SCOZINC OPERATIONS – SOUTHWEST EXPANSION ENVIRONMENTAL ASSESSMENT REGISTRATION DOCUMENT

Cooks Brook, Halifax County, Nova Scotia

Prepared For:
ScoZinc Limited

Prepared by:
Conestoga-Rovers & Associates

45 Akerley Blvd.
Dartmouth, Nova Scotia
Canada B3B 1J7

Office: (902) 468-1248
Fax: (902) 468-2207

web: http:\\www.CRAworld.com

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TABLE OF CONTENTS

LIST OF FIGURES
(Following Text)

LIST OF TABLES

LIST OF APPENDICES

GLOSSARY OF TERMS AND ABBREVIATIONS

Note: Both imperial and metric units have been used throughout the document. Every effort has been made to standardize units, however units given are as reported.

ACCDC	Atlantic Canada Conservation Data Centre
ANFO	Ammonium nitrate fuel oil – an explosive
ARD	Acid Rock Drainage
AST	Above ground Storage Tanks
°C	Degrees Celsius
CANMET	Canada Centre for Mineral and Energy Technology
CCME	Canadian Council of Ministers of the Environment
CEAA	Canadian Environmental Assessment Act or Agency
CEPA	Canadian Environmental Protection Act
CLC	Community Liaison Committee
CO	Carbon monoxide
CO_2	Carbon dioxide
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CRA	Conestoga-Rovers and Associates
CRM	Cultural Resource Management Group
dB	Decibels
dBA	Decibel on the A-scale
DFO	Fisheries and Oceans Canada
Drumlin	An elongated hill or ridge of glacial drift.
EA	Environmental Assessment
EARD	Environmental Assessment Registration Document
EC	Environment Canada
ESR	Emergency Spill Regulations
H_2S	Hydrogen sulphide
ha	Hectare
IA	Industrial Approval
kg	Kilogram
km	Kilometre
km / h	Kilometre per hour
Lpm	Litres per minute
loam	Rich soils containing a relatively equal mixture of sand and silt and a somewhat smaller proportion of clay.
m	Metres
masl	Metres above sea level
mbsl	Metres below sea level
MBCA	Migratory Bird Convention Act

mg/L	milligrams per Litre
mm	millimetres
MMER	Metal Mining Effluent Regulations
MSC	Meteorological Service of Canada
MVT	Mississippi Valley-Type – a type deposit containing Zn and Pb mineralization
NAAQS	National Ambient Air Quality Standard
NAPS	National Air Pollution Surveillance
NO_2	Nitrogen dioxide
NOx	Nitrogen oxide
NPRI	National Pollutant Release Inventory
NSDNR	Nova Scotia Department of Natural Resources
NSE / NSDOE / NSEL	Nova Scotia Environment, currently (since 2008), but historically referred to as NS Department of Environment and more recently as NS Environment & Labour depending on the timeframe.
NSEA	Nova Scotia Environment Act
NSESA	Nova Scotia Endangered Species Act
NSM	Nova Scotia Museum
OHS	Occupational Health & Safety
O_3	Ground level Ozone
Pb	Lead
PID	Property Identification Number
PM / PM 10 / PM 2.5	Particulate matter (10 – less than 10 microns, 2.5 less than 2.5 microns)
PMR	Petroleum Management Regulations
POL	Petroleum, Oil and Lubricants
ppm	parts per million
SARA	Species at Risk Act
ScoZinc	ScoZinc Limited
Selwyn	Selwyn Resources Ltd.
SO_2	Sulphur dioxide
SO_x	Sulphur oxides
SPL	Sound pressure levels
t	Tonnes
tailings	Mining residue
till	Glacial drift composed of an unconsolidated, heterogeneous mixture of clay, sand, pebbles, cobbles, and boulders.
TMF	Tailings Management Facility
TSP	Total suspended particulates
UOR	Used Oil Regulations
VEC	Valued Environmental Component
Zn	Zinc

$\mu g / m^3$	Microgram per cubic metre
UST	Underground Storage Tanks
USgpm	US gallons per minute

1.0 PROPONENT AND PROJECT INFORMATION

1.1 PROPONENT INFORMATION

The proponent is ScoZinc Limited (ScoZinc), a wholly-owned, Nova Scotia registered subsidiary of Selwyn Resources Limited (Selwyn) of Vancouver, British Columbia. Nova Scotia Registry of Joint Stocks information of the proponent is included in Appendix A.

Proponent Contact Information:

Mr. Joseph Ringwald
VP Mining, Selwyn Resources Ltd.
jringwald@selwynresources.com

Mr. Steven Quinn
Project Manager, Selwyn Resources Ltd.
squinn@selwynresources.com

Corporate
Selwyn Resources Ltd.
Suite 700 - 509 Richards Street
Vancouver, BC V6B 2Z6
Tel: (604) 801-7240
Toll Free: 1-888-989-9188
Fax: (604) 689-8355
www.selwynresources.com

Local
ScoZinc Limited
15601 Highway 224
Cooks Brook, NS B0N 2H0
Tel: (902) 758-1010
Fax: (902) 758-1011

Environmental Assessment Consultant Contact Information:
Mr. Peter G. Oram, P. Geo
Vice-President, Conestoga-Rovers & Associates
45 Akerley Blvd.
Dartmouth, NS B3B 1J7
Tel. (902) 468-1248
Fax: (902) 468-2207
poram@craworld.com

1.2 PROJECT INFORMATION

Name of the Undertaking: ScoZinc Operations Southwest Expansion Project
Location of the Undertaking: Cooks Brook, Halifax County, Nova Scotia

_____ _____, 2011
Mr. Joseph Ringwald Date
VP Mining, Selwyn Resources Ltd.

2.0 PROJECT OVERVIEW

2.1 MINE OPERATIONAL HISTORY

Exploration for base metals began at the Gays River site in 1970 and there have been several owners and operators that have mined or planned to mine the site since, as summarized below.

1970– 1985	Cuvier Mines / Esso Minerals Canada
1986 – 1996	Seabright Resources / Westminer Canada Ltd.
1996 – 2002	Savage Resources Canada Co. / Pasminco Ltd.
2002	Regal Mines Ltd.
2002 – 2006	ScoZinc Limited / OntZinc Corp, HudBay Minerals Ltd
2006 – 2011	ScoZinc Limited / Acadian Mining Corp.
2011 – Present	ScoZinc Limited / Selwyn Resources Ltd.

2.1.1 CUVIER MINES / ESSO MINERALS CANADA

The zinc-lead deposit at Gays River was delineated in the early 1970's by Cuvier Mines and ESSO Minerals Canada. Initial site development began with the exploration decline driven in 1975-76. Mine development began in 1978 and the mill was commissioned in October, 1979. From 1979 to 1981 production from underground mining totalled 500,000 tonnes of lead / zinc ore. Mine production was suspended in 1981 and the facility was subsequently closed in 1982, due to hydrogeological difficulties (inflows of groundwater and loose sediment in the underground operations) and operating losses mainly associated with reduced zinc / lead prices as compared to when operations began.

Prior to and during this current proposed development, a number of studies were carried out to address environmental conditions at the then defined Gays River property. These documents included:

Baseline Environmental Study for the Proposed Imperial Oil / Cuvier Mines Limited, Lead-Zinc Mine at Gays River, Nova Scotia. Dames and Moore Consulting Engineers. 1974.

- *Environmental Study and Preliminary Impact Assessment, Gays River Lead-Zinc Project for Imperial Oil Limited and Cuvier Mines Limited*. Dames and Moore Consulting Engineers. 1976.

- *A Survey of the Fishery Resources of the Gays River, Nova Scotia*. Dames and Moore Consulting Engineers. 1977.

- *Environmental Assessment, Gays River Project, Esso Minerals Canada.* The Environmental Applications Group Limited. 1978.

These documents were reviewed for this current undertaking and provide some useful background information regarding the early history of the project site and the associated environmental conditions at that time. These documents were not included as appendices as they were part of previous submissions and subsequent approvals.

2.1.2 SEABRIGHT RESOURCES / WESTMINER CANADA

In 1986 the Gays River Mine and associated facilities were acquired by Seabright Resources Inc. (Seabright). The mill was subsequently converted to process gold ore from mineral properties that Seabright held in the region. Seabright was acquired by Westminer Canada Inc. (Westminer) in 1988, at which time a review of the zinc/lead potential at Gays River was undertaken. Following completion of feasibility studies in 1989, the underground workings were dewatered and test mining was carried out. The mill was converted back to a zinc and lead processing facility. Bulk sampling proved to be successful and full scale production began in March 1990. The mine and mill operated for approximately 15 months processing 190,000 tonnes of ore. Hydrogeological problems and economic considerations again forced production to be suspended in May 1991.

During its operation, the mine produced approximately 15,000 tonnes of zinc/lead ore per month and discharged 572 tonnes/day of tailings to the tailings management area. The mine and mill employed 142 people (mill - 24, mine - 100, administration – 18) at that time.

The following chronology summarizes the submission of documents by Seabright/Westminer and the associated permits and approvals granted by Nova Scotia Environment (NSDOE) from 1988 to 1990.

June, 1988	*Gays River Mill Industrial Approval Application*, Porter Dillon Limited (For the processing of gold ore only).
June 20, 1988	Westminer received Industrial Approval No. 88-073 to operate the mill as a gold processing facility (NSDOE File No. 11-88-0165-10.2)
July 31, 1989	Westminer applied for IA for Test Mining (i.e. 10,000 tonne bulk sample)

August 30, 1989	Westminer received IA No. 89-090 for the 10,000 bulk sample (NSDOE File No. 11-89-0128-10.2)
September 13, 1989	*Gays River Mill - Addendum To Industrial Approval Application*, Porter Dillon Limited (For the addition of lead/zinc ore processing).
October 11, 1989	*Gays River Mine, Registration for Environmental Assessment Act*, Porter Dillon Limited.
November 3, 1989	Westminer received correspondence indicating that the project did not warrant a full environmental assessment under CEAA and approval was granted with stipulations under the Environmental Protection Act and the Water Act.
December 5, 1989	Westminer applied for an Extension to IA No. 89-090 for an additional 20,000 tonne Pb/Zn ore bulk sample.
December 22, 1989	NSDOE granted approval for the additional 20,000 tonne bulk sample.
January 18, 1990	NSDOE granted approval of the September 13, 1989 Addendum, as an amendment to IA No. 88-073 (NSDOE File No. 11-88-0165-10.2)
January 22, 1990	*Gays River Lead/Zinc Mine IA Application*, Porter Dillon Limited (For Full Scale Operation)
March 30, 1990	NSDOE granted IA No. 90-007 for Full Scale Operation (NSDOE File No. 11-90-0026.09)

These documents were not included as appendices as they were part of previous submissions and subsequent approvals.

Westminer/Seabright Resources held water rights permits for two separate withdrawal activities. Permit #2891 authorized Westminer to retain dams and withdraw water from Annand Brook for industrial purposes at a rate of 2650 litres per minute (Lpm) (700 USgpm) for the purpose of gold recovery by gravity and floatation processes. Permit #2892 authorized Westminer to withdraw water from the Gays River for use at

its mill at a rate of 1211 Lpm (320 USgpm) to supply domestic needs, compressor cooling water and fire protection equipment. Both permits expired December 31, 2006.

In addition to the above noted documents and associated approvals, Westminer also commissioned a number of surveys and studies, which were carried out prior to and following the mine and mill being placed into full scale production. A list of these studies is provided below.

- *Gays River Lead-Zinc Mine - Pre-Blast Survey*, Risktech Consulting Services Limited, 2 volumes, January, 1990.

- *Gays River Mine/Mill - Water Well Survey*, Porter Dillon Limited, February, 1990.

- *Gays River Mill/Mine Groundwater Monitoring and Baseline Water Quality Report*, Porter Dillon Limited, March, 1990.

- *Gays River Mine Abandonment Plan*, Westminer Limited, September, 1991

Subsequent to the closure of the mine/mill and its placement on a care and maintenance program, Westminer applied to NSDOE in February 1992 for a series of amendments to the existing IAs 88-073 and 90-007. Approval for the request to allow a reduction in the compliance monitoring program while the mine and mill were placed on a "care and maintenance" basis was granted in two letters dated March 12 and March 27, 1992, amending all requests into IA 90-007. In 1992 the mine/mill was placed in care and maintenance and the mine workings were allowed to flood.

2.1.3 SAVAGE RESOURCES / PASMINCO

Savage Resources Canada Company (Savage), a wholly-owned subsidiary of Pasminco Limited of Australia (Pasminco), acquired the rights to the mine and mill in November 1996. In January 1997, the IA Permit (90-007) and two Water Rights Permits (2891, 2892) were legally transferred to Savage and the Scotia Mine (new name). In 2002 Pasminco merged with 3063554 Nova Scotia Company to form ScoZinc Limited.

Savage commissioned the preparation of an Environmental Protection Plan in 1997 entitled "Environmental Protection Plan in Case of an Inrush at The Scotia Mine, Halifax County, Nova Scotia" was completed by Dr. Peter Cain of the Canada Centre for Mineral and Energy Technology (CANMET) and was submitted to NSDOE in order to partially fulfil the requirements of IA No. 90-007 and meet the requirements/conditions of the Nov. 3 1989 EA approval.

Between June 1997 and January 1998 the mine was dewatered and the discharge water was initially pumped into the North Branch of the Gays River. At some point the discharge was redirected into the South Branch of the Gays River because the Main Branch appeared to be a major source of water ingress to the mine. Once the discharge was redirected, the Main Branch dried up.

A sand pit was operated in the former underground portal area from about 1986 to 1992. In 1998, a section of the mine property began operation as a sand pit and continued for several years. Between 1997 and 2003 Savage Resources / ScoZinc held the actual permit for sand but Elmsdale Landscaping operated the pit. Since 2004, Gallant Aggregates has held the permit and made an attempt to crush waste rock from the site for use as commercial aggregate but it was found to not be suitable.

Following the dewatering program, Savage decided to change their approach to the mining project. Savage proposed to develop and operate an open pit in the central zone of the deposit, and to continue with the original Westminer plans for underground mining in the Northeast. Savage's mine plan was designed to extract approximately 2.5 million tonnes of zinc / lead ore from a combined open pit and a permitted underground operation (Northeast Orebody). Several components of this project were continuations of operations that had been previously reviewed and approved, including the underground mining, milling and concentrate shipping, and therefore were not required to be considered as part of any new undertaking under the Environmental Assessment process. The key components of that project were described as:

1. A surface mining operation centred around the former underground portal, and;
2. Construction of a River Diversion, Control Dyke and associated watercourse alterations.

The river diversion and use of surface mining methods for the majority of ore recovery were touted as the key to a successful operation. Local geology and hydrological conditions make for a situation where a flood susceptible river overlies a high permeability sand layer at surface. The river diversion and dyke system had been designed to limit the potential for floodwaters to enter the pit area as groundwater through the sand layer or directly over adjacent flooded lands. The river diversion was therefore an integral part of this undertaking as was allowing the pit to flood, with entry and exit points to the Gays River, for the reclamation plan for the surface mine.

Environmental Assessment Approval (EA) was granted for the proposed Savage project in August 2000. The Approval contained Conditions including specific monitoring and studies prior to the river diversion being constructed and additional information required to be submitted as part of an Industrial Approval (IA) application. The IA application was not prepared or filed as Pasminco's direction changed and eventually the property ownership changed (see Section 2.1.4)

In 2004 an attempt was made to remove accumulated overburden from the portal pit using a dredge. This was an attempt to clear the overburden and develop an open pit but was ultimately not successful.

2.1.4 SCOZINC LTD / ACADIAN MINING CORP

Acadian Mining Corporation acquired ScoZinc from HudBay Minerals in July 2006. The Minister transferred the August 2000 Environmental Assessment Approval. An IA (2006-055136) to *"Construct, Operate, and Reclaim the Gays River Mine at Cooks Brook, Nova Scotia"* was granted to ScoZinc on February 23, 2007 and is in effect for a 10 year period ending February 23, 2017. Production commenced at the mine in May 2007.

The Bulk Solids Handling Facility located at Sheet Harbour Industrial Park, North Atlantic Marine Terminal, Sheet Harbour, Nova Scotia was developed for the temporary storage of zinc and lead concentrate with the capacity at the terminal to load the concentrates on to a ship. IA (2007-057986) to operate the Bulk Solids Handling Facility was granted to ScoZinc Limited on October 31, 2007. The approval is in effect for a 10 year period ending October 31, 2017.

During the brief mining history the mine site employed approximately 120 people in various aspects of mine operations and administration. The mine produced, over a two year period in 2007 and 2008, 656,500 tonnes of ore and 341,000 tonnes of low grade ore which yielded 28,000 tonnes of zinc and 11,100 tonnes of lead concentrates.

The mine operations for Acadian at the Gays River mine proceeded according to the 1999 EA as an open pit operation, on-site milling, and concentrates were shipped via Sheet Harbour port facility. A river diversion was part of the 1999 EA, however this aspect was not completed and this was an allowable deviation. Meetings were held with Nova Scotia Department of Natural Resources (NSDNR), NSE, Environment Canada (EC) and Fisheries and Oceans Canada (DFO) in 2006 and 2007 that confirmed that the need for the river diversion did not exist. The value of the ore resources at that time did not warrant extending the existing pit to the north, requiring a river diversion when considering the regulatory requirements and public concern. As prices for zinc-lead

increase the river diversion may be re-visited but are not part of the current undertaking described in this document as proposed by ScoZinc.

The Mine was placed on care and maintenance in early 2009 due to falling metal prices. The pit was allowed to fill with water over a period of nine months. Selwyn Resources Ltd. acquired ScoZinc Limited on June 1, 2011.

It should be recognized that the mine and mill facility have a long successful operational history and one that has had very few compliance issues. The Southwest Expansion project as presented will use the same mill, the same tailings management facility, the same administrative building and much of the same infrastructure (powerlines, roadways, etc.) that previous operations have. The footprint for the extraction area and the stockpiles are also in areas of the site that have been disturbed to a great extent from past forestry, agricultural, aggregate and mining operations.

2.2 REGULATORY ENVIRONMENT

Federal and provincial environmental acts and regulations apply to ScoZinc in regards to the design, site preparation, operation, and rehabilitation of the proposed mine. In addition to the environmental legislation, other acts and regulations relating to labour standards, mining practices, and other phases are applicable to the Project.

ScoZinc has made themselves aware of the applicable acts and regulations that pertain to the proposed undertaking at Cooks Brook, Halifax County, Nova Scotia. The ScoZinc personnel and consultant team have demonstrated the ability to prepare the necessary information and design plans required to obtain permits and approvals, as well as the ability to operate within the requirements of such acts and regulations.

The following list provides some pertinent acts that may be applicable for the undertaking and/or were considered in the preparation of this Environmental Assessment Registration Document (EARD). The list is not exhaustive.

Federal Legislation

- *Canada Wildlife Act* and Regulations
- *Canadian Environmental Assessment Act* and Regulations
- *Canadian Environmental Protection Act* and Regulations
- *Fisheries Act* and Regulations
- *Migratory Birds Convention Act* and Regulations

- *Transportation of Dangerous Goods Act* and Regulations
- *Species at Risk Act*

Provincial Legislation

- *Environment Act* and Regulations
- *Dangerous Goods Transportation Act* and Regulations
- *Endangered Species Act* and Regulations
- Labour Standards Code
- *Mineral Resources Act* and Regulations
- *Occupational Health and Safety Act* and Regulations

2.3 PROJECT DESCRIPTION

ScoZinc has defined an expanded mineral resource at the ScoZinc Operations and proposes to expand the area under permit so as to include it in the new mine plan for development and extraction. The mineral resource to be mined by the Southwest Expansion Project is an extension of the deposit recently mined by Acadian Mining. The area was no included or covered under the August 2000 Environmental Assessment Approval.

The maximum Project footprint is approximately 130 hectares consisting of:

- Southwest Expansion Mine Area 33.9 ha
- Stockpiles, Roads, etc 96 ha

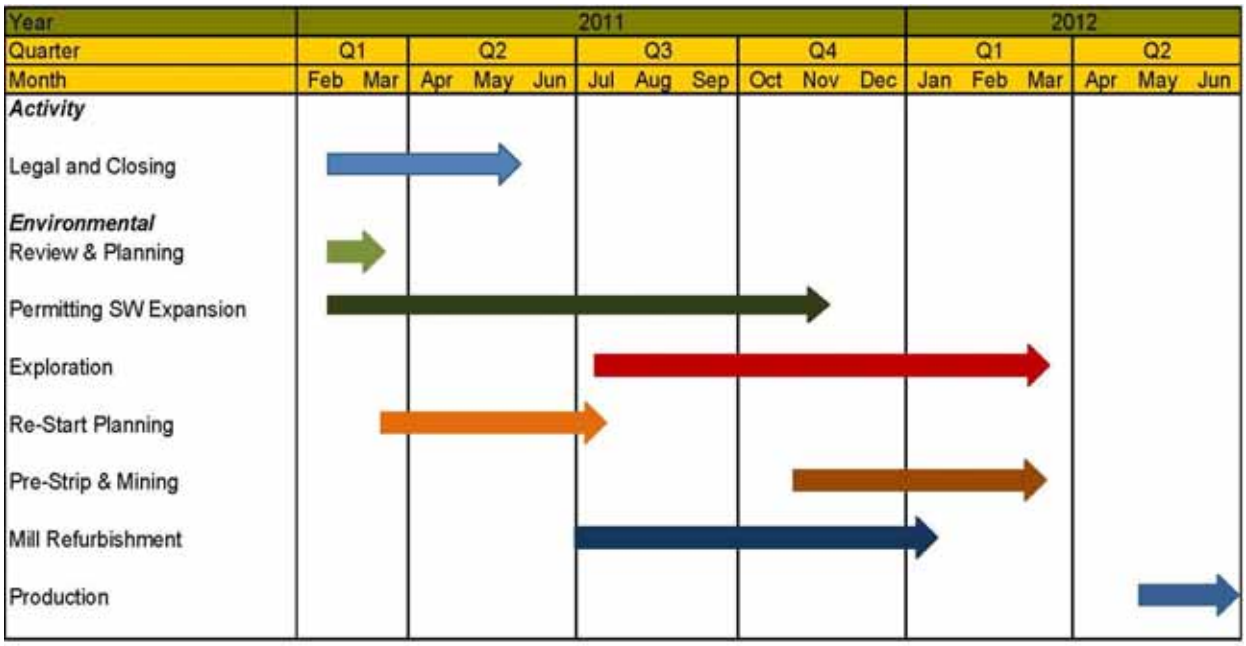
The final pit outline (existing permitted area is 32.1 ha and Southwest Expansion is 33.9 ha) measures 1,700 metres long by 500 metres wide at its widest point. Its footprint is 66 hectares. The existing pit will be expanded progressively in a southwestern direction, followed by mining the northeast portion of the existing pit. Waste material will be placed in two waste piles located to the north and south of the Southwest Expansion area. The northeastern portion of the pit would be mined last, with much of the waste material being used to backfill the middle portion of the pit. Any excess waste would be placed on the waste piles. After the completion of mining, the pit would be allowed to flood, forming two deep quarry lakes. The southwestern and northeastern lakes would have footprints of 11 hectares and 22 hectares for a total area of 33 hectares. The smaller, northern waste pile would have a footprint of 16 hectares and a final height of 55 metres

above sea level (masl). The larger, southern waste pile would have an 80 hectare footprint and a final height of 90 masl).

The areas listed above present the total area that may be impacted over the life of the project. The actual disturbed area at any one time during the life cycle of the mine will be much smaller as ScoZinc will undertake a progressive reclamation approach to minimize the disturbed area.

Table 2.1 below illustrates the key activities of environment, engineering, mill refurbishment, pre-stripping, and permitting of the Southwest Expansion. The timeline for restart of ScoZinc Operations is aggressive, but achievable, provided the timely completion of financing for restart capital. Selwyn proposes to finance the acquisition, restart and working capital through a combination of debt and equity with a strong preference to utilize debt and minimize share equity dilution.

TABLE 2-1: SCOZINC OPERATIONS – RESTART SCHEDULE



2.4 GEOGRAPHIC SETTING

The site is located at 15601 Highway 224, Cooks Brook, Halifax Regional Municipality, Nova Scotia (Figure 2-1) which is approximately 10 kilometres east of Dutch Settlement and 20 km west of Middle Musquodoboit. The site is approximately a one hour drive from Halifax or about thirty minutes from the Stanfield International Airport. The mine

is located in a rural-residential area of central Nova Scotia, typified by rolling topography with abundant surface water.

2.5 PROJECT COMPONENTS

The Project will only include the Southwest Expansion of the existing Surface Mine. All other infrastructure except the powerlines and a dewatering pipeline will remain as is currently in use and confirmed in this document. The powerlines and dewatering pipeline currently cross over the Southwest Expansion and will be rerouted to accommodate stripping activities.

Mine activities will include drilling, blasting, loading and hauling. The ore mined for production will be transported by off-highway, haulage trucks to existing crushing and screening, and milling facilities. Overburden and direct mine waste associated with the deposit will be stockpiled around the perimeter of the mine. The existing tailings treatment facility will be used and studies were conducted as part of this assessment to confirm the capacity of the ponds.

Initial production is estimated at 830,000 tonnes of ore per annum increasing to a production rate of between 875,000 and 1 million tonnes per annum. The additional volume of ore produced from the Southwest Expansion Area is estimated to extend the life of the mine by an additional 3.5 years. Exploration in the area will be focused on the Getty deposit, Northeast deposit, and 50 kilometres of mineral claims to the northeast of Gays River to keep the production at the mill sustainable beyond the Southwest Expansion.

2.6 PROJECT SCHEDULE

The anticipated schedule leading to production is indicated in Table 2-2. It is emphasized that implementation of each activity is dependent on the successful completion of the scheduled tasks.

TABLE 2-2: SCOZINC OPERATIONS SCHEDULE

Year	Activity
2011	• Restart Mine • Main Pit Dewatering • Mill Refurbishment • Overburden Removal • Core Drilling • EARD Southwest Expansion Approval and IA Amendment
2012	• Operational Start • Mill Start up • Overburden Removal • First Production – 830,000 tonnes per annum • Initial progressive reclamation commences
2013 -2015	• Continued increase in production to 1,000,000 tonnes per annum • Final Reclamation commences

The process of reclaiming mines that go through provincial EA is typically done in several stages. At the EA stage, a "conceptual reclamation plan" is presented to the public during public consultation and refined based on public input. This refined "conceptual reclamation plan" is presented in the EARD for review by regulators and the public for its general approach and some details on the timing, key aspects, type of reclamation and projected end use of lands after the reclamation is complete. Should the Project receive EA approval there often will be a Condition of Release that stipulates the need to prepare a "preliminary reclamation plan" for review by NSE and NSDNR and the Community Liaison Committee (CLC) as part of the application for an amendment to the existing IA. This plan is used to determine the value of the Reclamation Bond that the proponent will need to provide in order for the project to proceed.

The needs and wishes of a community, as well as the mining process, may change as the project proceeds resulting in the requirement for a "Final Reclamation Plan" to be submitted six months prior to the end of the extraction phase of the mine life. This Plan is prepared by the proponent in consultation with the CLC, NSE, NSDNR and possibly other parties such as a community group or technical organizations. This "final reclamation plan" is then accepted and the proponent begins the work. The plan often includes monitoring components for aspects such as surface water quality, groundwater quality, water levels, vegetation growth and wetlands health. When the proponent completes the entire reclamation plan, including the post-reclamation monitoring requirements and any other reclamation related condition, the proponent is able to get back the reclamation bond value in full. Nova Scotia does also allow for portions of the bond to be released if progressive reclamation is part of the project. For example, if 20

percent of the area has been reclaimed to the goal in the "preliminary reclamation plan", a portion of that may be released if NSE and NSDNR complete inspections and are satisfied with the work completed.

The mine site has had a long history on forestry, mining and industrial development with little regard to progressive reclamation of disturbed areas. This project will provide a net benefit in its plans to reclaim disturbed areas outside the Southwest Expansion project footprint. This completion of the project reclamation plan and plans for other disturbed areas under ScoZinc's influences will benefit the entire site, the proponent's integrity for reclamation efforts on future projects, and thus benefit the industry and the province.

2.7 SITE PREPARATION AND CONSTRUCTION

The mine development and future operations are based on a plan proposing a fleet of 70 to 100 tonnes, off-road haulage trucks matched with 10-20 cubic metre wheel loaders and large hydraulic shovels. The haulage and primary wheel loader/hydraulic shovel fleet production capability, fleet productivity, operating schedules, leasing, owning and operating cost will be continuously monitored and analyzed throughout the life cycle of the Project. As the mine advances through its life cycle, analysis may indicate larger, off-road haulage trucks or alternate shift schedules be employed. The following sections detail the mine development process.

Development of the Southwest Expansion area will include road building, construction of settling ponds, erosion and sediment controls, overburden removal, stockpiling of soil and waste rock, and rock extraction. Clearing and grubbing will take place prior to waste and ore extraction operations and will follow a work progression schedule limiting the disturbance to those areas required for mining activities.

Clearing and grubbing requirements vary across the site as there are larger disturbed areas from forest harvesting and smaller cleared areas associated with old mine pits and extensive access roads and all-terrain vehicle trails. The forested area consists of a mixture of coniferous and deciduous trees of various age classes.

Any merchantable timber available on the site will be sold and the remaining material will be used to the greatest extent possible for reclamation activities on site.

There are a few small historic buildings present within the Southwest Expansion area, which will require demolition. Should petroleum impacted soil or groundwater, or

hazardous materials be identified, the affected material will be handled, transported and disposed of according to all applicable legislation.

The removal of overburden will be completed in a progressive nature according to the mine development plan. This will minimize the area extent of disturbed area at any one time. Overburden will be removed by excavators, trucks and dozers and then stockpiled.

Overburden removal will preferentially occur during the winter months, when the ground is frozen or the summer months when the ground is dry. The overburden will be removed using the fleet of 70 to 100 ton haulage trucks matched with hydraulic excavators. Some stripping operations may permit the use of the wheel loaders if the ground is frozen or firm enough to support the loaders and haulage trucks. Overburden removal must be restricted to these months to allow the material to be placed in the stockpiles. The material to be stripped does not have the bearing capacity to support the haulage trucks or any of the other pieces of mobile equipment when wet. The material must be frozen or dry when worked or placed in the stockpiles. Approximately 55 million (includes waste rock (4.8 Mt) and gypsum (14.8 Mt)) tonnes of overburden will be stripped from the area over the life of the Project.

Where topsoil and organic material can be separated from the underlying till, it will be stockpiled for use during reclamation activities. Run-off from the site will be directed to the tailings pond to allow time for any suspended sediments to settle prior to leaving the site. Rock material directly beneath the unconsolidated till will be drilled and blasted for excavation.

2.8 OPERATION AND MAINTENANCE

The mining equipment and accessories used in the operations will vary through the life of the project. The expected types of equipment and accessories that may be used for overburden removal, drilling, and blasting, loading and hauling run of mine ore waste rock include:

- excavators (shovel and backhoe configuration)
- 70 - 100 tonne off-road haul trucks
- 10-15.5 cubic metre capacity wheel loaders
- Snow plow and sanding trucks
- Mobile equipment support equipment: skid steer loaders, mini excavators, small wheel loaders, boom truck

- bulldozers
- rotary, down-the–hole (DTH) and hydraulic top-hammer drills
- grader(s)
- water truck(s)
- excavator mounted hydraulic rock breaker
- Utility vehicles: pick-ups, mechanic service vehicles, fuel & lube truck(s)
- sump pump(s), rafts and discharge pipe(s)
- blasting shelters
- ammonium nitrate (ANFO) and explosives delivery trucks
- tractor and float

All roadways in the mine expansion will be designed, constructed and maintained to enable vehicles to pass each other safely and of sufficient width to accommodate the proposed traffic. Generally, the main permanent haulage roads will be constructed three times the width of the largest unit proposed to operate on the roads. This may vary in area where space is limited and expected traffic is minimal, in which case operating procedures will be implemented to ensure safe road and traffic conditions. Adequate shoulder berms will be constructed and maintained along the edge of those portions of the road where the vertical drop is greater than three metres. The grade on the roadways will not exceed 12% on any 300 metre section of these roadways.

Temporary roads and ramps within the quarry and some roads less than 300 metres in length may exceed 12%. These roads and roadways will be designed, constructed and maintained to minimize hazards caused by slipping or skidding vehicles and constructed to ensure that the grades do not exceed the design capacity of the vehicles and equipment proposed to use the roads. Final design of all aspects of the mine will be in accordance with appropriate legislation.

2.9 EFFLUENTS AND EMISSIONS

Erosion and Sediment Control

Surface water management will be important during development and operation to address erosion and sediment control. Sediment-laden stormwater runoff will be prevented from entering surface waterbodies. The perimeter slopes of the mine will be angled into the active pit, thus creating a catchment that always drains into the mine. Many edges of the pit will remain vegetated and undisturbed. As described above, surface water will be directed to the lowest point in the mine pit and retained, to allow

sediment to settle out. The Tailings Management Facility (TMF) consisting of the tailings pond and polishing pond is available for discharge if waters needing suspended solids to be settled out and can be pumped there when needed.

ScoZinc is familiar with and utilizes NSE's Sediment and Erosion Control Handbook for Construction Sites. This document will be used in the design of all mitigative measures. In addition, industry best practices will be consulted and reviewed in the development of a comprehensive erosion and sedimentation prevention and control strategy. In accordance with best management practices and standard NSE requirements, erosion and sediment controls will be in place to ensure that effluent generated during mine operations are managed appropriately. Design criteria applied to erosion and sediment control structures will follow industry accepted practices, which typically use a 100 year return period design storm (depending on design life of project). Design criteria would be reviewed with NSE during the IA stage to ensure adequacy.

Diversion berms and ditching will be constructed to direct surface water runoff from the site as part of the surface water management plan. Where required, the berms and ditching will be vegetated to minimize erosion. As needed during establishment of grass cover, temporary erosion and sedimentation control measures will be in place (e.g., rock dams with geotextile, hay mulching, etc.). Where possible, clean water will be diverted around disturbed areas to minimize treatment volumes in the TMF.

Settling ponds will be located at the base of the stockpile areas to ensure that the overall drainage and flow patterns leading into the existing catchment areas are maintained. The ponds will be designed to ensure that the limits of any IA that may be granted by NSE for the project are not exceeded.

In accordance with the NSE IA, all stockpile and storm run-off from the site will meet or be below the allowable maximum suspended solids concentrations in grab samples (50 mg/L) and monthly average concentrations (25 mg/L). These levels will be monitored to ensure compliance.

Solid Waste

Solid waste generated at the Project site will consist of unusable rock, organics and other naturally occurring materials from the pit. Waste rock from the pit will be used, as appropriate, for infrastructure development with the excess being stored in the waste rock stockpile. Garbage produced on the mine site will be brought back to the existing facilities and trucked away for appropriate reuse or disposal to a provincially approved waste disposal facility.

Liquid Effluents

All of the administration, processing and support facilities will remain at the existing site location and are serviced by an on-site sewage treatment system. Mill discharges and water from mine dewatering go to the TMF where passive treatment occurs and effluent is monitored.

The Southwest Expansion project will use the existing TMF for the disposal of tailings and treatment of effluent. Bathymetric work in July 2011 indicated that the existing Tailings Pond has a volume of approximately 850,000 cubic metres available and the Polishing Pond a volume of approximately 500,000 cubic metres. Please refer to the Technical Memorandum - Volume of Tailings and Polishing Ponds in Appendix E. Data for the original design are limited and not definitive on the original capacity but anecdotal information suggests that both the Tailings and Polishing ponds have over 50% of the original design volumes available.

Mill discharge to the TMF has historically been to a "tailings beach" located in the northeastern part of the Tailings Pond in a valley that had an original elevation in the range of 10-15 m above sea level. Tailings have been discharged to the TMF from the mill via large piping and through a variety of diffusers to promote and enlarge a fan of tailings. The tailings beach has over time developed to cover an area roughly equal to the current Tailings Pond and to elevations between 26 metres in the north to 23 metres (slightly higher than the current water level in the Tailings Pond). ScoZinc intends to continue to use this method of tailings disposal as it allows all but the finest solids in the mill discharge to be deposited in the tailings beach and maintain a significant portion of the Tailings Pond as "open" for settling of the finer solids before effluent decants to the Polishing Pond. ScoZinc intends to explore other options for increasing the capacity of the tailings beach to higher elevations to maintain "open" capacity. The extra capacity between the 23 and 26 metre level in the area of the tailings beach is significant (up to 250,000 cubic metres).

Total tailings volume that will be generated for the Southwest project is in the order of 920,000 cubic metres. Therefore the existing TMF is able to accommodate this volume and is predicted to be able to provide for adequate treatment of effluent at the final discharge point from the Polishing Pond. As outlined in Section 5, a comprehensive monitoring program will be required and refined with input from NSE and EC through the MMER.

Geotechnical studies were completed in 2008 to assess the potential for raising the dam heights using their existing footprint and this was found to be easily completed and existing site materials were available and suitable for this task. This would be an option

explored if the need is identified through the compliance monitoring program. Mill effluent will be recorded (solids, quantity, chemistry) and reconciled with the compliance monitoring data. ScoZinc recognizes the need to liaise with NSE and Environment Canada on the effluent monitoring requirements through the IA process and MMER.

Airborne Emissions

Vehicle exhaust will represent the majority of air emissions from the site. Emissions produced will include carbon monoxide, carbon dioxide, oxides of nitrogen, sulphur dioxide, and dust. Emissions from the burning of hydrocarbons will be managed through the use of clean burning, low-sulphur diesel fuel and propane. All equipment will be properly maintained and inspected and engine idling will be reduced when not in use to further decrease emissions from the site.

Blasting produces similar emissions to vehicle exhaust in addition to dust and hydrogen sulphide. Blasting gases readily dissipate in the atmosphere following detonation. Dust and particulate are confined to the open pit areas.

Dust will be generated in the open pit, on haul roads, stockpiles, and blasthole drilling. ScoZinc will implement operational dust reduction methods (primarily water applied to roads) to reduce potential fugitive dust emissions at the mine site and during transportation. An annual dust control assessment will evaluate the effectiveness of the dust control mitigation measures undertaken under the air pollution control program. This assessment will focus on determining the effectiveness of the current practices with the aim to improve the program for the subsequent year. A quality assurance and/or quality control program will also be undertaken to ensure the air pollution control program is fully operational. It is anticipated that the results of the annual assessment will be reported to NSE with other aspects of the monitoring that will be done on an annual basis.

Greenhouse gases typically include carbon dioxide, methane and nitrous oxide. Typically, increased levels of carbon dioxide result from the burning of fossil fuels or deforestation. Increases in carbon dioxide emissions will be minimized as on site reclamation processes proceed. Methane emissions generated on site will not be significant. Methane is considered a chemical process greenhouse gas and is generated through the decomposition of organic matter and the carbonization of coal. Emissions of methane, if any, produced on site will not be significant. Nitrous oxide is generated predominantly through industrial and agricultural processes with a smaller contribution from vehicle exhaust. Well maintained mobile equipment and replacement as equipment ages will minimize nitrous oxide emissions.

Noise Emissions

The Project will result in noise from the blasting, excavation, milling, drilling, and transportation operations. The main contributors to noise on site will be blasting and heavy equipment such as excavators, drills and haul trucks.

ScoZinc will review past blast monitoring procedures and the applicable legislation prior to design of the blasting plan.

ScoZinc will control operations and equipment to ensure that noise levels are kept within recommended limits for surface mining operations. Mine site noise levels will be periodically measured at the property boundaries and at the nearest receptors to ensure regulation levels are not exceeded. ScoZinc will investigate exceedences of noise guidelines attributed to Project activities through the CLC. Certain equipment noises associated with mining activities have a specific regulated safety requirement such as back-up beepers. ScoZinc will investigate the use of strobes for operations during the night.

Hazardous Waste

Materials needed for mine site operations are stored in accordance with applicable legislation. Explosives will be stored at an off-site magazine.

Petroleum, Oil and Lubricants (POL)

ScoZinc is very familiar with the requirements for petroleum management. The Project will require the use, storage and handling of petroleum products such as fuel oil, gasoline and lubricants. Mobile equipment will be fueled within the pit or at a central facility using tanks and infrastructure that is approved for use in Nova Scotia. Storage of any POL will be in compliance with applicable legislation as well. Any location where fuelling is taking place will be equipped with a spill kit and the operators will be trained in their use. Storage of POL will be mainly at existing facilities where the majority of the routine maintenance would take place. Limited storage may take place at the Southwest Expansion area in compliance with applicable legislation for quantities and container types.

Within the context of the current site, the storage and handling of bulk quantities of POL is administered by the following regulations that have been enacted within the *Nova Scotia Environment Act* (*NSEA*):

- Petroleum Management Regulations,
- Emergency Spill Regulations, and
- Used Oil Regulations.

Federal acts and regulations exist that apply to the storage and handling of POL, however, they generally only apply to Federal sites and would not be applicable to the subject property. In general, the applicable provincial requirements mirror federal legislation and have been developed in consideration of them.

Petroleum Management Regulations

The *NSEA* Petroleum Management Regulations (PMR) apply to all underground (UST) and aboveground (AST) storage tanks with a capacity greater than 4,000 L. New USTs with capacities of less than 2,000 L are prohibited. The PMR require registration of storage tanks with NSE, and establish construction and installation standards, reporting procedures, tank removal, and updating standards. Delivery of petroleum products to an unregistered tank is prohibited. NSE must be notified of proposed new installations at least three days in advance of the planned installation and a Storage Tank System Installation Report must be submitted within 30 days of completion of the installation. Similar notification requirements exist for altering or removing existing tank systems.

The regulations require that tanks be installed in accordance with the Nova Scotia Construction, Installation and Operating Standards for Petroleum Storage Tank Systems ("the Standard"), which provides detailed design codes for new tank systems, the most significant of which include corrosion protection and leak detection systems. The PMR specifies periodic maintenance checks of these systems. ASTs must also be inspected daily or as specified by the Province and, where required by the Standard, observation wells must be checked at least monthly. The PMR also specify inventory reconciliation requirements for USTs and ASTs. Reconciliation does not apply to tanks connected to heating appliances. Inventory control records must be kept for at least two years.

The PMR also requires constant supervision of all fuel transfers. Spills must be cleaned up immediately and reported in accordance with the Emergency Spill Regulations.

ScoZinc will comply with the current regulations and recently had a Phase 1 EA completed to qualify existing conditions and ensure current compliance.

Emergency Spill Regulations

The *NSEA* Emergency Spill Regulations (ESR) specify verbal and written reporting requirements for releases of various substances. With respect to typical POL products expected to be handled at the subject site, the following minimum quantities would require reporting:

- Flammable Liquids 100 L
- Used Oil 100 L
- Contaminated Used Oil 5 L (see Used Oil Regulations)

Spills must reported "as soon as (the responsible) person knows of the unauthorized release" (ESR Part 6). 'Responsible person' is defined under Section 69 of the *NSEA*. All spills are to be reported verbally, by telephone, to the Provincial Emergencies Reporting Centre. NSE may, at their discretion, require a written report within a specified timeframe. If required, written reports must outline the actions taken to investigate the cause of the release, assess the adequacy of the response, remediate any impacts, dispose of contaminated materials and prevent future recurrences.

ScoZinc will comply with current regulations.

Used Oil Regulations

Under the *NSEA* Used Oil Regulations (UOR), used oil, including contaminated used oil, can only be sold, transferred or otherwise disposed of to an approved used oil collector, as defined under the regulations. UOR Sections 12 and 13 provide exceptions to this requirement for uncontaminated used oil. Under Section 12, sellers of crankcase oil must provide a used oil return facility for the general public. Section 13 prescribes conditions under which used oil may be used as a fuel source. Foremost amongst the requirements to permit burning of used oil is the need to verify, through laboratory analysis, that the used oil is not contaminated and the need to obtain NSE approval. No person can possess confirmed contaminated used oil unless NSE is notified, using a prescribed form, within seven days of receipt of laboratory analysis demonstrating contamination to be present. Contaminated used oil cannot be diluted, nor can other substances be added to used oil for the purposes of disposing of these other substances. The land application of used oil is prohibited.

ScoZinc will comply with current regulations.

2.10 DECOMMISSIONING AND RECLAMATION

ScoZinc considers the goal and responsibilities of reclaiming mined sites to be a key element of the project plan, and will return the land to a state of equal or better status than prior to disturbance. Reclamation is understood as not only operational activities of overburden removal, stock piling, backfilling overburden, contouring, placing of topsoil, and revegetation, but also as an integral part of project planning that keeps future land use foremost in mind.

The previous operator developed a detailed reclamation plan (April 2011) in consultation with NSDNR and NSE with input from other stakeholders, including the community. ScoZinc was provided with public input on the conceptual reclamation plan for the Southwest Expansion and this input will be integrated with the mine plan and will address the key areas of land use, water resources, restructuring, recontouring, revegetation, restoration of services, aesthetics, safety, and future land use.

The goal of reclamation is to produce a landscape that is safe, stable and compatible with the surrounding landscape and final land use. This is generally achieved by grading, contouring, capping with soil, revegetating, flooding mined areas and time.

ScoZinc plans to use their own resources for reclamation activities, although some contract tree-planting and hydroseeding contractors may be required. Dozers and excavators will be used to regrade and contour the side slopes of piles to ensure that they are stable. Rock lined ditches are constructed as necessary, to control run-off and prevent erosion of the exposed soils. The slopes are typically seeded with a naturalization mix of native grasses, fescue, trefoil and clover. Nova Scotia has many examples of reclaimed mine sites that are used for a variety of purposes including recreation, wood lots and wetlands.

It is anticipated that the reclamation program will be completed within a three year period from the end of the Southwest Expansion extraction of ore being completed. Additional details on timelines will be developed with the CLC as part of the IA Application process and in light of comments from the public through the public review period for the EARD and conditions in the EA approval if granted.

The final pit outline measures 1,700 metres long by 500 metres wide at its widest point. Its footprint is 66 hectares (Figure 2-2).

The existing pit will be expanded progressively in a southwestern direction, followed by mining the northeast portion of the existing pit. Waste material will be placed in two waste piles located to the north and south of the Southwest Expansion area. The western portion of the pit would be mined last, with much of the waste material being used to backfill the middle portion of the pit. The lowest planned elevation of the pits will range from 80 to 95 meters below sea level.

After the completion of mining, the pit would be allowed to flood, forming two deep quarry lakes. The southwestern and northeastern lakes would have footprints of 11 hectares and 22 hectares for a total area of 33 hectares.

The smaller, northern waste pile will have a footprint of 16 hectares and a final height of 55 metres above sea level. The larger, southern waste pile would have an 80 hectare footprint and a final height of 90 metres above sea level.

The TMF, mill, administration buildings will be reclaimed and revegetated once milling operations have been completed. ScoZinc understands the reclamation bonding legislation in Nova Scotia and will submit plans to NSE and NSDNR to have the appropriate bonding in place prior to additional site disturbance in the Southwest Expansion Area. ScoZinc wishes to have the concept of progressive bonding discussed with NSDNR and NSE. This concept entails progressively bonding the project as the disturbed footprint expands and then progressively returning bond monies as the final reclamation limits are reached and stated objectives meet.

3.0 PROJECT SCOPE

3.1 SCOPE OF THE UNDERTAKING

The project description is provided in detail in Section 2 and summarized in the following section. The proposed Southwest Expansion includes the development and operation of a surface mine contiguous to the existing surface mine. Existing facilities will be employed such as the use of off-highway haul roads within the pit to the processing plant or waste rock storage areas; overburden and waste rock stockpiles; use of temporary settling ponds in the pit and surrounding waste rock piles; and existing tailings and polishing ponds. No new facilities are required to support the expansion of the surface mine.

The land area for the fully developed Southwest Expansion project area will be approximately 130 ha including 96 ha for stockpiles. ScoZinc currently owns 668 ha of land in the proposed project area. The Mineral Lease No. 10-1 covers an area of 601.5 ha (Figure 3.1-1). Extraction of ore will commence at the southwestern boundary of the existing surface mine and progress in a southwestern direction. The study area for the purposes of this EA encompasses the footprint of the proposed expansion, airshed, noiseshed, downstream receiving waterbodies, watersheds, and groundwater sheds within measurable zones of influence as outlined in subsequent sections.

Run-off from new or existing stockpiles will be collected and directed to the existing TMF. Temporary ponds and other sedimentation control measures will be constructed in advance of mine development, to ensure adequate sedimentation control during initial site works and pit development. Permanent measures and settling ponds will be employed during operations. Water from within the expansion area will be directed to the lowest bench of the mine (sump) and pumped out to the existing tailings facility. Settling ponds will be constructed as needed to ensure that limits for maximum suspended solids in the discharge are not exceeded as stipulated in any IA that would be granted by NSE.

The Southwest Expansion of the existing surface mine will commence immediately upon receipt of all required approvals. The life span of the proposed expansion will be about 3.5 years. Decommissioning and reclamation plans are described in Section 2.10. Reclamation will commence in a progressive fashion as is feasible to minimize the areal extent of the active working area.

3.2 PURPOSE AND NEED FOR THE UNDERTAKING

ScoZinc requires an expansion of the ScoZinc Operations to continue its operations in the area beyond the current limits of the existing mine and may extend the life of the mine site for at least another 3.5 years. There will be 110 to 130 full-time persons employed by ScoZinc in various operations related to mining. The continued operation of the mine is essential to ScoZinc's plans for developing a sustainable production of zinc and lead concentrates in Nova Scotia. Payroll, taxes and royalties from the project are significant and needed for all Nova Scotians to maintain a good quality of life.

3.3 CONSIDERATION OF ALTERNATIVES

Environmental management is a priority to Selwyn and its subsidiaries. It is the corporate objective for operations to meet and/or exceed the current standards to achieve a high level of environmental performance. This EARD presents these environmental goals and outlines the Selwyn methodology to continue to protect the environment. Company personnel have the proven ability to meet environmental goals while efficiently mining reserves.

3.3.1 ALTERNATIVES TO THE UNDERTAKING

Alternatives to the undertaking are defined as functionally different ways of achieving the same end. There is no viable alternative to mining for mineral extraction. Metals are not found in any other raw form other than embedded in the earth's crust. The location of the mine is fixed by the local geology and the zinc/lead resource.

One alternative to the undertaking is a "do nothing" alternative. A "do nothing" approach results in no mineral extracted for this area and no benefits to Nova Scotia. The demand for zinc/lead necessitates continued mining. The "do-nothing" alternative would have effects on potential government revenues that would not be realised; potential employment and skills development associated with the Project that would not occur, and potential opportunities for local contractors and businesses in the Musquodoboit Valley and elsewhere that would not occur.

3.3.2 ALTERNATIVE METHODS OF CARRYING OUT THE UNDERTAKING

Alternative methods of carrying out the undertaking are defined as means of similar technical character or methods that are functionally the same. The analysis addresses alternatives to extraction methods; mine site layout and infrastructure configuration; processing options.

3.3.2.1 EXTRACTION METHODS - OPEN PIT VS. UNDERGROUND

Mining can be undertaken by either underground or open pit methods. In this particular case, the resource is close to the surface, and while underground mining has been attempted at the site in the past, the most commercially viable and financially prudent option is an open pit operation – a continuation of the existing permitted mine. To date, concentrations of zinc/lead of sufficient grade, continuity and/or predictability are not sufficient in the Southwest Expansion Area to support a commercial underground operation. Commercial underground mining for this Project is currently therefore not an option.

3.3.2.2 MINE LAYOUT AND SITE INFRASTRUCTURE CONFIGURATION OPTIONS

There are no options for re-positioning the open pit – the zinc/lead deposit is fixed by geology.

The tailings/polishing ponds have been previously established and will be used for continued mining. The remaining capacity of the ponds is discussed further in this document.

Waste Rock Storage Piles have been previously established or areas have been designated for such use. The two areas known as the South stock pile (currently used) and North stockpile (designated area) have been designed to consider future expansion of the mine.

3.3.2.3 ALTERNATIVE PROCESSING OPTIONS

Selwyn purchased ScoZinc in 2011. Among the mining assets were a recently upgraded mill facility and a TMF with additional capacity. Zinc-lead ore processing is specialized and the mill facility will undergo additional upgrades in many aspects to allow for high efficiency ore processing. Alternatives to the processing of ore on-site were examined by ScoZinc but found to all be cost prohibitive and not in line with corporate philosophy on maximizing local benefits and sustainable practices.

Off-Site Processing

Off-site processing would involve the transport of ore via local roadways and the need for, as there are no facilities within the trucking economic limit (roughly 200 kilometres based on the ore value), construction of a facility to process ore. This approach involves needlessly building a facility and the associated costs for this that the project cannot bear and remain economic. This approach would also not work from a project timeline point of view where production of concentrates is planned for early 2012.

3.4 SCOPE OF THE ENVIRONMENTAL ASSESSMENT

This document serves to provide information required for NSE to approve the surface mining of the Southwest Expansion Area with appropriate conditions for the ScoZinc Operations, Cooks Brook, Nova Scotia. The proposed Project must be registered for Environmental Assessment under the Environmental Assessment Regulations of the Nova Scotia Environment Act as a Class I Undertaking.

The scope of this document has been determined by ScoZinc and Conestoga-Rovers & Associates (CRA), being based on the Project components, activities, field studies and regulatory consultations. The Guide to Preparing an EA Registration Document for Mining Developments in Nova Scotia (NSE 2009) was also used to determine/focus the scope of the assessment. Regulatory officials from both NSE and NSDNR have been aware of the intention to submit the EARD for this undertaking. Regulators have assisted in scoping by bringing forth issues of concern and/or uncertainty. The One Window process has assisted in this communication and information exchange. The one Window Committee meeting (June 21, 2011) held with Provincial and Federal regulators did not reveal a Canadian Environmental Assessment Act (CEAA) trigger. CEAA staff, or a designated federal department or agency, will coordinate the federal review of the

EARD at the time of the Provincial EA Registration and provide a response as to whether additional scrutiny is required via the federal EA process.

Methodologies and approaches to reflect current environmental and socio-economic conditions are contained in this EARD, as are results and implications of the completed formal public consultation program. Baseline information includes data collected by ScoZinc as a part of preparation of this EARD. Additional information was found in publicly available documents related to the area and data collected by the proponent and consultants on existing environmental conditions. The approach to site operations, including environmental management and monitoring, is based on knowledge gathered from past surface mining projects. CRA personnel have specific knowledge gained from activities at the site since 1996 and have experience in conducting environmental assessment for similar projects. ScoZinc has in-house environmental expertise as it relates to the design and operation of zinc-lead mines. Selwyn is also presently engaged in developing the Selwyn zinc/lead project mine near Howards Pass, Yukon.

The Valued Environmental Component (VECs) analysis is based on the project description, the environmental setting, and stakeholder input. The environmental assessment evaluates the potential effects, including cumulative effects, of each Project phase, (i.e., development, operation and decommissioning), as well as malfunctions and accidents, with regard to each identified. The VECs are as follows:

- Geology and Hydrogeology;
- Surface Water Resources;
- Flora and Fauna Species and Habitat;
- Wetlands;
- Air Quality / Noise;
- Archaeological and Cultural Resources; and
- Socioeconomic and Land Use.

Provincial environmental acts and regulations apply to ScoZinc Operations in regards to the design, site preparation, operation, and reclamation of the proposed mine expansion. In addition to the environmental legislation, other acts and regulations relating to labour standards, best mining practices, and other phases are applicable to the Project. ScoZinc is aware of the applicable acts and regulations that pertain to the proposed mine expansion. ScoZinc and Selwyn personnel have effectively demonstrated the ability to prepare the necessary information and design plans required to obtain permits and approvals, as well as the ability to operate within the requirements of such acts and

regulations as demonstrated by past work at Gays River and the Selwyn Project at Howards Pass.

The following list provides some pertinent acts that may be applicable for the undertaking and/or were considered in the preparation of this Environmental Assessment Registration Document:

- *Dangerous Goods Transportation Act* and Regulations
- *Endangered Species Act* and Regulations
- *Environment Act* and Regulations
- *Wildlife Act* and Regulations
- Labour Standards Code
- *Mineral Resources Act* and Regulations
- *Occupational Health and Safety Act* and Regulations

If the Project is approved, it will be subject to an Environmental Assessment (EA) Approval issued with Conditions of Release. The project will also require an amendment to the existing provincial IA for the site. An Industrial Approval (IA) defines specific operational conditions and limitations, including dust, noise, surface water and groundwater discharge criteria and monitoring and land reclamation. An application to amend the IA would be completed by ScoZinc when/if EA approval is received. This approval application is reviewed by and granted by NSE.

ScoZinc is aware of the municipal legislation applicable to this Project and will work with the local Planning Commission office and staff as required.

3.5 ASSESSMENT METHODOLOGY

Conestoga-Rovers & Associates (CRA) conducted field studies in May and June 2011, to supplement the existing baseline conditions of the proposed expansion area. From these studies CRA was able to determine appropriate mitigation, as required to minimize environmental effects from the proposed expansion Project. These surveys consisted of: plant survey; wetlands survey; breeding bird survey. These surveys were undertaken by qualified biologists under contract to CRA. A desktop assessment and field reconnaissance of potential archaeological and heritage resources was undertaken by a professional archaeologist on areas not previously surveyed.

Additional information, in support of the field studies, was gathered through a review of digital orthoimagery and LIDAR data (April 2011), site mapping, Nova Scotia Museum, Atlantic Canada Conservation Data Centre (ACCDC), and NSE.

Spatial boundaries are defined by the Project footprint, and the immediate area surrounding it, within which the VECs are likely to interact with, or be influenced by, the Project. Temporal boundaries are of short duration, limited to the Project and post-Project (i.e. Reclamation) activities.

Potential environmental effects of a project and the significance of an effect consider the geographic extent, magnitude, frequency, and duration of each effect. The prediction of the residual environmental effect is developed through professional judgment and the application of proposed mitigative measures.

4.0 PUBLIC CONSULTATION

4.1 OBJECTIVES AND BACKGROUND

Public consultation is a key element in the environmental assessment process in that it allows the proponent to gather and use information from communities surrounding the project site and use this information in final project design. ScoZinc understands the value of public engagement and appreciates the community input thus far on the project and envisions a long and mutually beneficial public engagement program for the Southwest Expansion Project.

4.2 COMPONENTS AND ACTIVITIES

Following the June 2011 announcement that Selwyn had acquired ScoZinc, the Company began a pro-active consultation and community outreach program. The intent of this program was to (a) provide information (as available at the time) about the intended project; (b) elicit possible questions and/or concerns from the local community and other stakeholders, and; (c) attempt to address these questions and/or concerns either through the provision of information or accommodating changes to the Project design.

The consultation program was undertaken simultaneously with the environmental baseline study program for the project. This approach has the potential to have some limitations in that some questions raised by the public may not be immediately addressed because the environmental studies that provide those answers often take months or years to complete. However, the long history of environmental baseline studies and data from the various periods of site operation allow for many issues to be known, thereby allowing ScoZinc and the public to have a clear idea of past issues and how best to deal with these when operations recommence.

The following summary provides the various activities that have been undertaken by the Company with respect to public consultation and communications:

- Meeting with Community Liaison Committee - May 5, 2011.
- One Window Committee Meeting - June 21, 2011
- ScoZinc Mine Site Open House Meeting - June 22, 2011.
- Public Information Session for EA – Cooks Brook Fire Hall - June 29, 2011

Materials used as part of the public consultation program are located in Appendix B.

4.2.1 LOCAL RESIDENTS

An initial meeting with the CLC was held on May 5, 2011. ScoZinc provided an overview of plans and introduced key staff to the CLC. Discussions centered on past issues, communications protocols and the commitment of the current CLC members to remain on the CLC. ScoZinc sees this as a great asset to the project.

An informal meeting of local residents was held on June 22, 2011 at the ScoZinc Operations. The main purpose of the meeting was introducing Selwyn to the community and discuss plans for the mine. The local communities were informed of the meeting through direct handbill delivery as Canada Post was on strike. A total of 200 invitations were placed in local mailboxes with over 80 attendees noted from local communities. An overview presentation was given and a series of panels with information on Selwyn as a company, the Howard's Pass Project, the ScoZinc Operation plans, Southwest Expansion, Selwyn's corporate philosophy, and commitment to completing projects that consider key factors in success i.e. community, environment, health and safety and economics. Information on the upcoming Public Information Session was provided at the Open house as well.

ScoZinc also informed all attendees of the upcoming Public Information Session for the EA to be held on June 29, 2011 at this Open House meeting.

4.2.2 LOCAL COMMUNITIES

The local residents were informed of the Public Information Session for the EA through direct handbill delivery as Canada Post was in the early stages following a strike/lock out. A total of 200 invitations were placed in local mailboxes. The meeting was also advertised in a regional newspaper according to EA requirements. The Project area does not have a local paper with the coverage to inform local communities, nor does it have a community radio station, so Selwyn relied on direct handbill delivery.

A series of panels was available for viewing from 12:00 to 9:00 PM on Wednesday, June 29, 2011 which explained the following:

Poster Name	Poster Description
Who is Selwyn Resources?	Introduction to the company, its resources and its directors and management.
The Southwest Expansion Project	Specific details on the project being proposed and key components.
Project Timeline	A time-line of past and future activities leading to eventual zinc/lead production.
Geology	Explanation of the geological setting and rock types involved in the Gays River area deposits.
Mining	Explanation of how mining of the ore and waste rock within the pit would be conducted and how mining was conducted in the past.
Milling/Ore Processing	Description of the ore processing methodology, with flowsheet, from crushing and grinding through the chemical process to the production of concentrate and shipping details.
Environmental Baseline Studies	An overview of the various studies completed and key results.
Reclamation	Outline of the process to return the site, during and after mining, to a state at least equal to that prior to disturbance.

The panels were supplemented with additional information on aspects of the Project by consultants to the Project. These individuals provided information on topics such as environmental baseline studies and permitting history, archaeology and cultural resource management (provided by Cultural Resource Management Group).

Participants were asked to sign in to the Session and then were provided with a quick overview of the panels and structure of the Session. A summary of the number of participants and their home community is provided below. Participants then viewed the various panels and information and were assisted by company representatives and the aforementioned consultants with any questions that they had. Comments from the participants were recorded on flipcharts for other participants to view. This format allows all participants to get a sense of the primary issues/concerns and for ScoZinc to use this information to refine aspects of the Project. A summary of the comments is provided below.

A total of 32 participants attended the session with a breakdown of their home communities shown in Table 4.1.

TABLE 4.1: HOME COMMUNITIES OF PUBLIC INFORMATION SESSION PARTICIPANTS

Location	Number of People
Gays River	11
Cooks Brook	5
Carrolls Corner	3
Middle Musquodoboit	1
Lake Echo	1
Toronto	1
New Glasgow	1
Wyses Corner	1
Central North River	1
Ellershouse	1
Indian Brook	2
Milford	1
Enfield	1
Dartmouth	1
Urbania	1
Total	**32**

4.2.3 FIRST NATIONS

First Nation involvement with past operators of the mine and mill were favourable and meaningful. First Nations were involved in Mi'kmaq ecological knowledge gathering in the late 1990's and again in 2005 (unpublished). In 2007, a site of significance was mitigated (the Sinkhole Site) using First Nations involvement and staff in an area of the Gays River that was planned for disturbance by a previous mine plan. Contact has been made with representatives from the closest First Nations community of Indian Brook and preliminary discussions held about mutually beneficial programs. ScoZinc will pro-actively engage in further discussions and are cognizant of the "Made in Nova Scotia Process" for Mi'kmaq engagement. A separate copy of the EARD will be sent by ScoZinc to Indian Brook as part of the EA process as well as copies that will be sent by NSE to the Kwilmu'kw Maw-klusuaqn Negotiation Office (KMKNO) to facilitate Mi'kmaq involvement in the EA process.

First Nations input through the EA public review process is important and encouraged by ScoZinc. Any concerns about adverse effects of the project will be taken seriously by ScoZinc and the steps which ScoZinc has taken to address or attempt to address the concerns will be communicated to the KMKNO.

4.2.4 REGULATORY AGENCY CONSULTATION

Prior to and post-purchase of ScoZinc, Selwyn engaged in a series of meetings with NSE and NSDNR officials to understand local issues and legislation. These meetings involved several Selwyn representatives and assisted in the project design that is presented in this EARD. Included in these meetings was an official One Window Committee meeting on June 21, 2011. This valuable process involves presentation of key project information to regulators from a variety of agencies including NSE, NSDNR, Environment Canada (EC), Canadian Environmental Assessment Agency (CEAA), Fisheries and Oceans Canada (DFO), and NS Labour. This meeting served to assist with screening the project for issues of concern and identifying possible federal triggers of which none were noted. ScoZinc will continue to be in contact with all agencies and understand that CEAA will coordinate a review of the EARD by federal agencies as part of the provincial EA process.

4.2.5 PUBLIC COMMENTS AND METHODS USED TO ADDRESS ISSUES AND CONCERNS

An important element of public consultation is to use the information in the final design of a project. Selwyn recorded all comments made at the June 29, 2011 session (see Table 4.2) and have used this feedback in the project's final design as noted in the table and throughout this document.

TABLE 4.2: SUMMARY OF COMMENTS AND CONCERNS RAISED BY STAKEHOLDERS

Question/Issue	Response
What will the public involvement be in the final plan at the end of the mine life?	The public, through the CLC, will be asked for input in the final design.
What are the phases of the mine life?	The existing pit will be expanded progressively in a southwestern direction, followed by mining the northeast portion of the existing pit. Waste material will be placed in two waste piles located to the north and south of the southwest expansion mine area. The northeastern portion of the pit would be mined last, with much of the waste material being used to backfill the middle portion of the pit.
Will equipment have catalytic converters / modern emissions control system?	ScoZinc is leasing and purchasing modern mobile equipment and will investigate the feasibility of catalytic converters.
What equipment will be used in the pit and ore handling?	Excavators, wheeled loaders, hydraulic shovels, and 100 tonne haul trucks will be utilized in the pit and ore handling.

TABLE 4.2: SUMMARY OF COMMENTS AND CONCERNS RAISED BY STAKEHOLDERS

Question/Issue	Response
What hazardous materials will be used at the mine? Is a list of these hazardous materials and reagents available?	Typical mining reagents will be used and approved by NSE. Petroleum products for equipment will be present as well and properly stored / used.
How will the hazardous materials be transported?	Hazardous materials will be transported to / from site by accredited suppliers and transport companies.
What are the spill contingencies in case something happens?	Contingency plans for fires, oil spills, chemical spills, and other emergency situations are legislated to be completed through the Approvals process. Mine site staff will be trained in awareness, prevention and response procedures.
Will there be scheduled blasting times?	Consideration will be given to schedule blast times consistent with community interests.
Will there be pre-blast surveys?	Pre-blast surveys have been conducted in the past (1998 and 2006). A pre-blast survey will be considered for those structures close to the expansion area. A review of the previous survey in other areas is being completed and may be supplemented.
What are the blast monitoring procedures?	Blast monitoring will be done in accordance with Nova Scotia legislation. Complaints may be vetted through the Mine office or the Community Liaison Committee.
What is the local hiring policy?	ScoZinc is seeking to hire locally to the greatest extent possible. The first step is to hire a General Manager who will build the team.
How many people will be hired / jobs are available?	ScoZinc estimates there will be approximately 110 to 130 employees hired once the mine and mill are at full production.
Do you have a list of the types and numbers of jobs (employees) available?	An estimate of the number of positions has been stated above and the types of jobs available are currently being determined.
What are the wages for different positions? Ranges?	Wages will be competitive for the mining industry in Nova Scotia.
How many trucks will enter and leave the mine per day?	At full production it is estimated approximately 3 to 4 trucks per day will leave the mine to transport concentrate to Sheet Harbour.
What route will the trucks use?	The trucks will be travelling to Sheet Harbour along route 224.
What will the frequency of shipments from Sheet Harbour be?	The frequency of shipments will range from every four weeks to eight weeks.
Will compliance monitoring take place?	Yes, compliance monitoring is a requirement of existing IAs and MMER requirements.
How many sampling locations are proposed and where will they be placed?	Sampling will take place at pre-existing locations and as designated by legislation and approvals.
What parameters will be monitored?	Those specified by NSE and MMER.
Where will the process water come from?	Process water will come from the existing engineered polishing pond.
How will the process water be treated?	Process water will be discharged to the tailings pond where settling and treatment occurs.
How will the tailings pond be reclaimed?	The beach areas will be covered in overburden and revegetated.
Will the process lakes / ponds be linked to any rivers?	No lakes process lakes will be linked to any rivers.
How large will the stockpiles be	Please refer to Figure 3.1-1.

TABLE 4.2: SUMMARY OF COMMENTS AND CONCERNS RAISED BY STAKEHOLDERS

Question/Issue	Response
(height, dimensions)?	
Where does the stockpile drain to?	Stockpiles drain to the settling ponds in the pit and / or the tailings pond.
Will any lakes be stocked with fish?	Stocking has not been included in the reclamation plan at this point. Discussions will take place with the community near the end of mine life for input as to the final land use.
Will back-up beepers or strobelights be used?	Strobe lights will be the preferred option if determined to be compliant with OHS regulations.
Will the river be monitored for dust?	The river is monitored for water quality but the program does not include particulate.
What is the bond value of the mine?	The bond value was determined by the NSDNR to be adequate for complete mine site reclamation. The bonding amount will vary over time as progressive reclamation is undertaken.
Is the bond value public information?	No, the value is set by NSE / NSDNR and typically not public information.
Will mine benches be according to applicable legislation?	Yes, all ScoZinc operations will follow applicable OHS regulations.

5.0 VALUED ENVIRONMENTAL/SOCIO-ECONOMIC COMPONENTS (VEC) AND EFFECTS MANAGEMENT

It should be noted that this currently proposed Project has the benefit of over 20 years worth of baseline and operational monitoring data to assist with determining actual past impacts and what may be encountered during the Southwest Expansion Project. Several aspects of the proposed project have been designed in consideration of a review of this data and the lessons learned from past operations.

5.1 GEOLOGY

5.1.1 EXISTING ENVIRONMENT

Physiography

This region of Nova Scotia is dominated by mainly Carboniferous rocks (shale, limestone, sandstone, gypsum) upon which deep soils derived mainly from glacial outwash (Roland 1982) have developed. These Central Lowlands provide a topography that is variable in nature from lowland plains to rolling hills; rarely exceed 90 metres above sea level. The central basin is drained by several large rivers that are affected by the tidal movements of the Bay of Fundy, with the exception of the Musquodoboit River which flows south to the Atlantic Ocean. A few lakes dot the landscape but not nearly as abundantly as the Atlantic Interior or Southern Uplands.

The climate is conducive to farming; mainly beef or dairy herds, and forage and cereal crops. Forests are generally comprised of softwood but tolerant hardwoods are found on well drained hills.

The Project area is classed as well drained, fine textured soil on hummocky terrain that lies in the southern extent of the Central Lowlands, adjacent to the Rawdon / Wittenburg Hills and the Eastern Interior Ecodistricts (Neily et al 2003).

Soils

The development of soils (Figure 5.1-1), within this area of Halifax and Colchester Counties, has, for the most part, been derived from glacial drift (Agriculture Canada, 1963). Soils mapping (1963, 1991) indicates strong relationships between the distribution of parent materials and the underlying rock formations. Both the coarse and fine textured materials occur regionally with the course material being derived from the granites and quartzites. Finer textured deposits have been developed from the strata less resistant to erosion such as slates and sandstone, siltstone, shale and evaporites.

The resultant soil types from the different parent materials share common features. Where granites are the parent, soils are typically yellow to tan, relatively coarse (sandy loam) and limited in thickness. It is quite permeable, with a corresponding low water retention capability and often too stony for agricultural purposes. Within Halifax County, these soils occur mainly in the western and southern sections. The Gibraltar Series, with limited occurrences of Bayswater and Nictaux Series, is the most common soil from granite material.

Pale brown to olive brown sandy loam is characteristic of soils derived from quartzites as a parent material. More fines are present than in the granitic soils and therefore holds moisture slightly better. The thicknesses that occur remain limited due to the relative coarseness of the material. These soils, regionally are found mainly in the southern section and are dominantly Danesville and Halifax Series and to a lesser extent the Aspotagan Series.

Slate parent materials form fine-textured, grey to olive brown soils, described as sandy loam to loam. The soils have greater potential for agricultural use due to being less stony, having a greater thickness and having a greater enhanced capability of retaining water as compared to the coarser grained granite and quartzite derived soils. The Riverport, Middleton and Bridgewater Series of soils occur mainly in the southern and western sections of Halifax County.

Soils derived from Windsor Group parent material are typically fine-textured sandy loam to sandy clay loam of greater thickness than other types herein described. They are characteristically moderately permeable and thus, having good moisture retention and, being relatively stone free, have good agricultural capability and use. The Falmouth and Hantsport Series are most common in the western section of Halifax County. Queens and Wolfville Series are widespread in all the area, but Queens is uncommon in the southern section. Hebert Series may also be found.

The soils of the Project area have been developed on the glacial material deposited locally and strongly reflect the composition of the bedrock parent material and formed over the Halifax and Windsor Group strata creating soils that are fair to excellent for agricultural use. Seven mapped soil units are known in the area (Agriculture Canada 1963), and can be summarized in three categories:

1. Those which were developed from alluvial deposits that includes Hebert, Chaswood and Cumberland Series.

2. Those developed from silty clay loam from either lacustrine deposits or till (Halifax Formation or Windsor Group parent material) including Lawrencetown, Queens and Wolfville Series.
3. Peat that has developed locally where conditions were favourable (boggy, wet areas).

The majority of the Expansion area is covered by Queens Series (65%). The Series is classified as having rolling topography (9 to 16 % slopes) and is moderately stony. Other soil series at the mine include Wolfville to the south, a peat deposit that lies between the Wolfville and the Queens Series, and the Cumberland, Chaswood, Halifax, and Bridgeville Series that lie in narrow bands parallel to the Gays River to the north and east of the site. Figure 5.1-1 illustrates the distribution of the various soil type is the vicinity of the mine.

Surficial Geology

The Musquodoboit Valley is host to four major till types which all have a strong relationship with parent material in terms of composition and distribution. The majority of the Valley is underlain by Lawrencetown Till followed by Quartzite Till and to lesser extents, slate and Granite Till sheets. The Lawrencetown Till is characteristically a compact clay or sandy till matrix, which has formed the parent material for much of the soils used for agricultural purposes in the area. The other till sheets are more commonly associated with occurrence of Goldenville Formation – Quartzite Till, Halifax Formation – Slate Till, and Cambrian-Ordovician granites – Granite Till (Figure 5.1-2).

Locally, Lawrencetown Till dominates the soil stratigraphy comprising 20 to 40 metres, locally 90 metres, of red to brown clayey-glacial till. Localized occurrences of Slate Till occur east of Gays River roughly in a bend extending from near Big Shaw Lake to Seven Mile Stream and east of Wittenburg Mountain. A considerable occurrence of glacio-fluvial deposits have been mapped at Cooks Brook as well as a discontinuous band north of Gays River which are composed of water sorted sands with silt and gravel units.

Bedrock Geology

The Musquodoboit Valley region is dominated by two groups, mainly the Meguma and Windsor Groups. The Meguma Group includes two formations – the lower, Goldenville Formation is composed of metamorphosed sandstones interbedded with subordinate slates; and the upper, Halifax Formation which is dominated by slates and sheared siltstones and minor sandstones (Figure 5.1-3). The strata are Cambrian-Ordovician in age (CSPG 1985).

The Windsor Group includes evaporites (gypsum, anhydrite, limestone) and associated shales, mudstones, and siltstones with limited (thin and discontinuous) occurrences of halite. The Windsor Group strata were deposited during the Carboniferous Period under relatively low energy marine conditions.

The local geology consists of a dominance of Lower Carboniferous (Mississippian Age) Windsor Group strata with occurrences of the Meguma mapped southwest and northeast of the Gays River/Cooks Brook area. The Project is situated between the Carboniferous Basin to the north which extends over much of central Nova Scotia, and a smaller synclinal extension of Carboniferous rocks, defined by the Cooks Brook Syncline, to the south. Prominent structural features include the Black Brook and Cooks Brook faults, generally trending northeast-southwest, subparallel to the regional trend of the areas major units.

Two formations lie within the area – the Gays River and the Carrolls Corner Formations. The basal Gays River Formation, which onlaps (through marine transgression) the older Meguma, is typically dolostone and minor limestone that can be, locally, highly fossiliferous. The Carrolls Corner Formation is anhydrite and gypsum stratified with minor dolostone and mudstone and directly overlies the Gays River Formation. Local outcrops of the Meguma are evident throughout the area.

Mineralization in the Gays River area is known as a Mississippi Valley-type (MVT) deposit. “These deposits are epigenetic, stratabound, carbonate-hosted sulphide bodies composed predominantly of sphalerite (Zn), galena (Pb), iron sulphides (pyrite, marcasite), and carbonates (calcite, dolomite). MVT deposits are important Zn and Pb reserves and resources in the world. Silver, barite, gypsum, and fluorite may also be economically recovered from these deposits” (Paradis et al, 2007). Gays River is considered a major world MVT deposit with an associated gypsum deposit that may potentially be produced as a by-product. The mineralization forms mainly in the open-space fillings, collapse breccia or as a host rock replacement in mainly dolostones. The deposits originate from saline basinal metalliferous fluids that range in temperature from 75 to 200 °C (Paradis et al, 2007). Mineralization in the South Gays River area has been known for well over 100 years. Pits and trenches were established in the area as early as 1951 to access low-grade mineralized dolomite.

Karst Topography

Karst is a topographic feature with distinctive characteristics of relief and drainage arising from a higher than normal degree of solubility in rock, especially carbonate rocks and evaporites (Jennings 1971). The solution processes developed over many thousands of years manifests itself at the surface in the form of sinkholes, vertical shafts or pipes,

disappearing streams, and springs to complex caves and underground drainage systems. Solution caves are known to occur in gypsum and limestone areas (Davies & Browne 1996).

In Nova Scotia, the gypsum-anhydrite strata, known as the Windsor Group, outcrop over extensive areas extending from the Minas Basin at Windsor to Antigonish and much of lowlands of Cape Breton, including the Bras d'Or Lakes coastal areas. The Windsor Group underlies about 5.5% of the province's geology (Figure 5.1-4). Karst development across the province can be variable, depending on things such as bedrock type and purity, physiographic location and biogeoclimatic setting. Several periods of glaciation have exposed, eroded and reburied earlier developed karst leaving a thick deposit of glacial drift over many of these beds. However, where the strata have become exposed at the surface, a distinctive highly karsified landscape is evident. There is potential for karst development in any formation that contains highly soluble rock. While other formations exist that contain lesser amounts of evaporites (gypsum, anhydrite, limestone), the Windsor Group rocks with near surface gypsum and anhydrite is regarded to have the highest potential for karst development.

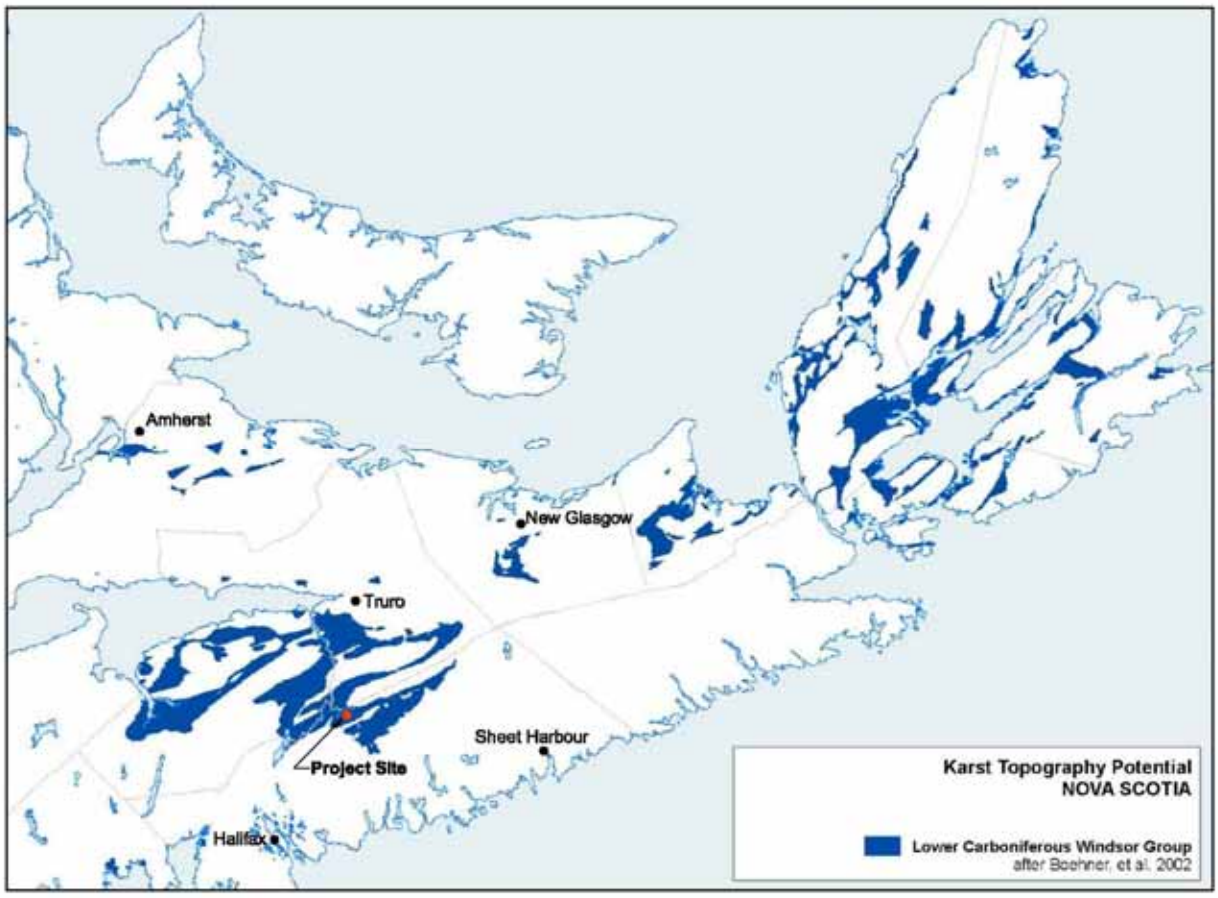


Figure 5.1-4: Karst Topography Potential in Nova Scotia

Karst topography does not easily lend itself to development. Typically it is avoided for development because of the potential for sinkholes. The general unevenness of the terrain does not afford easy cultivation of forests or agricultural use unless a thick overburden or a smoother undulating surface is present. Karst is a unique resource with significant biological, scientific, cultural, recreational, and economic values. A cumulative effects analysis of impacts of mining, farming and forestry activities on karst ecological and geoheritage values has not been conducted. Moreover, this type of analysis is problematic because karst potential is only surmised from the geological mapping record where certain known formations indicate that potential. The extent and distribution of karst landforms in Nova Scotia is unknown. In general, karst areas in Nova Scotia have remained, except for mining and farming activities, undeveloped.

5.1.2 POTENTIAL EFFECTS, PROPOSED MITIGATION, MONITORING AND FOLLOW-UP

Acid Consumption and Production in Bedrock

Acid rock drainage (ARD) refers to the outflow of acidic water from (usually abandoned) metal mines or coal mines or disturbance from construction in some environments where mainly iron sulphides may be exposed in the strata. The ScoZinc Operations has been extensively mapped using drill hole, outcrop mapping and mining information. There are no reports of Halifax Formation slate in the area where the disturbance in the Southwest Expansion area is proposed. The Goldenville Formation (meta-sediments such as quartzite) strata does exist in the project area and has been extensively tested and found to be only acid producing in 10% of the samples. The carbonate host rocks of the deposit are acid consuming and buffer any ARD present.

The management of any materials that are deemed through testing to be acid producing will be in accordance with an Acid Rock Management Plan. Where encountered, care will be taken to ensure that potentially acid generating rock is stockpiled in association with other buffering rock. Surface runoff from all stockpiles will be collected and directed to containment areas of the open pit. Surface water affected by the acid generating material will therefore not be discharged directly to natural watercourses.

All water collected in the open pit as a result of stockpile runoff and mine dewatering activities will be pumped and discharged to the TMF. Water leaving the TMF is subject to an effluent monitoring program to ensure compliance with established performance standards for water quality.

Paleontology

Prior to the glaciers covering this area, there was ongoing sinkhole activity in the gypsum and limestone rocks. Many prehistoric animal remains have been found in these Karst features throughout the province. As noted karst features i.e. sinkholes have been documented near the site. No pre-historic remains have been reported at the project Southwest Expansion area.

The gypsum rock is not known to contain any fossils. However, the limestones, dolostones, siltstone and mixtures thereof interbedded with the gypsum contain fossil marine plants and animals of the Mississippian Period. The most obvious are brachiopod, clams, crinoids, corals, bryozoa and ostracods. One area of concern in paleontology relevant to the project was noted by the Nova Scotia Museum of Natural History. There has been a report of a Carboniferous fish vertebrate from the Lower Carboniferous Windsor Group. ScoZinc will work with the Nova Scotia Museum of Natural History and other interested parties if paleontological resources are found in the Project area.

5.2 SURFACE WATER RESOURCES

5.2.1 EXISTING ENVIRONMENT

Surface Water Resources was selected as a VEC because of the potential for Project activities to interact with the freshwater environment. Indicators of the VEC include aquatic life, fish habitat and surface water quality as well as potential water uses for agriculture, recreation, industry or potability. There are no known agricultural, recreational, industrial or potable uses of the surface water located on the ScoZinc Property. No streams were located in the Project area, however, surface drainage from a portion of the site is directed towards Gays River.

Regional

Nova Scotia contains an abundance of surface water features in all areas of the province. High annual rainfall and moderate to low evapotranspiration rates and a short summer period combine to make available a large volume of water for surface water bodies. The effects of glaciation have resulted in a multitude of wetlands and small lakes as well as a dense network of small streams. The province contains some 46 primary watersheds whose networks of streams and 6,670 lakes together cover about 215,000 hectares, or more than 4% of the province. By comparison, only about 2% of New Brunswick is covered by fresh water, and on Prince Edward Island it is less than 1%.

The lakes of Nova Scotia, which are relatively more abundant in the southwestern part of the province, are small by most standards. Nova Scotia's rivers are also relatively small. The mine site is within the largest drainage basin in the province, the Shubenacadie-Stewiacke River system. This system is north and northwest of the mine and drains an area of approximately 2,800 square kilometers. By contrast, the nearby Musquodoboit River system drains approximately 600 square kilometers.

Local

A watershed divide is located near Chaswood (approximately 11 kilometres east of the site) which separates the Musquodoboit River system from the Stewiacke-Shubenacadie River system (Figure 5.2-1). Drainage for the Gays River sub-system of the Stewiacke-Shubenacadie River system begins at this divide and collects from the valley sides to the north and south of the emerging Cooks Brook and Gays River. This drainage starts its west to southwest flow direction towards the confluence with Shubenacadie River located at a large wetland known as MacPhee Pond after which the Shubenacadie River runs north to the Bay of Fundy. The Southwest Expansion Project is located in an elongated valley extending from the Chaswood area to Carrolls Corner traveling east-west. The Gays River is the principal watercourse in the area, with its headwaters in Lake Egmont. The Main Branch of the Gays River flows north and west past the mine site, to converge with the South Branch Gays River. Additional inputs to the Gays River system in the vicinity of the site include Annand Brook, South Branch Gays River, Black Brook, Meadow Brook and McLean Brook.

Gays River has a variety of uses including fishing, paddling, and swimming as well as supporting aquatic life. The project is not expected to change the ability of anyone to use the Gays River as in the past.

Stormwater at the site is generally uncontrolled, with the exception of a few ditches. Therefore, stormwater run off generally follows the surface topography and discharges into either Gays River to the north, the South Branch Gays River to the west, Annand Brook to the south and east or directly into the Open Pit or the Tailings/Polishing Ponds to the south.

The local area drainage patterns are as follows:

- Areas north, south and east of the mine site discharge directly to the Gays River, Main Branch and indirectly via Annand Brook (south), Black and Meadow Brooks (north).
- Areas west of the mine site discharge to the Gays River, Main Branch and indirectly via the Gays River, South Branch.

In the site area, the Gays River is a meandering channel with overall low gradient and limited riffles and abandoned pools. The substrate sediments are predominately silt with very minor boulders and cobbles. The active channel averages 10 metres in width with a range of water depths from several centimeters to several metres. Unexpectedly, the river banks in this area are well consolidated and show little evidence of erosion.

The volume of surface water entering Gays River from its tributaries is large. This results in profound effects on water quality from rainfall events. Observed and measured increases in turbidity from these rainfall events result in increases in aluminum and manganese, as observed in the baseline information.

Previous Monitoring Programs

Several groundwater and surface water monitoring programs have been implemented over the course of the mining operations carried out at the Gays River Mine facility. The operation itself has undergone several property management changes and subsequent monitoring program iterations throughout the various operational phases. Initial environmental studies and baseline studies were conducted in the late 1970s and continued through out the various operational and care and maintenance time periods. Groundwater, surface water and effluent discharge samples have been collected at various monitoring wells, surface water locations along Gays River and final discharge points. Analytical data collected includes general chemistry parameters, metals, TSS, toxicity, water level monitoring and flow monitoring from Gays River in accordance with Metal Mining Effluent Regulations (MMER) and Nova Scotia Environment Compliance requirements.

A summary of groundwater and surface water programs is presented in Table 1, Overview of Groundwater and Surface Water Studies. Early baseline and compliance monitoring show effluent discharge results in compliance with applicable Metal Mining Effluent Regulations (MMER). Monitoring for MMER compliance has been ongoing. Groundwater elevation data has been collected at several monitor wells on a regular basis. In general water levels have shown seasonal fluctuations based on heavy rainfall or dry seasons, as well as fluctuations due to operational changes. Water levels were also monitored from several surface water locations and show similar fluctuations.

Water quality is assessed by collecting groundwater and surface water samples and the analytical data is compared to the Canadian Council of the Ministers of Environment (CCME) Freshwater Aquatic Life (FWAL) guidelines, as the groundwater may discharge to nearby aquatic environments. Groundwater samples have shown some exceedances in ammonia based on pH and temperature, nitrate and a few metals including copper, iron, zinc, nickel and cadmium. Surface water samples have shown some exceedances in

dissolved oxygen, and some metals including aluminum, cadmium, copper, lead and zinc. No long term trends for exceedences were observed.

Monitoring wells adjacent to residential properties with drinking water wells are compared to Health Canada's Guidelines for Canadian Drinking Water Quality (GCDWQ). These groundwater samples show some exceedances in color, and a few dissolved metals including manganese and lead.

It is expected that as the mining operations transition from care and maintenance mode into production again, compliance samples collected for ground water and surface water will exhibit similar water level and water quality trends as previously detailed.

5.2.2 POTENTIAL EFFECTS, PROPOSED MITIGATION, MONITORING AND FOLLOW-UP

Changes to Drainage Quantity and Quality to the Gays River

The existing conditions at the site are such that drainage to the Gays River occurs in many areas via overland flow. The configuration of stockpiles for the proposed Southwest Expansion have the potential to decrease the quality and quantity of flow to the Gays River. As well, there will be pit dewatering which will be comprised of both surface water from overland flow and groundwater (see Section 5.3).

An examination of the changes in the amount of overland flow due to the stockpile slope directions and changes in the cover (soil versus forested) was completed (Appendix E) and the difference found to be negligible in terms of the quantity due to the large size of the Gays River watershed. Water quality will be maintained through the use of re-vegetated slopes, temporary settling ponds, drainage ditches to capture and re-direct surface water and the use of the large TMF where water quality is such that it is in need of going through that system. Water at the site that is directed to the TMF eventually drains back to the Gays River so that the only loss is by evaporation which is limited.

Possible water quality changes may occur due to overland run-off collecting solids and contaminants from the mining process such as zinc/lead, POL and ammonia from ANFO. As noted above, most water will be captured and treated in one form or the other in temporary ponds or the TMF. All water discharging the site via the TMF or from temporary ponds (final locations to be determined through field surveys prior to the IA application) will be monitored and results compared to NSE and CCME values for surface water. The abundance of site area, size of the TMF and available materials for the construction of additional ponds make it easy to quickly make improvements to surface water capture and treatment if needed. During operations where areas that are

currently vegetated are disturbed, it will be particularly important to follow NSE Sediment and Erosion Control Handbook techniques for ensuring surface water quality is not degraded.

Reclamation

Reclamation will proceed incrementally as the mining operations continue and move from east to west. The ultimate reclaimed area will likely feature two separate small lakes within the pit footprint, and complete revegetation of all stockpiles and disturbed areas. The lakes, which will not be connected to each other or Gays River, would serve multiple purposes, including recreation, habitat and as a continued supply of water to downstream areas as required. Monitoring of water quality would continue as required by NSE. Water quality monitoring during pit refilling and as recently as July 2011 indicates that pit water quality is excellent with no long term issues of being able to be a productive aquatic habitat.

Decommissioning and reclamation plans are described in Section 2.10 and the conceptual plan is shown on Figure 2-2.

5.3 GROUNDWATER RESOURCES

Groundwater quality and quantity has been studied extensively in the region. The regional hydrogeology of the Musquodoboit Valley was published in detail by Dr. Chang Lin in 1970 and published in NS Environment Report 70-3 Hydrogeology of the Musquodoboit River Valley, Nova Scotia. This report is an excellent source of information on the hydrostratigraphic units within the Valley Region and their associated water quantity and quality characteristics including maps that indicate the spatial relationship of the units. The proximity of the Mine and the Project Area to Dr. Lin's study area allows this report to serve as an information source.

5.3.1 EXISTING ENVIRONMENT

The major hydrostratigraphic units within the regional area are:

- Meguma Group - Halifax Formation Slates & Goldenville Quartzites
- Cambrian-Ordovician Granites
- Windsor Group Clastics & Evaporites
- Surficial Deposits – sand and gravel, and till

Halifax Formation Slates generally yield adequate quantities of water (4-20 Lpm), while the quality can be quite variable and prone to elevated concentrations of iron and manganese. Quartzites and granites are very similar in terms of water quantity and quality. The yield range is the same as the slates and the water quality is lower in iron and manganese but slightly higher in hardness. Windsor Group strata generally do not yield water which is suitable for domestic purposes due to the elevated total dissolved solids, hardness, sulphate, and iron.

The sand and gravel surficial deposits can yield large quantities of water (> 500 Lpm) of good to excellent water quality, but these deposits are under utilized. The tills generally yield adequate quantities and quality of water within 3 to 8 metres of the surface and thus have been highly utilized in the valley for domestic water supplies but are prone to elevated hardness and presence/exceedence in the acceptable level of bacterial matter (fecal and total coliform).

The local hydrogeological regime can be characterized as two separate systems with the degree of interaction between the two systems highly dependant on the topography and local geology. The surficial deposits aquifer systems have a near surface water table within the low (clay till) to highly permeable (sand, gravel) materials. In the surficial materials, groundwater movement is between the individual soil grains and moves under gradients controlled by topography. In the deeper bedrock aquifers, groundwater flow is dependant upon the degree to which fractures and voids within the strata are connected and the hydraulic head differences between these openings. In many areas, these systems will act completely separately from each other as groundwater in the near surface systems discharges directly to surface water bodies e.g. Gays River. In some areas, the bedrock groundwater system will receive direct recharge from the surface system as groundwater migrates downward.

The site hydrogeology has been previously studied and described in detail by a number of agencies. Common conclusions from the various studies reveal:

1. evidence of a strong relationship between surface water and local groundwater levels within the surface materials aquifer;
2. poor water quality in the clay till surface material ; and
3. a strong link between permeable (sand/gravel) surficial materials and the underlying bedrock aquifers in terms of vertical recharge and water quality.

A domestic water well study completed in 1997 by MGI Limited (now CRA Limited) indicated that with respect to local hydrogeology:

1. water levels in the surficial materials (both clay and sand/gravel units) were generally within 5 m of ground surface and mirrors local topography; and
2. water quality is poor with exceedences in the Canadian Drinking Water Quality Guidelines for iron, manganese, copper, lead, sulphates, colour, and turbidity; and total and fecal coliform is commonplace.

The hydrogeological regime in the Southwest Expansion area is a complex geological system controlled by a karsted gypsum / carbonate contact which has been infilled with Cretaceous-age sands and clays. Two overlying Pleistocene glacial cycles and recent deposition of the river alluvium adjacent to the meandering Gays River complicate the hydrogeology. Several sand units form aquifers that are separated by zones of permeable clays which are probably interconnected in the karsted gypsum deposits overlying the mineral deposit.

Potential groundwater effects north of the river, where all of the residential development is located, has been reviewed and reported in previous work on the area between 1980 and 2008. The data, while limited in this area, does provide for a number of observances and assumptions to be made with respect to the potential drawdown effects from pumping in the existing and proposed surface operations. Deeper bedrock aquifers (gypsum and carbonate), Cretaceous sand and clays, and the Lower Sand Unit have the greatest groundwater fluctuations in response to underground pumping, while the other units (Upper Sand / Lacustrine Clay Unit, and in particular the Red Till and Alluvium Unit) have lower drawdowns or fluctuations.

The majority of the domestic wells in the area are dug wells, located several hundred metres north of Gays River across a topographic and watershed divide. These wells appear to be producing water from the Upper Pleistocene Glacial Cycle which comprises Red Till, Upper Lacustrine Clay and the Upper Sand Units. Topographic mapping reveals a number of northwest trending drumlins which are typically till (i.e. Red) units that have groundwater fluctuations of 0.66 m to 11.25 m near the river. Fluctuations of 0.66 to 2.22 m are more typical. Previous maintenance dewatering operations are not known to have created issues with domestic wells or the Gays River. It is recognized that a monitoring program for both surface water and groundwater during the initial dewatering of the Main Pit (typically done at higher flow rates than maintenance pit dewatering) would be prudent and will be developed with NSE based on known past effects on the Gays River of this type of dewatering program.

The Southwest Expansion consists of several interconnected pits as outlined in Section 2 and shown graphically in Appendix E. The bottom elevation (mine elevation) of the deepest portions ranges from 95 to 80 metres below sea level (mbsl) in the expansion

area as compared to roughly 60 mbsl at the deepest portion of the existing pit. For comparison, the Gays River is roughly 14 metres above sea level (masl) as is the water level in the existing pit. Groundwater entering the pit areas will be pumped to the TMF as a precaution for treatment. This volume of water in turn empties to Annand Brook and flows back the Gays River. As outlined in Appendix E the only losses from the system are those of evaporation from the expansion area pits and this volume is not significant in terms of the overall water budget for Gays River. If baseflow in the Gays River is reduced by dewatering efforts it will be replaced due to the configuration of the overall water management system at the site. Please refer to Section 5.2 for a discussion on the importance of monitoring programs. Note as well that there are mitigation options such as reductions or changes in pumping programs, re-directing surface flows and other methods available.

5.3.2 POTENTIAL EFFECTS, PROPOSED MITIGATION, MONITORING AND FOLLOW-UP

Changes to Groundwater Quality and Quantity

The groundwater regime of the area will be affected by dewatering the existing (Main) pit and construction of the new Southwest Expansion, primarily in terms of quantity. Past operations at the site have been successfully completed with very few recorded issues with groundwater quantity and domestic well issues. Baseflow to the Gays River is not predicted to be significantly affected due to the location of the Southwest Expansion, the fact that groundwater levels are roughly equal to the Gays River as it is the base of the groundwater system in the area, and the small percentage that the groundwater inflows are in relation to the total watershed size and possible groundwater inputs.

Effects to the groundwater quality as a result of construction will be limited in areal extent and groundwater chemistry changes they create due to earth moving and changes in surface water flow patterns. Possible groundwater quality changes due to contaminants from the mining process such as zinc/lead, POL and ammonia from ANFO are not predicted but will be included as parameters in the comprehensive groundwater monitoring program. A comprehensive groundwater monitoring program has been part of previous operations. ScoZinc will continue these and provide supplemental plans at the IA stage where required. Please refer to Appendix G for an overview of the groundwater monitoring program completed at the site in the past. This data set allows ScoZinc has been relied upon for the impact predictions and provides valuable pre-operations data to be used for comparisons with future data.

Domestic Wells

Several past operators were able to have both underground and surface operations that did not negatively impact the ability of local groundwater supplies in terms of both quantity and quality. Water quantity impacts are not predicted for domestic wells as they located on the other (east) side of a groundwater and surface water divide (Gays River) and the location of the Southwest Expansion being on the western side of the Gays River and mainly away from domestic wells. Figure 5.3-1 shows the number of wells within a radius of the pit. The number was derived from the location of the civic address point assuming one well per property. No wells are located within 200 metres of the proposed Southwest Expansion pit and nearly all of this area is located south of Gays River. Twenty, 40, and 50 wells are located within 500, 800 (legislated distance) and 1000 m of the pit, respectively. From past well surveys it was found that the majority of the wells in the area are dug although upgraded properties and newer homes probably have drilled wells.

Information from the past operator indicated that three complaints were received and investigated relative to water quantity and quality. It is understood that there are no unresolved complaints currently. ScoZinc will continue to have a clear line of communication through the General Manager and CLC for domestic well complaints to be recorded and evaluated in accordance with published NSE requirements and any supplemental requirements that will be outlined in an Environmental Assessment Approval or Industrial Approval.

ScoZinc will undertake supplemental domestic well surveys in the areas to the west of the southwest Expansion area that have not previously been included in past (1997 and 2006) surveys. Approximately 20 homes have been identified and will be visited to determine if homeowners wish to be part of the survey for domestic well conditions (quality and quantity) and structural assessments prior to initiation of any blasting or overburden removal.

A Domestic Well Damage bond is in place for the site now and will be reviewed with NSE for adequacy. During the process of putting this bond in place a Water Quality Policy was developed and is outlined below. The Policy is part of the existing Industrial Approval for the site and it is anticipated that, if EA is granted, that the Water Quality Policy would be part of the amended IA.

Water Quality Policy

The purpose of the Water Quality Policy is to address degradation, reduction or loss of water quality or quantity if water supplies are impacted by the Project.

The policy includes the following:

- Provision of potable water: ScoZinc will, in a timely fashion, provide potable water to any resident or facility within 500 metres of the mine area who experiences a loss of water quality or quantity that is attributed to the Project. Those residences or facilities within 500 metres will be provided with contact information to register water quality concerns by telephone on a twenty-four hour basis.
- Independent third party: ScoZinc will procure an independent third party, in consultation with NSEL, to investigate supply related problems.
- Method of provision: The methods of providing suitable quality and quantity of potable water may include bottled water, an alternative water supply (capable of meeting baseline conditions, necessary yield and adequate quality) or treated groundwater using a domestic water quality related system (such as a water softener). ScoZinc will make a decision on method of providing water to impacted residents / facilities considering magnitude, type and duration of impacts, as well as costs, logistics and desires of residents / facilities.

5.4 WETLANDS

5.4.1 EXISTING ENVIRONMENT

Wetlands have been selected as a VEC because of potential interactions between the proposed Southwest Expansion and the physical environment. Wetlands can have many functions, known as wetland functional attributes, which play important roles in natural ecosystems. Wetlands can minimize erosion and control flooding, and can reduce contaminant loads. Wetlands may also be closely linked to local hydrogeology, in that they may be groundwater recharge and discharge areas. They also perform various important biological functions, such as providing habitat for wetland species, as well as for upland species which require wetland habitat at some point in their life history. Humans also utilize wetlands for various recreational activities such as bird watching, hunting, and harvesting of wild plants, as well as commercial operations such as cranberry production and peat harvesting. In Nova Scotia, wetlands are protected under the provincial Environment Act and an approval is required for their alteration.

The study area for the evaluation of wetlands encompassed the Southwest Expansion pit, the proposed North stockpile and the central northern portion of the South stockpile.

Field surveys revealed a total of seven wetlands within or adjacent to the proposed pit and stockpile areas. The wetland surveys were conducted on June 22, 2011. Locations of

the seven wetlands are depicted in Figure 5.4-1. These wetlands can be grouped according to wetland types. Three types of wetlands are located within the study area: shrub swamp, fen and marsh. Most of these wetlands are small (< 1 ha) and are composed of a combination of these wetland types. ACCDC and NS Museum Screening reports can be found in Appendix F.

Two plant species and one lichen species yellow-listed by NSDNR occur in or near riparian wetlands just north of the proposed North stockpile. Canada lily (Lilium canadense) and wood nettle (Laportea canadensis) occurs in Wetland 7 and the lichen (Sticta fuliginosa) occurs in Wetland 9.

Five wetlands will be removed by the Southwest Expansion. Wetlands 1, 2, 5, 6, and 8 are located within the Southwest Expansion pit and/or proposed stockpiles areas. Two wetlands are located close to stockpiles and may be partially impacted (drainage) by the proposed North stockpile, Wetland 7 and Wetland 9.

5.4.2 POTENTIAL EFFECTS, PROPOSED MITIGATION, MONITORING AND FOLLOW-UP

As outlined above, the Southwest Expansion project involves the loss of approximately 4 ha of wetlands. The mine design process for the Southwest Expansion involved trying to change pit outlines or stockpile locations so that wetlands could be avoided. However, the location of the orebody is fixed and therefore the methods to extract the resource are constrained and wetland loss could not be avoided. The North stockpile design has been revised from the original to avoid direct wetland loss for these two however the proximity may create drainage changes that will affect function. Additional surveys will be completed prior to the design of the wetland compensation program to determine if Wetland 7 and/or 9 need to be included.

ScoZinc recognizes the need for the development of a wetland compensation program as part of the IA stage of the project. Wetlands can serve an important role in flood control, water quality improvements and habitat for rare or species of significance for the Mi'kmaq. Studies completed at the site by ScoZinc and previous operators indicate that none of the wetlands lost to this project have these specific functions but are important ecological features and a proper compensation program is needed. The proposed wetland compensation plan will likely involve replacement on the project site as this is typically the regulator and public preference. This site is large (over 600 hectares) and has soils and topography that is conducive to successful wetland replacement programs making on-site replacement a better option than off-site. The timeframe for this project is

small for a mining project (3.5 years) thereby allowing for the wetlands to be replaced within a short period from the loss which is preferable as well.

5.5 FLORA AND FAUNA

5.5.1 EXISTING ENVIRONMENT

Flora

Flora and flora habitat is considered a VEC because of its contribution to regional biodiversity and potential interactions between project activities and the physical terrestrial environment. The presence of rare flora may be indicative of rare habitats which may support unusual assemblages of plants and animals. Protecting rare plants is beneficial to ecosystems in that it results in simultaneously protecting rare habitats and the associated species of flora and fauna. Flora is considered rare in Nova Scotia if it has been listed as a rare species by the province (NSDNR General Status Ranks or the Nova Scotia Endangered Species Act (NSESA)), or if it has been listed rare nationally by Committee on the Status of Endangered Wildlife in Canada (COSEWIC) or the federal Species at Risk Act (SARA). The VEC for rare plants and cyanolichens in this document considers any species of vascular plant listed as rare in any of the above lists. The flora survey was conducted by Tom Neily. ACCDC and NS Museum Screening reports can be found in Appendix F. A list of potential priority plant and lichen species for the study area can be found at the end of Appendix C.

This site area for the Southwest Expansion project and previous undertakings with similar footprints has been examined in detail. ScoZinc reviewed all of the previous work and completed supplemental assessments in 2011 in areas where no surveys had been completed (western end of the South Stockpile for example). Some of the past data was also older and needed to be updated due to the species involved (a bird survey for example as they are highly mobile). In past surveys the flora of greatest interest was *Hepatica americana (nobilis)* or the Round-leaved Liverwort which is red-listed in Nova Scotia. The location of the population is outside the disturbed footprint and has been monitored for health through previous mine operational and care and maintenance periods with no issues being identified. The monitoring reports were submitted to NSE and the reports have not been made public in the interest of protecting the location of the species.

Flora species and flora habitat were surveyed on June 9-10, 2011. The study area for flora and flora habitat encompassed the Southwest Expansion area, the proposed North stockpile and the central northern portion of the South stockpile. A significant portion

of the vegetation in this area has been disturbed historically through forestry, agriculture, mining, and road building.

Eight flora habitats were identified, including softwood stands, mixed wood stands, upland hardwoods, clear cuts, secondary regeneration, alder swales, riparian and river aquatics and wetlands.

Three flora species of special status were identified in the study area. Two plant species and one lichen species yellow-listed by NSDNR occur in or near riparian wetlands just north of the proposed northern stockpile. Canada lily (*Lilium canadense*) and wood nettle (Laportea canadensis) occurs in Wetland 7 and the lichen (*Sticta fuliginosa*) occurs in Wetland 9.

Previous work on species of significance to the Mi'kmaq by Confederacy of Mainland Mi'kmaq in the late 1990's (unpublished) indicated that no species were identified. The intervale area of the Gays River does have Wisqoq (Black Ash) habitat but none were identified in previous surveys. The Southwest Expansion project will not affect this intervale area and therefore no impacts to any Wisqoq that may exist will occur.

Fauna

Fauna are considered a VEC due to their role in biodiversity and ecological integrity. Many faunal species are protected under the Nova Scotia Wildlife Act (1989) or the Migratory Bird Convention Act (MBCA) (1994). In Nova Scotia, a species is considered rare when it is listed as rare or sensitive to anthropogenic disturbance by the province (NSDNR General Status Ranks of Wild Species or the NSESA), or listed nationally by COSEWIC or SARA.

In Nova Scotia, legislation protecting birds includes the MBCA and the Nova Scotia Wildlife Act. The MBCA protects migratory birds and their nests. Most bird species present in Nova Scotia are listed under the MBCA; however, it does not include avian predators such as raptors and introduced species such as European starlings (Sturnus vulgaris). The Nova Scotia Wildlife Act specifically protects raptors including eagles, ospreys, falcons, hawks and owls.

A breeding bird survey was conducted on June 16-17, 2011. The area surveyed included the Southwest Expansion area, the proposed northern stockpile and the central northern portion of the southern stockpile. Surveys were conducted as 10 minute point counts following Canadian Wildlife Service protocols for environmental assessment at representative locations within major habitat types in the study area. An additional pre-dawn survey was completed following Bird Studies Canada protocols for whip-poor-

will/nighthawk. A total of 816 birds representing 58 species were recorded during the breeding bird survey. A list of bird data recorded at each survey point is provided in Appendix C. Breeding birds were present in all habitat types. Descriptions of each bird survey point are provided in Appendix C. The most abundant species in descending order of abundance were red-eyed vireo (Vireo olivaceus), chestnut-sided warbler (Dendroica pennsylvanica), American robin (Turdus migratorius), common yellowthroat (Geothlypis trichas), and American redstart (Setophaga ruticilla). No species of concern were identified during the point counts conducted in the Southwest Expansion area.

5.5.2 POTENTIAL EFFECTS, PROPOSED MITIGATION, MONITORING AND FOLLOW-UP

Project-related effects for the Southwest Expansion area on terrestrial flora, including rare species, and habitat at the site are limited due to the fact that the vast majority of the area proposed has already been disturbed through forestry, agriculture, or mining related activities. No species of concern were noted and no critical habitat was identified and therefore there will be no losses associated with the completion of this project as described. Additional consultation with NSE and NSDNR for the yellow listed Canada lily (*Lilium canadense*) and wood nettle (*Laportea canadensis*) occurring in Wetland 7 and the lichen (*Sticta fuliginosa*) occurring in Wetland 9 will be undertaken with the aim to determine the best methods for monitoring and critical elements for their health that may be mitigated through specific design aspects of the project in close proximity to the species. The project as described will not have direct impacts on these species but the drainage may be affected thereby possibly impacting them.

Monitoring of the *Hepatica americana (nobilis)* population was completed as part of the operational compliance monitoring program between the discovery of the species (1997) and present. Monitoring reports were submitted to NSE and indicated no significant population deviations that were attributable to mine operations. The reports are confidential due to the requirement to not disclose the actual location of the species. ScoZinc understands that NSE staff will review this EARD and are therefore in the best position to access whether the current monitoring programs are adequate and stipulate the program required should the EA Approval be issued.

Project-related effects on fauna and habitat are limited due to the fact that the vast majority of the area proposed has already been disturbed through forestry, agriculture, or mining related activities. Loss of habitat will occur in the extraction and stockpile areas but will have minimal impact due to the availability of similar replacement habitat in the general area. Many of the faunal species in the area have a familiarity with mining

operations and the infrastructure which may reduce typical mortality issues with industrial activities.

The Wood Turtle has been observed within the Gays River and intervale area. The species is "vulnerable" status in Nova Scotia and past efforts to mitigate impacts to this species have been implemented at the site. ScoZinc intends to continue these measures as part of the Southwest Expansion project and they generally have included surveys of habitat (complete), turtle fencing between the active areas of the site and the Gays River intervale habitat and heavy equipment operator education to make them aware of what a wood turtle looks like and nesting areas if encountered would be marked to avoid being impacted. ScoZinc does not have specific data on long term Wood Turtle populations but will work with NSDNR to determine the best monitoring methods to assist in building the provincial knowledge base for the species. In the early EBS work completed in the 1970's this species was noted as occurring in the Gays River area.

As many of the faunal species at the site are mobile, there will be a need and a desire by ScoZinc to seek ways to keep mortality rates low due to mining activities. Mitigative measures that may be employed, if needed, could include fencing, lighting, and refinements to operations during certain periods of the year. ScoZinc is aware of NSDNR requirements relative to clearing of lands during nesting/fledgling season for bird species and will adhere to these.

Ongoing issues of importance to local flora and faunal species will likely be brought forward by the CLC and regulators. ScoZinc commits to an open and consultative approach to seeking resolutions on all issues raised.

ScoZinc recognizes the value of species-at-risk and will develop a statement of planned action in consultation with NSE and NSDNR if the EA is approved. We would expect EA Approval if granted to include specific instruction conditions relative to the requirements.

5.6 ARCHAEOLOGICAL AND CULTURAL RESOURCES

Archaeological screenings & reconnaissance of the proposed Southwest Expansion area was conducted by Cultural Resource Management (CRM) Group Limited under Heritage Research Permits A2006NS78 and A2011NS43, to locate and identify archaeological resources within the proposed impact area, and to offer resource management recommendations. Work was conducted in 2006 and 2011. The 2011 study (Appendix D) summarizes all the work completed at the mine site. Individual reports, that include mitigation of other mine site cultural features, are available if required.

5.6.1 EXISTING CONDITIONS

The 2006 study area was a nearly 90 hectare "L"-shaped area located west of the processing mill and northwest of the tailings pond (Figure 5.6-1). The area consisted of upland terrain with varying degrees of forest cover. The only "archaeological" feature identified was the site of a residence believed to have been established by William Wilson sometime after his purchase of the property in 1872. Being relatively modern and having been heavily impacted by mechanical demolition and site leveling sometime between 1938 and 1992, the site did not warrant registration as an archaeological site and required no further archaeological investigation. CRM recommended this to the Heritage Division and the recommendation was accepted.

The 2011 archaeological screening built upon earlier archaeological screening prepared by CRM Group and was designed to fill the gaps of the Southwest Expansion area that had not been previously covered. Two study areas were defined, however, only the western area falls within the context of this project (Figure 5.6-1).

Visual inspection of the western parcel revealed the presence of a large sand pit situated within the eastern portion of the study area. Given its proximity to Gays River, careful attention was paid to the areas located along the river bank and along an associated meander. Four areas considered to exhibit high potential for encountering both Precontact and/or early historic Native and historic Euro-Canadian archaeological resources were identified. All four areas are located along the river bank or along the meander on a high, dry and level area that would have been suitable for both Precontact and/or early historic Native and historic Euro-Canadian utilization.

High Potential Area 1:
This area (20 m x 10 m) is located along the eastern side of a small meander. No specific features were identified.

High Potential Area 2:
This area (100 m x 10 m) is located along the eastern side of the meander northwest of High Potential Area 1. Visual inspection of the plateau revealed the presence of two potential historic features. A 3 metre by 4 metre rectangular depression was identified that may represent the remains of a cabin or other historic structure. A small circular (2m) depression, north of the first feature, may be the remains of an associated privy.

High Potential Area 3:
This area (100 m x 20 m) is located along the eastern bank of Gays River and south of High Potential Area 2. Visual inspection of the area revealed the presence of a concentration of stone, located adjacent to the river. The presence of another concentration directly across the river suggests that these features may represent the remains of an historic bridge. Indeed, portions of an historic road alignment were visible running north / south along the terrace.

High Potential Area 4:
This area, located along the eastern bank of Gays River and north of High Potential Area 3, constitutes a pair of high, dry and level 100 metre long terraces (western - 11 m wide, eastern - 21 metres wide) that run parallel to the river.

Given the high, dry and level nature of the locale and their proximity to Gays River, these areas are considered to exhibit high potential for encountering both Precontact and historic archaeological resources.

None of these high potential areas are within the disturbed footprint for the currently proposed project.

5.6.2 POTENTIAL EFFECTS, PROPOSED MITIGATION, MONITORING AND FOLLOW-UP

The 2011 archaeological screening and reconnaissance of the ScoZinc Operations study area property consisted of a review of documentation that had been compiled for previous projects within the ScoZinc property and a visual inspection of the study area. It did not involve sub-surface testing. Field reconnaissance conducted by CRM Group archaeologists determined the eastern study area to exhibit low potential for encountering both Precontact and / or early historic Native archaeological resources, and historic Euro-Canadian archaeological resources. Four high potential areas for encountering both Precontact and / or early historic Native archaeological resources, and historic Euro-Canadian archaeological resources were identified within the western study area.

Based on these results, the following management recommendations are offered for the Southwest Expansion area:

1. It is recommended that if any of the areas of potential archaeological significance located within the western study area, as identified in this report (High Potential Areas 1 - 4), are to be impacted in any future development of

the ScoZinc Operations, they be subjected to a program of shovel testing to determine whether or not buried archaeological resources are present and/or to determine the age, function and significance of identified features.

2. It is recommended that in the event that archaeological deposits or human remains are encountered during development activities associated with the ScoZinc Operations, all work in the associated area(s) should be halted and immediate contact made with the Heritage Division (Laura Bennett: 424-6475).

Personnel involved in all ground disturbances related to the construction and mining activities in the Southwest Expansion area will be made aware of the potential for archaeological and/or cultural resources and the appropriate actions to take in identifying and reporting such features.

In summary, assuming that the proposed mitigation measures are applied, Southwest Expansion Project is not likely to have significant adverse effects on archeological and historical features in the area.

No additional work or mitigation is required to allow the project as described to proceed. ScoZinc will continue to complete surveys in any areas outside the proposed footprint that may be disturbed in future activities.

5.7 ATMOSPHERIC CONDITIONS/ AIR QUALITY

5.7.1 EXISTING ENVIRONMENT

NSE monitors ambient air quality at ten locations across Nova Scotia. Generally, ambient air quality meets or exceeds national standards in most communities. The common air pollutants monitored regularly are respirable particulate (PM 2.5), sulphur dioxide (SO_2), carbon monoxide(CO), ground level ozone (O_3), nitrogen dioxide (NO_2), and hydrogen sulphide (H_2S). Exceedences for these pollutants are, typically, small and infrequent in Nova Scotia.

Meteorology

The site is located at Cooks Brook, Nova Scotia which is approximately 10 kilometres east of Dutch Settlement and 20 kilometres west of Middle Musquodoboit. The nearest climate station with historical data that is representative of that region is the Upper Stewiacke climate station (ID# 8204193) operated by the Meteorological Service of Canada (MSC). The station is located approximately 60 km northeast of Gays River. The

following is a summary of average climate conditions at the Upper Stewiacke Station, based on climate normals published by Environment Canada for the period from 1971 to 2000.

Observations from the historical Upper Stewiacke weather data indicate an average total annual precipitation of 1322 mm, which includes 199 cm of average snowfall per year and 1123 mm of average rainfall per year. Rainfall patterns remain fairly constant through out the months of May to August increasing through September through December. Measurable precipitation occurs on an average of 302 days per year, with 251 days of measurable rainfall and 61 days of measurable snowfall.

The extreme one day rainfall for the station is 133 mm on August 15, 1971 and extreme one day snowfall is 59 cm on February 1, 1992. Average annual temperature is 6.1 °C, with an average monthly range from -6.4 °C to 18.4 °C. Temperature extremes can range from -41.1 °C to 36.1 °C. There is an average of 240 days per year with an average temperature above 0 °C.

Historical wind data is not available from the Upper Stewiacke weather station, therefore historical wind data is taken from the Halifax Airport climate station (MSC ID# 202250), which is located approximately 30 km southwest of the mine site. This is the closest station to the site for which historical wind data exists.

Average wind direction taken from Halifax International Airport (1971 to 2000) is generally westerly from November through to March and southerly April to October. Wind speeds average approximately 18.4 km/hr, with an average range of 13.5 km/hr in September to 18.6 km/hr in February. Maximum hourly speeds can range from 56 km/h in September to 89 km/hr in March, with maximum gusts of up to 132 km/hr recorded.

Baseline and quarterly monitoring has been conducted at several locations around the existing mine site through 2007 and 2008. The site has a history of operations that were able to meet regulatory requirements for monitoring. These plans have been reviewed and will be updated to reflect current requirements and be submitted for review by NSE as part of the IA application process.

Generally the meteorological data from MSC is sufficient for mine design and operation. ScoZinc will work with Environment Canada's Atmospheric and Meteorological Services staff relative to the use and analysis of data collected from the site's meteorological station. ScoZinc intends to use the site specific data collected in any

reviews of the original design and design refinements will be based in part on the site meteorological data.

Total Suspended Particulate and Fine Particulate Matter

The National Air Pollution Surveillance (NAPS) network is a cooperative program that measures air quality across Canada. The closest NAPS monitoring location to the proposed Southwest expansion is at Cherry Brook Road, Westphal, NS, (near Dartmouth) approximately 60 km to the southwest. At present, both PM10 and PM 2.5 levels are monitored at that station. Monthly PM 2.5 measurements for 2006 ranged from 5 $\mu g/m^3$ -11 $\mu g/m^3$. Monthly PM 10 measurements for 2006 ranged from 8 $\mu g/m^3$ -20 $\mu g/m^3$. Currently, USEPA regulates PM 10 under the National Ambient Air Quality Standard (NAAQS) at 150 $\mu g/m^3$ for a 24-hour sample and an annual average of 15 $\mu g/m^3$. PM 2.5 will be further regulated at 30 $\mu g/m^3$ for a 24-hour sample in 2010 through the Canada Wide Standards (CWS).

The existing environmental conditions have been observed during previous baseline and monitoring events. The data collected will be used in the design of the final monitoring program developed for the IA.

Other Pollutants and Greenhouse Gases

For this project, on site trucking, mobile equipment and utility vehicles have the potential for producing emissions of other air contaminates including carbon monoxide (CO),nitrogen oxides(NO_X), sulphur dioxide (SO_2),ozone, hydrogen sulphide (H_2S) and other greenhouse gases. These are currently regulated through the EPA National Ambient Air Quality Standards (40 CFR Part 50) and the Nova Scotia air Quality regulations (N.S. Reg 187/2010).

5.7.2 POTENTIAL EFFECTS, PROPOSED MITIGATION, MONITORING AND FOLLOW-UP

Temporal boundaries for the assessment of air quality have been developed for the time periods during which Project air emissions will have the potential to degrade the local air quality in and around the Southwest Expansion site. The Southwest Expansion is expected to extend the life of the mine by 3.5 years. Local ambient air quality will be affected throughout that time period. Process emissions will be generated throughout the life of the project. The expansion process and operations are not seasonal; therefore there are no marked temporal boundaries to air emissions throughout the life of the project.

The spatial boundary is the zone of influence of emissions from the expansion and existing processing operations that will affect the local ambient air quality. The closest residential property is within 220 m of the proposed Southwest Expansion. The zone of influence will encompass a 5 km radius including, Carrolls Corner, Pine Grove, Coldstream, Cooks Brook and Lake Egmont surrounding both the existing mine site and proposed Southwest Expansion.

Development and mining operations, on site vehicle operations, and waste rock piles all can contribute to the over all local air quality. Air-borne particulate will be generated during the development and operational phases of this project. On site vehicles operations, as well as trucking operations can contribute to overall dust, as well as increased emissions of nitrogen oxides (NOx), sulphur dioxides (SO2), carbon monoxide (CO), ozone, hydrogen sulphide, and greenhouse gases including methane and carbon dioxide (CO2). The following mitigative measures will be utilized to reduce project emissions:

- Wet suppression controls on unpaved surfaces;
- Speed reduction to keep dust levels at minimum;
- Stabilized slopes of either mulch or vegetation for waste rock stockpiles;
- Hardened surfaces where practical;

- Equipment maintained in good working order;
- Use of large haul vehicles so as to minimize trip frequency;
- Low sulphur diesel fuel;
- Reduced idling; and
- Incorporating native shrubs and trees in the reclamation plan to further reduce carbon dioxide levels and other green house gases.

National Pollutant Release Inventory (NPRI) Reporting

The NPRI is a federally administrated program that collects data on annual on site emissions of substances released to the air, water and land, as well as offsite transfers of substances for disposal or recycling. NPRI reporting is a requirement of sub section 46(1) of the Canadian Environmental Protection Act (CEPA). ScoZinc is aware of the legislation and will comply with reporting requirements once the project specifications are finalized for the IA phase.

Reclamation

Progressive reclamation will be integrated in the overall mine plan. Dust and exhaust type emissions will be produced from equipment and machinery used for reconstruction and re-contouring of stock piles and waste rock piles, back filling and overburden relocation. Similar mitigative measures as outlined for waste rock piles, including wet suppression of unpaved surfaces and roads, will help reduce dust impacts from these activities. Regular machinery maintenance, the use of low sulphur fuel, the overall distance of the reclaimed areas from sensitive receptors and the natural buffers of the reclamation areas will help reduce emissions and dust impacts associated with the equipment utilized in the reclamation process.

In summary, assuming appropriate mitigation to minimize dust generation and transport, significant Project-related effects on air quality are not likely to occur during construction and operation phases. Additional Total Suspended Particulate (TSP) and emissions monitoring would be required to measure the full effects on suspended particulate matter and exhaust emissions once the expansion process begins and as it continues on. Particulate monitoring throughout different phases of the expansion process can be conducted utilizing a Beta Array Monitor or High Volume Sampling. In addition, detailed modeling can be conducted to better estimate emissions contributions and ground level concentrations.

5.8 NOISE

5.8.1 EXISTING ENVIRONMENT

Noise is defined as any unwanted sound which may be hazardous to health, interfere with speech and verbal communications or is otherwise disturbing, irritating or annoying. Noise is measured as sound pressure levels (SPL) in decibels (dB). This scale is “A" weighted to approximate the way the human ear hears. Noise measurements are therefore represented as dBA units. In general an increase in noise levels from 1 to 3 dBA will not be noticeable, 3 to 5 dBA will be noticeable by most people, 5 to 7 dBA will be easily heard and an increase of 7 to 10 dBA will be considered by most to be twice as loud (USEPA Reference-1974). Because the decibel scale is logarithmic, doubling of the number of noise sources will increase noise levels by 3 dBA. A tenfold increase in the number of noise sources will add 10 dBA to the noise level.

Table 5.8-1 lists some common noises and typical dBA levels. Extremely low levels of sound are in the 20 to 35 dBA range, while sounds causing immediate and noticeable disturbance start at 70 to 80 dBA. A quiet location such as library or inactive residential area will register a sound level of approximately 35 dBA. A tractor-trailer passing at a

distance of 10 to 15 metres will create 80 dBA, similar to that of shouting at a distance of one metre.

TABLE 5.8-1: COMMON NOISES AND TYPICAL dBA LEVELS

NOISE LEVEL (dBA)	TYPICAL OUTDOOR NOISE LEVELS	TYPICAL INDOOR NOISE LEVELS
140	Threshold of pain on the human ear	
130		
120		
110	Gas mower at 1 metre	Nightclub music
100		
90		
80	Semi-truck @ 10-15 m travelling 70 to 90 kilometres / hr	Shouting at 1 metre
70	Autos @ 10-15 m travelling 70 to 90 kilometres / hr	
60	Normal conversational speech at 1 metre	
50		
40	Rural daytime	Library
30		
20	Rural night time	
10		Recording studio
0	Threshold of hearing	

The proposed Southwest Expansion of the existing surface mining operation is bounded by Gays River, Highway 224, Carrolls Corner, Pine Grove, and Cooks Brook areas. There are several contributing factors to existing noise in this area:

- Existing background noise from road traffic including local traffic, and farm equipment;
- Existing background noise from air traffic;
- Existing background noise from current mining operations;
- Existing noise from scheduled blasting events; and,
- Noise from current blasting procedures and siren warnings.

The existing environmental conditions have been observed during previous baseline and monitoring events. The data collected will be used in the design of the final monitoring program developed for the IA.

5.8.2 POTENTIAL EFFECTS, PROPOSED MITIGATION, MONITORING AND FOLLOW-UP

The Southwest Expansion area will create blasting, loading, rock crushing and hauling noise. Temporal boundaries for the acoustic environment have been developed for the time periods during which related mine site noise will have the potential to degrade the local air quality in and around the expansion site. The Southwest Expansion is expected to extend the life of the mine by 3.5 years. The acoustics environment will be affected throughout that time period. Most of the noise impacts will result from heavy vehicle operations. Impacts will occur during the development and blasting operations as the project proceeds, and as a result of decommissioning and reclamation. The expansion is not seasonal; therefore, there are no significant seasonal boundaries.

The spatial boundary is the zone of influence of noise emissions from the expansion area that will affect the local ambient air quality. The nearest resident to the proposed mine expansion boundary is approximately 220 m. The zone of influence will encompass a 5 km radius including, Carrolls Corner, Pine Grove, Coldstream, Cooks Brook and Lake Egmont surrounding both the existing mine site and proposed Southwest Expansion.

A significant adverse effect occurs where the project increases background noise levels at a residential area above the NSE guidelines or by more than 10 dBA. An adverse effect that does not meet these criteria would be considered as not significant. A positive effect would be project-related activities that decrease the ambient noise levels.

Sources of mine site related noise may include blasting, onsite heavy truck traffic and operation of other heavy machinery. Table 5.8-2 outlines some typical noise ranges for heavy construction equipment. Noise levels for stationary construction equipment will decrease by approximately 6 dBA at a doubling of the distance from the source.

TABLE 5.8-2: TYPICAL NOISE LEVELS 15 M FROM HEAVY CONSTRUCTION EQUIPMENT

Type of Equipment	Noise Level Range (dBA)
Front Loaders	70-85
Backhoes	70-95
Trucks	85-95
Excavator	85-95
Jack Hammers / Rock Drills	80-100
Reference: "Traffic Noise Analysis and Mitigation Manual" Environmental Section, Oregon State Highway Division, 1990	

The level of noise will vary according to the type of development activity. Noise from the equipment and lack of effective mufflers is a source of noise. Regular maintenance of the equipment will reduce noise levels. This measure will adequately mitigate potential noise impacts. Noise monitoring will be conducted and the results submitted to regulators as requested. The mitigation procedures may vary as long as noise levels are in accordance with the regulatory approval.

Blasting Noise

The existing environment is already exposed to noise from blasting and general mining operations, as well as heavily influenced by farming equipment. Local residences may experience spikes from blasting activities and perceived increases in noise levels from mining operations.

A monitoring plan during blast events will be developed for the IA phase.

Reclamation

Progressive reclamation will be integrated in the overall mine plan. Noise impacts from reclamation processes will result from equipment and machinery used for reconstruction and recontouring of stock piles and waste rock piles, back filling and over burden relocation. Regular machinery maintenance, the overall distance of the reclaimed areas from sensitive receptors and the natural buffers of the reclamation areas will help reduce impacts of noise associated with the equipment utilized in the reclamation process.

ScoZinc will control operations and equipment to ensure noise levels are kept within recommended limits for surface mining operations. Mine site noise will be periodically measured at the property boundaries to ensure regulation levels are not exceeded. Should it be required, a sampling program to collect representative noise level data will be undertaken when surface clearing and operations begin.

The nearest residence to the proposed expansion site is approximately 220 m away. Appropriate mitigation to minimize noise levels to reasonable levels will be made. All noise emissions will meet the specifications outlined in the IA, as well as the Guidelines for Environmental Noise Measurement and Assessment, 1990.

Additional noise level monitoring would be required to measure the effects once the expansion process begins. Monitoring stations can be set up at any time through the process should noise complaints arise. Monitoring stations will be set up along the property line as directed by NSE at the IA stage.

5.9 SOCIO-ECONOMIC ENVIRONMENT

5.9.1 EXISTING CONDITIONS

The Southwest Expansion Project is located in Cooks Brook, a small unincorporated community in the Halifax Regional Municipality (HRM) that borders the community of Gays River, Colchester County. This community lies between the larger communities of Middle Musquodoboit, Lantz and Shubenacadie. The population of the surrounding area is described by Nova Scotia Finance, Community Counts to fall within three broad "communities" named, Middle Musquodoboit, Lantz, and Wittenburg. The total population of these three areas is 6816 (2006 Census). About 28% of the population is under 20 years of age and 13% is 65 years of age or older. Population growth between 1996 and 2006 was about 3%. English is spoken by over 99% of the population. The average family income for the area ranges from $56,500 to $67,000 per annum (The more affluent area being Lantz).

Within 2 kilometres of the proposed open pit there are 74 recorded civic addresses. Given the rural/agricultural nature of the area it can be assume that most of these locations are residential. Therefore, within a distance of the open pit the following number of residences can be surmised: 0.5 km – 20; 1 km – 50; 1.5 km – 62, and; 2 km – 74 residences.

The boarder area includes the larger communities of Milford, Shubenacadie, Stewiacke, Elmsdale and Enfield which will also benefit from employment and purchasing at the mine.

In the local areas there is a range of land uses focused on resource based industries such as agriculture, forestry and mining. The mine site is located in an agricultural area that extends from the Musquodoboit Valley north into Colchester County. Agricultural land use accounts for approximately 5 % of the Gays River area. The regional area has a 50 year mining history at the East Milford gypsum open pit mine, large rock quarries at Elmsdale and Coldstream, limestone quarries at Brookfield and Upper Musquodoboit, and Shaw Resources' sand pits at Hardwood Lands and West Indian Road. The area is a mining area.

The regional area is primarily forested with mixed use (mainly residential and small business) located along the secondary roads. Sawmills and a wood pellet manufacturing plant are located near Middle Musquodoboit. Forested lands are

primarily privately owned. Private woodlot owners are a significant source of supply to these facilities. ScoZinc owns about 50% of the property in the Gays River area.

The Southwest Expansion project will use existing public roads that require no upgrading or infrastructure changes such as bridges. The primary route used will be Highway 224 to Upper Musquodoboit and Sheet Harbour for the transport of concentrates from Gays River. Previous operators of the mine used various transportation routes for shipping concentrate including truck, bulk ship, container, and rail. ESSO shipped concentrates out of Dartmouth and Westminer / ScoZinc shipped in containers through Halifax ports.

The expected average daily number of trucks (B-train styled with closed boxes) is 4 which is a small percentage (less than 2%) of the daily truck traffic based on recent data from public sources. Other routes may be examined for concentrate shipments should the Sheet Harbour facility cease to be able to accommodate ScoZinc's needs or during spring weight restriction periods. All provincial 100-series highways do not have the spring weight restrictions and therefore may need to be used depending on concentrate storage capacities and customer requests. This option would not require another storage facility or a spring weight restriction exemption.

5.9.2 POTENTIAL EFFECTS, PROPOSED MITIGATION, MONITORING AND FOLLOW-UP

The effects of the proposed Southwest Expansion project to the local socio-economic conditions will be observable in several key areas.

Local Employment and Economic Activity

The socio-economic impacts of the mine to the local economy will be seen in the creation of available employment, expenditures in the local area for suppliers of fuel, equipment, repair and maintenance services, and trucking. Impacts that require mitigation are reduced residential and land values due to industrial activities. Given the length of the project this would only be a short term outcome of the project, however, a stable employment base in the area may also move to increase land values.

Recreational Activity

Recreational use of the Mine site has been limited in the past by mining activity and the need, due to safety factors, to limit site access to the site. Local residents and others continue to use the areas south of Highway 224 and adjacent to the Gays River for walking, fishing and swimming. The future final land use of the mine site will be determined with input from the local community. After closure of the mine, final

reclamation is intended to return the site to a condition that reflects the surrounding landscape. Disturbed areas will be regraded and revegetated and all buildings will be removed or put to other use. Flooding of the open pit should provide new opportunities for recreation, previously unavailable in this area.

Visual Impacts

Effects to visual quality of the local area that result from construction, operation, de-commissioning and reclamation of the Southwest Expansion area include changes to the short term and long term viewscapes in the local area. The roadways, buildings, open pit, tailings management facility and south stockpiles are already in existence and there will be no change in the visual environment related to these items, with the exception of continued use of the South stockpile. The resultant landscape will mimic the existing rolling hill topography with variety of cover (grass, trees, etc.).

The wastepile digital terrain models and associated images shown in figures 5.9-1 to 5.9-4 were created by combining available LIDAR data, mine pit design details, orthographic aerial imagery, National Topographic Service maps and other historical data. All of the existing data was combined utilizing the latest version of Civil3D and various other data manipulation programs. The criteria for the design of the wastepiles, including footprint, sideslopes, height, setbacks and drainage were established based on waste volume requirements, reclamation plan, current and proposed environmental assessment and approvals, land ownership constraints and stakeholder input. Basic configuration includes:

- 30 m setback from Gays River
- 2.25:1 sideslopes
- 20 m setback from the final pit
- 55 m and 88 m top elevations for the north and south wastepiles respectively
- irregular footprint to improve natural aesthetics of final piles

The visuals were taken from the following general locations (Figure 5.9-1), from 1.5 m above existing ground level at the associated location:

- Viewpoint A from Hwy 224 – Looking east
- Viewpoint B from Richard Dexter's farm – Looking west
- Viewpoint C from Intersection of Coldstream Rd and Hwy 224

Land Use

Mining operations often involved changing the land use of an area. In some cases a new mine will require lands that may have been publicly used for recreation, agriculture or other purposes. These lands would be needed for stockpile locations, within the ore body or other mine infrastructure. In the case of the lands needed for the Southwest Expansion project the existing land use is confined to two types: forestry (by past operators of the mine and by private landowners) and mine related operations from past operators (stockpiles, roads, borrow pits). The majority of the lands are already owned by the proponent and discussions are ongoing with third parties to secure all the required lands through purchase or lease. During the various operations and idle periods at the mine site public access was restricted for safety reasons so that public use of the lands has not occurred, with permission of the owner, since before the facility was originally developed in the 1970s. Therefore the proposed Southwest Expansion project will have little affect on local land use.

5.10 OTHER PROJECTS IN THE AREA

5.10.1 EXISTING CONDITIONS

The proponent is aware of several existing and planned mining operations within 20 km of the site. National Gypsum Canada Ltd. owns and operates the largest open-pit gypsum quarry in the world at Milford Station, approximately 5 km from the Project site. Tusket Mining Limited owns a gypsum deposit at Murchyville. That site, approximately 15 km from the Project area, is completely permitted but currently under care and maintenance.

Beyond 20 km there are numerous gold deposits (former producers) that are in various stages of exploration and development. Atlantic Gold NL is in the process of developing the Touquoy Gold Project at Moose River Gold Mines, approximately 30 km from Gays River. The Touquoy project has received Environmental Assessment Approval and completed a detailed feasibility study.

Significant adverse Project-related effects in conjunction with other undertakings in the area are not likely to occur, assuming the effective application of mitigative measures as outlined in this document.

6.0 EFFECTS OF THE PROJECT ON THE ENVIRONMENT

Activities associated with the proposed mine expansion and operation will be conducted in accordance with terms and conditions of the EA and existing or amended IA.

Environmental effects will include the loss of some habitat within the proposed Southwest Expansion Area. The expansion area has been the subject of past agricultural, deforestation and some mine related activities. Field surveys conducted to date indicate that this area does not include listed rare or sensitive species; therefore, these effects are not anticipated to be significant.

The Gays River acts as a natural barrier between the mine and surrounding homes. While some homes are located within 800 m of mine activities, all homes are located across the River from the site. Localized impacts on air quality can be expected through the formation of airborne particulate matter. These impacts are readily controlled through standard mitigative measures (e.g., dust suppression) and follow-up monitoring as necessary. Blasting will be conducted on a set schedule and blasting will be monitored as per provincial and federal regulations. Mitigative measures for blasting may include pre-blast condition surveys of homes within 800 m of mining activity.

Assuming the mitigative measures specified in this report are implemented, and the mine is operated according to existing provincial guidelines and approvals, no significant adverse residual environmental or socio-economic effects are likely. Continued operation of the mine will result in economic benefits, including employment and ongoing business opportunities for local suppliers.

7.0 EFFECTS OF THE ENVIRONMENT ON THE PROJECT

Environmental effects often include any change to the project that may be caused by the surrounding environment. Discussions on potential environmental effects on the Project are usually limited to climate and meteorological conditions. Precipitation and runoff may cause temporary delays in mine construction, operation, and reclamation activities. Projected severe weather events caused by climate change may also hamper operational activity. Climate change is more likely to affect projects with much longer durations, however, legacy systems, such as reclaimed tailings may be affected by future severe weather events if not planned for properly.

Nationally, Canada has been in a warming trend (1.1º C) since 1895, however, in Atlantic Canada, the warming peaked in the 1950s followed by a cooling trend to the 1990s with an overall trend increase of 0.4º C since 1895. The Atlantic Region does show an overall increase in precipitation since 1948, an increase in the number of daily precipitation events above 20 mm and a slight increase in the number of snowfall events above 15 cm (Lewis 1997).

There are a number of planning, design, and construction strategies intended to minimize the potential effects of the environment on the Project so that the risk of damage to the Project or interruption of service can be reduced to acceptable levels. Mitigation measures include, but are not limited to, designing and installing erosion and sediment control structures to accommodate appropriate levels of precipitation, and considering weather conditions when scheduling activities, including scheduling of activities to accommodate weather interruptions. All Project activities are conducted out-of-doors and thus weather has been and will be factored into all Project phases and activities. The project is intended to operate twelve months of the year. Heavy snowfalls and accumulation may force temporary closure of operations.

Climate and meteorological conditions, including climate change, are not anticipated to significantly affect the operation of the mine over its lifetime. Short period events, *e.g.* heavy rainfall, blizzards or thunder storms, may temporarily shut down operations for safety reasons. This has occurred during previous operations and production was able to safely resume in a short period of time.

Earthquakes are mapped by the Natural Resources Canada. Only 19 quakes with a maximum magnitude (M) of 3.2 (near Bridgewater in 2007) have been recorded in Nova Scotia in the last 5 years. No significant earthquakes ($M < 5.0$) have occurred in Nova Scotia between 1600 and 2006 (Lamontange et al 2008). There is, therefore, little likelihood of earthquakes being an effect on the project.

Wildfires are limited in Nova Scotia but there is the potential for this to affect the project. The Mill and Administration building have fire protection and mobile equipment has many options to re-locate to areas where no combustible vegetation is within 100 metres if a forest fire threat occurs.

Flooding of the Gays River occurs on during seasonal high flows but has not historically affected operations at the site for the surface mine operations. A flood control dyke is in place for low lying areas between the river and Main Pit. Flood risks for the Southwest Expansion Project are reduced since the operations are farther from the Gays River.

The regional area has karst potential, and karst features (*i.e.* sinkholes) have been documented on the site. The project area has been heavily drilled (core) during advanced exploration programs over the years and any unseen or underground karst features should be well documented from that process. For areas that may be not well documented within the project footprint, several techniques, including drilling and ground penetrating radar, may reveal any karst features that exist.

8.0 OTHER APPROVALS REQUIRED

The Proponent is required to register this Project as a Class I Undertaking pursuant to the Nova Scotia Environment Act and Environmental Assessment Regulations. Other relevant provincial regulations include the Activities Designation Regulations, which requires an amendment to the existing Industrial Approval from Nova Scotia Environment for expansion of the zinc / lead mining operation, as well as approval to alter wetlands; and the General Blasting Regulations made pursuant to the Nova Scotia Occupational Health and Safety Act (1996). The project may require an additional, or amendment to the existing, Mineral Lease to include the proposed area. If gypsum should be produced for sale, the project will require a Non-Mineral Registration under the M*ineral Resources Act*. New or amended water withdrawal permits may also be required.

No municipal approvals are required.

There are no known requirements for an environmental assessment under the Canadian Environmental Assessment Act (CEAA) associated with the proposed Southwest Expansion. No federal land or funding is required for the Project. There are no requirements for federal permits or authorizations under the CEAA Law List Regulation currently projected.

9.0 FUNDING

This project will be totally funded by ScoZinc. No federal or provincial funding is required.

10.0 ADDITIONAL INFORMATION

No additional information is provided in support of this document.

11.0 REFERENCES

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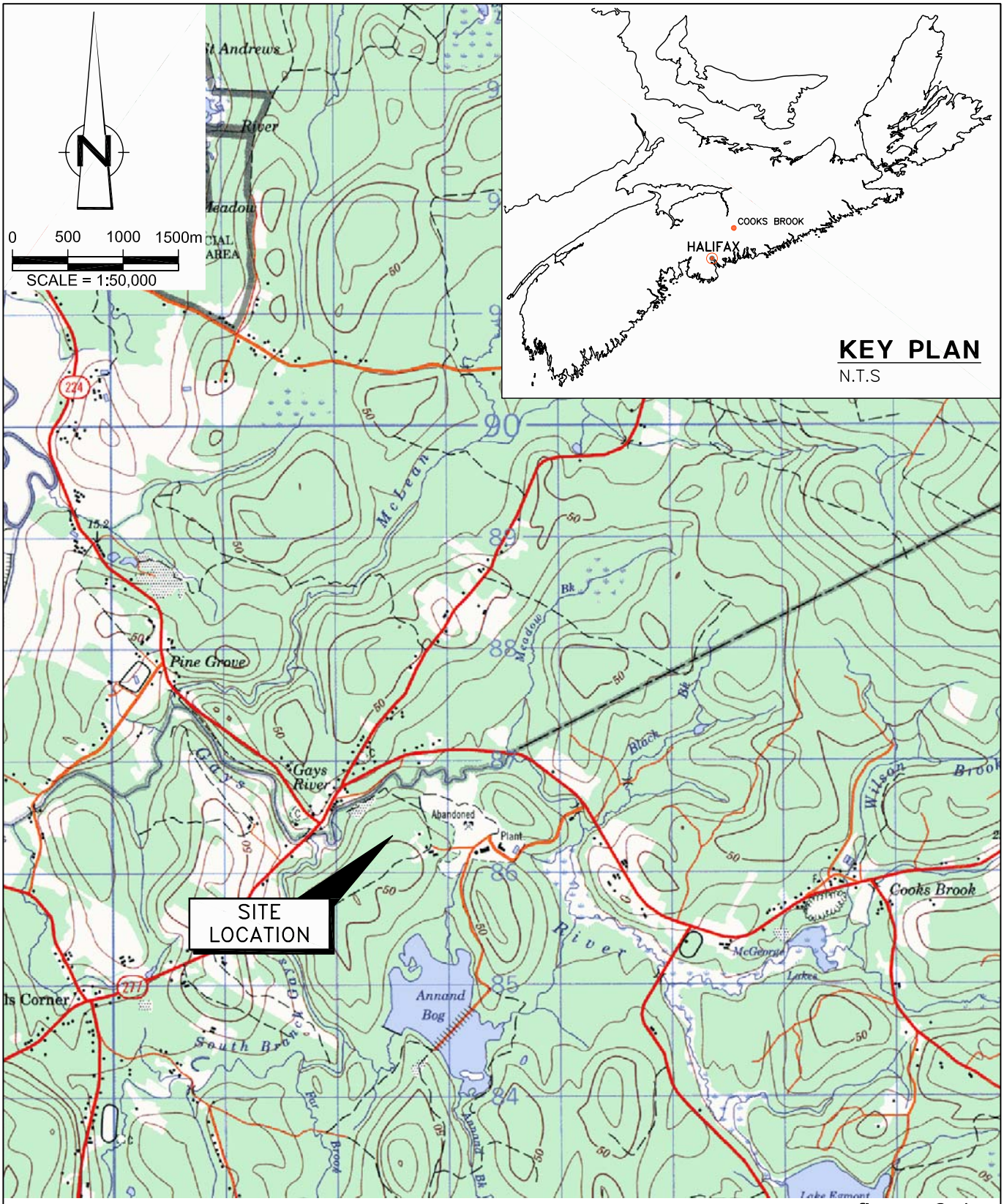
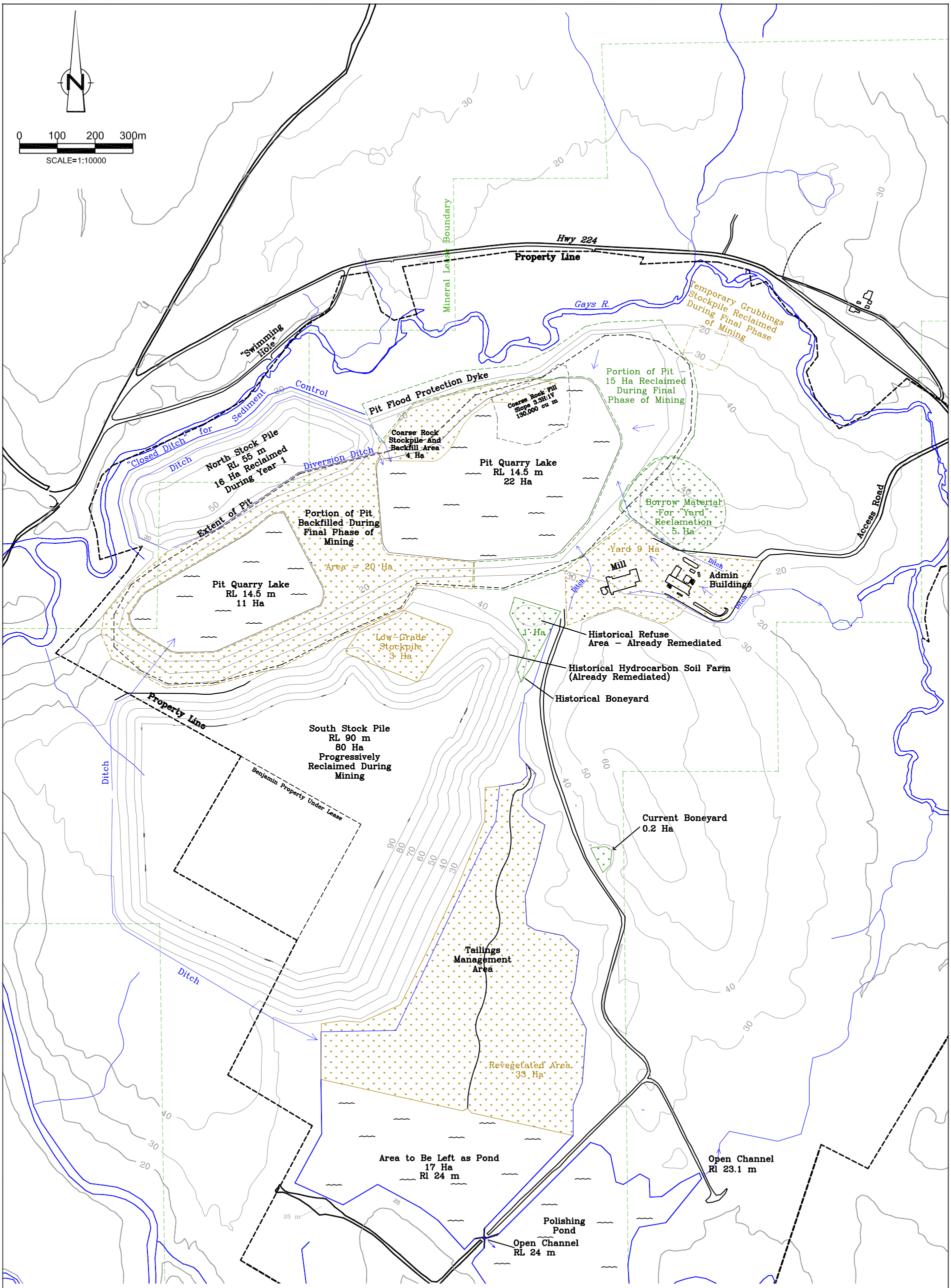


figure 2-1

SITE LOCATION
SCOZINC OPERATIONS
SCOZINC LIMITED
Cooks Brook, Nova Scotia

074320 GN-DA002-1 JULY 05/2011



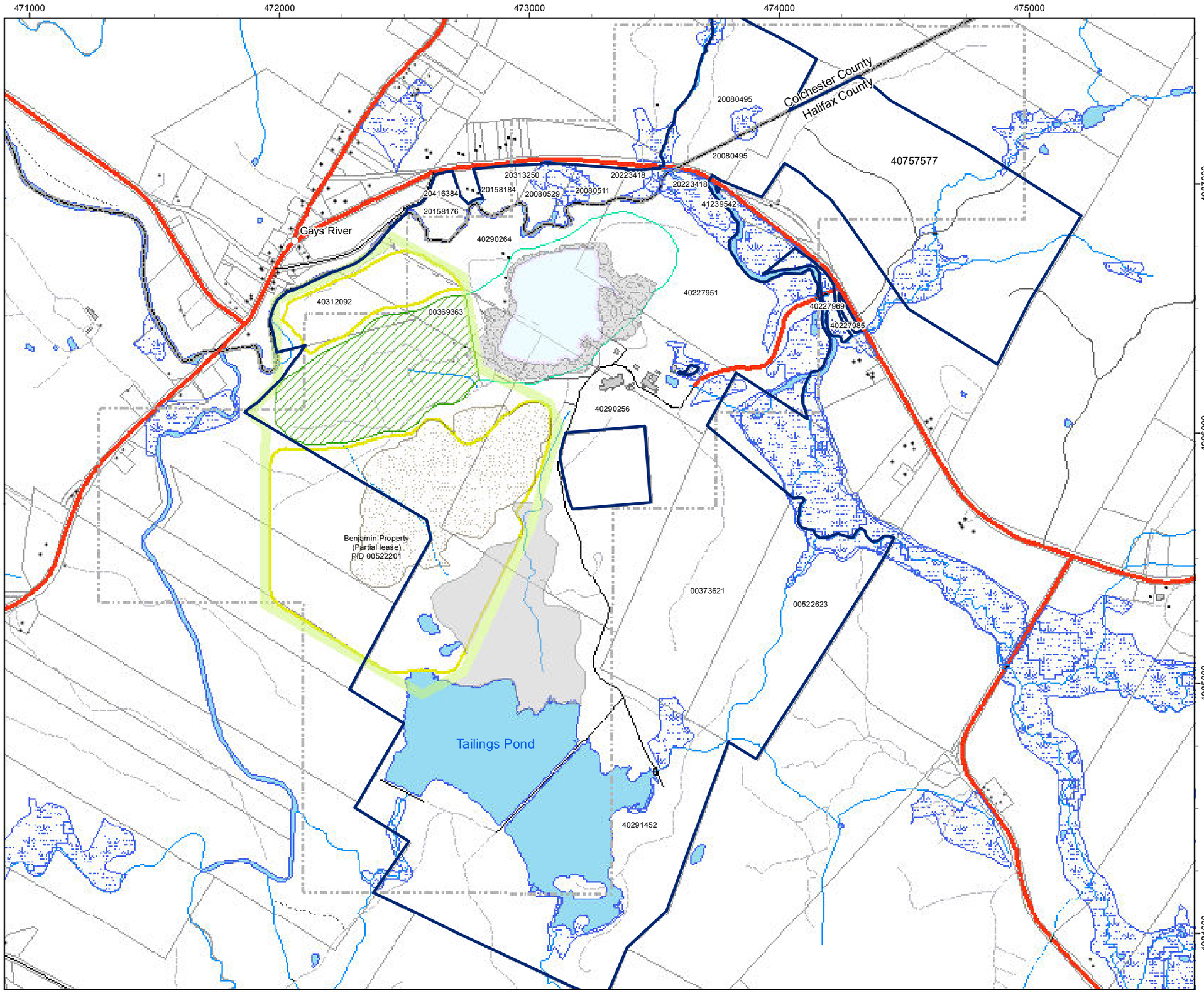
Legend:
- Property Line
- Contour Line
- Mineral Lease Outline
- Water

Scale: 1:10,000 (Check Bar Scale)
Site Grid.
Dimensions in metres.
Contour interval = 10 metres.

Pit and waste pile design by Allnorth.
Surrounding contours and site plan by Doug Roy, P.Eng., MineTech.

figure 2-2

RECLAMATION CONCEPTUAL PLAN
SCOZINC OPERATIONS
SCOZINC LIMITED
Cooks Brook, Nova Scotia



LEGEND:

- ScoZinc Limited Property
- Property

Site Features

- Water-Filled Pit
- Current South Stockpile
- Tailings Beach
- Extent of Existing Pit
- Project Footprint
- Existing Permitted Pit
- Southwest Expansion Pit
- Stockpiles
- Mineral Lease 10-1
- Buildings
- Buildings
- Local Road
- Loose Surface
- Seasonal Dry Weather
- Driveways
- Track
- Trail
- Abandoned
- Bridge
- Culvert

SOURCE:

Base Map : SNS&MR
Property : SNS&MR

0 125 250 500 750 1,000
Metres

N

PROJECTION:	DRAWN / CHECKED BY:	MAP ANGLE:
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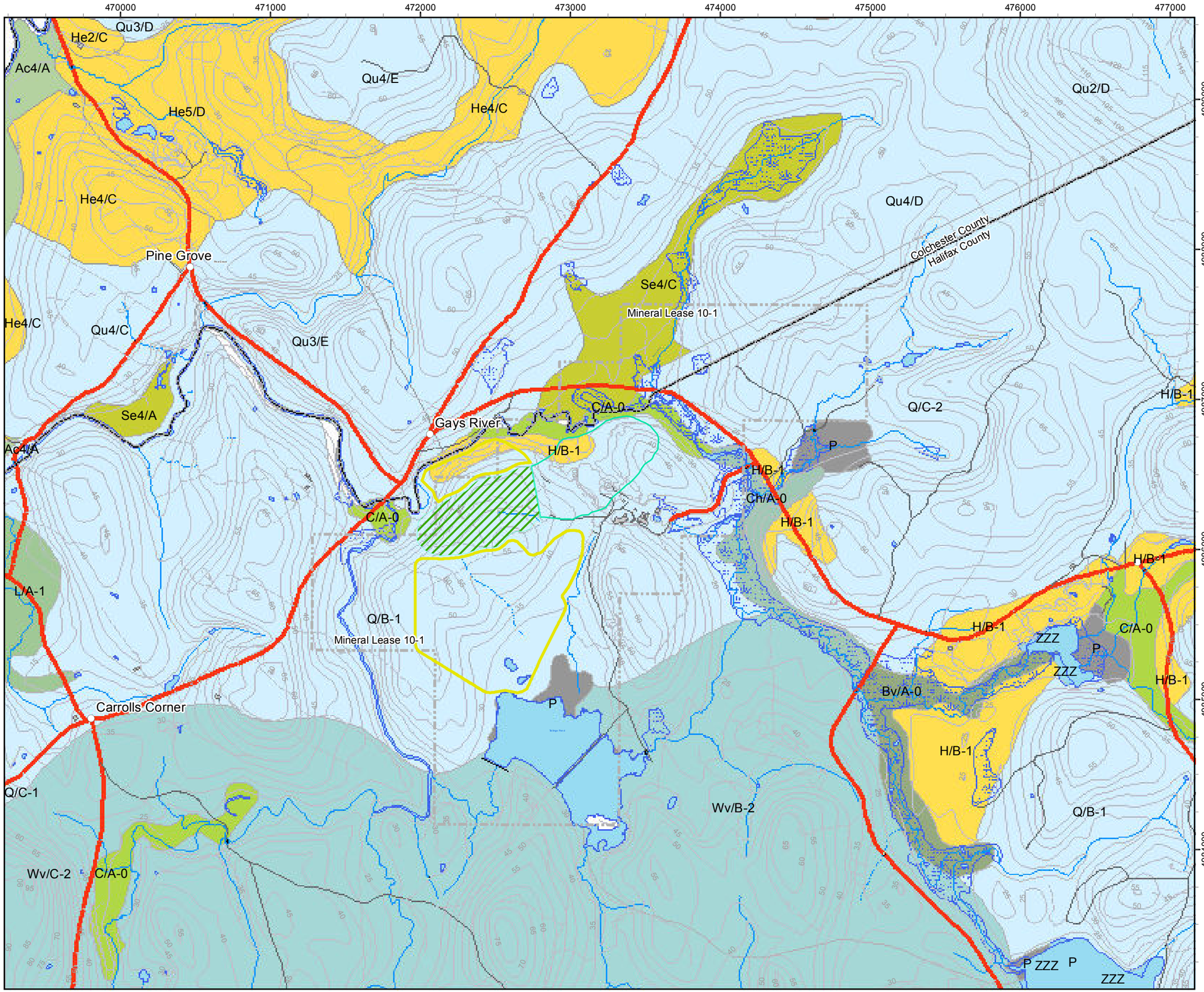
SCALE:	**DATE:**	**PROJECT NO:**
1:15,000	July 4, 2011	052000

074320(02) GIS-DA031-1_Project Scope.mxd

figure 3.1-1
PROJECT SCOPE
SCOZINC OPERATIONS
SCOZINC LIMITED
Cooks Brook, Nova Scotia

CONESTOGA-ROVERS & ASSOCIATES



LEGEND:

Regional Soils

- Acadia (Ac)
- Bridgeville (Bv)
- Chaswood (Ch)
- Cumberland (C)
- Fash (Fs)
- Hebert (He or H)
- Lawrencetown (L)
- Peat (P)
- Queens (Qu or Q)
- Stewiacke (Se)
- Wolfville (Wv)
- Water
- Existing Permitted Pit
- SW Expansion Pit
- Stockpiles
- Contours (5m)

Soil Series - Drainage Qu4
Slope - Stoniness D-1

Slope		Drainage
Colchester Co.		2 - Moderately well drained
A - Level	0 - 0.5%	4 - Imperfectly drained
B - Nearly Level	0.5 - 2	
C - Very Gentle	2 - 5	
D - Gentle	5 - 10	
E - Moderate	10 - 15	
Halifax Co.		Stoniness
A - Level	0 - 2 %	0 - Stone free
B - Undulating	3 - 8	1- Slightly stony
C - Rolling	9 - 16	2 - Moderately stony
		3 - Very Stony
		4 - Excessively stony

SOURCE:

Base Map : SNS&MR
Soils: Agriculture and Agri-Food Canada

0 125 250 500 750 1,000
Metres

N

PROJECTION:	DRAWN / CHECKED BY:	MAP ANGLE:
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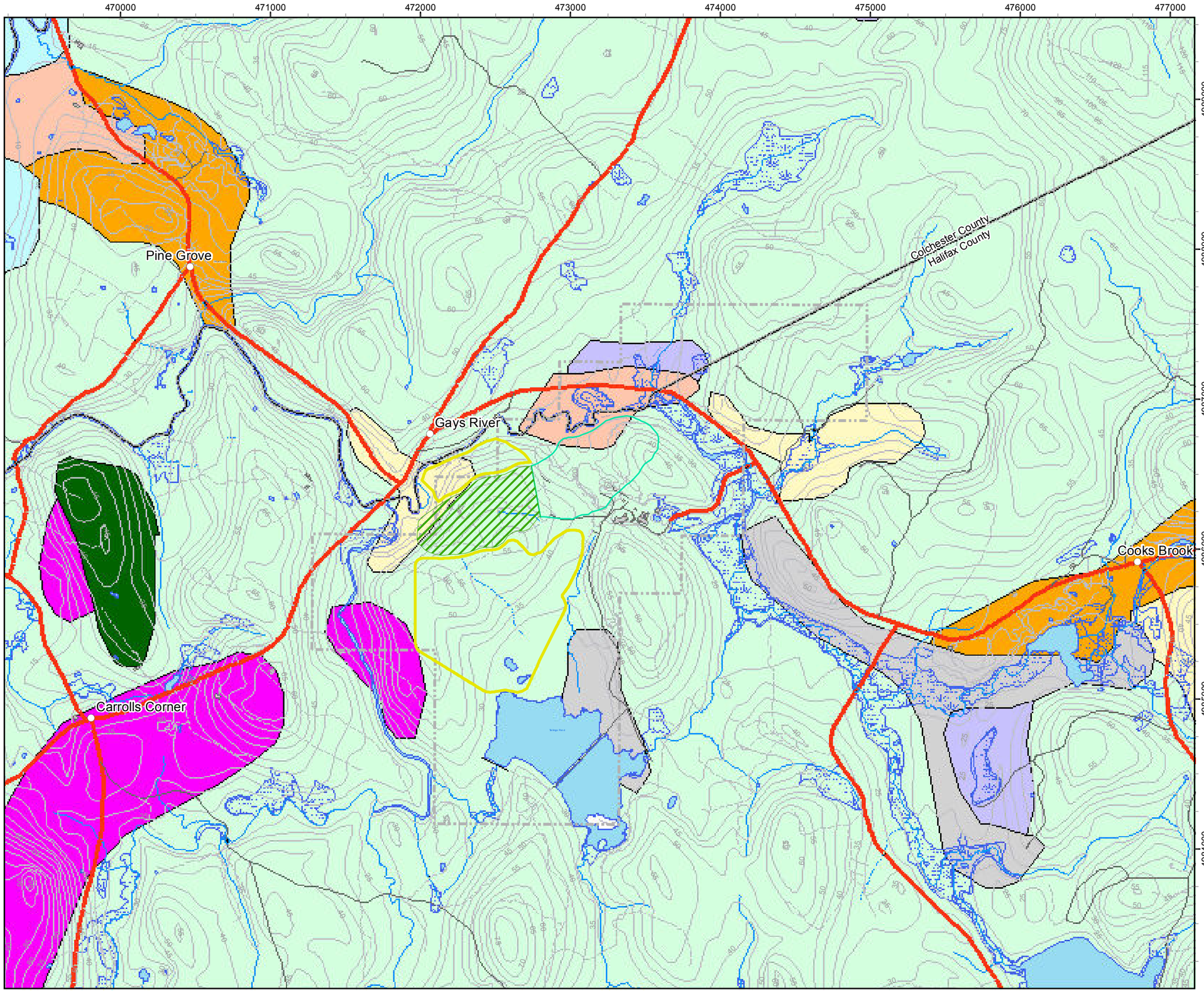
SCALE:	**DATE:**	**PROJECT NO:**
1:25,000 /	June 7, 2011	074320

074320(02) GIS-DA051-1_Regional Soils.mxd

figure 5.1-1
REGIONAL SOILS
SCOZINC OPERATIONS
SCOZINC LIMITED
Cooks Brook, Nova Scotia

CONESTOGA-ROVERS & ASSOCIATES



LEGEND:

Surficial Deposits

- Organic Deposits
- Alluvial Deposits
- Marine Deposits
- Glaciolacustrine Deposits
- Glaciofluvial Deposits (Outwash Fans)
- Glaciofluvial Deposits (Kames and Eskers)
- Silty Till Plain (Ground Moraine)
- Silty Drumlin (Drumlin Facies)
- Bedrock
- Mineral Lease 10-1
- Existing Permitted Pit
- SW Expansion Pit
- Stockpiles
- Contours (5m)

SOURCE:

Base Map : SNS&MR
Surficial Geology: NSDNR

0 125 250 500 750 1,000
Metres

N

PROJECTION:	DRAWN / CHECKED BY:	MAP ANGLE:
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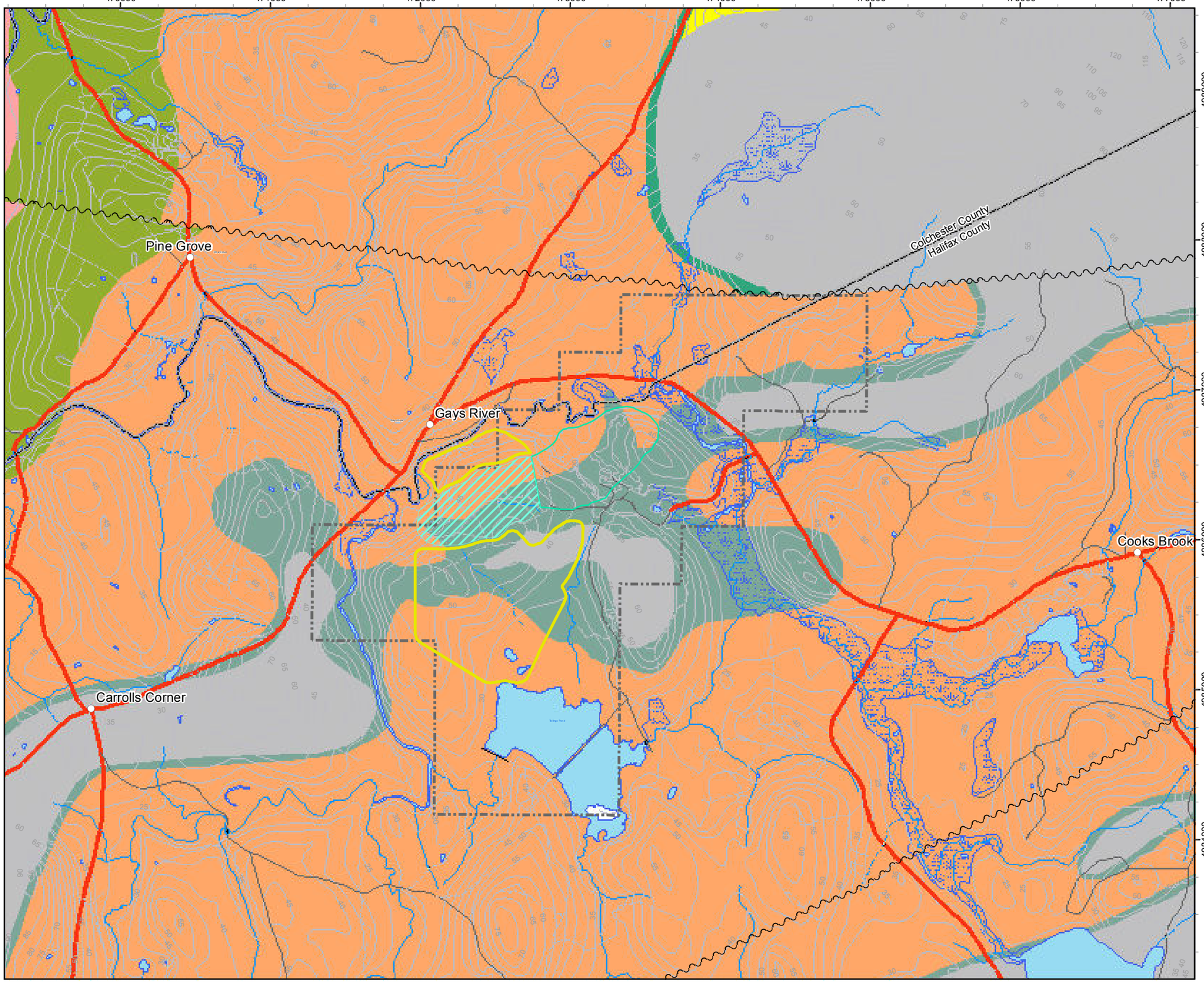
1:25,000 /	June 7, 2011	074320

074320(02) GIS-DA051-2_Surficial Geology.mxd

figure 5.1-2
SURFICIAL DEPOSITS
SCOZINC OPERATIONS
SCOZINC LIMITED
Cooks Brook, Nova Scotia

CONESTOGA-ROVERS & ASSOCIATES



LEGEND:

Geology

- Green Oaks Formation
- MacDonald Road Formation
- Carrolls Corner Formation
- Gays River Formation
- Undivided Gays River and Macumber formations
- Coldstream Formation
- Halifax and Goldenville Formations

Faults

- approximate fault, probable

- Mineral Lease 10-1
- Existing Permitted Pit
- Southwest Expansion Pit
- Stockpiles
- Contours (5m)

SOURCE:

Base Map : SNS&MR
Geology: NSDNR DP ME 20 v2, 2006

0 125 250 500 750 1,000
Metres

N

PROJECTION:	DRAWN / CHECKED BY:	MAP ANGLE:
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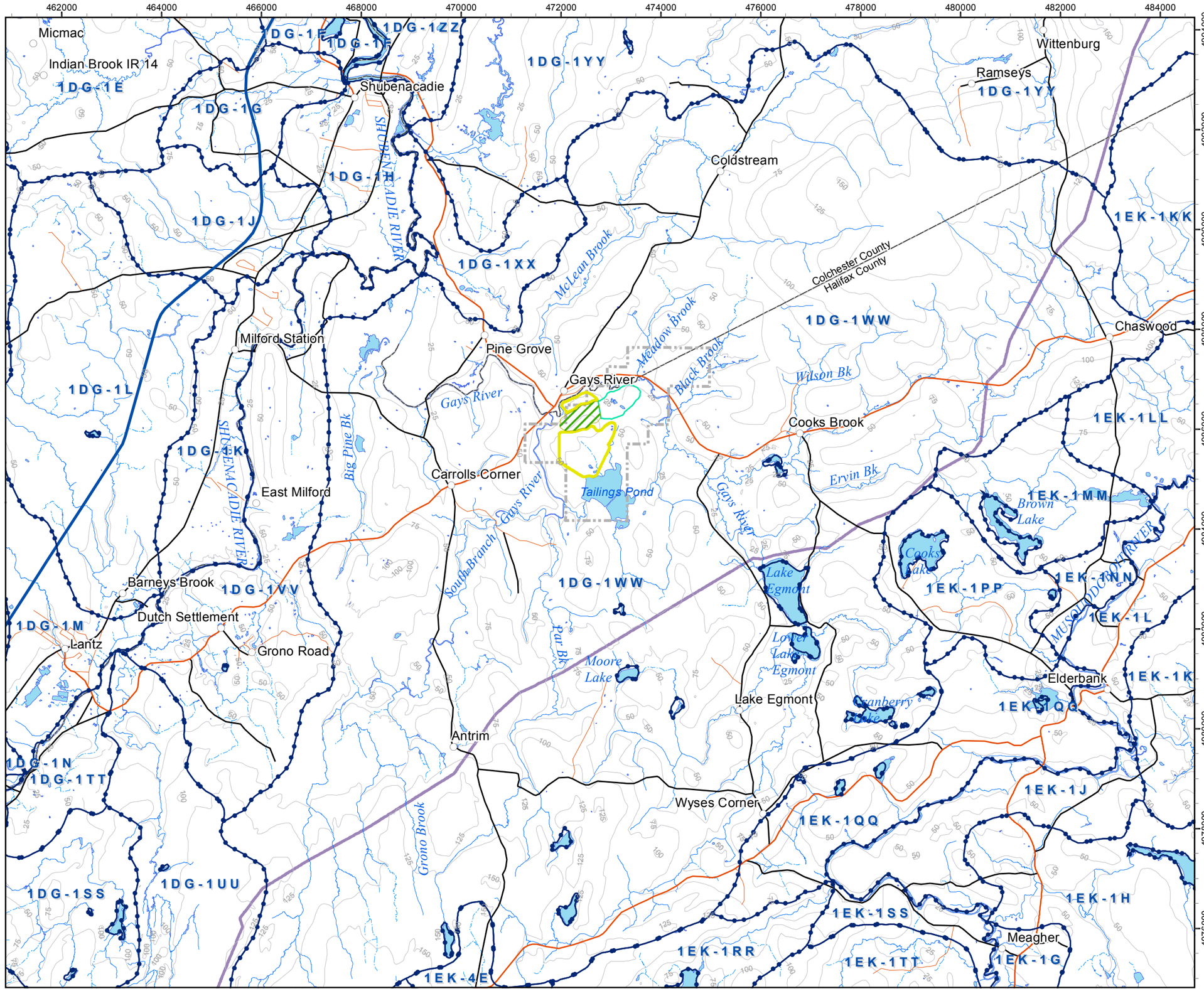
SCALE:	**DATE:**	**PROJECT NO:**
1:25,000 /	June 7, 2011	074320

074320(02) GIS-DA051-3_Bedrock Geology.mxd

figure 5.1-3
BEDROCK GEOLOGY
SCOZINC OPERATIONS
SCOZINC LIMITED
Cooks Brook, Nova Scotia

CONESTOGA-ROVERS & ASSOCIATES



LEGEND:

- Watershed Boundaries
- Mineral Lease 10-1
- Existing Permitted Pit
- SW Expansion Pit
- Stockpiles
- Contours (25m)
- Lakes,
- Stream
- Stream (approximate)
- Natural Gas Pipeline

Watershed Area : 1DG-1WW = 20,205 ha

SOURCE:

Base Map : SNS&MR
Watershed boundaries NS Environment

0 0.5 1 2 3 4
Kilometres

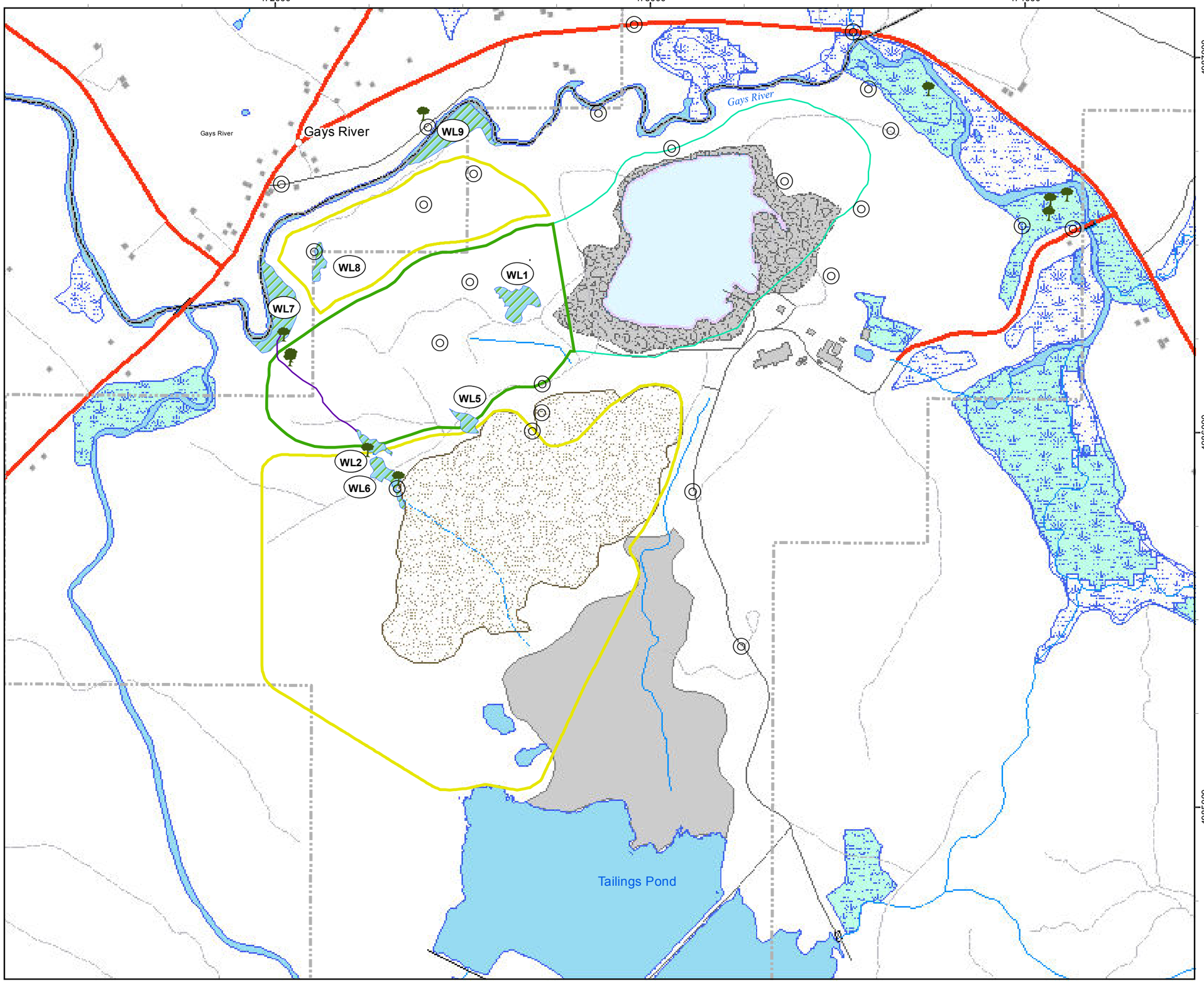
N

PROJECTION:	DRAWN / CHECKED BY:	MAP ANGLE:
UTM z20 NAD83	JJP /	0° North
SCALE:	**DATE:**	**PROJECT NO:**
1:75,000 /	July 4, 2011	074320

074320(02) GIS-DA052-1_Surface Water.mxd

figure 5.2-1
SURFACE WATER RESOURCES
SCOZINC OPERATIONS
SCOZINC LIMITED
Cooks Brook, Nova Scotia

CONESTOGA-ROVERS & ASSOCIATES



LEGEND:

- Water-Filled Pit
- Current South Stockpile
- Tailings Beach
- Extent of Existing Pit
- Mature Forest Stands
- Avian Point Count Sites
- Drainage swale
- Field Identified Wetlands
- Mineral Lease 10-1
- Existing Permitted Pit
- Southwest Expansion Pit
- Stockpiles

SOURCE:

Base Map : SNS&MR
Geology: NSDNR DP ME 20 v2, 2006

0 50 100 200 300 400
Metres

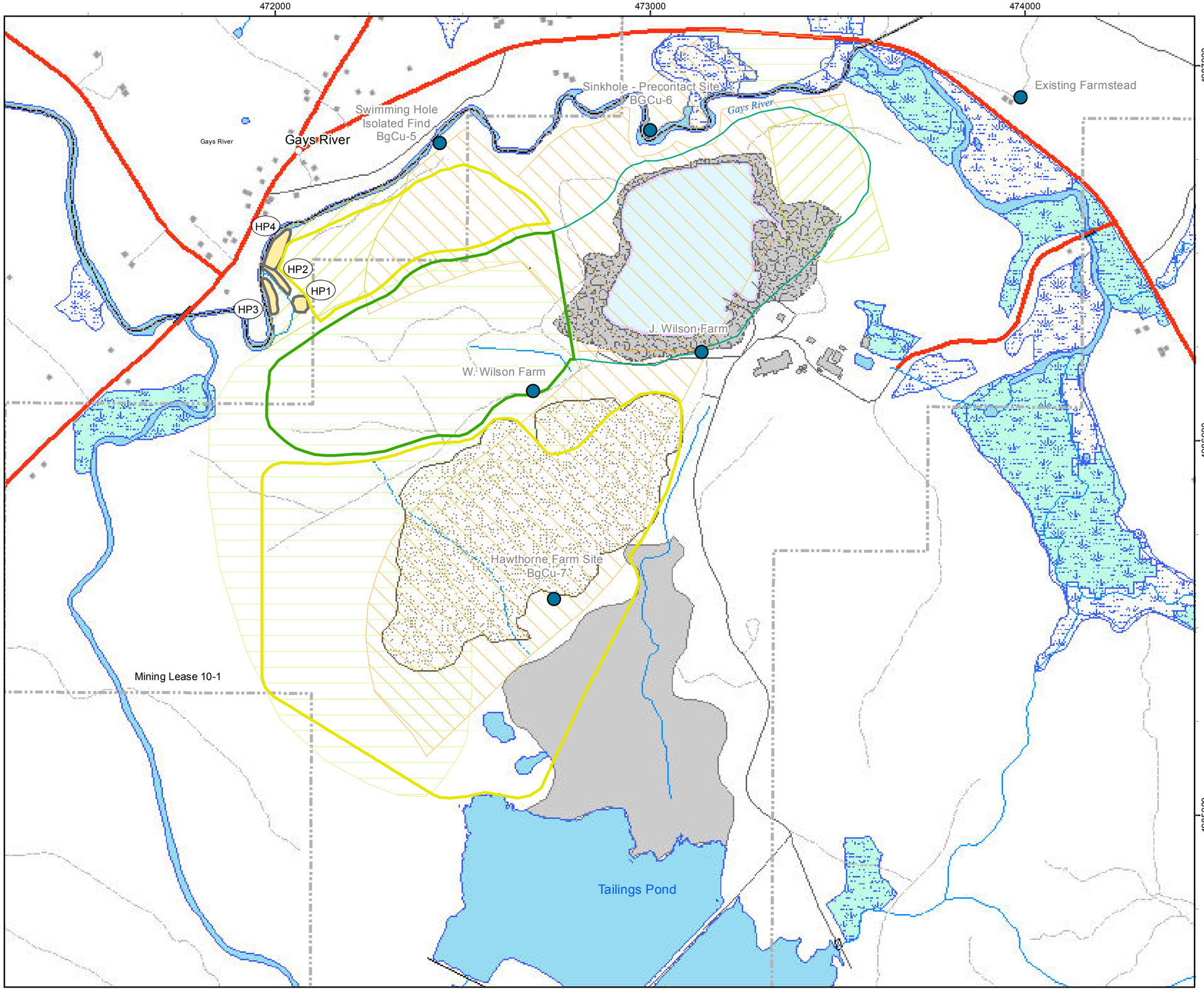
N

PROJECTION:	DRAWN / CHECKED BY:	MAP ANGLE:
UTM z20 NAD83	JJP /	0° North
SCALE:	**DATE:**	**PROJECT NO:**
1:10,000 /	July 4, 2011	074320

074320(02) GIS-DA054-1_Biolgical Studies.mxd

figure 5.4-1
FLORA, FAUNA & WETLANDS
SCOZINC OPERATIONS
SCOZINC LIMITED
Cooks Brook, Nova Scotia

CONESTOGA-ROVERS & ASSOCIATES



LEGEND:

Archaeological Studies

- 1998 Study Area
- 2006 Study Area
- 2011 Study Area
- Archaeological Sites & Features
- High Archaeological Potential
- Mineral Lease 10-1
- Existing Permitted Pit
- Southwest Expansion Pit
- Stockpiles
- Water-Filled Pit
- Current South Stockpile
- Tailings Beach
- Extent of Existing Pit

SOURCE:

Base Map : SNS&MR
Archaeology: CRM Group

0 50 100 200 300 400
Metres

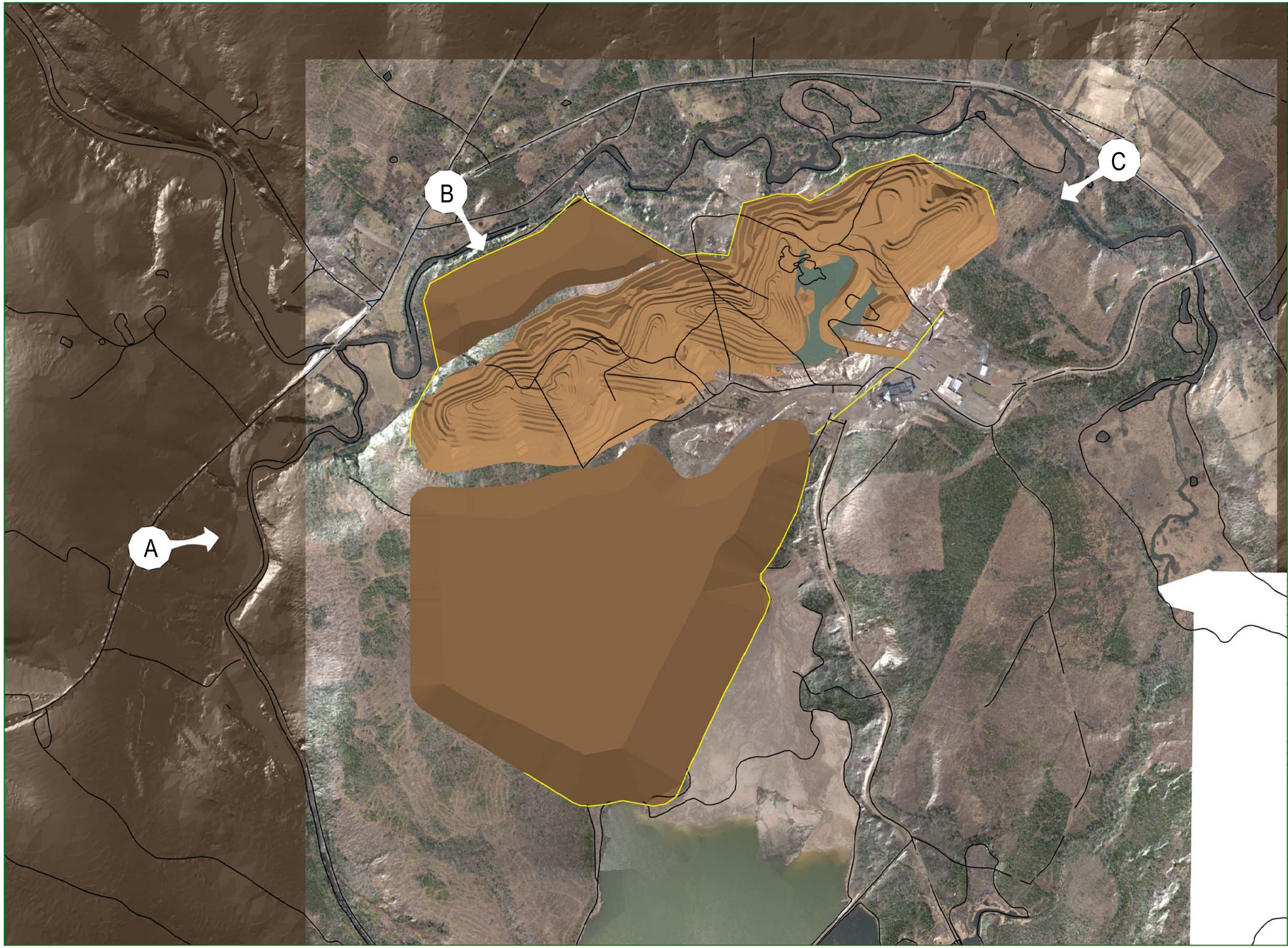
N

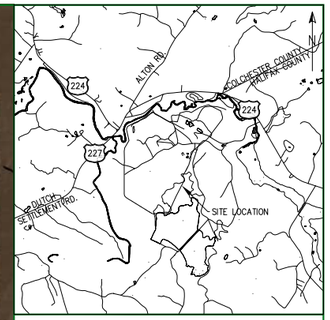
PROJECTION:	DRAWN / CHECKED BY:	MAP ANGLE:
UTM z20 NAD83	JJP /	0° North
SCALE:	**DATE:**	**PROJECT NO:**
1:10,000 /	July 4, 2011	074320

074320(02) GIS-DA056-1_Arch Studies.mxd

figure 5.6-1
ARCHAEOLOGICAL STUDIES
SCOZINC OPERATIONS
SCOZINC LIMITED
Cooks Brook, Nova Scotia

CONESTOGA-ROVERS & ASSOCIATES





KEYPLAN
SCALE : 1:100000

VIEWPOINT A:
LOOKING TOWARDS SCOZINC MINE SITE FROM HIGHWAY 224. FOCAL LENGTH IS 17mm AT A HEIGHT ABOVE GROUND OF 1.5m.

COORDINATES (NAD83 – UTM ZONE 20)
N: 4985769.000
E: 471233.000

VIEWPOINT B:
LOOKING TOWARDS SCOZINC MINE SITE FROM HIGHWAY DEXTER PROPERTY ALONG HIGHWAY 227. FOCAL LENGTH IS 17mm AT A HEIGHT ABOVE GROUND OF 1.5m.

COORDINATES (NAD83 – UTM ZONE 20)
N: 4986854.000
E: 473951.000

VIEWPOINT C:
LOOKING TOWARDS SCOZINC MINE SITE FROM THE INTERSECTION OF HIGHWAY 224 AND HIGHWAY 227. FOCAL LENGTH IS 17mm AT A HEIGHT ABOVE GROUND OF 1.5m.

COORDINATES (NAD83 – UTM ZONE 20)
N: 4986766.000
E: 472064.000

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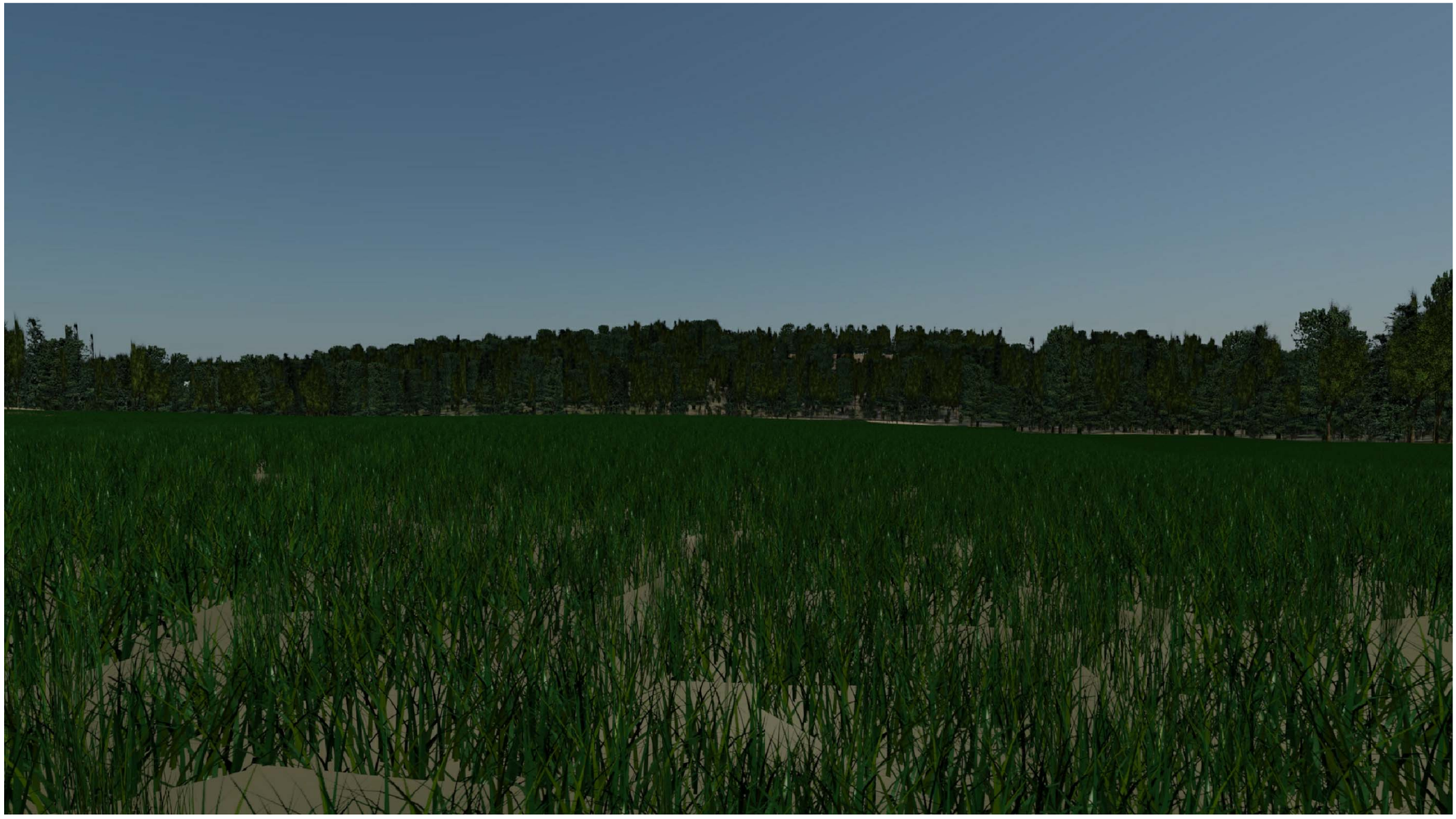
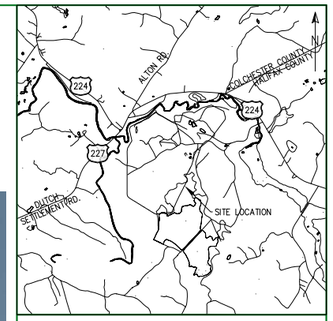
PROJECT:
SCOZINC MINE
GAY'S RIVER
NOVA SCOTIA

TITLE:
FIGURE 5.9-1
VIEWPOINT LOCATIONS

DWG. NO.:	REV:
11HF0044-101-001	1

2011/08/08 C:\Users\Alex\Desktop\020811 - ScoZinc\11hf0044_030811.dwg





KEYPLAN
SCALE : 1:100000

REV	YY/MM/DD	DESCRIPTION	DR	APP
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0	11/08/03	ISSUED FOR INFORMATION	ABB	CSF

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SCALE:	N.T.S.	APPD BY: CSF	DATE: 11/08/03

PROJECT:

SCOZINC MINE
GAY'S RIVER
NOVA SCOTIA

TITLE:

FIGURE 5.9-2
EXISTING CONDITIONS
FROM VIEWPOINT A

DWG. NO.:	REV:
11HF0044-VP-A-001	1

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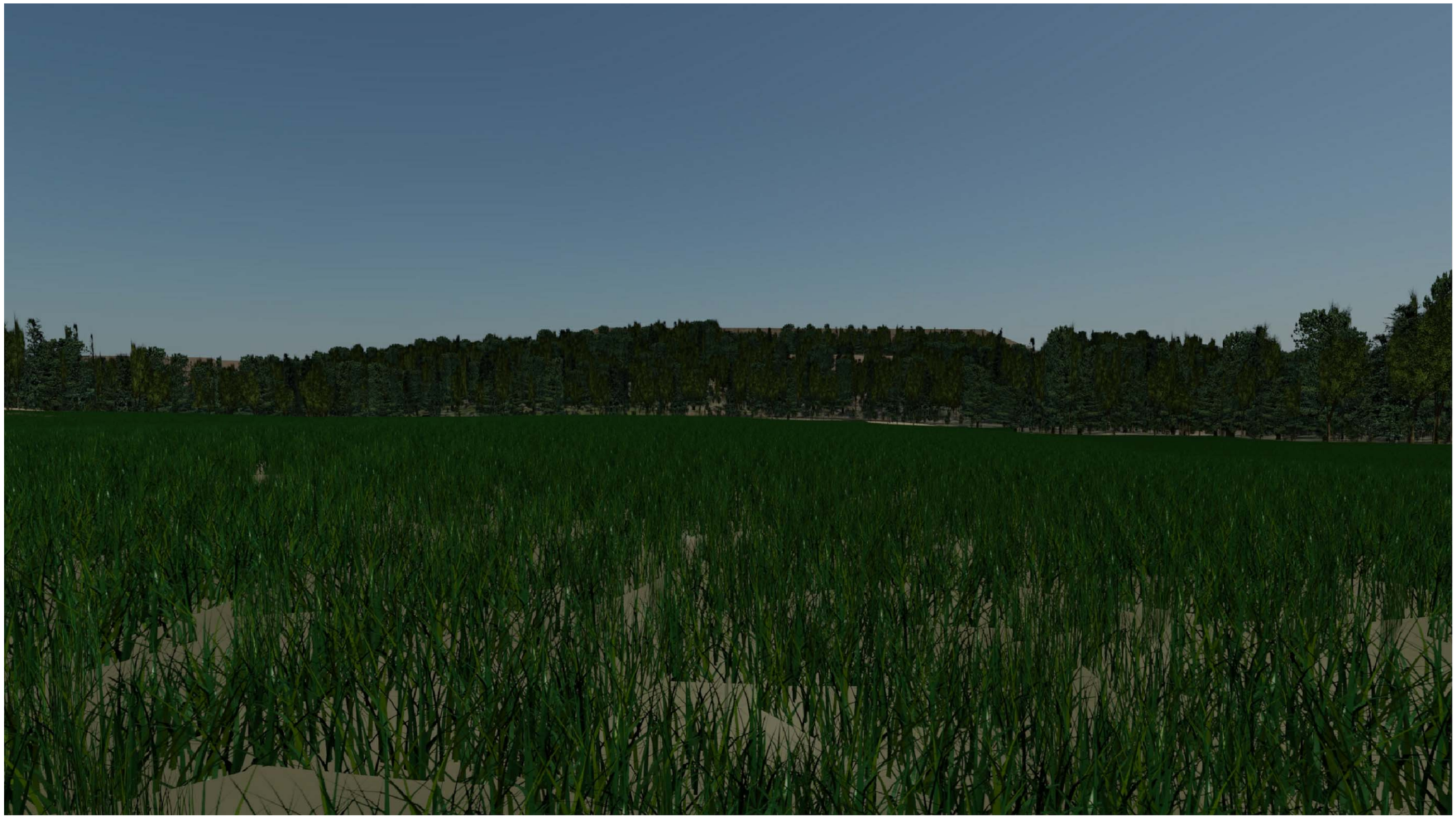

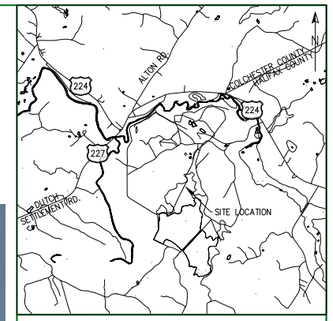

KEYPLAN
SCALE : 1:100000

REV	YY/MM/DD	DESCRIPTION	DR	APP
1	11/08/08	UPDATED FIGURE NUMBERING	ABB	CSF
0	11/08/03	ISSUED FOR INFORMATION	ABB	CSF

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SCALE: N.T.S.	APPD BY: CSF	DATE: 11/08/03

PROJECT:

SCOZINC MINE
GAY'S RIVER
NOVA SCOTIA

TITLE:

FIGURE 5.9-3
PHASE 3 – POST CONSTRUCTION
FROM VIEWPOINT A

DWG. NO.:	REV:
11HF0044-VP-A-002	1

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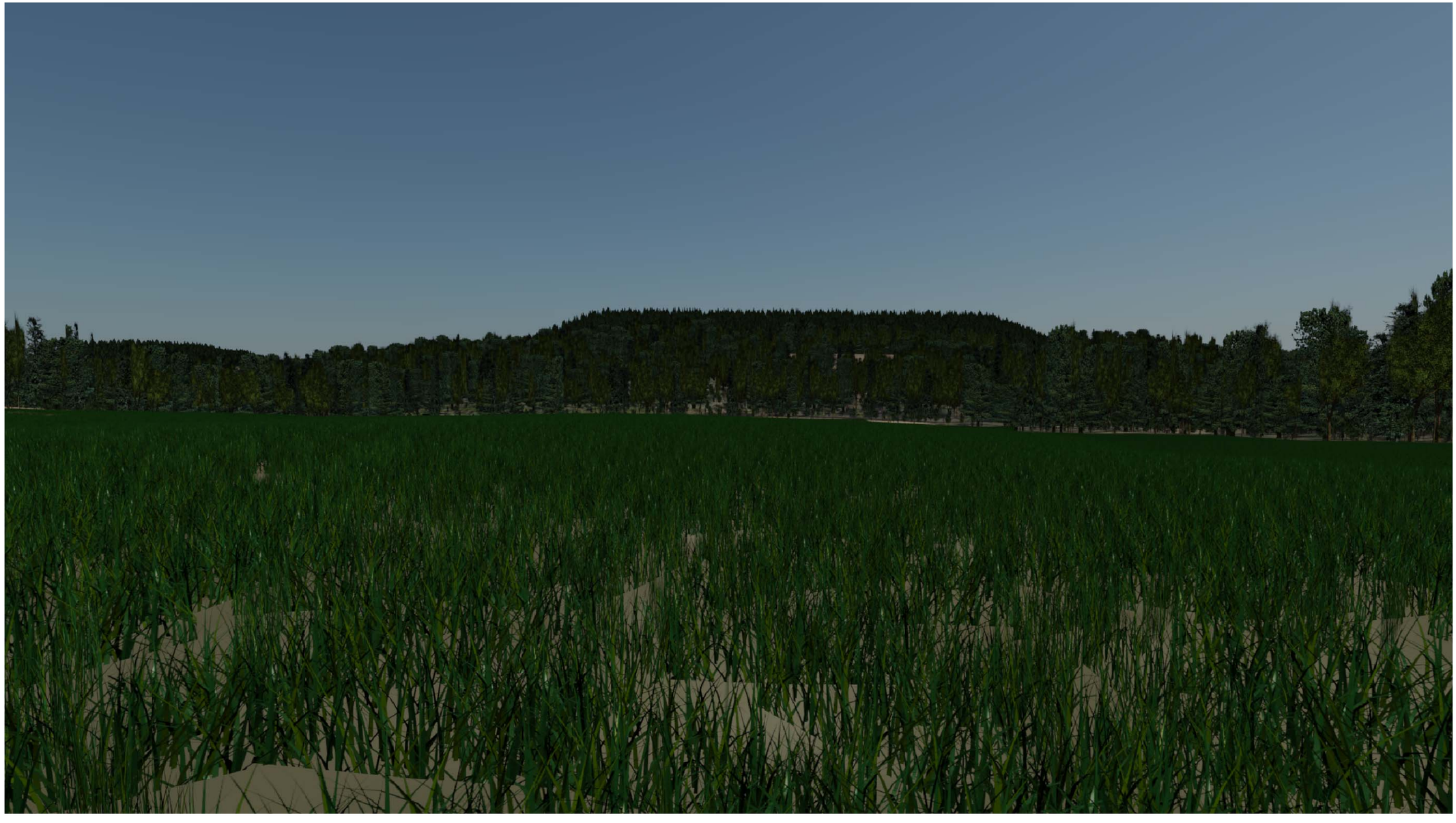

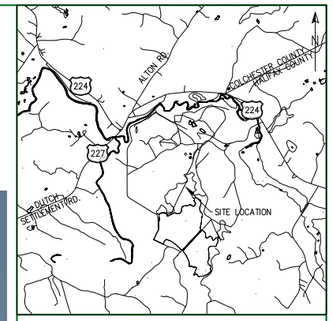

KEYPLAN
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SCALE: N.T.S.	APPD BY: CSF	DATE: 11/08/03

PROJECT:

SCOZINC MINE
GAY'S RIVER
NOVA SCOTIA

TITLE:

FIGURE 5.9-4
PHASE 3 – 20 Yr. POST CONSTRUCTION
FROM VIEWPOINT A

DWG. NO.:	REV:
11HF0044-VP-A-003	1

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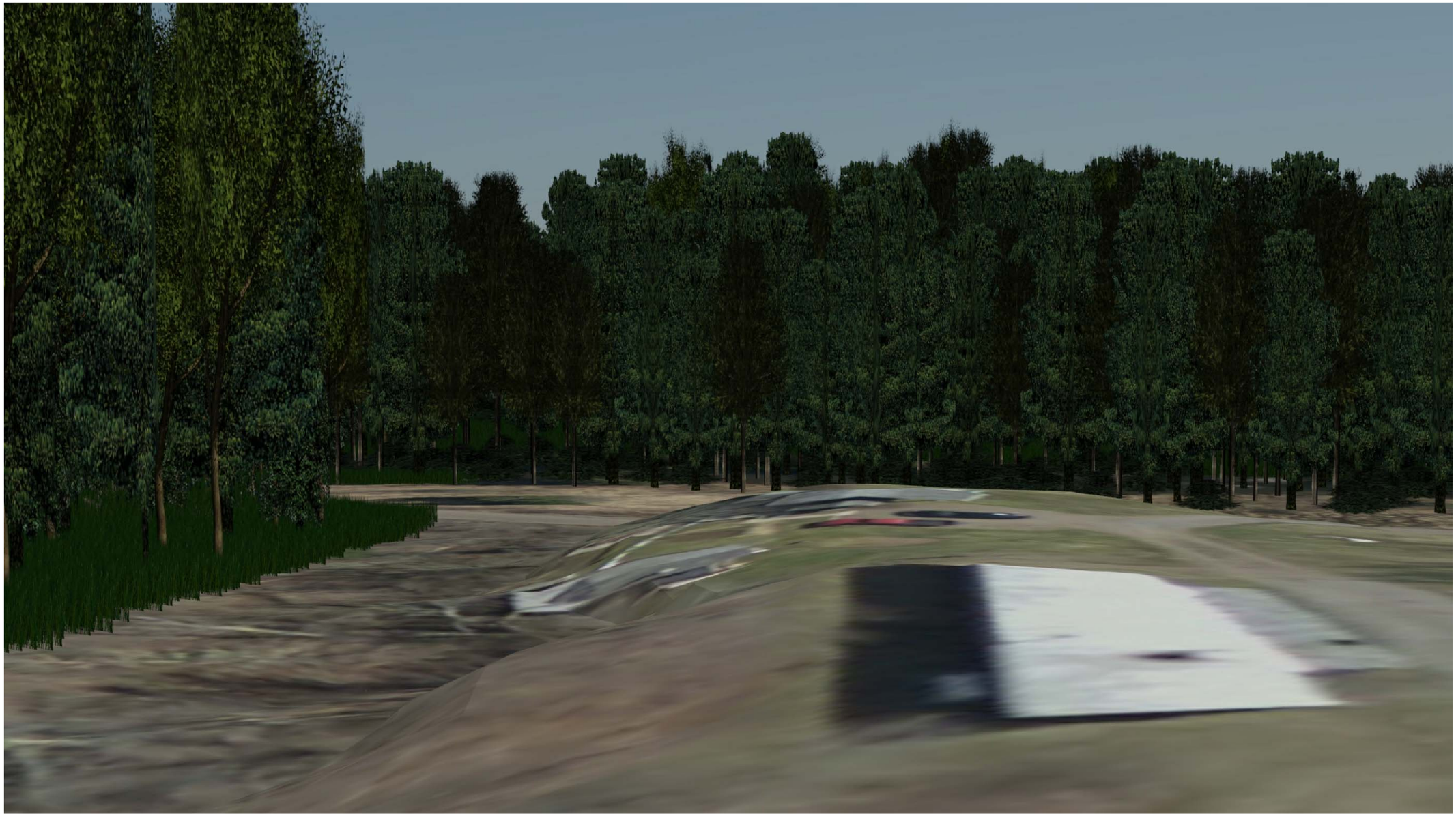

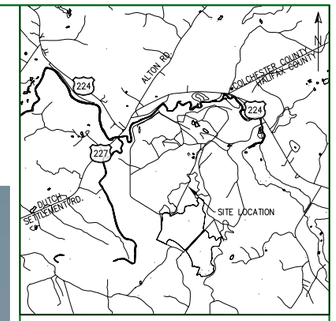

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1	11/08/08	UPDATED FIGURE NUMBERING	ABB	CSF
0	11/08/03	ISSUED FOR INFORMATION	ABB	CSF

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SCALE: N.T.S.	APPD BY: CSF	DATE: 11/08/03

PROJECT:

SCOZINC MINE
GAY'S RIVER
NOVA SCOTIA

TITLE:

FIGURE 5.9-5
EXISTING CONDITIONS
FROM VIEWPOINT B

DWG. NO.:	REV:
11HF0044-VP-B-001	1

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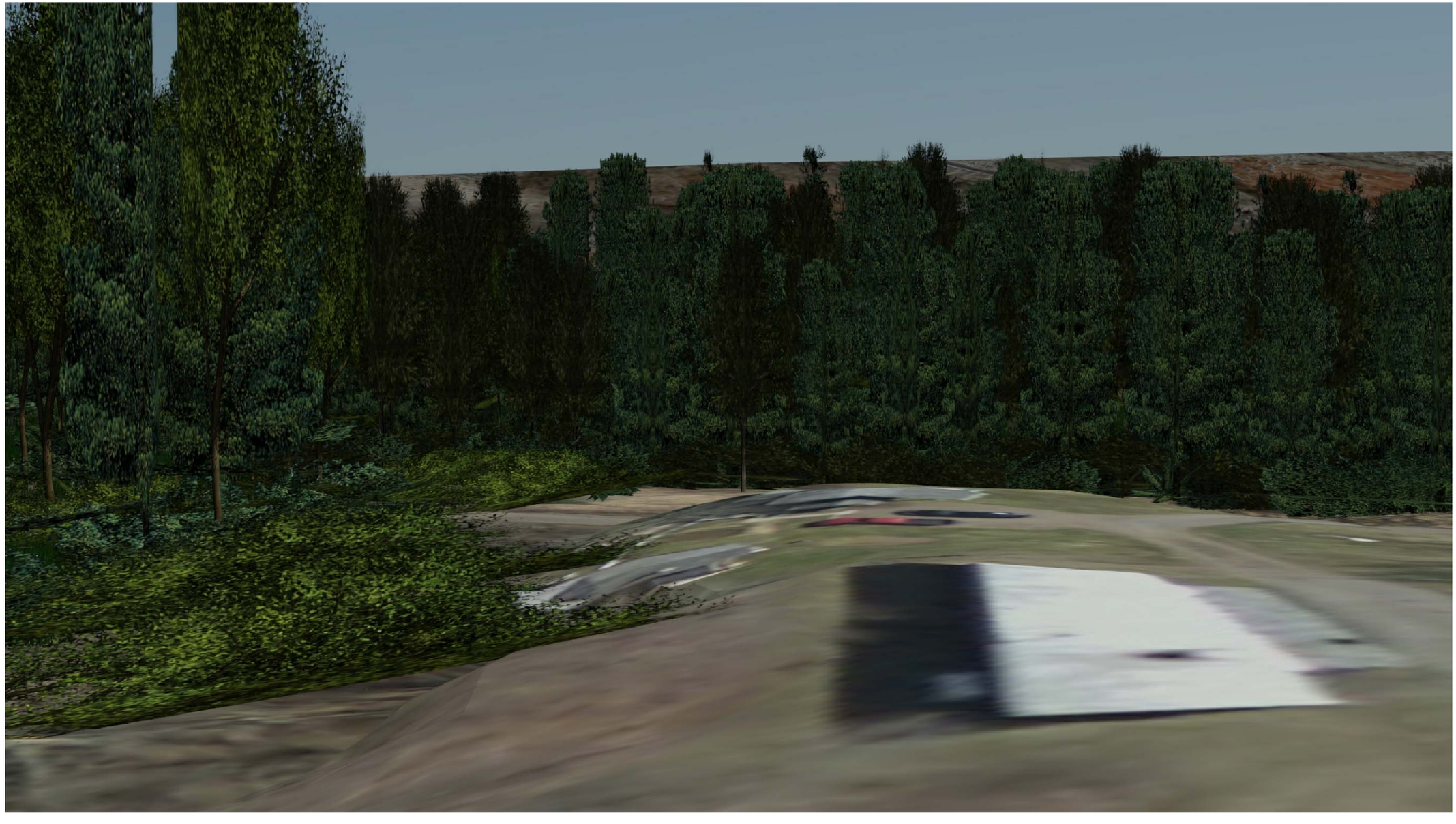

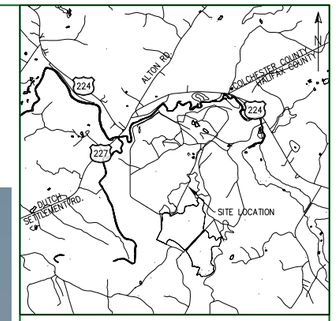

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1	11/08/08	UPDATED FIGURE NUMBERING	ABB	CSF
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SCOZINC MINE
GAY'S RIVER
NOVA SCOTIA

TITLE:

FIGURE 5.9-6
PHASE 3 - POST CONSTRUCTION
FROM VIEWPOINT B

DWG. NO.:	REV:
11HF0044-VP-B-002	1

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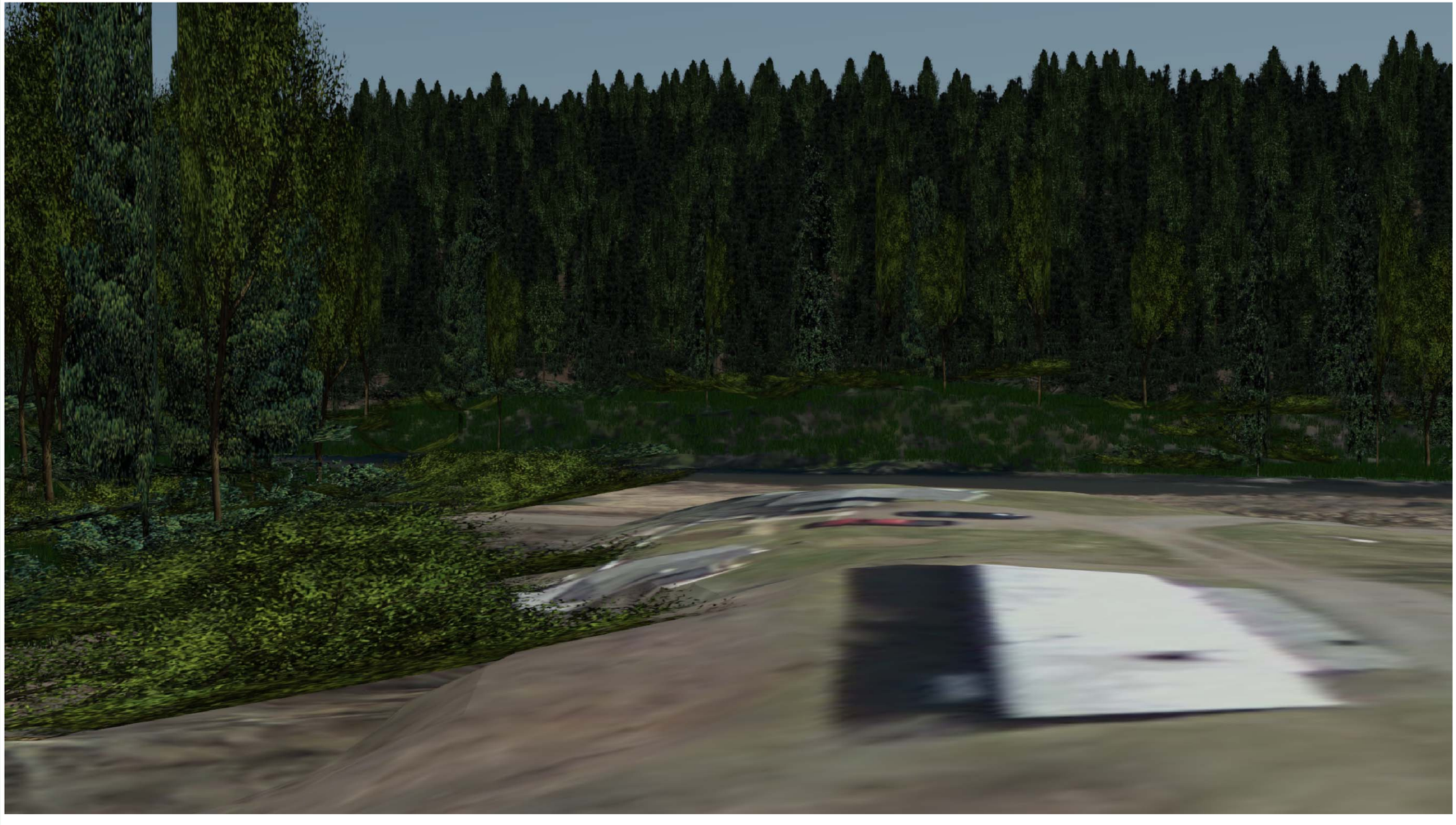

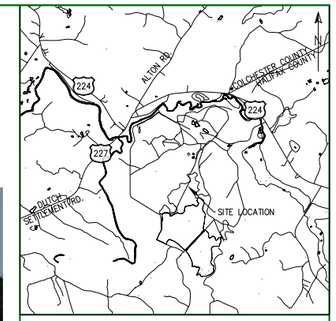

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SCALE : 1:100000

REV	YY/MM/DD	DESCRIPTION	DR	APP
1	11/08/08	UPDATED FIGURE NUMBERING	ABB	CSF
0	11/08/03	ISSUED FOR INFORMATION	ABB	CSF

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SCALE:	N.T.S.	APPD BY: CSF	DATE: 11/08/03

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SCOZINC MINE
GAY'S RIVER
NOVA SCOTIA

TITLE:

FIGURE 5.9-7
PHASE 3 – 20 Yr. POST CONSTRUCTION
FROM VIEWPOINT B

DWG. NO.:	REV:
11HF0044-VP-B-003	1

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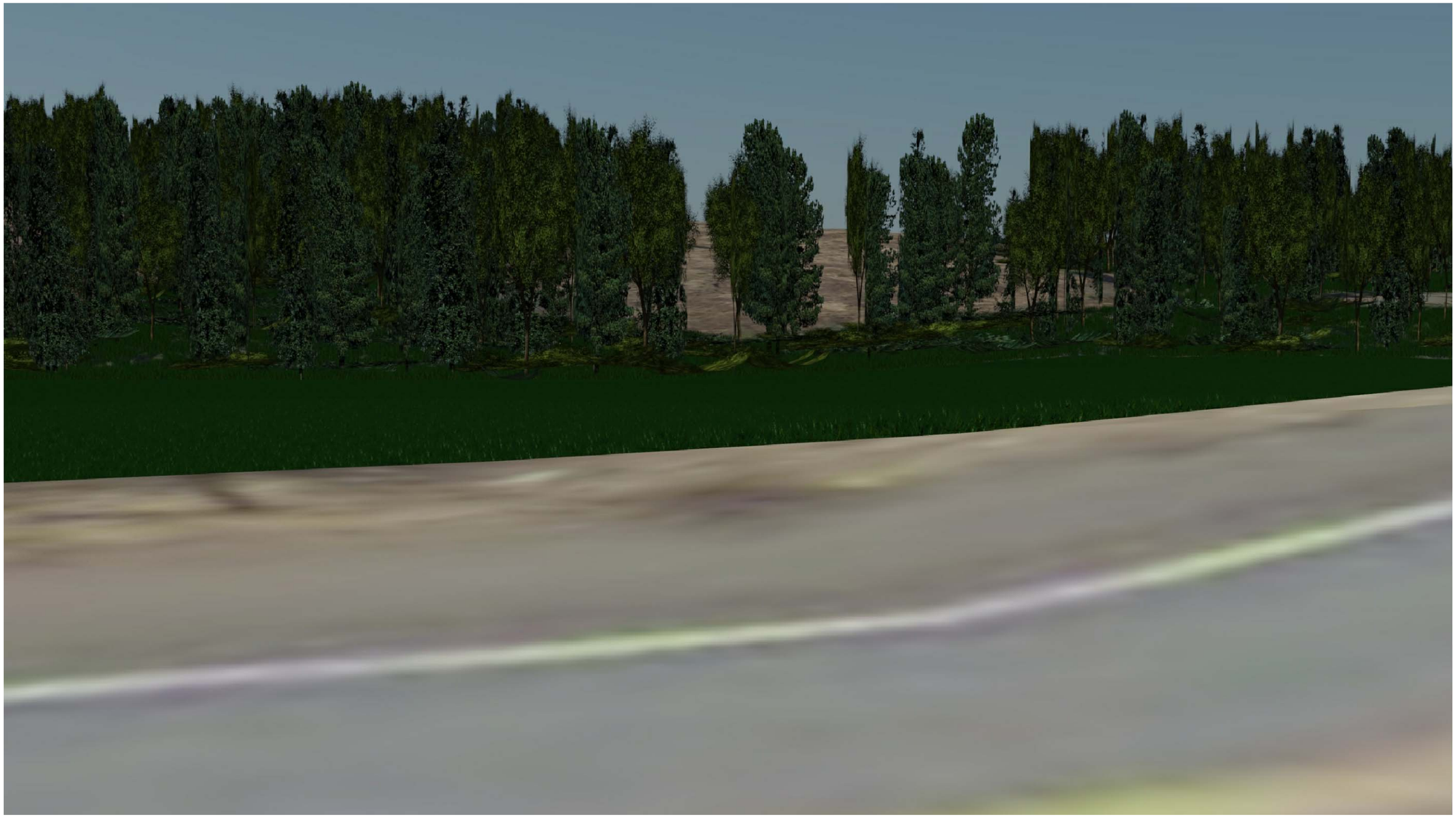

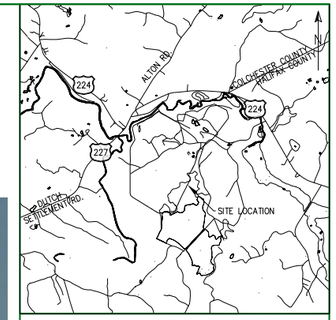

KEYPLAN
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REV	YY/MM/DD	DESCRIPTION	DR	APP
1	11/08/08	UPDATED FIGURE NUMBERING	ABB	CSF
0	11/08/03	ISSUED FOR INFORMATION	ABB	CSF

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DRAWING SIZE: 11 x 17	CHKD BY:	DATE:
SCALE: N.T.S.	APPD BY: CSF	DATE: 11/08/03

PROJECT:

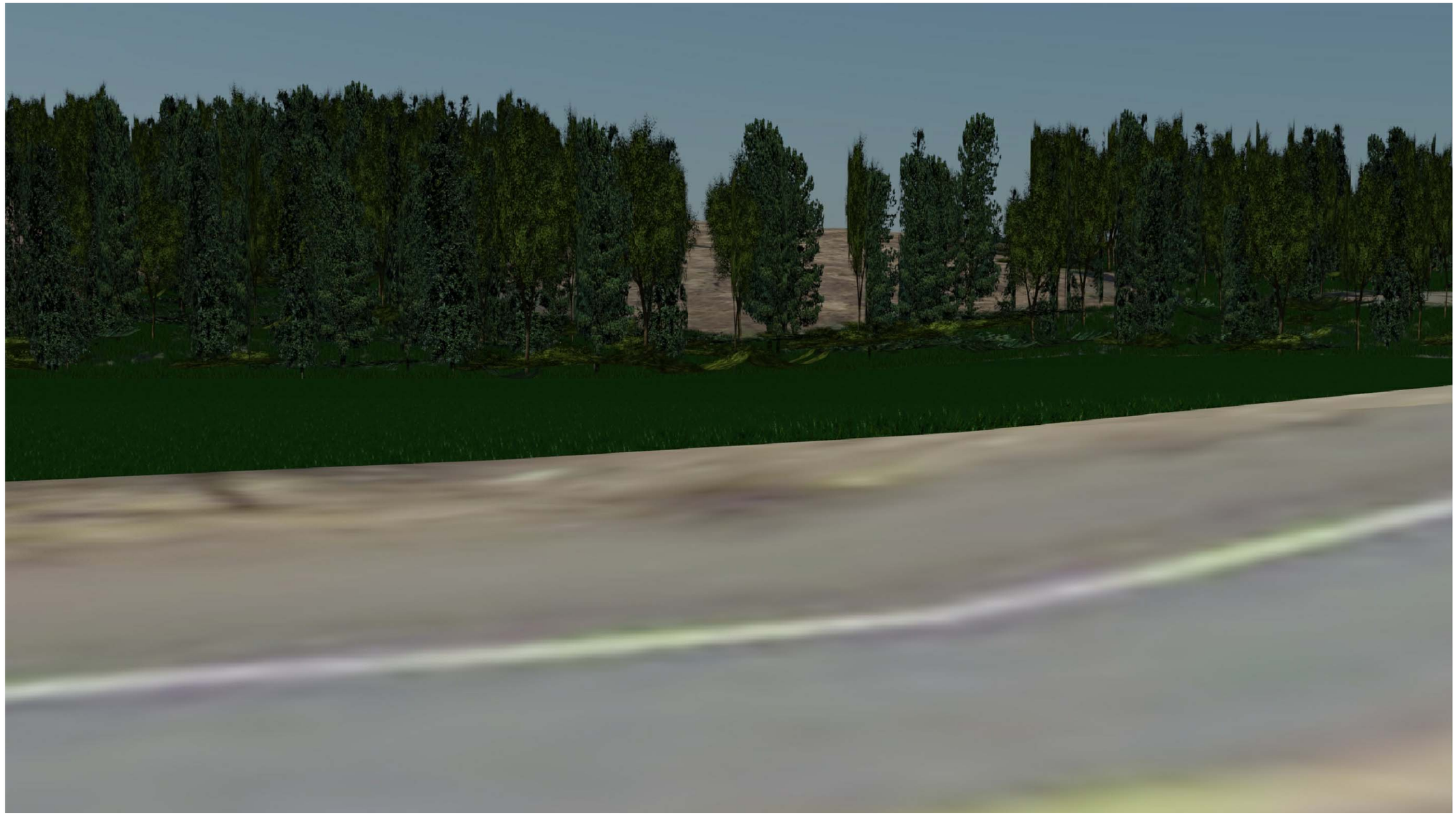
SCOZINC MINE
GAY'S RIVER
NOVA SCOTIA

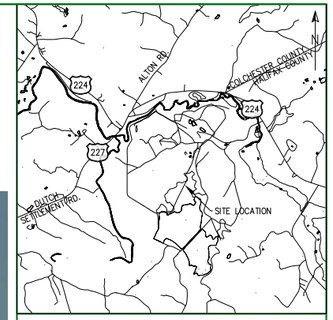
TITLE:

FIGURE 5.9-8
EXISTING CONDITIONS
FROM VIEWPOINT C

DWG. NO.:	REV:
11HF0044-VP-C-001	1

2011/08/08 C:\Users\Alex\Desktop\020811 - ScoZinc\11hf0044_030811.dwg





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REV	YY/MM/DD	DESCRIPTION	DR	APP
1	11/08/08	UPDATED FIGURE NUMBERING	ABB	CSF
0	11/08/03	ISSUED FOR INFORMATION	ABB	CSF

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SCOZINC MINE
GAY'S RIVER
NOVA SCOTIA

TITLE:

FIGURE 5.9-9
PHASE 3 - POST CONSTRUCTION
FROM VIEWPOINT C

DWG. NO.:	REV:
11HF0044-VP-C-002	1

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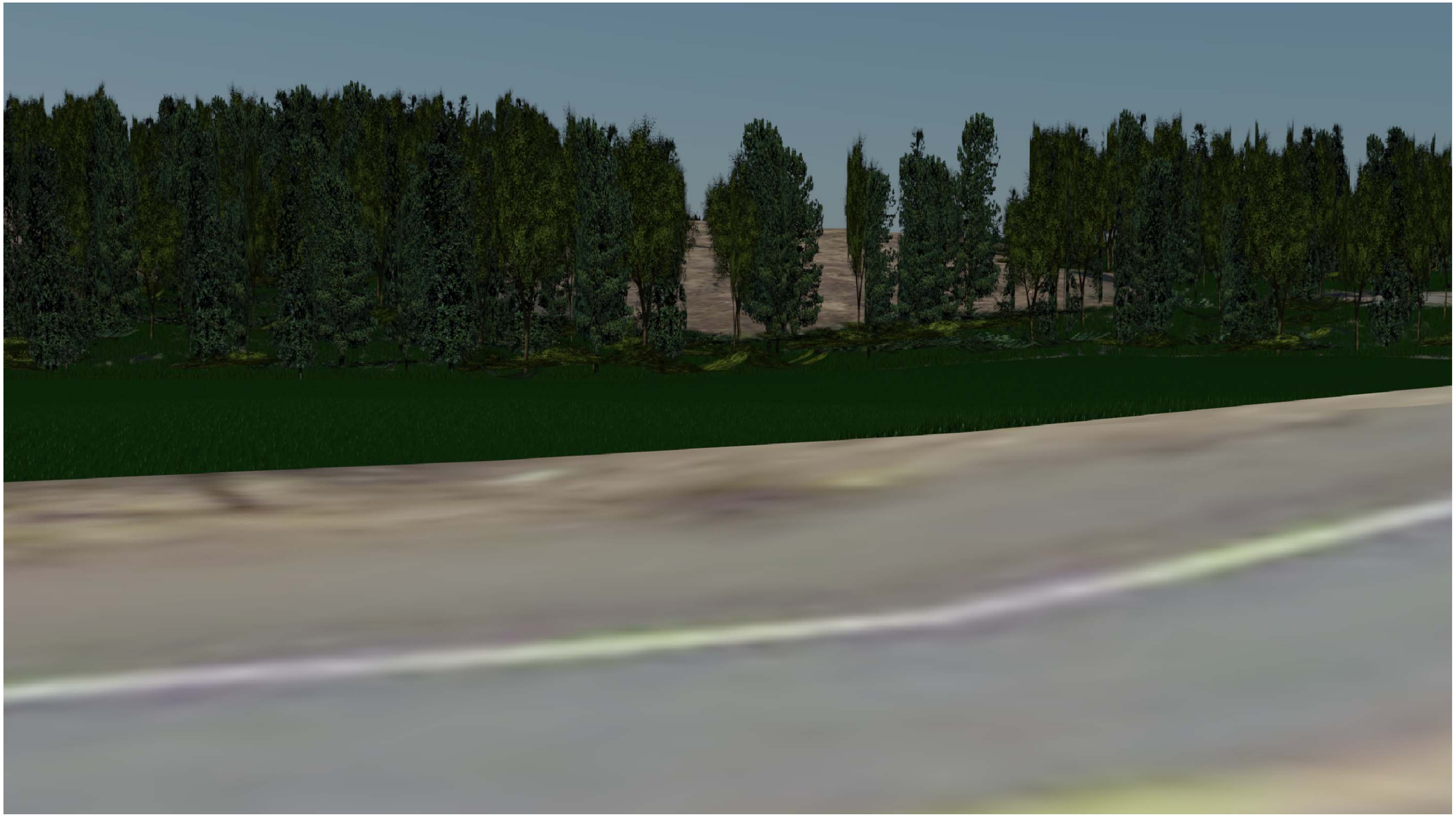

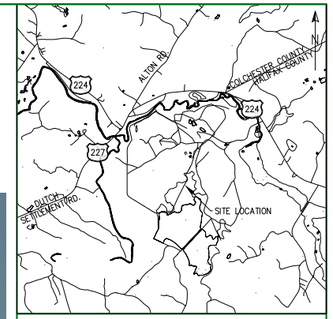

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GAY'S RIVER
NOVA SCOTIA

TITLE:

FIGURE 5.9-10
PHASE 3 - 20 Yr. POST CONSTRUCTION
FROM VIEWPOINT C

DWG. NO.:	REV:
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