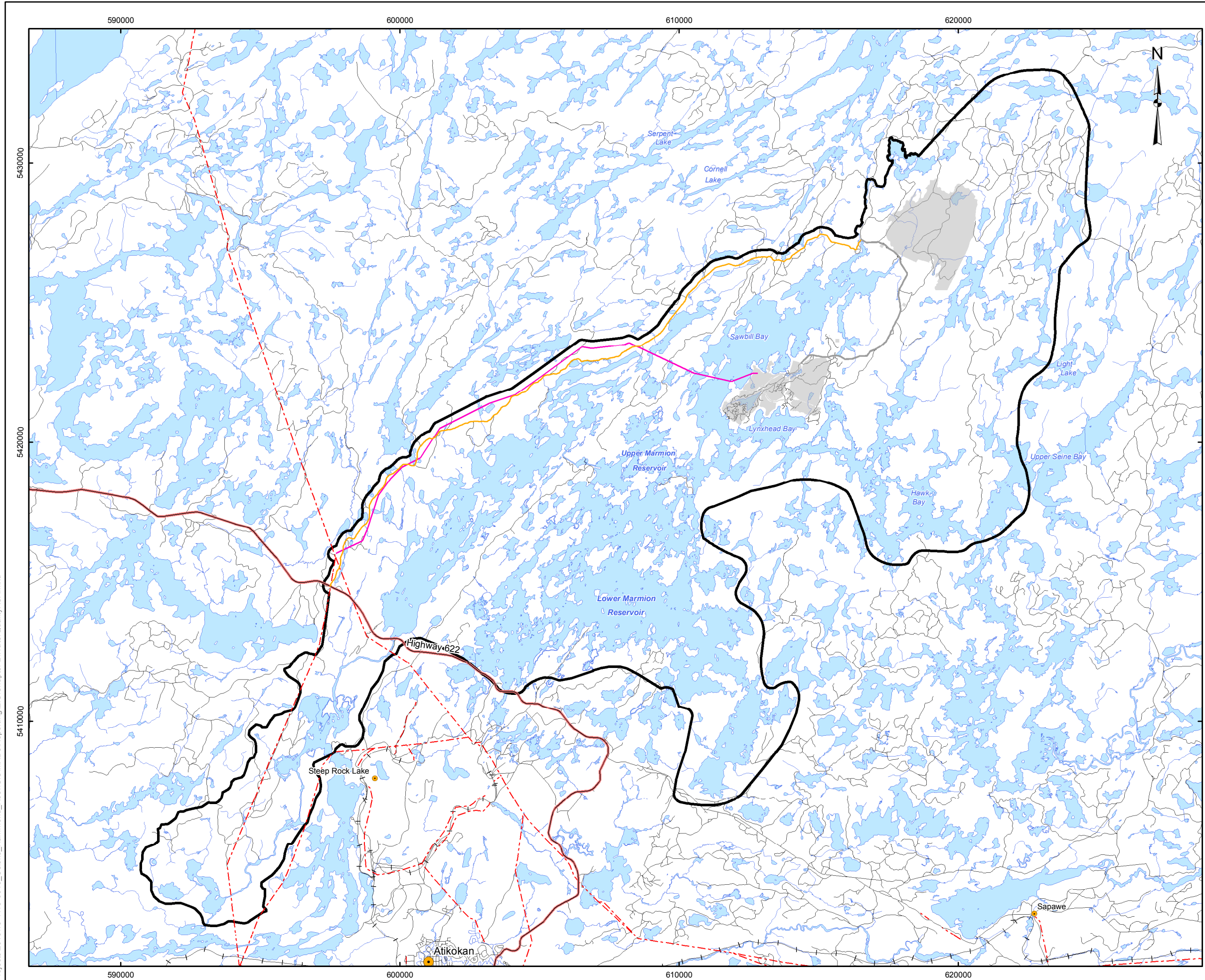
Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd
 Base Data - MNR NRVIS, obtained 2004
 Produced by Golder Associates Ltd under licence from
 Ontario Ministry of Natural Resources, © Queens Printer 2008
 Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N



PROJECT		HAMMOND REEF GOLD PROJECT ATIKOKAN, ONTARIO, CANADA	
TITLE		TERRESTRIAL ECOLOGY REGIONAL STUDY AREA	
 Golder Associates Mississauga, Ontario	PROJECT NO.	13-1118-0010	SCALE AS SHOWN
	DESIGN	CGE 14 Nov. 2008	VERSION 2
	CHECK	AVS 2 Dec. 2013	FIGURE: 2-3F
	REVIEW	KT 2 Dec. 2013	

G:\Projects\2013\13-1118-0010_Osisko_Hammond_Reef\GIS\MapDocs\Reporting\EIS\Chapter 2\Terrestrial_Ecology_RSA.mxd

U. S. A.



LEGEND

- City/Town
- Small Community
- Provincial Highway
- Road
- Existing Railway
- - - Power Transmission Line
- River/Stream
- Lake
- Mine Site Road
- Access Road (Hardtack / Sawbill)
- Project Transmission Line
- Project Facilities
- ▭ Water Quality Regional Study Area

REFERENCE

Base Data - Provided by OSISKO Hammond Reef Gold Project Ltd
 Base Data - MNR NRVIS, obtained 2004
 Produced by Golder Associates Ltd under licence from
 Ontario Ministry of Natural Resources, © Queens Printer 2008
 Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 15N



PROJECT		HAMMOND REEF GOLD PROJECT ATIKOKAN, ONTARIO, CANADA	
TITLE		WATER QUALITY REGIONAL STUDY AREA	
 Golder Associates Mississauga, Ontario	PROJECT NO. 13-1118-0010	SCALE AS SHOWN	VERSION 2
	DESIGN	CGE	14 Nov. 2008
	GIS	JO	2 Dec. 2013
	CHECK	SP	2 Dec. 2013
	REVIEW	SP	2 Dec. 2013
			FIGURE: 2-3G

G:\Projects\2013\13-1118-0010_Osisko_Hammond_Reef\GIS\MXD\Reporting\EIS\Chapter 2\WaterQuality\RSA.mxd

AMENDED EIS/EA REPORT
CHAPTER 2: ENVIRONMENTAL ASSESSMENT METHODS
VERSION 3

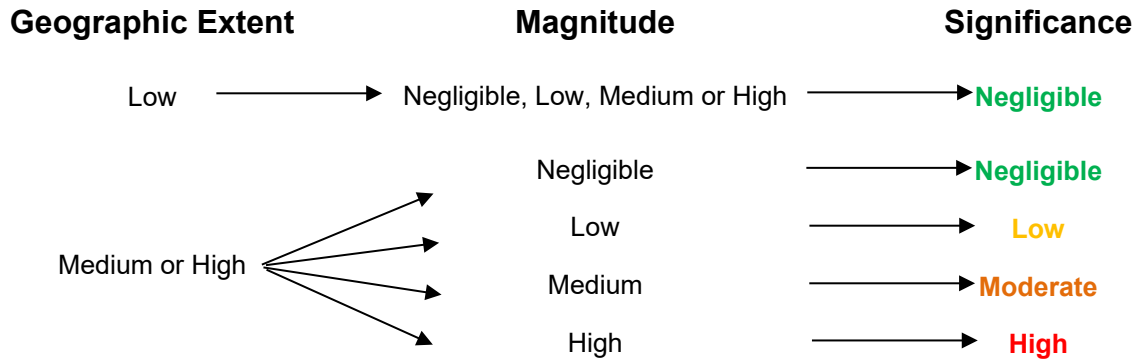


Figure 2-4: Decision Tree for Assigning Significance to Residual Effects on the Socio-economic Environment