

## **APPENDIX C**

1992 Certificate of Approval C.A. #AA92-023996, issued to  
previous owners



GOVERNMENT OF NEWFOUNDLAND AND LABRADOR  
DEPARTMENT OF ENVIRONMENT AND LANDS

**CERTIFICATE OF APPROVAL**

File No. 731.045

Pursuant to *The Department of Environment & Lands Act*, Section(s) 24

Date March 3, 1992 Approval No. AA92-023996

Proponent: Newfoundland Resources & Mining Company Ltd.  
P.O. Box 40  
Port au Port East, NF  
A0N 1T0

Attention: Mr. T. J. Furey  
Manager

Re: Limestone Quarry Operations, North Development

Approval is hereby given for: the quarrying, screening and shipping of high purity limestone aggregate.


This approval does not release the proponent from the obligation to obtain appropriate approvals from other concerned provincial, federal and municipal agencies.

This approval is subject to the terms and conditions indicated in the attached Appendix(es).

It should be noted that prior approval of any significant change in the design or installation of the proposed works must be obtained from the Department of Environment & Lands.

Failure to comply with the terms and conditions will render this approval null and void, place the proponent and their agent(s) in violation of *The Department of Environment and Lands Act* and make the proponent responsible for taking any remedial measures as may be prescribed by this Department.



  
for MINISTER

## **APPENDIX D**

Environmental Assessment Registration for a Quarry,  
submitted in 1999, File #208.12.008



GOVERNMENT OF  
NEWFOUNDLAND AND LABRADOR

Department of Environment and Labour  
P.O. Box 8700 St. John's, Newfoundland A1B4J6  
**Environmental Assessment Division**

Telephone: (709) 729-2562

File Ref No. 208.12.0008

Fax: (709) 729-5518

April 05, 1999

Mr. David Stonehouse  
P.O. Box 160  
Corner Brook, NF  
A2H6C7

Dear Mr. Stonehouse :

On behalf of the Minister, I hereby acknowledge receipt on 1999/04/01 of your Registration pursuant to Section 6 of The Environmental Assessment Act, of the following proposed undertaking:

**Lower Cove Limestone/Dolomite Quarry Expansion**

It has been assigned the file number **208.12.0008**

The information contained in your Registration Form is now under review to determine whether an environmental impact statement is required. You may expect to receive notification of the decision of the Minister of Environment and Labour concerning this matter, on or before:

**May 16, 1999**

If you have any questions concerning this review or any other aspect of the Environmental Assessment Process, please contact **Mr. Paul Carter**.

Thank you for your co-operation.

Yours truly,

  
Phil Graham  
Director

## ENVIRONMENTAL REGISTRATION

March 10, 1999

**Undertaking:** Continuing development/expansion of the Lower Cove limestone/dolomite quarrying operation.

**Proponent:** Atlantic Minerals Ltd.  
P.O. Box 160  
Lear's Road  
Corner Brook, NF  
A2H 6C7

**Chief Executive Officer:** William D. Fitzpatrick  
President  
709-637-2810

**Contact Person re: Environmental Assessment:** J. David Stonehouse  
V. P. Development  
709-637-2847

**Nature of the Undertaking:** To further develop the existing quarrying operations at Lower Cove.

### **Purpose/Rational /Need for the Undertaking:**

Atlantic Minerals Ltd. has, during the last three years, operated a business by mining, processing and exporting chemical grade limestone, chemical grade dolomite and construction aggregates. This undertaking has created, on the Port au Port Peninsula, 90 jobs which run from nine to twelve months per year. In order to sustain this business, continue these jobs and address environmental concerns the developments described below must proceed.

### **Description of the Undertaking:**

It is expected that this business will continue to operate for decades and it is with this in mind that present planing is being done. The developments to be described are those that can be foreseen at this time. Please reference Map #2 while reading this section.

As quarrying proceeds year by year the quarry footprint will increase. The high calcium limestone quarry (mining lease #137) will reach its limit in 25-30 years depending on production and sales. The present dolomite quarry (mining lease #151) will reach its ultimate size and be mined out in 4 to 5 years. Safe mining of this deposit, to the extraction of all economic reserves, necessitates the draining of Duck Pond (actually a 0.6 meter deep bog hole). An application for a C.A. from the Dept. of Environment and Labour, Water Resources Division, to proceed with this draining, was filed on Sept. 25, 1998.

The depletion of this dolomite deposit will require the opening of dolomite quarry #2, which will have a life of about 10 years. A road will be constructed to this site. Atlantic Minerals maintains mineral claims to the west of this site where more dolomite has been located but plans for development here have not yet begun.

Atlantic Minerals proposes to build a tailings pond for limestone fines and silt. This pond will have a life of 4 to 5 years and be in use until dolomite quarry #1 is mined out. At that time quarry #1 will become a tailings pond - it will have a life of many decades. The utilization of these areas as tailings ponds require the building of a pipeline from the washing plant to first the new tailings pond then 4 to 5 years later to dolomite quarry #1. A return pipeline to recirculate the clear water back to the wash plant is also required. These tailings ponds are necessary to replace the existing settling ponds near the wash plant. The present settling ponds are prone to leaking after cleaning and the storage area for silt and fines adjacent to them is becoming filled. Geotechnical engineering for the tailings pond is being done presently by Newfoundland Geosciences Ltd. and will be submitted to the Dept. of Environment and Labour when complete.

(i) General Location : The area of Atlantic Minerals operations is between and to the north of the communities of Lower Cove and Sheaves Cove on the Port au Port Peninsula. See attached 1: 50,000 map #1 and detailed map#2.

(ii) Physical Features: the expanded quarry floor footprints, the proposed road to dolomite quarry #2, the proposed tailings pond and surrounding berms, the slurry and clear water pipelines. See Map #2.

(iii) Construction: Construction of berms for the tailings pond should begin in about two months pending the completion of engineering and environmental approval. Pipeline work will follow. The road to dolomite quarry #2 will be started next winter or the following winter. This work will be done by Atlantic Minerals own forces and equipment during non-production times. It is anticipated that it will take 2 winters to build the road and another to develop the site for mining. The actual start date will be decided when sales predictions determine the necessary start-up of quarry #2.

Dust generation caused by the use of heavy earth moving machinery is the only construction related source of pollution. This will be controlled by the use of a water truck and calcium chlordide applications to the roads when necessary. Dust generation is unlikely during winter road construction.

There are no potential causes of resource conflicts.

(iv) Operations: As stated above, it is anticipated that operations at this site will continue for decades. The operation of quarrying and processing of limestone/dolomite will not change as a result of this undertaking - except for the replacement of the problematic settling ponds with the 4 to 5 year tailings pond and quarry #1's conversion to a tailings pond later. This will be an environmental improvement.

(v) Occupations: It is expected that all construction and other development outlined here will be done with Atlantic Minerals own forces. The occupations of those involved in both the new developments and future operations at this site are the same as those at the site today.

(vi) Project Related Documents: Attached are:-

1. C.A.# AA92-023996 - approval to the previous owners of the site to begin development of the high calcium limestone quarry,
2. C.A.# 97-12-4802 - approval to divert the stream exiting Duck Pond.
3. Fish and Habitat Study of Goose Pond Adjacent to Atlantic Minerals Quarry - (Jacques Whitford Environmental Ltd.)

#### Approvals Required:

1. C.A. to drain Duck Pond - application filed Sept. 25, 1998. (Water Resources Div.)
2. C.A. to construct tailings pond - application will be made when engineering complete.

#### Schedule :

Atlantic Minerals Ltd. would like to have approval for this undertaking by early May of 1999. The sooner the approval is given to begin construction of the tailings pond, the sooner the use of the existing settling ponds can be abandoned. Approval to drain Duck Pond is required by June of 1999 so that the face of dolomite quarry #1 can proceed to the east (reserves moving west and south will soon be depleted and there are no reserves to the north).

#### Funding:

No government funding is being sought for these developments at this time.

March 8, 1999  
Date

William J. Fitzpatrick  
Signature of Chief Executive Officer

## **APPENDIX E**

Fish and Fish Habitat Study of Goose Pond

Adjacent to AML Quarry (JWEL 1997)



**Jacques Whitford  
Environment Limited**

Consulting Engineers  
Environmental Scientists

607 Torbay Road  
St. John's, Newfoundland  
Canada A1A 4Y6

Tel: 709 576 1458  
Fax: 709 576 2126

Environmental Impact Assessment  
Environmental Engineering  
Environmental Protection Planning  
Hydrogeology  
Air Quality  
Public Consultation  
Archaeology & Heritage Planning

Geotechnical Engineering  
Materials Engineering & Research  
Mining Engineering

Dartmouth, NS  
Sydney, NS  
Port Hawkesbury, NS  
Saint John, NB  
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Moncton, NB  
Bathurst, NB  
Charlottetown, PE  
St. John's, NF  
Corner Brook, NF  
Goose Bay, LAB  
Hull, PQ  
Ottawa, ON  
Toronto, ON  
Calgary, AB  
Lethbridge, AB  
Vancouver, BC  
Freeport, ME  
Mexico, DF  
Moscow, Russia  
Buenos Aires, Argentina

Mr. David Stonehouse  
Atlantic Minerals Limited  
P.O. Box 160  
Corner Brook, NF  
A2H 6C7

November 17, 1998

Project 1198

*David*  
Dear Mr. Stonehouse

*Re: Fish and Habitat Survey of Goose Pond Adjacent to Atlantic Minerals Quarry*

This letter is a report on the observations and conclusions of a fish habitat survey and sampling for fish at Goose Pond adjacent to Atlantic Minerals Quarry on the Port au Port Peninsula. The purpose is to describe the methods used and the results of a fish habitat and fish presence survey.

### Background

Goose Pond and Duck Pond are two ponds located adjacent to the dolomite quarry. To facilitate planned development of the quarry operation, Atlantic Minerals will seek to conduct modifications to the drainage of the local watershed, including these two ponds. There are no significant streams flowing to either pond, as they are headwaters to Harry Brook and as such they receive all of their water from local drainage from mainly wetland areas. The streams of both ponds travel a short distance before they flow entirely underground and emerge some distance away to eventually flow into Harry Brook, which is fish habitat (R. Burton, DFO, *pers. comm.*). All proposed modifications to the watershed will occur upstream of the subterranean flow.

DFO require a determination of fish habitat prior to authorizing any activities that might constitute a harmful alteration, disruption or destruction (HADD) of fish habitat. Soundings conducted on Duck Pond and Goose Pond determined that the maximum depths of the ponds are 0.76 m and 1.5 m respectively (D. Stonehouse, AML, *pers. comm.*). DFO have determined that Duck Pond does not contain fish and does not comprise productive fish habitat (R. Burton, DFO, *pers. comm.*). Jacques Whitford Environment was contracted to investigate the presence of fish in Goose Pond.





## Field Survey

Narcissus Walsh and Robert Coish (JWEL) conducted a field survey on November 2, 1998 to describe potential fish habitat and fish presence in Goose Pond and connecting streams.



Goose Pond is oriented in a generally north-south direction along its major axis and is approximately 750 m in length and 250 m wide. The pond is shallow and soundings confirmed the maximum depth to be 1.5m. Occasional boulders and cobbles were observed along the shoreline; a single area of sand was observed at the inflow. Substrate was typically mud and fines with no observed gravel.

Inflow to Goose Pond is at the south-west section of the pond and is comprised primarily of surface drainage from the marsh/bog area.

The outflow originates in a marsh area to the north-east with the channel being poorly defined through the grassy marsh. Approximately 200 m from the quarry access road the drainage has been channalized (1.5 to 2 m wide) to permit efficient flow to a pair of culverts (circa 1 and 1.5 m diameter) installed under the access road to the quarry. Flow along the western side of the roadway is in a north-westerly direction to a point approximately 400 m from the roadway where the stream flows entirely underground. The stream re-surfaces after approximately 500 m and flows into Harry Brook.

## Fish Habitat

The potential fish habitat of Goose Pond and connecting streams was characterized during surveys on foot and by inflatable boat. Photographs and videotape augmented field notes.

As described above Goose Pond is a shallow pond with generally soft substrate. No areas of potential lake spawning were observed.

Inflowing streams are limited to short and sometimes indistinct channels draining the wetland areas. Flows were slow at the time of the field survey. No suitable spawning gravel was seen in these areas.

The substrate in the outflow channel from the pond to the road is mud and fines with occasional exposed bedrock. No spawning substrates were seen in this section. Banks of the channel were straight cut and provided no overhang; no instream cover was present. Drainage through the marsh area was poorly defined with little observed flow; gradient in this area was less than 0.5%. Vegetation in the marsh area consists primarily of marsh grasses.

Substrate in the stream section located downstream of the road is primarily boulder and cobble overlying bedrock. Extended sections of exposed bedrock are present in this section. No gravel was observed, hence no areas of spawning substrate were observed.

Water depth ranged from 10 to 50 cm and flow was primarily riffle and rapids over a gradient of about 2.5% along the stream length. Occasional small shallow pools are located along the stream. Spawning substrate was lacking from the pools.

The stream section that runs underground is an obstruction to potential fish migration.



## Fish Sampling

Fish sampling was conducted under an Experimental Licence issued by DFO. Sampling methods included gillnets in the pond and electrofishing along the pond margin and in the streams. All fish taken by electrofishing were released unharmed.

### *Gillnetting*

Experimental gang of gillnets (6 panels; mesh sizes ranging from 25 to 89 mm) were set at two locations (north and south ends) within Goose Pond and tended at regular intervals throughout the daytime fishing period. Gillnets were set at 1300 hours with checks at 1415, 1515 and 1645 hours. No fish were observed or captured with the exception of two sticklebacks captured in the 25-mm mesh of the northern set. The fishing effort consisted of 3.75 hours fishing per gang (7.5 h total effort). The experimental licence stipulated that no overnight sets were to be made.

### *Electrofishing*

Qualitative electrofishing was conducted in all stream sections and several shallow areas at the perimeter of Goose Pond. A total of 1000 seconds of fishing effort was conducted from upstream of the road to the point where the flow becomes subterranean. Areas that were not fished included the marshy areas near the pond and areas where the channel was indistinct. This effort produced a catch of 12 sticklebacks. No other fish were observed.

The inflow at the southern end of Goose Pond was electrofished (200 seconds of fishing effort) and 10 sticklebacks were captured.

Shallow areas at the perimeter of Goose Pond were fished (400 seconds fishing effort) from an inflatable boat. A total of 5 sticklebacks were observed in these areas.

No salmonids were observed in any of the areas that were electrofished.



## Summary

Potential fish habitat was examined for pond areas and all streams connected to Goose Pond. The habitat is poor quality as potential spawning areas are very limited or lacking. Instream cover is also limited, providing poor quality rearing habitat. The potential habitat in Goose Pond could be limited by winterkill from freezing or potentially elevated temperatures during the summer. Water levels may also be significantly reduced during low flow periods. These conditions often occur in shallow ponds with low water flow. No salmonids were observed or captured in the course of this fish survey. The underground flow of the stream bars potential migration into Goose Pond.

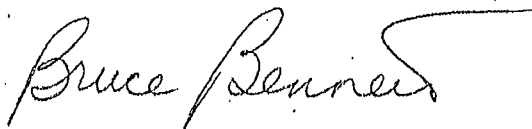
## Conclusions

Goose Pond and the connecting streams are not productive fish habitat. This conclusion should allow DFO to provide a timely response to your application for alterations to the watershed or related instream works.

I trust that this will enable you to proceed with your planning exercise. Please call if you have any questions on this, or any related material.

Yours truly,

JACQUES WHITFORD ENVIRONMENT LIMITED



Bruce Bennett

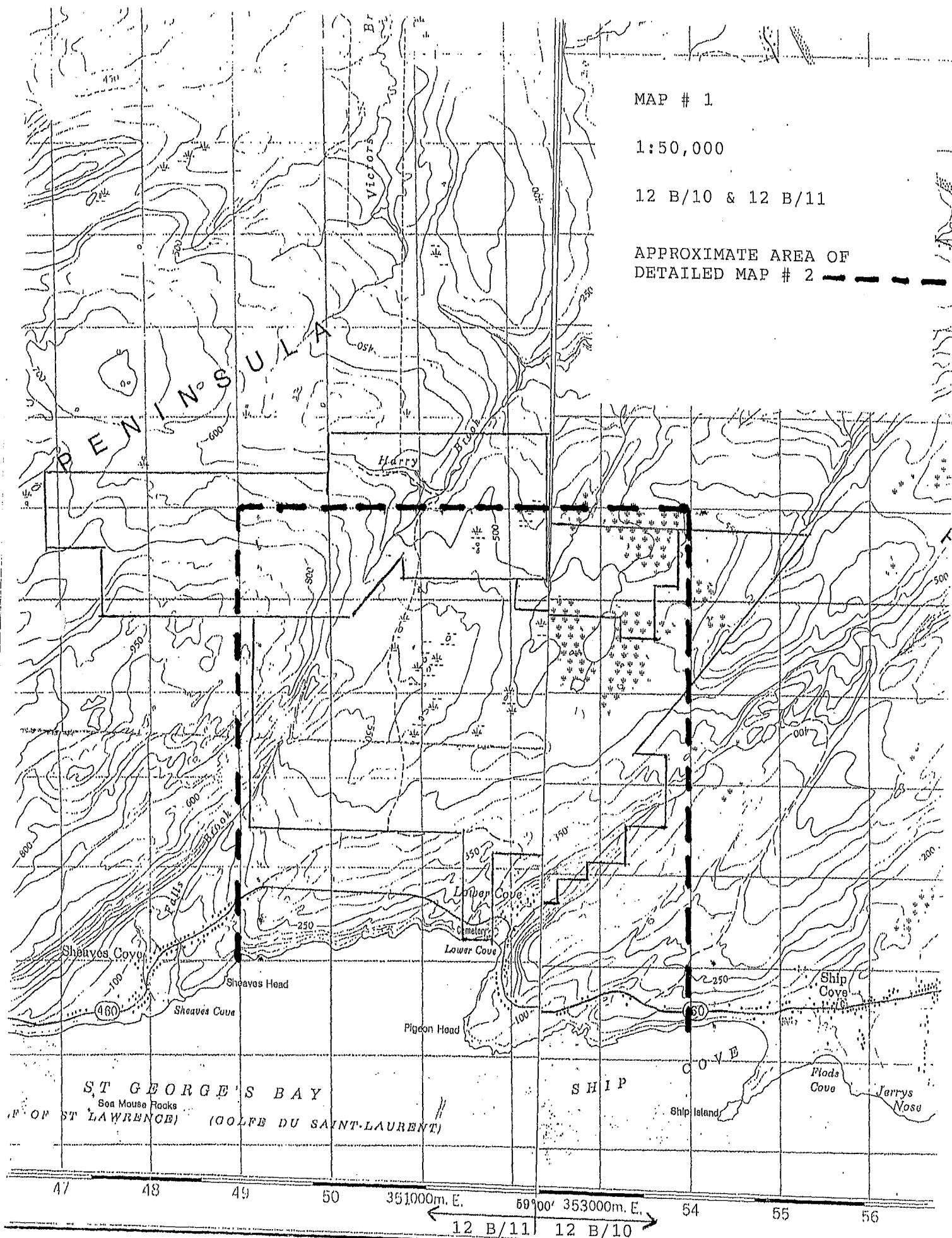


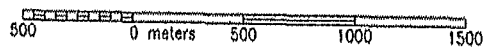
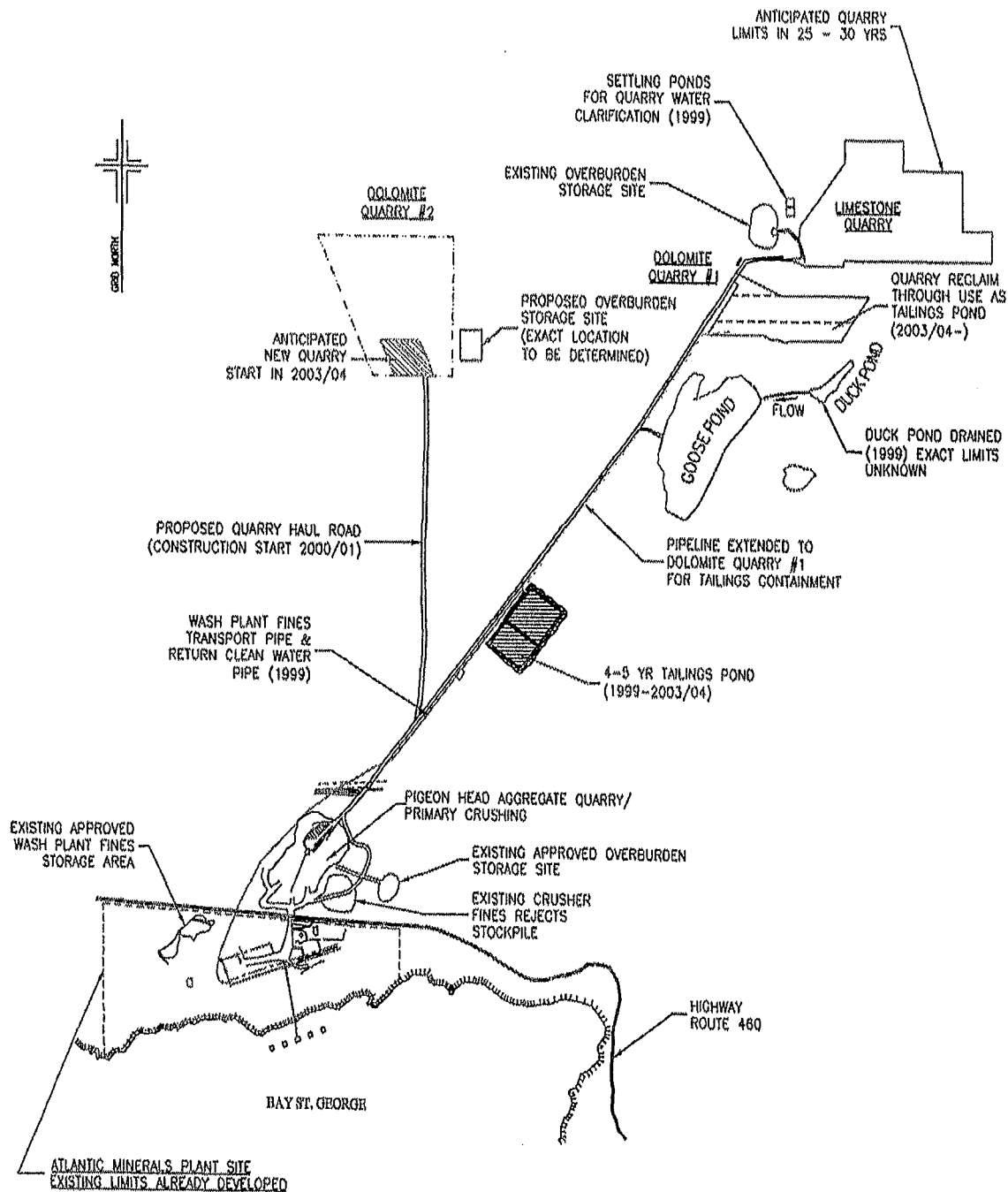
MAP # 1

1:50,000

12 B/10 & 12 B/11

APPROXIMATE AREA OF  
DETAILED MAP # 2





Lower Dove Quarry  
Box 10, Site 1, R.F.T. 03  
Port au Port, Newfoundland  
Canada A6N 1T0

Telephone: (709) 644-2447 or 2448  
Fax: (709) 644-2448  
Internet: www.atlanticminerals.com

Title:

# ATLANTIC MINERALS LTD. FORECASTED 30 YEAR OUTLOOK GENERAL SITE PLAN

Date: 9-MARCH-99

Drawn by: M. SPENCER

Scale: AS INDICATED

Drawing No.: SK-1

Rev.: 0

## **APPENDIX F**

Permanent Water Use License #97-12-4802



File No: 526

GOVERNMENT OF  
NEWFOUNDLAND AND LABRADOR

Department of Environment and Labour

**APPENDIX B - Completion Report**

Pursuant to the *Environment Act*, SN 1995 c E-13.1, Section(s) 11

Date: December 16, 1997

Approval No: C.A. 97-12-4802

Proponent: Atlantic Minerals Limited  
P.O. Box 160  
Corner Brook, Newfoundland  
A2H 6C7

Attention: Mr. David Stonehouse

Re: Diversion of Duck Pond, Lower Cove

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Approval was given for: construction of a 250 metre long channel to divert the flow of water from Duck Pond to Goose Pond for expansion of the Lower Cove, Port au Port Peninsula limestone quarry, with reference to the application dated December 10, 1997 and information provided December 17 and 18, 1997.

*I (the proponent named above) do hereby certify that the project described above was completed in accordance with the plans and specifications submitted to the Department of Environment and Labour and that the work was carried out in strict compliance with the terms and conditions of the Certificate of Approval issued for this project.*

Date APR 20/99

Signature [Signature]

This completion report must be completed and forwarded to the following address upon completion of the approved work.

Department of Environment and Labour  
Water Resources Division  
P.O. Box 8700  
St. John's, Newfoundland, A1B 4J6



# **APPENDIX G**

Environmental Protection Plan Table of Contents  
(including an updated Contingency Plan)

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ATLANTIC MINERALS LIMITED  
LOWER COVE QUARRY**

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# APPENDIX H

## Initial Blast Monitoring

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To: Jamie Goosney, P.Eng.  
Atlantic Minerals Limited

From: Lorne Boone, P.Eng.  
St. John's, NL

File: 121618352

Date: March 2, 2016

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**Reference: Blast Monitoring Results: Interim Report**

A blast monitoring program is currently being undertaken at the site to support noise and vibration studies.

Blast monitoring was conducted on November 28, 2015. The production blast was typical of a 100 MT Production Volume. The results were measured using an Instantel Blast Mate digital seismograph to measure both ground vibration and sound pressure level (air shock).

Results at approximately 200 m from the blast location at the quarry indicated the following:

Ground Vibration	Sound Pressure Level
Geophone Measurement: 8.87 mm/s (Peak Vector Sum (PVS))	Microphone Measurement: 125.2 DB
Recommended Guideline: Less than 50 mm/s (PVS)	Recommended Guideline: Less than 140 DB considered "no damage" level for windows

Initial results confirm that AML's blasting operations are within industry guidelines and should have no adverse effects. The recommended guidelines are applicable to on-site activity. Off-site blast monitoring guidelines have lower threshold values.

Monitoring will continue through 2016 once quarry operations are initiated after current winter closure.

**STANTEC CONSULTING LTD.**



Lorne Boone, M.Eng., P.Eng., P.Geo.  
Principal  
Phone: (709) 576-1458  
Fax: (709) 576-2126  
Lorne.Boone@stantec.com

# **APPENDIX I**

2014 Certificate of Approval

C.A. #AA14-035590 for existing operations



GOVERNMENT OF  
NEWFOUNDLAND AND LABRADOR  
Department of Environment and Conservation

## CERTIFICATE OF APPROVAL

Pursuant to the Environmental Protection Act, SNL 2002 c E-14.2 Section 83

Issue Date: **March 31, 2014**

Approval No. AA14-035590

Expiration: **March 31, 2019**

File No. 731.047

Proponent: **Atlantic Minerals Limited**  
Lower Cove Operation  
P.O. Box 10  
Site 1 Rural Route #3  
Port au Port, Newfoundland  
A0N 1T0

Attention: William Fitzpatrick, President

Re: **Atlantic Minerals Limited – Lower Cove Operation**

---

Approval is hereby given for the operation of quarries, processing facilities, product stockpiles, load port facilities, settling ponds and other associated works, located at Lower Cove on the Port au Port Peninsula, for the production of chemical grade limestone and dolomite, and construction aggregates.

This Certificate of Approval does not release the proponent from the obligation to obtain appropriate approvals from other concerned provincial, federal and municipal agencies. Nothing in this Certificate of Approval negates any regulatory requirement placed on the proponent. Where there is a conflict between conditions in this Certificate of Approval and a regulation, the condition in the regulation shall take precedence. Approval from the Department of Environment and Conservation shall be obtained prior to any significant change in the design, construction, installation, or operation of the Lower Cove Operation, including any future expansion of the Lower Cove Operation. This Certificate of Approval shall not be sold, assigned, transferred, leased, mortgaged, sublet or otherwise alienated by the proponent without obtaining prior approval from the Minister.

This Certificate of Approval is subject to the terms and conditions as contained therein, as may be revised from time to time by the Department. Failure to comply with any of the terms and conditions may render this Certificate of Approval null and void, may require the proponent to cease all activities associated with this Certificate of Approval, may place the proponent and its agent(s) in violation of the *Environmental Protection Act*, and will make the proponent responsible for taking such remedial measures as may be prescribed by the Department. The Department reserves the right to add, delete or modify conditions to correct errors in the Certificate of Approval or to address significant environmental or health concerns.



  
For **MINISTER**



## TERMS AND CONDITIONS FOR APPROVAL No. AA14-035590

March 31, 2014

### General

1. This Certificate of Approval is for the operation of quarries, processing facilities, product stockpiles, load port facilities, settling ponds and other associated works, located at Lower Cove on the Port au Port Peninsula, for the production of chemical grade limestone and dolomite, and construction aggregates. Extensive future expansion or change of activities will require a separate Certificate of Approval.
2. Any inquiries concerning this approval shall be directed to the Western Regional Office of the Pollution Prevention Division (telephone: (709) 643-6114; or facsimile: (709) 643-8654; or email [duffyt@gov.nl.ca](mailto:duffyt@gov.nl.ca)).
3. In this Certificate of Approval:
  - **accredited** means the formal recognition of the competence of a laboratory to carry out specific functions;
  - **AML** means Atlantic Minerals Limited (Lower Cove Operation);
  - **Department** means the Department of Environment and Conservation and its successors;
  - **Director** means the Director of the Pollution Prevention Division of the Department;
  - **hazardous waste** means a product, substance or organism that is intended for disposal or recycling, including storage prior to disposal or recycling, and that:
    - (a) is listed in Schedule III of the *Export and Import of Hazardous Waste Regulations under the Canadian Environmental Protection Act, 1999*;
    - (b) is included in any of Classes 2 to 6, and 8 and 9 of the *Transportation of Dangerous Goods Regulations* under the *Transportation of Dangerous Goods Act, 1992*; or
    - (c) exhibits a hazard classification of a gas, a flammable liquid, an oxidizer, or a substance that is dangerously reactive, toxic, infectious, corrosive or environmentally hazardous;
  - **licensed** means has a Certificate of Approval issued by the Minister to conduct an activity;
  - **liquid waste** is defined by the *Slump Test* (Canadian Standards Association test method A23.2-5C for determining the slump of concrete). The liquid waste slump test involves placing the waste in a 30 cm open inverted cone. The cone is removed and the immediate decrease (slump) in height of the waste material is measured. If the material slumps such that the original height is reduced by 15 cm or more, the waste is considered liquid;
  - **Minister** means the Minister of the Department;



- **proficiency testing** means the use of inter-laboratory comparisons to determine the performance of individual laboratories for specific tests or measurements;
- **QA/QC** means Quality Assurance/Quality Control;
- **register(ed)** means that information regarding the storage tank system has been submitted to a Service NL office and a registration number has been assigned to the storage tank system.
- **regulated substance** means a substance subject to discharge limit(s) under the *Environmental Control Water and Sewage Regulations, 2003*;
- **spill or spillage** means a loss of gasoline or associated product in excess of 70 litres from a storage tank system, pipeline, tank vessel or vehicle, or an uncontrolled release of any volume of a regulated substance onto or into soil or a body of water;
- **storage tank system** means a tank and all vent, fill and withdrawal piping associated with it installed in a fixed location and includes a temporary arrangement;
- **used lubricating oil** means lubricating oil that as a result of its use, storage or handling, is altered so that it is no longer suitable for its intended purpose but is suitable for refining or other permitted uses;
- **used oil** means a used lubricating oil or waste oil; and
- **waste oil** means an oil that as a result of contamination by any means or by its use, is altered so that it is no longer suitable for its intended purpose.

4. All necessary measures shall be taken to ensure compliance with all applicable acts, regulations, policies and guidelines, including the following, or their successors:

- *Environmental Protection Act*;
- *Water Resources Act*;
- *Air Pollution Control Regulations, 2004*;
- *Environmental Control Water and Sewage Regulations, 2003*;
- *Halocarbon Regulations*;
- *Storage and Handling of Gasoline and Associated Products Regulations, 2003*;
- *Used Oil Control Regulations*;
- *Heating Oil Storage Tank System Regulations, 2003*;
- *Sampling of Water and Wastewater - Industrial Effluent Applications Guidance Document*; and
- *Accredited Laboratory Policy*;

This Approval provides terms and conditions to satisfy various requirements of the above listed acts, regulations, Departmental policies and guidelines. If it appears that all of the pertinent requirements of these acts, regulations, policies and guidelines are not being met, then a further review of the works shall be conducted, and suitable pollution control measures may be required by the Minister.

5. All reasonable efforts shall be taken to minimize the impact of the operation on the environment. Such efforts include minimizing the area disturbed by the operation, minimizing air or water pollution, finding alternative uses, acceptable to the Director, for waste or rejected materials, removing equipment or structures when they no longer have further use, and considering the requirement for the eventual rehabilitation of disturbed areas when planning the development of any area on the facility property.
6. **AML** shall provide to the Department, within a reasonable time, any information, records, reports or access to data requested or specified by the Department.
7. **AML** shall keep all records or other documents required by this Approval at the Lower Cove location for a period of not less than three (3) years, beginning the day they were made. These records shall be made available for review by officials of the Department or Service NL when requested.
8. Should **AML** wish to deviate in any way from the terms and conditions of this Certificate of Approval, a written request detailing the proposed deviation shall be made to the Minister. **AML** shall comply with the most current terms and conditions until the Minister has authorized otherwise. In the case of meeting a deadline requirement, the request shall be made at least 60 days ahead of the applicable date as specified in this Approval or elsewhere by the Department.

### **Construction**

9. Any work that must be performed in a body of water below the high water mark shall be carried out during a period of low water levels.
10. All construction operations shall be carried out in a manner that minimizes damage to land, vegetation, and watercourses, and which prevents pollution of bodies of water.
11. The use of heavy equipment in streams or bodies of water is not permitted. The operation of heavy equipment shall be confined to dry stable areas.
12. All vehicles and equipment shall be clean and in good repair, free of mud and oil, or other harmful substances that could impair water quality.
13. During the construction of concrete components, formwork shall be properly constructed to prevent any fresh concrete from entering a body of water. Dumping of concrete or washing of tools and equipment in any body of water is prohibited.
14. Waste hardened concrete shall not be disposed as unsuitable material at the project site. Waste hardened concrete shall be put to beneficial use on site as fill material, or it shall be sent to an approved waste disposal site.
15. All areas affected by this project shall be restored to a state that resembles local natural conditions. Further remedial measures to mitigate environmental impacts on water resources can and will be specified, if necessary in the opinion of this Department.

16. Any alteration of a water body or work within 15 m of a water body shall be approved by the Water Resources Management Division of this Department. Alteration of a water body may include culvert installations, stream crossings, outfalls, infilling; or bridge, dam, and wharf construction.
17. All culvert installations, stream crossings and alterations of water bodies are to be approved by the Water Resources Management Division of this Department.

### Waste Management

18. All waste generated at the facility is subject to compliance with the ***Environmental Protection Act***. All non-industrial waste shall be placed in closed containers and, on at least a weekly basis, removed from the site. If required, industrial waste shall be disposed of by a licensed operator. These wastes shall be disposed of at an authorized waste disposal site with the permission of the owner/operator of the site.
19. **AML** shall ensure that all volatile chemical and solvent wastes, if they cannot be reused, are placed in suitable covered containers for disposal in a manner acceptable to the Department. Disposal of liquid wastes at waste disposal sites in the province is not permitted.
20. Disposal of hazardous waste in a municipal or regional waste disposal site in this Province is prohibited. Transporters of hazardous waste shall have an approval issued by the Minister. Those generating hazardous waste shall have a waste generators number issued by the Director and shall also complete the required information outlined in the Waste Manifest Form.

### Open Burning

21. Materials listed in **Table 1** shall not be burnt in open fires.

Table 1 - Material Not Approved for Open Burning	
tires	manure
plastics	rubber
treated lumber	tar paper
asphalt and asphalt products	railway ties
drywall	paint and paint products
demolition waste	fuel and lubricant containers
hazardous waste	used oil
biomedical waste	animal cadavers
domestic waste	hazardous substances
trash, garbage, or other waste from commercial, industrial or municipal operations	materials disposed of as part of the removal or decontamination of equipment, buildings or other structures

22. Materials not listed in *Table 1* may be burned on site only with the approval of the Department.

### Noise

23. Efforts shall be made to minimize and control noise resulting from site operations and maintenance activities. All vehicles hauling materials within the facility shall have exhaust and muffling devices in good working order.

### Dust Suppression

24. **AML** shall control dusting resulting from construction and operational activities at the site. Use of dust suppressants other than water or calcium chloride shall require approval of the Director. **AML** are encouraged to use best management practices when applying calcium chloride or any other approved dust suppressant.

### Spill Prevention and Containment

25. Areas in which chemicals are used or stored shall have impermeable floors and dykes or curbs and shall not have a floor drain system, nor shall it discharge to the environment. Areas inside the dykes or curbs shall have an effective secondary containment capacity of at least **110%** of the chemical storage tank capacity, in the case of a single storage container. If there is more than one storage container, the dyked area shall be able to retain no less than **110% of the capacity of the largest container or 100 % of the capacity of the largest container plus 10% of the aggregate capacity of all additional containers, whichever is greater.** These dyked areas shall be kept clear of material that may compromise the capacity of the dyke system. Once a year, the dykes shall be visually inspected for their liquid containing integrity, and repairs shall be made when required. Once every ten years, the dykes shall be inspected, by a means other than visual inspection, for their liquid containing integrity, and repairs shall be made when required.
26. All on site storage of petroleum shall comply with the *Storage and Handling of Gasoline and Associated Products Regulations, 2003*, or its successor. Storage tank systems shall be registered with Service NL. All aboveground storage tanks shall be clearly and visibly labelled with their GAP registration numbers.
27. Where applicable, all tanks and fuel delivery systems shall be inspected to appropriate American Petroleum Institute or Underwriters' Laboratories of Canada standards, or any other standards acceptable to this Department. The required frequency of inspections may be changed at the discretion of the Director.
28. An inventory of all petroleum and chemical storage tanks shall be submitted to the Director for review by **August 2014**. This inventory shall include a plan showing location, registration number (where applicable), identification number, material stored, capacity, annual throughput, tank material, tank type, tank diameter, tank height, tank colour, roof type, year of manufacture, date of installation, date of last inspection, failure history, maintenance history, dyke capacity and date of next planned inspection. Every two (2) years, an update of any significant changes to the inventory shall be submitted to the Director.

29. Refuelling and maintenance of vehicles and equipment shall, whenever possible, be undertaken on a prepared impermeable surface with an oil containment or collection system. When this is not possible, due care shall be taken to prevent spillage on the ground and to the surrounding environment, particularly streams and other water bodies. The Contingency Plan for fuel storage shall detail the specific response actions in the event of a spill from refuelling or maintenance activities.

### **Environmental Contingency Plan**

30. **AML** shall continue to implement the *Environmental Contingency Plan (December 2002)* for the Lower Cove Operation. This Plan describes the actions to be taken in the event of a spill of a toxic or hazardous material. Copies of the Plan shall be placed in convenient areas throughout the facility so that employees can easily refer to it when needed. **AML** shall ensure that all employees are aware of the Plan and understand the procedures and the reporting protocol to be followed in the event of an emergency. An annual response exercise is recommended for response personnel. Every year, as a minimum, the Plan shall be reviewed and revised as necessary. Any proposed significant revisions shall be submitted to the Director for review. Changes which are not considered significant include minor variations in equipment or personnel characteristics which do not effect implementation of the Plan.
31. Every time **AML** implements the *Environmental Contingency Plan*, information shall be recorded for future reference. This will assist in reviewing and updating the Plan. The record is to consist of all incidents with environmental implications, and include such details as: date; time of day; type of incident (i.e. liquid spill, gas leak, granular chemical spill, equipment malfunction, etc.); actions taken; problems encountered; and other relevant information that would aid in later review of the Plan performance. Each incident report shall be submitted to the Director as per the *Reporting* section.

### **Rehabilitation & Closure Plan**

32. A Rehabilitation and Closure Plan detailing the actions to be taken to restore areas disturbed by the operation has been submitted to the Department (*March 2005*). The Plan shall be implemented progressively as required and completed upon site closure. **AML** shall perform an annual review of the Plan, accounting for an expansion or alteration of activities, and revise the Plan as necessary. All proposed revisions shall be submitted to the Director for review.

### **Used Oil**

33. Used oil shall be retained in an approved tank or closed container, and disposed of by a company licensed for handling and disposal of used oil products.

### **Water Quality Monitoring and Discharge**

34. **AML** shall perform a Water Quality Monitoring Program as per *Table 2*.

35. All results from the Water Quality Monitoring Program shall be submitted to the Director as per the **Reporting** section.
36. All water pumped from Dolomite Quarry #1 and the Hi-Cal Limestone Quarry shall be discharged into Duck Pond via the designated discharge line/outlet.
37. All water pumped from Dolomite Quarry #2 shall be discharged into the approved quarry discharge area via the designated discharge line/outlet.
38. **AML** shall maintain a closed loop system (no discharge) for its product washing operation. Water used in product washing shall be collected and pumped to the settling pond for treatment (suspended solids removal). Treated water from the settling pond shall be reused in the washing operation. Make up water, if required, shall be obtained from Goose Pond.

Table 2 – Water Quality Monitoring Program		
Location	Parameters	Frequency
1. Dewatering of Dolomite Quarry #1 and Hi-Cal Quarry – discharge point into Duck Pond.	General Parameters - must include the following: nitrate + nitrite, nitrate, nitrite, ammonia, pH, TSS, colour, sodium, potassium, calcium, sulphide, magnesium, alkalinity, sulfate, chloride, turbidity, reactive silica, orthophosphate, phosphorous, DOC, conductance, TDS (calculated), phenolics, carbonate (CaCO <sub>3</sub> ), hardness (CaCO <sub>3</sub> ), bicarbonate (CaCO <sub>3</sub> )	Grab Sample four (4) times per year (not less than one month apart)
2. Dewatering of Dolomite Quarry #2 – discharge point into designated area.	Metals Scan - must include the following: aluminium, antimony, arsenic, barium, beryllium, bismuth, boron, cadmium, chromium, cobalt, copper, iron, lead, manganese, molybdenum, mercury, nickel, selenium, silver, strontium, thallium, tin, titanium, uranium, vanadium, zinc	
	pH, TSS	Monthly

### Analysis and QA/QC

39. Unless otherwise stated herein, all solids and liquids analysis performed pursuant to this Approval shall be done by either a contracted commercial laboratory or an in-house laboratory. Contracted commercial laboratories shall have a recognized form of accreditation. In-house laboratories have the option of either obtaining accreditation or submitting to an annual inspection by a representative of the Department, for which **AML** shall be billed for each laboratory inspection in accordance with Schedule 1 of the **Accredited Laboratory Policy (PD:PP2001-01.02)**. Recommendations of the Director stemming from the annual inspections shall be addressed within 6 months, otherwise further analytical results shall not be accepted by the Director.

40. If **AML** wish to perform in-house laboratory testing and submit to an annual inspection by the Department then a recognized form of proficiency testing recognition shall be obtained for compliance parameters for which this recognition exists. The compliance parameters are listed in the ***Effluent and Monitoring*** section. If using a commercial laboratory, **AML** shall contact that commercial laboratory to determine and to implement the sampling and transportation QA/QC requirements for those activities.
41. The exact location of each sampling point shall remain consistent over the life of the monitoring programs, unless otherwise approved by the Director.
42. **AML** shall bear all expenses incurred in carrying out the environmental monitoring and analysis required under conditions of this Approval.

### **Monitoring Alteration**

43. The Director has the authority to alter monitoring programs or require additional testing at any time when:
- pollutants might be released to the surrounding environment without being detected;
  - an adverse environmental effect may occur; or
  - it is no longer necessary to maintain the current frequency of sampling and/or the monitoring of parameters.
44. **AML** may, at any time, request that monitoring program or requirements of this Approval be altered by:
- requesting the change in writing to the Director; and
  - providing sufficient justification, as determined by the Director.

The requirements of this Approval shall remain in effect until altered, in writing, by the Director.

### **Reporting**

45. Monthly reports containing the environmental compliance monitoring and sampling information required in this Approval shall be received by the Director, in digital format (e-mail or CD), within 30 calendar days of the reporting month. All related laboratory reports shall be submitted with the monthly report, in spreadsheet format (Microsoft Excel or a format easily transferable to Excel), and either Adobe Portable Document Format (PDF) or hardcopy format. Digital report submissions, if e-mailed, shall be sent to the following address: <<statenv@gov.nl.ca>>

46. All incidents of:

- *Environmental Contingency Plan* implementation; or
- non-conformance of any condition within this approval; or
- spillage or leakage of a regulated substance; or
- verbal/written complaints of an environmental nature from the public received by **AML** related to the Lower Cove Operation, whether or not they are received anonymously;

shall be immediately reported, within one working day, to a person or message manager or facsimile machine as follows:

- contact this Department (Western Regional Office) by phoning (709) 643-6114, faxing (709) 643-8654, or emailing [duffyt@gov.nl.ca](mailto:duffyt@gov.nl.ca).

A written report including a detailed description of the incident, summary of contributing factors, and an Action Plan to prevent future incidents of a similar nature, shall be submitted to the Director. The Action Plan shall include a description of actions already taken and future actions to be implemented, and shall be submitted within thirty days of the date of the initial incident. The address for written report submission is:

Director, Pollution Prevention Division  
Department of Environment and Conservation  
P.O. Box 8700  
St. John's, NL  
A1B 4J6  
Telephone: (709) 729-2556  
Facsimile: (709) 729-6969

47. Any spillage or leakage of gasoline or associated product shall be reported immediately through the Canadian Coast Guard at 1-(709)-772-2083.

### **Expiration**

48. This Certificate of Approval expires ***March 31, 2019***.

49. Should the proponent wish to continue to operate beyond this expiry date, a written request shall be submitted to the Director for the renewal of this approval. Such request shall be made prior to ***September 30, 2018***.



cc: Ms. Maria Dober - Head  
Compliance Promotion and Expert Support  
Environment Canada – Atlantic Region  
45 Alderney Drive  
Dartmouth, NS  
B2Y 2N6

Mr. Rick Curran - Regional Director  
Service NL  
5 Mews Place  
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Mr. Alex Smith, P. Eng. – Director  
Mineral Development Division  
Department of Natural Resources  
P.O. Box 8700  
St. John's, NL  
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# **APPENDIX J**

## Stormwater Management Design Brief

Atlantic Minerals Limited  
Quarry Expansion – Site  
Surface Water Control

Design Brief



Prepared for:  
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Prepared by:  
Roger LeBlanc

July 27, 2015


## Sign-off Sheet

This document entitled Atlantic Minerals Limited Quarry Expansion – Site Surface Water Control was prepared by Stantec Consulting Ltd. ("Stantec") for the account of Atlantic Minerals Limited (the "Client"). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec's professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

Prepared by   
(signature)

**Roger LeBlanc**

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## **1.0 INTRODUCTION**

Atlantic Minerals Limited (AML) presently owns and operates the Quarry in Lower Cove, Newfoundland. The site is located on western coast of Newfoundland, on the Port a Port Peninsula. The site at Lower Cove consists of a primary crushing and finishing operation stockpiles awaiting shipment of finished products using loading conveyors at its marine loading facility.

AML have been experiencing plumes at two locations in the ocean immediately adjacent to the quarry during heavy rain events (see Figure 1). AML is seeking to implement surface water control measures to mitigate those plumes.

This design brief assesses site characteristics, weather events causing plumes, and establishes design criteria for mitigation options including the use of stormceptors and settling basins.

### **1.1 EXISTING SITE INFRASTRUCTURE**

The existing quarry operation at Lower Cove includes approximately 2,900 acres of developed and operational land within 13,000 acres of licensed claim.

The site is divided by local Rural Route #3. Operations north of the road consist primarily of mining while south of the road includes the primary crushing, finishing and sizing of aggregate materials. For the purpose of this assessment, only the southern portion of the site is being considered. The southern portion of the site also includes a guard house and administration building.

Presently, site drainage infrastructure is minimal and surface water generally flows freely through the site, eventually making its way to the ocean. As previously mentioned, over its years in operation, the natural buffer zone has eroded in a few locations and fine material is easily and rapidly carried away during short and intense rain events.

To date, operations staff has constructed some ditching in an attempt to divert surface water towards the southeastern portion of the site.

### **1.2 DESCRIPTION OF WEATHER EVENTS CAUSING PLUMES**

The occurrence of plumes after short intense rain events has been occurring for some time and has grown in frequency during the last two years. The cause of the increase in frequency is due to the erosion of natural vegetation and the decrease in the buffer between the quarry operation footprint and the ocean.

The most recent weather events causing plumes include the following listed below. All rainfall occurred within a 2 hour timeframe.

**Table 1 - Summary of Recent Rain Events Causing Plumes**

Event	Date	Precipitation
1	May 5, 2015	3.4 mm
2	June 17, 2015	14.2 mm
3	July 12, 2015	12.6 mm

### 1.3 COLLECTION AND ANALYSIS OF WATERSHED DATA

In order to size and design surface water control measures, the subject area has been divided into sub-catchment areas as shown on Figure 2. From this figure, we can see that 4 sub-catchment areas contribute to the surface runoff causing plumes, which are located up-gradient of the existing vegetated buffer. The 4 sub-catchment areas are grouped into two larger sub-catchment areas for the purpose of this assessment and the design of surface water control structures.

Due to its limited space, there are no plans to further develop the subject portion of the quarry (i.e. south of RR#3 Highway).

The subject area is entirely stripped of vegetation and organic matter. The site's surface consists of aggregate materials including stockpiles of finished fine and coarse sand. The smallest sand material is sub-4.75mm dolomite, which is the main cause of the plumes. The area is generally slope between 8-10% with less than 10% assumed to be imperviousness.

These hydrologic parameters are used to determine the Time of Concentration (TOC). The TOC, as well as the CN and Intensity Duration Frequency curve are used to determine the required size of settling basin for a particular return period using Hazen's Equation.

An analysis of the groundwater table was not conducted but the location and in-ground depth of the settling basins can be adjusted accordingly if encountered during construction.

### 1.4 POTENTIAL SITES

Potential sites for settling ponds within the site are limited due to the limits of the developed area proximity to the ocean. A Civil 3D water drop analysis indicates 2 potential areas for settling ponds. Due to the large size of the developed area and the general topography, it is recommended to divide the contributing watershed in two and use two smaller settling basins rather than a large one. Space available would not be able to accommodate the larger basin. The two locations available will allow for gravity flow through the proposed settling pond inlet and outlets. Access to both basins is within close proximity to existing site access roads. Due to its

proximity to the environmental receptors, consequences of failure would be significant therefore appropriate security factors will be incorporated into the design.

## 1.5 DESIGN RECURRENCE INTERVALS

For the purpose of this assessment, a range of recurrence intervals were considered. 6 and 12-hour return periods for 10, 25, and 100-year recurrence intervals were considered for the design.

## 1.6 SELECT DESIGN PARTICLE SIZE AND SETTLING EFFICIENCY

The settling zone area and configuration of the basin are dependent on size (nominal diameter) of the smallest particle to be removed by sedimentation. The expected effectiveness is determined by the settling efficiency. For the purpose of this design, we assumed the smallest particle based on a sub-4.25mm diameter particle, which is the finest material produced and stockpiled onsite.

## 1.7 PEAK FLOWS AND VOLUME OF RUNOFF AND SETTLING ZONE

The change in runoff volumes based on the existing quarry footprint is shown in Table 2.

**Table 2 Change in Runoff Volume**

Return Period	Peak Flow (m <sup>3</sup> /sec)	Volume (m <sup>3</sup> )
1:10	0.18	5,104 to 8,965
1:25	0.19	6,550 to 11,291
1:100	0.23	8,731 to 14,830

The retention capacity in the basins, utilizing rock berms, should be able to accommodate a volume of 5,104 to 8,965 m<sup>3</sup> based on a 1:10 storm event.

## 1.8 MITIGATION OPTIONS

The mitigation options discussed herein are based on site characteristics. The use of either mechanical separation/settling (e.g. stormceptor) or settling basins present the most efficient overall solution; however, several other upstream measures can also be taken.

1. For example, if at all possible, it is strongly recommended to:
2. Flatten side slopes of all exposed areas (including material stockpiles)
3. All surfaces should be graded to provide positive surface and subsurface drainage.
4. All existing vegetation should be saved and new vegetation should be promoted wherever possible.



## 1.9 MECHANICAL SEPARATION/SETTLING (STORMCEPTOR)

The use of precast concrete mechanical separation units such as stormceptors was assessed as a potential mitigation measure. However, it was determined that the size of unit required would be large and subject to frequent and intensive maintenance. For this reason, mechanical separation was not further considered and eliminated as a potential mitigation measure.

## 1.10 SEDIMENTATION BASIN SIZE

Surface water will enter the sedimentation basin and very fine particles in the water will separate by means of gravity. The water must be in the sedimentation basin long enough for the desired particle size to be removed. Smaller particles require longer periods for removal and thus larger basins. Stokes' law can be used to calculate the size of a settling basin needed in order to remove a desired particle size. Stokes' law gives a settling velocity determining an effective settling basin depth; so solids removal depends upon effective settling basin surface area, while the depth component of settling basin volume remains important for storage of settled solids.

Translation of required settling time surface area to settling basin geometry requires consideration of short circuiting and turbulence induced by wind, bottom scour, or inlet and overflow design. Settling basin geometry is important because effective time of settling within the basin will be the time a volume of water spends in non-turbulent conditions before reaching the settling basin overflow. Median time is always less than the mean time calculated by dividing available volume by anticipated flow. The median time of passage through a short, wide settling basin may be significantly less than the median time of passage through a long, narrow settling basin. Settling basins with overflow structures near the entrance points may hold a large volume of stagnant water while newly admitted water rapidly reaches the overflow point before settling can occur. Effective surface area for settling seldom extends perpendicularly more than a tenth the distance of a flow line from basin entrance to overflow unless baffles are installed. Effective surface area and geometry may change as accumulating sediment fills part of the originally constructed volume. Short cut channels may rapidly form through heavier sediment accumulations near the entrance to the settling basin. Flow through shallow portions of the settling basin may cause turbulence re-suspending sediment from the bottom of the basin. 0.6 m is being recommended as the minimum settling basin depth to avoid bottom scour. The recommended optimal depth is 1.5m.

The area of the settlement pond is based on the outflow capacity ( $Q_o$ ) of the outlet structure and settling velocity ( $V_s$ ) of the target size particle. The outflow capacity ( $Q_o$ ) is designed based on the runoff inflow quantity ( $Q_i$ ):  $Q_i = Q_o$ .

The basin size was determined by the following formula,  $SA = 1.2 Q_o / V_s$ , where:

- $Q_o = 0.23 \text{ m}^3/\text{sec}$  (outflow capacity of the outflow structure);
- $V_s = 0.01 \text{ cm/sec}$  (settling velocity of fine silt requiring a retention time of approximately 6 and 12 hours); and



## ATLANTIC MINERALS LIMITED QUARRY EXPANSION – SITE SURFACE WATER CONTROL

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The design settling basin size range for each sub-catchment area is shown below:

### **Sub-Catchment 1**

Area = 170,000 m<sup>2</sup>  
Time of Concentration (TOC) = 27.0 min  
CN = 88

100yr – 12hr = 11,672 m<sup>3</sup>  
100yr – 6hr = 8,731 m<sup>3</sup>

25yr – 12hr = 8,886 m<sup>3</sup>  
25yr – 6hr = 6,550 m<sup>3</sup>

10yr – 12hr = 7,056 m<sup>3</sup>  
10yr – 6hr = 5,104 m<sup>3</sup>

### **Sub-Catchment 2**

Area = 216,000 m<sup>2</sup>  
Time of Concentration (TOC) = 31.2 min  
CN = 88

100yr – 12hr = 14,830 m<sup>3</sup>  
100yr – 6hr = 11,095 m<sup>3</sup>

25yr – 12hr = 11,291 m<sup>3</sup>  
25yr – 6hr = 8,323 m<sup>3</sup>

10yr – 12hr = 8,965 m<sup>3</sup>  
10yr – 6hr = 6,485 m<sup>3</sup>

### **Intensity Duration Frequency (IDF) Data**

1:100 Year 6-hour Rainfall = 82.0 mm (Stephenville Airport)  
1:100 Year 12-hour Rainfall = 100.9 mm (Stephenville Airport)

1:25 Year 6-hour Rainfall = 67.5 mm (Stephenville Airport)  
1:25 Year 12-hour Rainfall = 83.0 mm (Stephenville Airport)

1:10 Year 6-hour Rainfall = 57.5 mm (Stephenville Airport)  
1:10 Year 12-hour Rainfall = 70.9 mm (Stephenville Airport)

Both Sub sheds used SCS Type III rainfall distributions transformed to 6 hours and 12 hours for volume calculations.



### 1.10.1 Pond Configuration

Using the recommended 5:1 ratio for the length:width, each pond will be 109 m long, 39.5 m wide, and 97 m long, 35 m wide respectively.

### 1.10.2 Overflow Spillway

Overflow for the sediment basin will be provided at the permeable rock inlet and outlet berms. The overflow spillway is sized for a flow of 0.18 m<sup>3</sup>/sec.

C1 Rip Rap will be placed in the ditch down gradient of the permeable rock berms to prevent erosion in the event of an overflow situation. The C3 Clear Stone will be in compliance with the Newfoundland and Labrador Standard Specification.

### 1.10.3 Permeable Rock Berms

A granular berm was determined to be an appropriate method to allow seepage flow to exit from the sediment containment system. The permeable berm outlet is based on a seepage outflow through rock fill with a defined porosity.

The up gradient permeable berm will be a rock fill with an average thickness and width of 3 m and 7.5 m respectively, and shall be comprised of material between 100 and 250 mm in diameter.

The permeable berm outlet will be rock fill with an average thickness and width of 3.0 m and 7.5 m respectively, and shall be comprised of material with a mean diameter of 75 mm (porosity of 0.450).

### 1.10.4 Rock Flow Check Dams

Two rock flow check dam should be constructed down-gradient of the permeable outlet berm to reduce velocity and to promote the further deposition of sediment, prior to ocean discharge. Rock flow check dams should also be constructed within new ditching at regular intervals as indicated in Figure 2 primarily to reduce velocity prior to entering the settling basin.

### 1.10.5 Maintenance

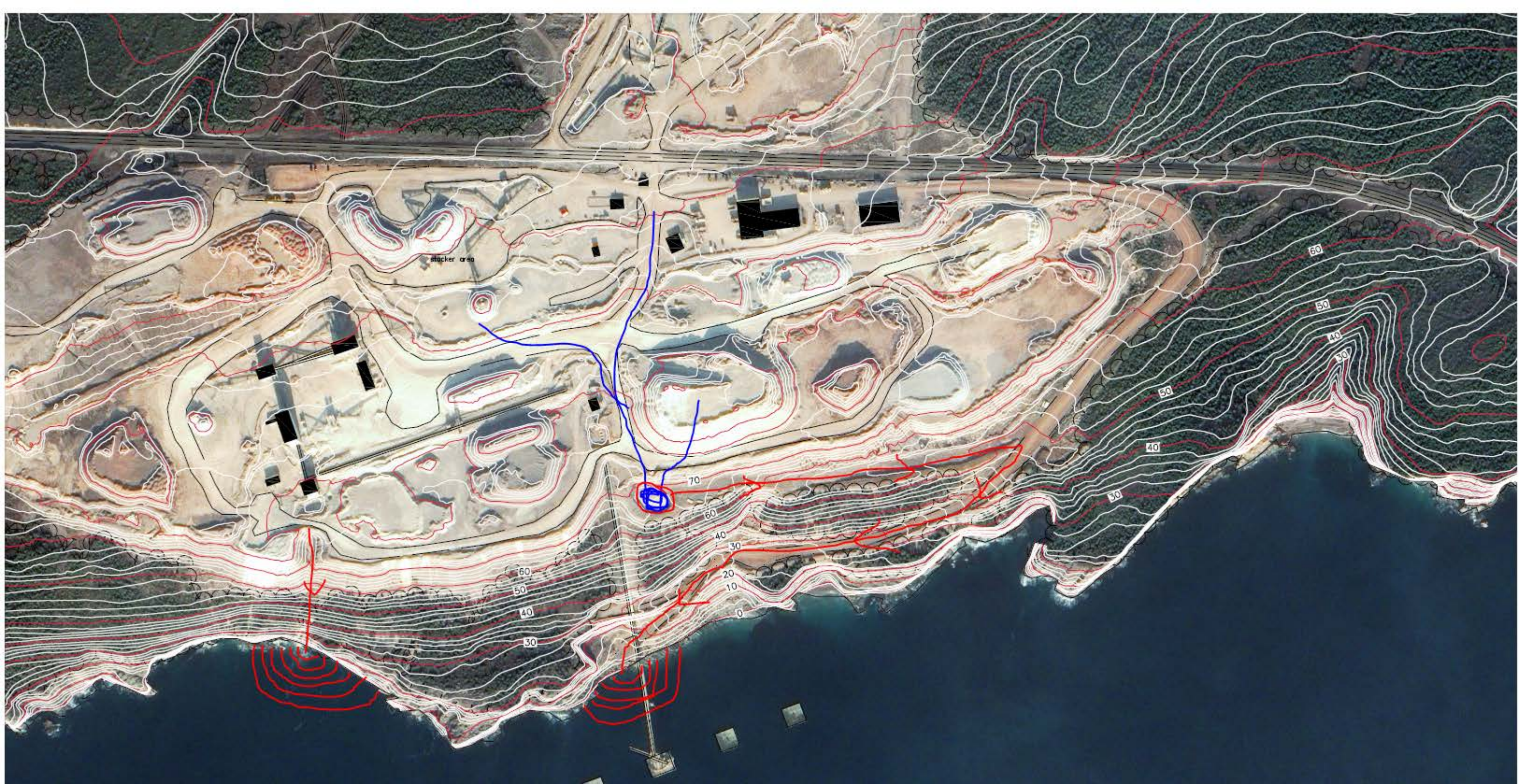
Once constructed, AML should establish and conduct regular site inspections of the sediment containment system and carry out regular maintenance on the system. Monitoring for plume occurrences following similar rainfall events will confirm the efficiency of the sediment containment system and the need to carry out maintenance or further improvements as required.

July 27, 2015

# APPENDIX A

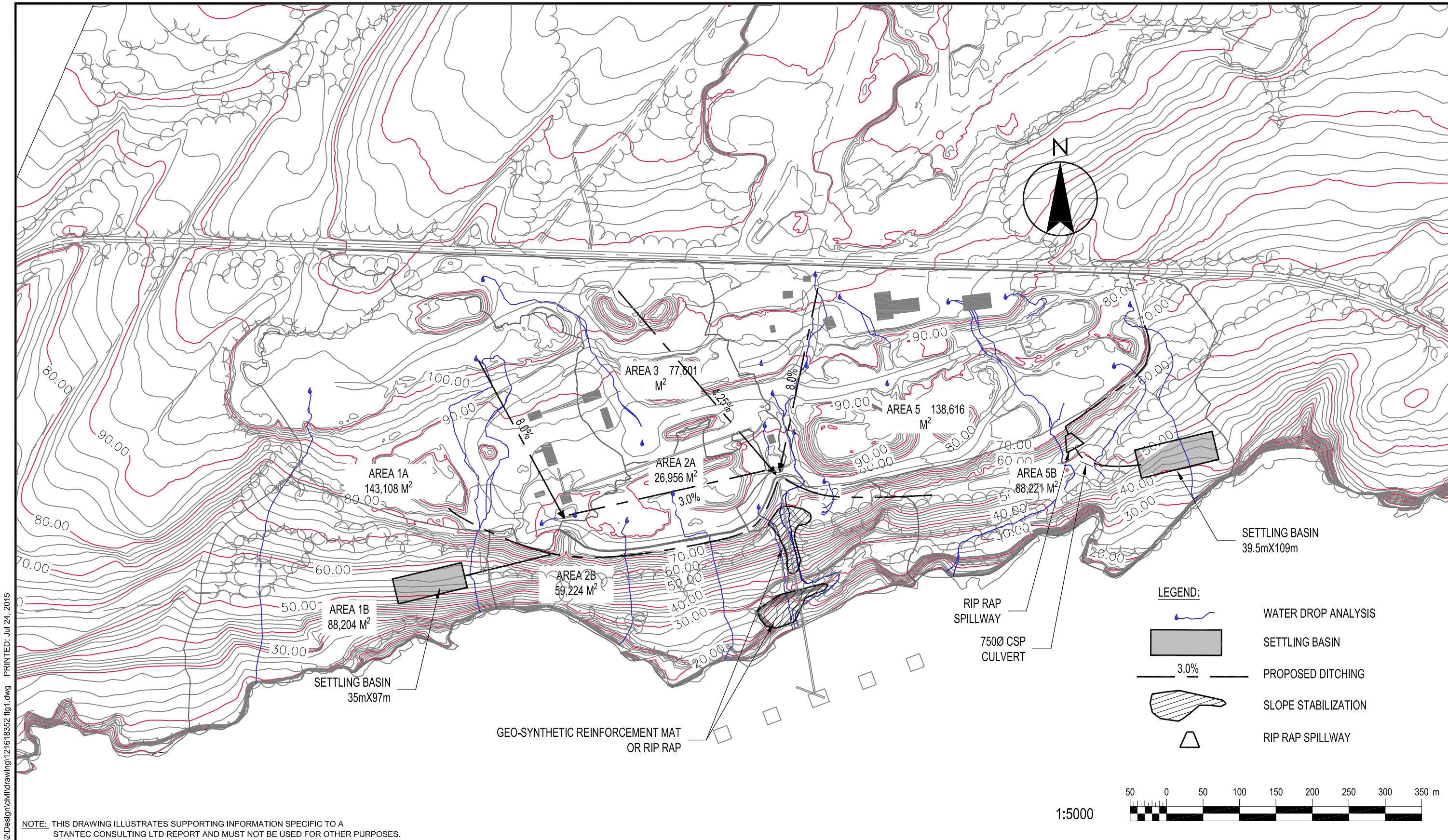
## SITE HYDROLOGIC DATA







V:\1216\active\121618352\Design\civil\drawing\121618352 fig1.dwg PRINTED: Jul 24, 2015



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

Reference:	

SURFACE WATER RUN-OFF SUB-CATCHMENT AREAS	
LOWER COVE QUARRY	
LOWER COVE, NFLD	
Client:	ATLANTIC MINERALS LTDS

Job No.:	121618352
Scale:	1:5000
Date:	2015/05/28
Dwn. By:	BDP
App'd By:	RAL

Dwg. No.:	1	

July 27, 2015

## APPENDIX B

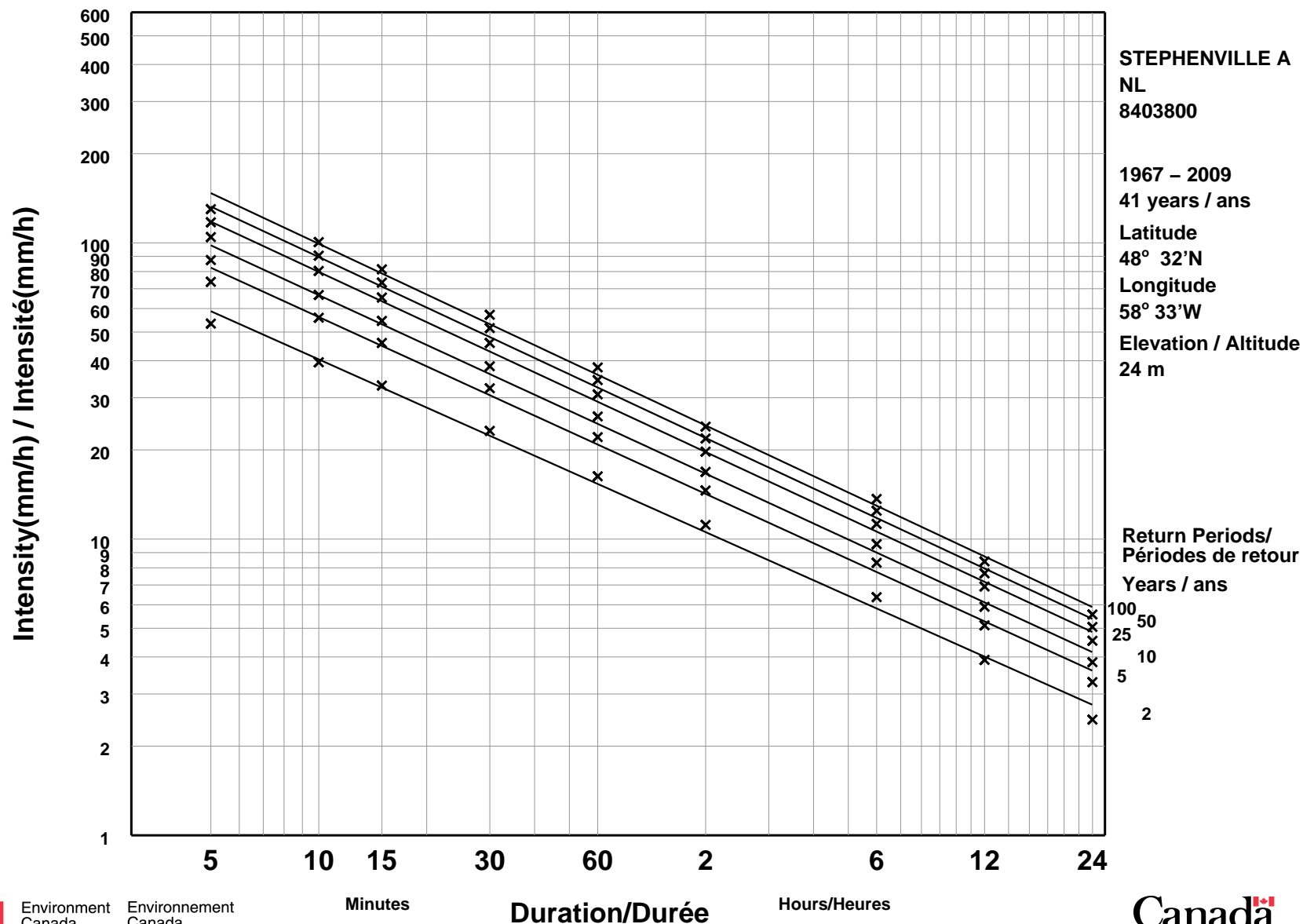
FIGURE 1 – ILLUSTRATION OF PLUMES

FIGURE 2-RECOMMENDED MITIGATION MEASURES

# Short Duration Rainfall Intensity–Duration–Frequency Data

2012/02/09

Données sur l'intensité, la durée et la fréquence des chutes de pluie de courte durée



Environment  
Canada

Environnement  
Canada

Minutes

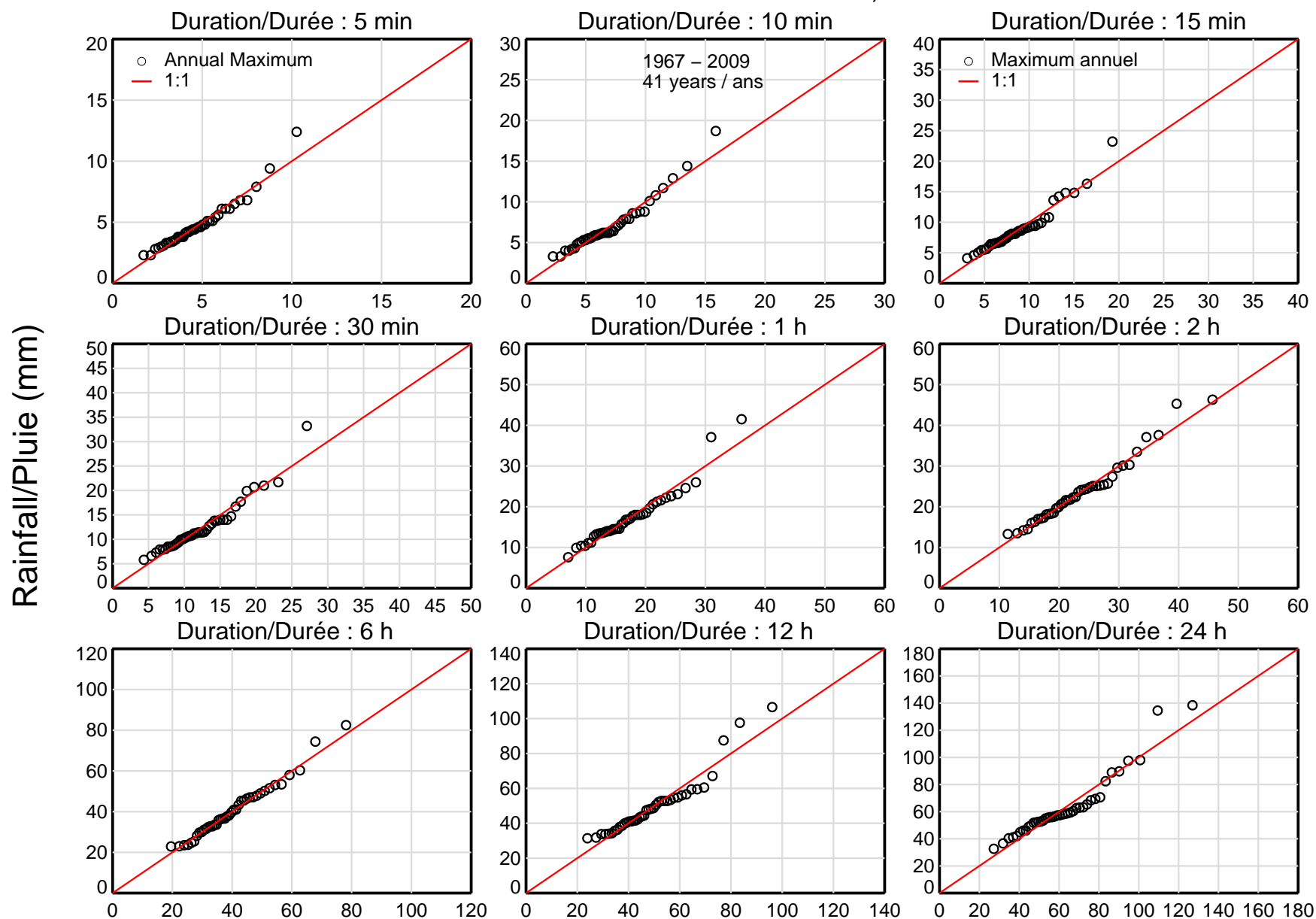
Duration/Durée

Hours/Heures

Canada



# Quantile-Quantile : STEPHENVILLE A, NL 8403800



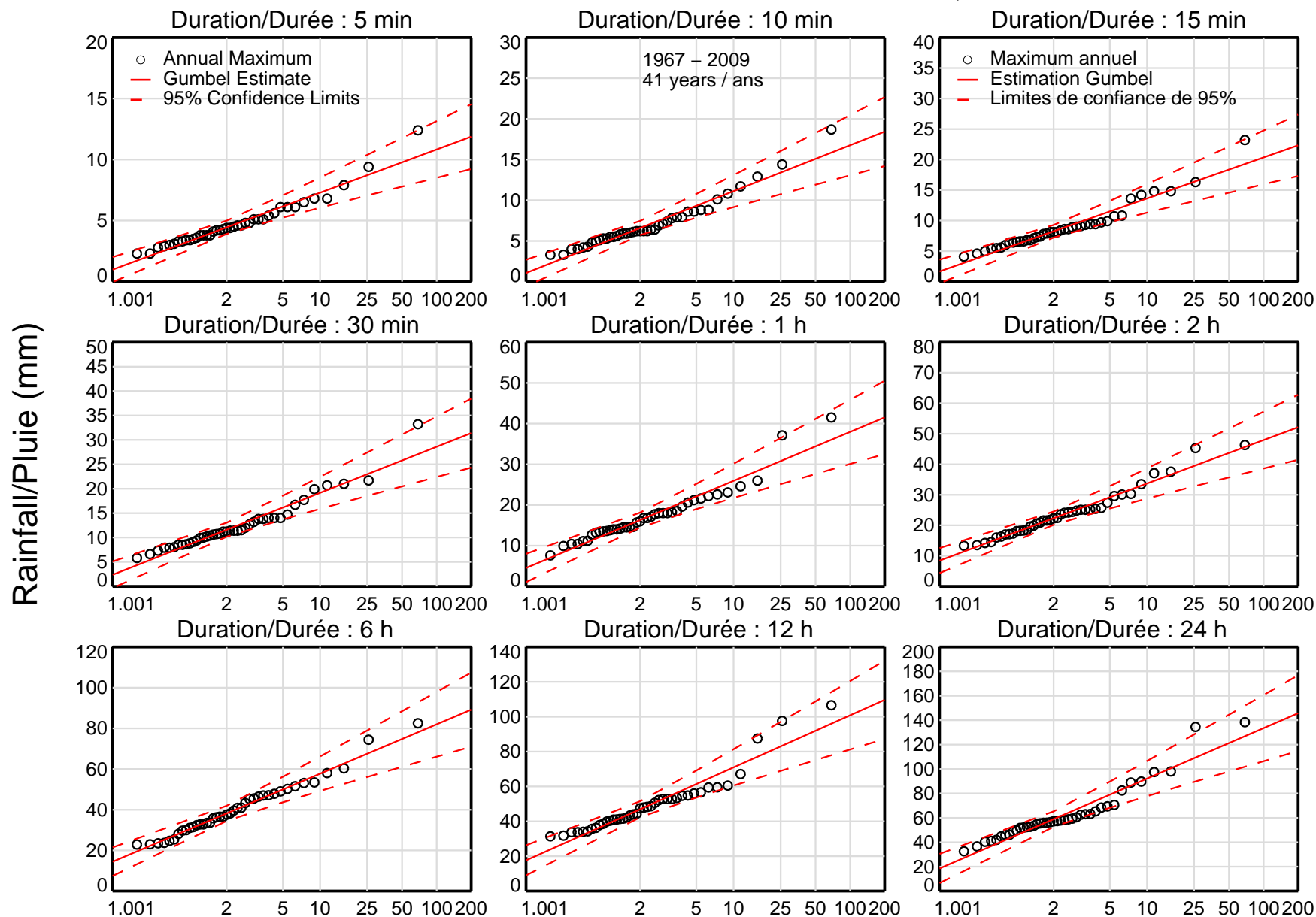
Environment  
Canada

Environnement  
Canada

2012/02/09

Canada

# Return Level/Niveau de retour : STEPHENVILLE A, NL 8403800



Environment  
Canada

Environnement  
Canada

Return Period/Période de retour (years/années)

2012/02/09

Canada