SHAW RESOURCES,

A MEMBER OF THE SHAW GROUP LIMITED

P.O. Box 60, Shubenacadie, Nova Scotia

B0N 2H0

on

PROPOSED LOVETT ROAD AGGREGATE PIT EXPANSION

Environmental Assessment Registration

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1.0 EXECUTIVE SUMMARY

Shaw Resources is a member of the privately owned The Shaw Group Limited of Nova Scotia. Shaw Resources wishes to expand its existing aggregate pit operations on Lovett Road, Coldbrook, Kings County, Nova Scotia. Currently, Shaw Resources holds an industrial approval from the Nova Scotia Department of Environment and Labour (NSEL) to construct and operate an aggregate pit of 2.2246 hectares on the Lovett Road property. The scope of the expansion will involve 4.9017 hectares of land, on land that has been leased by Shaw Resources from Lafarge Canada Inc. This Environmental Assessment Registration identifies potential environmental effects of the proposed undertaking, as well as the appropriate mitigation and follow-up monitoring measures.

It is anticipated that the pit expansion will commence soon after the project receives approval from the Nova Scotia Department of Environment and Labour and will be sustainable for ten (10) years. Final reclamation will occur within one year of project shutdown. Production at the site will be approximately 50,000 tonnes of aggregate per year. The purpose of the aggregate pit expansion is to extract aggregate for commercial, industrial, and retail markets. Once extracted, the aggregate will be transported by tractor-trailer trucks, through private lands, for processing at the Shaw Resources Keddy Operation on the South Bishop Road.

The operating schedule for the project will be consistent with current practices: 12 hrs/day (i.e., 7:00 am to 7:00 pm), 5 days/week (i.e., Monday to Friday), primarily during the spring and summer months, environmental conditions permitting. The site will be closed on Saturdays, Sundays, and statutory holidays, which is consistent with company policy. All activities associated with the project will be in accordance with the *Nova Scotia Pit and Quarry Guidelines* (1999). No physical facilities currently exist at the Lovett Road site, nor will any be required to accommodate the project.

In proposing an aggregate pit expansion in excess of four (4) hectares, Shaw Resources was required to register this project as a Class I Undertaking according to Part IV of the *Environment Act, N.S. Reg. 52/2005,* and the *Environmental Assessment Regulations, N.S. Reg. 26/95* for the Province of Nova Scotia, before commencing work on the project. The registration includes an environmental assessment of valued environmental components which were identified as being of significant concern, including:

1) Plant life (e.g., rare and sensitive plants)
2) Wildlife (e.g., rare and sensitive animals)
3) Surface water resources (e.g., streams or watercourses)
4) Groundwater resources (e.g., wells or other sources of drinking water)
5) Socio-economic environment (e.g., employment, health, & income)
6) Visual/aesthetic environment (e.g., noise, dust, & vehicular traffic)
7) Archaeological & heritage resources (e.g., evidence of aboriginal settlements)

Included in this final environmental assessment registration document are monitoring and mitigation measures to address any potentially significant environmental and public concerns. Key mitigation measures in response to public concerns include:

Issue/Concern	Monitoring and mitigation measures
Opportunities for public involvement	• Establishment of a Community Liaison Committee (CLC) • Sharing of groundwater reports and reclamation plan with CLC
Groundwater quality	• Test wells for monitoring groundwater • Mixing, stockpiling, and most, if not all, screening will occur off-site • No storage of chemicals on-site • No refuelling on site
Health and Safety	• Ensure existing gate is secured daily • Postage of additional no-entry signs • Removal of machinery and equipment at night • Emergency Response Plan for spill hazards
Aesthetics, Recreation & Property Values	• Maintain treed buffer surrounding proposed pit • No significant negative impact on property values is expected
Soil erosion and dust	• Refer to NSEL *Erosion and Sedimentation Control Handbook for Construction Sites*, and *Aggregate Operators Best Management Practices* and *Reclamation and Environmental Protection Handbook for Aggregate, Gravel and Quarry Operations* • Reclamation and decommissioning strategy, possibly including inactive Lafarge pit • No topsoil will be removed from site • Use of lignosulfate for dust reduction
Noise	• Adherence to 7 am to 7 pm hours working schedule • Adherence to *Guidelines for Pits and Quarries* • Maintenance of existing treed buffer zone
Wildlife and Habitat	• A 55 metre buffer zone between project activities and any riparian zone or watercourse • Sediment control structures to protect adjacent wetland and waterways from erosion risks • Hazard plans to protect wildlife and habitat from contamination risks; no storage of chemicals or refuelling on site • Site reclamation with pine and native vegetation • No evidence of Endangered Species or species of significant risk on site
Traffic	• Consideration of traffic control procedures (warning signs and stop signs) • Contribution to road maintenance, if required

Based on this environmental assessment, it is anticipated that the proposed project will not result in any significant, residual, adverse environmental effects, provided that the development of the project and the monitoring and mitigation measures described in this document are followed. These measures will include site reclamation, which will include the removal of any equipment, machinery, and other physical remnants of the project and the restoration of disturbed areas.

It is believed that the project will provide significant economic benefits, in terms of both direct and indirect employment and business opportunities. These would include benefits to:1) people employed directly by Shaw Resources; 2) businesses and their employees that provide services to Shaw Resources for materials such as fuel, tires, parts, and equipment; and 3), tertiary businesses and their employees that provide services to people either directly or indirectly employed by Shaw Resources such as stores and restaurants.

2.0 PROPONENT AND PROJECT IDENTIFICATION

2.1 Proponent Information

Name of Proponent:	Shaw Resources, a Member of the Shaw Group Limited
Postal Address:	P.O. Box 60, Shubenacadie, Nova Scotia B0N 2H0 Canada
Tel: Fax:	(902) 758-2095 (902) 758-3622
President & Chief Executive Officer:	Bert Frizzell

2.2 Project Information

Name of Undertaking:	Lovett Road Aggregate Pit Expansion
Location:	Lovett Road, Coldbrook, Kings County, Nova Scotia, Canada
Document Preparation:	Hendricus Van Wilgenburg BA, MA, MES
Address:	1396 Sherman Belcher Road, Kings County, Nova Scotia B0P 1J0 Canada
Tel:	(902) 678-3844
Email:	hvanwilgenb@ca.internet.ca

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Gordon Dickie

Signature of General Manager, Shaw Resources

Date: July 17, 2007

3.0 SCOPE

Shaw Resources, a member of The Shaw Group Limited, wishes to expand its existing aggregate pit operations on Lovett Road, Coldbrook, Kings County, Nova Scotia (Figure 1). In proposing an aggregate pit expansion in excess of four (4) hectares, Shaw Resources is required to register this project as a Class I Undertaking according to Part IV of the *Environment Act, N.S. Reg. 52/2005,* and the *Environmental Assessment Regulations, N.S. Reg. 26/95*, for the Province of Nova Scotia before commencing work on the project. This document fulfills that primary requirement for project registration under that legislation. The project falls under the authority of the Province of Nova Scotia and no municipal regulations apply to this project or to any connected activities.

3.1 Scope of the Undertaking

The proposed project consists of the expansion of an aggregate pit on the Lovett Road property beyond the 2.2246 hectares of property for which Shaw Resources currently holds an active Industrial Approval (see Appendix I: Copy of Industrial Approval). The scope of the proposed expansion will include approximately 4.9017 hectares of land. The *final footprint* of the proposed expansion and the active pit will include 7.1263 hectares. Activities connected to the proposed Undertaking will include aggregate excavation, occasional screening of aggregate, and transportation of aggregate from the Lovett Road property to the Shaw Resources' Keddy Operation on South Bishop Road for processing.

All mixing and stockpiling of the excavated aggregate and the majority of aggregate screening will occur at the Shaw Resources Keddy Operations on South Bishop Road. If circumstances require, screening will on occasion take place on the proposed project site. The proponent anticipates that aggregate extraction will be in the range of 50,000 tonnes per year, with the pit face advancing in sections. Excavation will occur intensely and periodically, for one or two months per year.

The proposed project will expand both north-westerly and south-easterly, beyond the active permitted pit (Figure 2). In each phase of the project, an area sufficient to meet specific mineral requirements for a three to five year period will be grubbed and prepared for excavation. Once the resource has been exhausted, the pit area will be graded, sloped, and otherwise modified using reclamation procedures detailed in Section 6.0: Reclamation and Decommissioning.

Shaw Resources will maintain within all areas of the property,:1) a 30 metre buffer between any active area of the proposed aggregate pit and the nearest property boundary; 2) at least a 100 metre buffer between any active area of the proposed aggregate pit and the nearest well, or foundation; and 3) at least 55 metre buffer between all project activities (e.g., overburden stockpiles) and the nearest watercourse, or established riparian zone.

3.2 Purpose and Need for the Undertaking

Policy objective

The principal policy objective for Shaw Resources is to secure a stable supply of aggregates and of the quality necessary to meet current and expected production and market requirements.

Rationale

Shaw Resources requires aggregates of varying quality to meet production and market requirements. Aggregates on the Lovett Road site are of sufficient size and quality to supply Shaw Resources with aggregates to meet its wide-range of mineral needs.

Undertaking context

The Lovett Road property is located on one distinct tract of land leased from Lafarge Canada Inc. Aggregate extraction began on the Lovett Road property in the 1980s, in an area south of and adjacent to the permitted pit (see Figure 2). In 2004, Shaw Resources entered into a lease agreement with Lafarge Canada Inc., allowing the proponent to extract aggregate from 7.1263 hectares of the property (see details in Figure 2), capturing both the permitted and proposed project areas.

Purpose of the proposed project

The purpose of the proposed project is to extract aggregate for the purpose of blending aggregates from other sources.

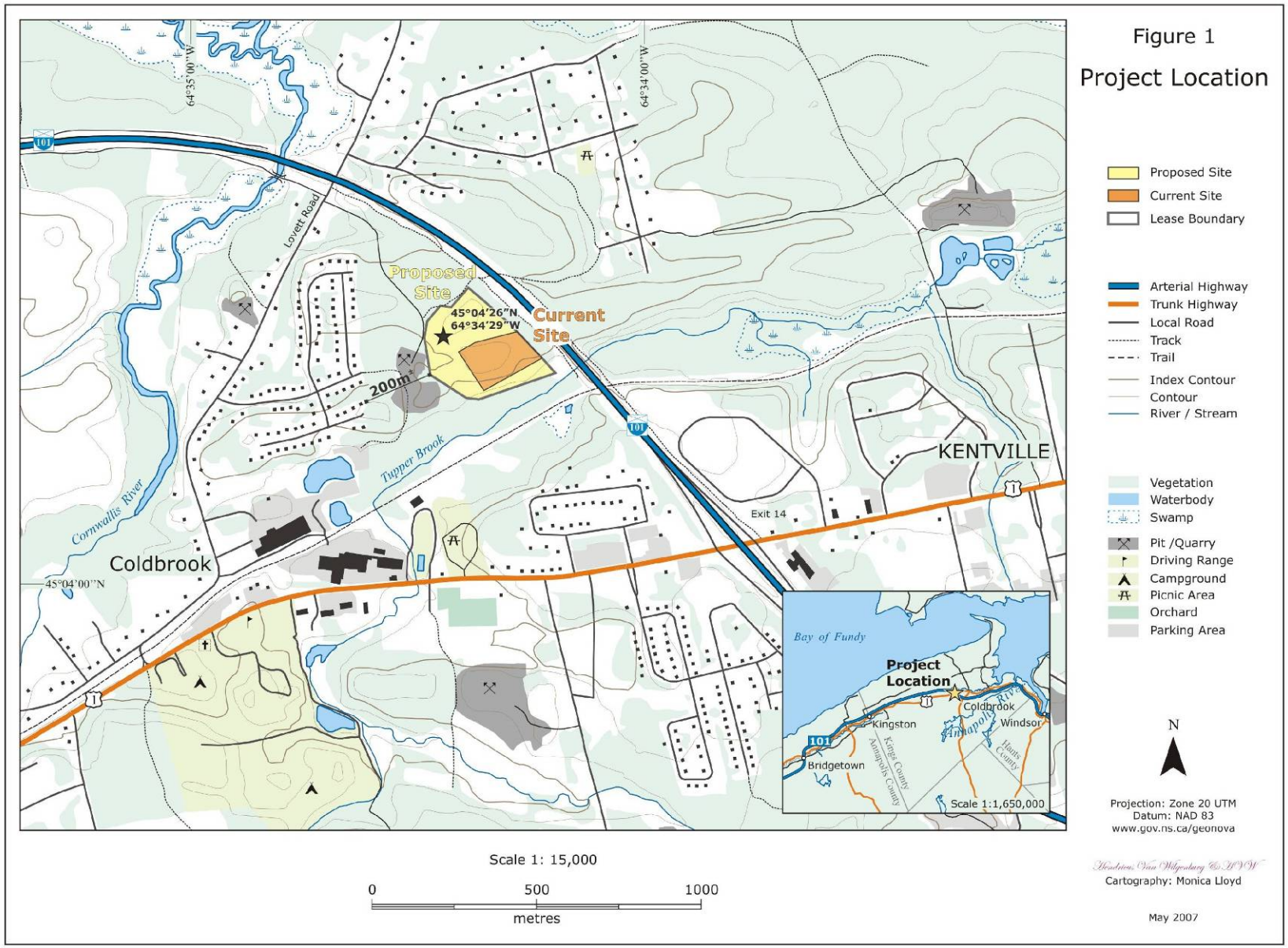
Figure 1
Project Location
Proposed Site
Current Site
Lease Boundary
Arterial Highway
Trunk Highway
Local Road
Track
Trail
Index Contour
Contour
River / Stream
Vegetation
Waterbody
Swamp
Pit /Quarry
Driving Range
Campground
Picnic Area
Orchard
Parking Area
Proposed Site
Current Site
45°04'26"N
64°34'29"W
200m
Lovett Road
Tupper Brook
Cornwallis River
Coldbrook
KENTVILLE
Exit 14
64°35'00"W
64°34'00"W
45°04'00"N
Bay of Fundy
Project Location
Kingston
Coldbrook
Windsor
Bridgetown
Annapolis River
Kings County
Annapolis County
Hants County
Scale 1:1,650,000
N
Projection: Zone 20 UTM
Datum: NAD 83
www.gov.ns.ca/geonova
Cartography: Monica Lloyd
May 2007
Scale 1: 15,000
0
500
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metres

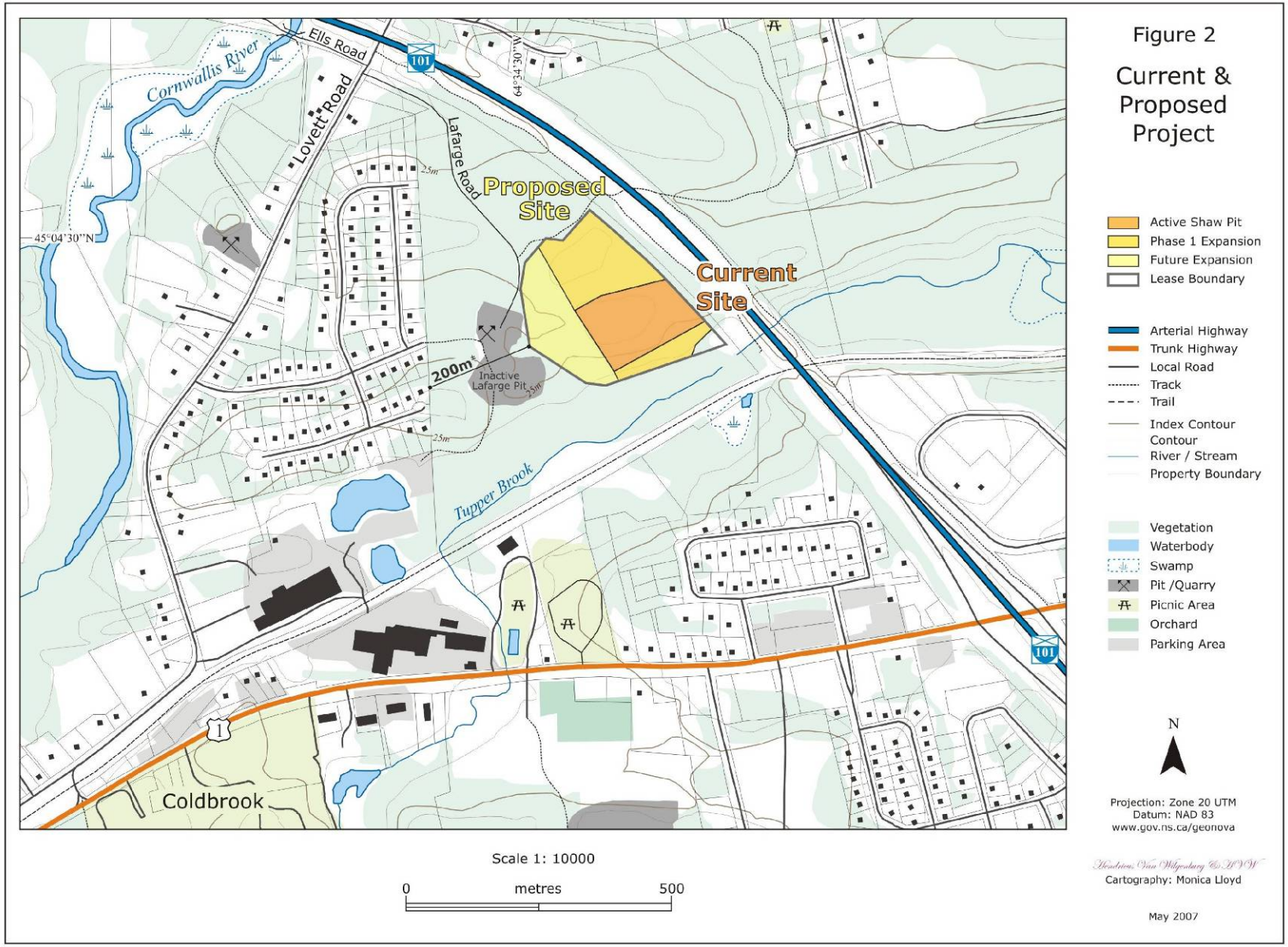
Figure 2
Current & Proposed Project
Cornwallis River
Ells Road
Lovett Road
Lafarge Road
Proposed Site
Current Site
45°04'30"N
64°24'30"W
200m
Inactive Lafarge Pit
25m
Tupper Brook
Coldbrook
101
1
Active Shaw Pit
Phase 1 Expansion
Future Expansion
Lease Boundary
Arterial Highway
Trunk Highway
Local Road
Track
Trail
Index Contour
Contour
River / Stream
Property Boundary
Vegetation
Waterbody
Swamp
Pit /Quarry
Picnic Area
Orchard
Parking Area
N
Projection: Zone 20 UTM
Datum: NAD 83
www.gov.ns.ca/geonova
Scale 1: 10000
0
metres
500
Cartography: Monica Lloyd
May 2007

3.3 Consideration of Alternatives

A review of project alternatives was carried out with regard to the following:

1) No aggregate extraction;
2) Outsourcing aggregate;
3) Location of the screening, mixing, and stockpiling area; and
4) Access routes to and from the site.

Abandoning the proposed project on the Lovett Road property is not a viable option from a resource acquisition and economic perspective. The proponent requires aggregates of varying quality for blending purposes in the amount and quality to sustain its current and future commitments. As part of its long-term economic strategy, Shaw Resources is continually searching for other properties to satisfy its mineral needs. The Lovett Road property is particularly advantageous because of its close proximity to the Shaw Resources wash plant at its Keddy Operations. To satisfy market requirements, Shaw Resources is required to process all aggregates used to standardize its mineral requirements. Shaw Resources has made a sizable investment in this plant. The Keddy Operations is a key fixture in the Shaw Resources operations in the Annapolis Valley. While it is physically possible to move the wash plant from the South Bishop Road site to another site, the cost of doing so would be excessive and unwarranted. In addition to the monetary cost of relocating, such would require new approvals for concerns such as water withdrawal, and acceptance by the local community.

Screening, mixing, and stockpiling will be carried out at the Keddy Operations. This only makes sense, from the perspective that all screening, mixing, and stockpiling will be carried out in one location. As mentioned earlier, some screening may be carried out on the Lovett Road property, but such occurrences will be rare.

Trucking aggregates from a range of sources to the South Bishop Road plant is an ongoing activity. It therefore makes economic and ecological sense to source aggregates as close as physically possible to the South Bishop Road site. This is by far the most efficient strategy for a number of related reasons associated with trucking aggregate such as wear on highways, consumption of fossil fuels, and wear on truck components.

Lastly, alternate access routes to the site were not considered. There currently exists a well-maintained road into the Lovett Road property which runs through a forested area. The forest along the Lafarge roadway buffers the proximate houses from any fugitive dust and noise generated by project activities. Alternate routes from the Lovett Road property were assessed, of which two were judged as reasonable. The first route is by Lovett Road and the second is a private roadway running directly to the Keddy Operations on South Bishop Road.

The Lovett Road route was rejected as an option because that route would require trucks to make a long, circuitous journey along Lovett Road to Highway 1, west along Highway 1 to South Bishop Road, then north on South Bishop Road to the plant entrance. Those roadways, particularly Highway 1, have relatively large volumes of traffic and pass through residential areas. The roadway through the Ells property and the bridge, which crosses Cornwallis River, are both privately owned. Compared to the Highway 1 route, the Ells roadway is roughly half the distance and avoids travel along the Lovett Road, Highway 1, and the South Bishop Road, thus by-passing residential areas and reducing traffic flow.

3.4 Scope of the Environmental Assessment

Shaw Resources is required to register the proposed project as a Class 1 Undertaking pursuant to the Nova Scotia *Environment Act, N.S. Reg. 52/2005,* and the *Environmental Assessment Regulations, N.S. Reg. 26/95*. Other relevant provincial regulations and guidelines to be adhered to are the *Nova Scotia Pit and Quarry Guidelines* (1999). Although no municipal regulations apply to this Undertaking, other relevant legislation, regulations, and/or guidelines to be adhered to include: the Nova Scotia *Activities Designation Regulations* (1995); the Federal *Fisheries Act* (1984); *Species at Risk Act* (2002); and the *Migratory Birds Convention Act* (1994).

The proponent and the consultant determined the scope of the environmental assessment for the proposed Undertaking based on the activities and environmental components associated with the proposed project. Furthermore, input from the professional judgments of the study team, a review of similar projects, consultation with regulatory authorities and municipal authorities, and field studies carried out at the site, were used to determine the scope of the assessment. The sub-consultant reports/individual field studies can be found in the appendices to this document.

The consultant met with Nova Scotia Department of Environment and Labour (NSEL) staff in July 2006 to discuss the project, the proposed expansion area and activities, and environmental components associated with the proposed project. During that period, the consultant also contacted the Manager of Planning for the Municipality of the County of Kings. The Manager was made aware of the proposed project and asked for information/direction concerning relevant land use policies and regulations that may impinge on the proposed project. In April 2007, the Director of Engineering & Works Department for the Town of Kentville was made aware of the proposed project and asked for information and direction concerning Kentville Wellfield, which begins some distance beyond the Lafarge property boundary. In May 2007, the area manager for Department of Transportation and Public Works was contacted and made aware of the proposed project and asked for information/direction concerning transportation relevant to the project.

In the fall of 2006, information bulletins were distributed in the Lovett Road area informing residents living in close proximity to the property that a public meeting would be held to discuss the proposed project, valued ecosystem components, and valued socio-economic components, in order to identify and qualify possible project-environment interactions.

This environment assessment evaluates the potential environmental effects of the proposed Undertaking over the life of the project. This study focuses on those Valued Environmental components (VECs) and Valued Socio-economic Components (VSCs) that have been identified as being of significant concern to arrive at meaningful evaluation of the impact of the proposed project. The following VECs and VSCs were investigated to identify and qualify possible project—environment interactions:

- Plant life (rare and sensitive plants)
- Wildlife (rare and sensitive animals)
- Socio-economic environment (including employment, health and income)
- Visual/aesthetic environment (including noise, dust and vehicular traffic)
- Groundwater resources (including wells and other sources of drinking water)
- Surface water resources (including streams or watercourses)
- Archaeological and heritage resources

Based on professional judgement, a review of databases and existing information, the size, nature, and location of the proposed Undertaking, the proponent and the consultants believe that any undesirable effects which may be associated with the proposed project will be limited to the immediate area of site. The final footprint of the project is expected to be 7.1263 hectares. The majority of the emissions and discharges will be confined to the Lovett Road property, provided that the proponent strictly adheres to the monitoring and

mitigation measures contained herein. It is in that light that the scope of this study—i.e., the environmental components—is confined to the Lovett Road property and adjacent areas.

4.0 PUBLIC INVOVLEMENT

4.1 General Description

A public meeting was held to generate local interest and to understand the attitudes, issues and key concerns of the community, interested individuals and groups with respect to the Lovett Road Aggregate Pit Expansion project. The meeting was held on September 26, 2006 at the South Bishop Road Lions Hall from 7:10 p.m. to 10:00 p.m. The meeting was facilitated by Hendricus Van Wilgenburg.

The purpose of the meeting was:

- To inform residents and interested parties of the details of the proposed Undertaking;
- To answer questions in a collective and transparent manner; and
- To listen and learn about the concerns of residents and interested parties with respect to the Undertaking.

Notice of the meeting was communicated by: 1) hand-delivery of 101 notices to most homes in close proximity to the site, along Lovett Road and in the Bessview Subdivision; 2) direct mailing of invitations to interested parties including Barry Peterson, Municipal Councillor; the Honourable Mark Parent, MLA; Grace Conrad, Chief and President of the Confederacy of Mainland Mi'kmaq; and Chief John Toney Annapolis Valley First Nation; and 3) publication of a meeting notice in the local newspaper two weeks before the meeting.

Sixty-seven (67) participants attended the public meeting, including five staff members of Shaw Resources. Notable attendees included a representative for the Honourable Mark Parent, MLA, and Barry Peterson, Municipal Councillor. The first half of the meeting was devoted to introducing the project and describing the undertaking, property, and environmental components being investigated in the Environmental Assessment. The second half of the meeting was devoted specifically to answering questions, recording comments, concerns, and opinions of participants, and addressing participant concerns.

To record their participation in the meeting, attendees were asked to register their names as they arrived. A comment sheet, contact information, and a synopsis of the proposed project (prepared by the facilitator) were provided to each registrant. The synopsis included information on the project scope, project operating schedule, expected production rates, transportation routes, and environmental studies conducted for the environmental assessment registration document. Also included were proposed monitoring and mitigation measures, and the potential economic benefits of the proposed expansion.

4.2 Opening Remarks

The facilitator initiated the meeting by introducing himself, the project proponent and company representatives present, as well as outlining the meeting format and objectives. The facilitator described his background and noted that he has been retained by the proponent, Shaw Resources, to carry out the following key roles: 1) to take comments and answer questions associated with the proposed project at the public meeting; 2) to hire the required specialists needed in the environmental assessment process; and 3) to act as project manager in overseeing the preparation of the environmental registration document.

The facilitator followed this introduction with a PowerPoint presentation, providing a brief overview of the points included in the Synopsis and an explanation of the stages in the development of an environmental assessment document. The facilitator explained that the land in question is owned by Lafarge Inc. and is leased to Shaw Resources for the purposes of aggregate extraction. A 2001 aerial map was used to show the current development at the site by Shaw Resources, and to outline the area involved in the proposed expansion.

4.3 Questions and Answers

Participants of the meeting requested information on the typical length of time it takes to complete a registration process. The facilitator responded that the length of process is varied; in some cases, it may take four months, in others, 1½ years or more. This depends in part on when the specific studies can be conducted and the minimum time required to prepare the documentation. The facilitator explained that once the project is registered and the registration document—for a Class I project—is submitted, the public has about ten days to review the document and submit comments; whereas the Minister has twenty-five days to render a decision.

Residents asked for local access to the registration document and individual studies completed by the contracted specialists in advance of filing the environmental assessment. The facilitator stated that individual reports will be included in the document and will not be released for community review unless their release is approved by the proponent. Once the project has been registered, two copies will be posted in public locations for the residents to review. The facilitator is available to answer specific questions and provide updates throughout this time period.

Attendees asked whether the requirements and recommendations included in the final environmental assessment document could be changed after the document has been filed for approval. The facilitator explained that the approval is granted based on the elements included in the document at the time of filing; however, testing requirements can be amended if requested by the Nova Scotia Department of Environment and Labour.

Participants had questions with respect to the existing aggregate operations at the Keddy site on South Bishop Road. Participants were interested in knowing the size of the Keddy project site and whether biophysical monitoring has been done throughout the development process. A company representative stated that the size would have been stated in the original application and that the document is on file with NSEL.

Attendees also wanted to know whether the zoning of the Lovett Road property, currently zoned R1 or Residential, was changed without notification to residents. A municipal councillor in attendance stated that the municipality has no authority over aggregate excavation and that a zoning of R1 permits aggregate extraction activities. The zoning has therefore not been changed in any way.

4.4 Public Feedback and Concerns

Participants at the meeting expressed a range of concerns and issues with respect to the Lovett Road Aggregate Pit Expansion project (Table 1). These can be categorized into:

1) Issues with operations at the site;
2) Biophysical issues;
3) Health and safety issues;
4) Socio-economic issues; and
5) Procedural issues (the environmental review process).

Each of these categories will be discussed in detail below.

1) Site Operation Issues

The amount of noise generated at the site was one concern noted by a few meeting participants. The presentation noted hours of operation for the proposed pit expansion project as 7 am to 7 pm. One resident suggested that the noise generated at Keddy operation is intolerable and that activities at the operation begin production as early as 5:30 am. (After the meeting, a person whose home is closest to the Lovett Road project area stated that noise has not been a concern at the site.) The facilitator commented that procedures laid out in the registration document will be closely adhered to by the proponent, and that a failure to do so could result in the Department of Environment and Labour halting operations.

A number of concerns were raised regarding traffic on Ells Road and Lovett Road. Participants were concerned with the high speed of vehicular traffic on the Lovett Road (at times 70 to 80 km) and that an increase in such traffic may be associated with the proposed operations. The proponent explained that trucks entering and exiting the Lovett Road site will not be traveling along Lovett Road, but simply crossing the Lovett Road diagonally to access the Ells roadway. A company representative suggested that traffic control issues might be addressed by the installation of stop signs at site entrances.

Meeting participants were also concerned with the wear and tear on roads used by heavy vehicles transporting heavy aggregate, and the associated need for care and upkeep. A company representative pointed out that road maintenance is the responsibility of the province and that the proponent is not the only user of the roads. Nonetheless, a company representative agreed to consider contributing to the cost of road maintenance, if required, to help alleviate participant concern. Participants were also concerned with wear and tear, and associated upkeep of the Ells Road Bridge, which crosses the Cornwallis River. A company representative stated that bridge upkeep is the responsibility of the landowner, but Shaw Resources is responsible for any damages to the bridge as a result of its activities.

Participants were also concerned with excess dust levels as a result of operations and the potential long-term effects of calcium chloride used in dust reduction on surrounding wildlife and human health. Residents were assured that this issue was being looked into, particularly the possible effects of this additive on the Cornwallis River.

2) Biophysical Issues

A number of concerns were raised in relation to drinking water quality, including concern with the potential impacts of the project on groundwater, which has already been negatively affected from other activities. The facilitator stated that monitoring wells will be drilled by the proponent on the recommendation of the hydrologist consulted. Wells will be monitored and reviewed on a scheduled basis as the project progresses. One resident asked whether drilling of the test wells themselves could lead to a change in conditions in the water table. The facilitator agreed to look into this issue.

Participants asked whether the proponent will offer any guarantees should there be problems with the ground water in the future and wanted specific information on the testing that will be conducted on the well water samples. The facilitator pointed out that the proponent is responsible for monitoring water levels and quality and for determining the cause of any changes within the system. On the issue of potential compensation for future damage, the facilitator stated that the issue is a legal one, and is outside the scope of this forum.

Those in attendance voiced concerns about potential negative impacts on the nearby brook and the plants and animals that use the site. The facilitator explained that studies on plant and animals in the area have not revealed any rare and endangered species on the project property and pointed out that a biologist has looked at potential impacts on the brook with no evidence of negative impacts from the project. He stated that there is a rare plant species growing beyond the project area. He also explained that NSEL regulations require a 30-metre buffer between all project activities and watercourses.

Meeting participants were interested in obtaining more information about the reclamation process once the project was complete, and requested a clearer definition of "reclamation". A company representative explained that the process normally involves grading and sloping the pit area, and covering the disturbed areas with the stockpiled overburden. Pit embankments are sloped in this process to avoid steep slopes and to lessen hazards. Erosion was noted as an issue, especially in terms of the impact on houses located behind the old pit on the property. A company representative suggested that the reclamation could be expanded to include the old Lafarge pit and that if the community wants to put forward a reclamation proposal, it would be considered. The residents asked that the above requests and comments be included in the environmental assessment document.

Concerns about the impact of the project on the aesthetics of the site were also raised. The facilitator pointed out that the treed buffer zone surrounding the proposed and current pit areas will retained. Nonetheless, it is the landowner's prerogative to do with the property as they wish, within provincial and municipal regulations.

3) Health and Safety Issues

Concern with lack of site security was brought up repeatedly by meeting participants. The community noted that the site is dangerous and that steps need to be taken to increase safety for the community. Current signage and fencing does little to keep unwanted OHV and foot traffic out and, in particular, does not go far enough in deterring children from entering the site. Additional concerns were brought forward about overnight security and the heavy equipment that is left on site overnight. Leakage and/or tampering could result in fires or explosions that are a real danger to properties in the area.

A company representative suggested that fencing the entire area is impractical but noted that there is currently a gate that is kept locked when operations cease, which prevents entrance into the site. A company representative agreed to post more signs, especially during the working season, and to ensure that the existing gate is secured daily. A company representative stated that all machinery and equipment will be removed on a daily basis and no fuel will be stored on site.

Some community members explained that they use the private Lovett Road property as a recreational site and that potential security solutions should take into consideration this current use of the property. The facilitator suggested that issues such as those could be addressed through a Community Liaison Committee (CLC), which could meet on a regular basis in a structured environment to continue discussions.

A company representative also assured residents that emergency response plans are already in place and that "immediate response" is company policy. There is also a company employee who monitors the site; but all employees working at the site are familiar with the emergency response plans and company protocols for the cleanup and reporting of hazardous spills.

4) Socio-Economic Issues

Residents voiced concerns about the potential negative impact of the project on real-estate values. It was pointed out by the facilitator that studies conducted in the U.S. on aggregate operations show that there is little negative impact on local real-estate values; in fact, in some cases values rise because of open areas created by aggregate excavation. A continuation of this discussion resulted in a request that the facilitator seek out additional data on such effects in Canada, and more specifically in Nova Scotia, before the environmental assessment document is registered.

Participants felt that there should be a balance between the potential profits to be gained by the proponent and the potential costs to the community, and expressed a strong interest in the creation of new recreational sites to achieve this balance. Participants proposed creating recreational trails in the area to provide an alternative to the Lovett Road site currently in use by some residents. Community members noted that the creation of alternative recreational sites can deter the use of off-highway vehicles (i.e., OHVs or ATVs) at the site, and safe recreational areas can be assured with the erection of additional signage. The facilitator added that additional potential economic benefits to the region from the proposed project include employment benefits. A company representative stated that Shaw Resources currently employs about eleven people at its Keddy operations, and sub-contracts drivers through local trucking companies.

5) Procedural Issues

Attendees were concerned that the aerial photograph outlining the scope of the current operation was outdated. Although the aerial photograph shows the proposed expansion area, buffer zones and the transportation routes (the currently used route), attendees noted that the presentation photo did not accurately represent the current area utilized for aggregate extraction. It was explained that aerial photos are taken about every ten years and that the 2001 aerial photograph used is the most recent available. The proponent agreed to try to obtain more recent images and aerial photos, if available, for use in further discussions.

Participants were concerned with the history of the proponents operations, specifically those at the Keddy site. Some expressed the view that if the general guidelines and monitoring have not been honoured at the Keddy operations, they are unlikely to be followed at the proposed Lovett site. A company representative replied by stating that the company went through all of the steps required at the time that the Keddy permit was applied for and

subsequently followed, but that those requirements and standards have changed considerably since the approval was issued. It should noted that Shaw Resources is in full compliance will all regulatory requirements at the Keddy Operations.

One attendee expressed gratitude that the community was being consulted, but also noted that it would have been appropriate to have been consulted two years ago when Shaw Resources applied for the industrial approval for the current project. Some attendees were offended that the proponent had taken so long to canvass the community for input. Furthermore, attendees expressed concern about the general degree of public involvement in the current environmental assessment process.

One attendee suggested that the community doesn't really have a say in what happens on the property given that it is private property. The facilitator noted that many of the issues raised at the meeting could be addressed through the development of a Community Liaison Committee (CLC). It was noted by a company representative that the company has set up similar arrangements in other areas to work with communities on projects and developments. It is worth noting that the public meeting being held was not an application requirement and that the meeting was held to solicit community involvement and to address resident concerns. Residents suggested that politicians should be encouraged in the future to make public engagement exercises a requirement at all stages of the environmental assessment process for all future developments.

4.5 Closing Remarks

In general, Shaw Resources demonstrated a willingness to engage in open discussions with community members and made a number of substantive commitments to the community in response to concerns raised at the meeting. There seemed a genuine willingness on the part of both parties to work together and to continue the consultation process in order to address the concerns of those most affected by the expansion, namely the residents.

4.6 Responding to Public Concerns

Shaw Resources acknowledges that the success of the proposed project depends on the support of the community. To that end, Shaw Resources will move to establish a Community Liaison Committee (CLC) as soon as the project receives Ministerial approval.

The community will be informed in advance—through the CLC—when scheduled seasonal operations at the Lovett Road site will begin and cease.

Shaw Resources will share groundwater reports with the CLC as a means of maintaining public confidence in its activities on the Lovett Road property and in local groundwater resources. Shaw Resources will also share reclamation plans with the CLC with the intent of incorporating community views, where possible, into the reclamation process.

Stop signs will be installed and maintained at the entrances to the Lafarge and Ells roadways. Should it be necessary to enhance entrance sightlines—restricted by plant growth—for oncoming traffic along the Lovett Road, vegetation will be cut along Department of Transportation right-of-ways for 30 metres in either direction on both sides of the Lafarge and Ells roadways—that is, with Department of Transportation approval. Further, Shaw Resources will approach the Department of Transportation to improving signage along Lovett Road to inform drivers of truck traffic crossing Lovett Road. The entrance to the Lovett Road property will be secured with a gate and locked when operations shut down. Signage warning visitors of construction and pit embankments will be maintained at the Lovett operations and additional signage posted to discourage use of the site by OHVs.

The bridge crossing the Cornwallis River on the Ells roadway will be inspected by a qualified engineer each year before operations at the Lovett Road site begin. The bridge is designed as per CAN/CSA, rated at CS-500KN (112,000lbs/50,802kg) for 100,000 cycles over 15 years. Shaw Resources will not exceed these weight limits and further, will post those weight limits at either end of the bridge to inform users of its limits. If the Ells Bridge fails its annual inspection or is damaged during use, operations at the Lovett site will come to a halt until the bridge is satisfactorily repaired or replaced. At no time will Shaw Resources transport aggregate along the Lovett Road—from the Lovett Road property—to its Keddy operations.

In response to the community's request, research was conducted to determine the impacts of aggregates pits on property values. A review of the academic literature on property values and aggregate pits and quarry operations suggests that the factors associated with property values are too complex to make any predictions regarding the impact of these aggregate operations. While no studies were found on the relationship between property values and aggregate operations in Nova Scotia or in Canada, studies in the United States report that positive impacts on publicly held open spaces, such as public parks, natural

areas, golf courses and greenbelts significantly increases a home's sale price; in fact, the closer the home to the open space the higher the price (Correll, Lillydahl and Singell 1978; Bolitzer and Netusil 2000). However, on privately held lands, such as in this case, no such relationship was found to occur. Studies suggest that if the open space is accessible to residents and the operations are aesthetically appealing because of places to walk and treed areas such as is the case on the Lovett Road property, no significant negative impact on property values is anticipated (Bolitzer and Netusil 2000).[1]

In response to the community's request for shorter working hours, Shaw Resources will begin project operations no earlier than 7:00 am and shut down at 7:00 pm. Such will minimize the impact of project activities on neighboring residents. Reponses to all other community concerns can be found in the relevant sections of this document.

[1] We acknowledge the at least one reference regarding the influence of pits on property values is dated and hence open to criticism (i.e., not relevant) because attitudes have changed dramatically over the past thirty years. While we accept that attitudes have changed dramatically, it cannot be assumed that behaviours regarding property values and so forth have also changed dramatically. The problem is that changes in attitudes do not evitably result in changes in behaviour, a problem long recognized in the social science, psychology, and the more recently, in the environmental literature.

Table 1: Summary of Issues and Concerns Raised by Public Meeting Participants

Category	Participant Issue/Concern Expressed	Response
1. **Site Operations**	• Noise & adherence to hours in the EA document (4) • Increased traffic and traffic speed (3) • Wear and tear of roads • Wear and tear of Ells Road Bridge (4) • Dust (3,4) • OHV traffic control	• Proponent will adhere to 7 am to 7 pm hours • Consideration of traffic control procedures e.g. warning/stop signs • Proponent will consider contributing to cost of maintaining the portion of the Lovett Road that Shaw Resources crosses; maintenance of Ells Road Bridge is the landowner's responsibility; damages to Ells Bridge as a result of project activities is Shaw Resources' responsibility • Impacts of dust control are being looked in to
2. **Biophysical**	• Further impacts on ground water system (4) • Impact of drilling test wells on water supply (4) • Impact on brook, plant and animal life • Reclamation plans/policy (4) • Erosion close to existing pit (1, 4) • Negative impact on aesthetics (4) • Depth of excavation in relation to water table (4) • Factors that will be considered in well monitoring	• Proponent will set up test wells and monitoring • Facilitator will look into risk to groundwater from drilling test wells • A 55 metre buffer zone between project activities and any riparian zone or watercourse will protect plants and wildlife within those areas. • Studies show no evidence of potential impacts on plants and animals • Reclamation may be expanded to include old pit; community can put forward reclamation proposal for consideration • Maintain treed buffer zone surrounding pit areas
3. **Health and Safety**	• Effects of calcium chloride on ecosystem and human health (2) • Lack of site security – current fence and signage insufficient (4) • Securing of equipment, tanks and other hazardous materials left overnight (4) • Emergency and hazards	• Effects of calcium chloride looked into • Proponent will post more signs and ensure existing gate is secured daily • Proponent will remove machinery and equipment at night • Emergency response plans are already in place

Category	Participant Issue/Concern Expressed	Response
4. Socio-economic	• Negative impact on real estate values • Need for alternate recreational sites • Shared use of site for recreation • Balance between negative impacts and potential benefits to community • Compensation for damage to water systems (2,3)	• Facilitator will seek out additional information on real estate impacts in Canada and Nova Scotia • Compensation is a legal issue that cannot be dealt with here
5. Procedural	• Outdated map of site being used • Lack of access to EA document and studies in advance of EA filing • Lack of opportunities for public involvement in the process • Adherence to guidelines in EA document • Public engagement exercises in the EA process should be made mandatory - through political lobbying • Community access to well monitoring reports • System to amend guidelines in EA • Zoning R1- not suitable for commercial enterprise (4)	• Proponent will try to obtain more recent aerial photos as they become available • Creation of a Community Liaison Committee (CLC) to address many concerns raised at the meeting

Note: Numbers in brackets indicate other categories under which the issue falls.

Plate 1: Active pit on Lovett Road property from southern treed buffer

Plate 2: Facing entrance to existing Lovett Road pit, from decommissioned Lafarge pit

Plate 3: Facing existing Lovett Road aggregate pit, and Highway 101 beyond treed buffer—west side

Plate 4: Facing existing Lovett Road aggregate pit, and Highway 101 beyond treed buffer—south side

5.0 DESCRIPTION OF THE UNDERTAKING

5.1 Proposed Project Overview

It is the intent of Shaw Resources to expand its existing aggregate pit operations on their Lovett Road property in Coldbrook, Nova Scotia (Figure 1). Currently, Shaw Resources holds an Industrial Approval from Nova Scotia Department of Environment and Labour (NSEL) to construct and/or operate an aggregate pit 2.2 hectares in size on the Lovett Road property (see Appendix I: Copy of Industrial Approval). The active Industrial Approval—No. 2004-043270, dated, 14th October 2004—expires on 14th October 2014. Shaw Resources entered into a lease agreement with the property owner, Lafarge Canada Inc, in 2004 (Appendices II and III: Lease Agreements). Upon signing the lease agreement, Shaw Resources assumed all responsibility for site development, preparation of new aggregate extraction areas, and aggregate extraction, as well as the restoration, reclamation, and decommissioning of the proposed and active project site.

Shaw Resources wishes to incorporate the permitted pit into the larger proposed project by developing the pit face to the north, west and south (see Figure 2). The proposed pit area features two hills, which contain most of the aggregates of interest. The surrounding forested area can best be described as a rolling landscape.

Shaw Resources will in all areas of the property maintain:1) a 30 metre buffer between any active area of the proposed aggregate pit and the nearest property boundary; 2) at least a 100 metre buffer between any active area of the proposed aggregate pit and the nearest well, or foundation; and 3) at least 55 metre buffer between all project activities (e.g., overburden stockpiles) and the nearest watercourse, or established riparian zone. The final footprint of the active project is 2.2246 hectares; the proposed project is 4.9017 hectares, totalling 7.1263 hectares of the property.

The inactive Lafarge pit to the south is not part of this expansion, but may become part of the final reclamation plan, subject to the approval of property owners.

5.2 Geographic Location

The proposed Lovett Road Aggregate Pit Expansion Project is on a thirty (30) hectare property wholly owned by Lafarge Canada Inc., of which 7.1263 hectares is leased by Shaw Resources. It is located in Coldbrook, Kings County, Nova Scotia, approximately one (1)

kilometre west of the town limits of Kentville. The property lies approximately two (2) kilometres north of Highway 1, east of Lovett Road and the adjacent Coldbrook Growth Centre subdivision and is bounded by Highway 101 to the north and east, and the former Dominion Atlantic Railway to the south. Cornwallis River is located to the west and north of the proposed project area, but is well outside of the area under study. Figure 1 shows the location of the existing aggregate extraction operation, and the area of interest for expansion, in relation to the topography, drainage, highways and structures of the Coldbrook Area.

The Shaw Resource property itself is zoned as R1 Residential by the Municipality of Kings County (See Appendix V: Diagram of Kings County Growth Area and Zoning), a zoning which permits aggregate extraction operations. The area surrounding the Shaw Resources aggregate extraction operation is of mixed land use. To the east, north and west side of the property, the zoning is also R1, Residential. The Coldbrook Growth Centre Subdivision specifically, located west of the project area, is a mix of residential, commercial, open space and institutional development under this zoning category. The area to the south of the Shaw property is zoned M1, or Light Commercial Industrial, in addition to R2 Residential.

5.3 Property History

For the last 100 years or more, the Lovett Road property has undergone extensive change. The effects of human activity are visible throughout the area. The forests have been harvested, at one time or another. The property has been used in the past for aggregate pit extraction. Anecdotal and empirical evidence suggests that some of the surrounding area was farmed extensively. An aerial photograph taken in 2001 portrays the impacts of farming, forestry, and residential activity in the study area (see Appendix VI: Botanical Survey).

5.4 Physical Components

The area of excavation interest consists of two small wooded ridges, one occupying the northern half of the property and the other the south. There are several roads and tracks through the property under study, however for the most part the property is forested. An off-highway vehicle (OHV) trail also passes through the valley between the two small hills on the property. The 2.2246 hectare portion of the property approved for aggregate extraction and cleared in 2005 lies on the south ridge and the expansion area for which

approval is being sought lies north-westerly of the south ridge (see above, Plates 3 & 4). The 1.7611 hectare inactive Lafarge aggregate pit lies west of the active and proposed pit areas. There are no above-ground water features on the site, but the Tupper Brook (a tributary of the Cornwallis River) flows in a north-easterly direction roughly 55 metres south of the proposed project area.

The site has been core sampled for desired aggregates in twelve areas of the 7.1263 hectare project area (see Figure 3)

5.5 Site Preparation and Development

Current Phase

The current or active pit is located within the boundaries labelled 'Current Phase' on Figure 4. Site preparation and development will occur in two phases, with reclamation occurring in three phases. Before any proposed pit site is prepared, the trees on the proposed pit area will be harvested by Lafarge Inc., which is within their rights as the landowner.

Site Development: Phase 1

In Phase 1, areas within the defined 'Expansion Area' as shown in Figure 5 will be grubbed (cleared of roots and stumps) using a bulldozer. All overburden will be stockpiled within the project area for future use in site reclamation. Extraction of sand from these areas will begin on the eastern end of the property and progress north-westerly. By so doing, the pit face will be directed away from the sub-division nearby, thus lessening the potential for noise impacts. A buffer zone will be retained in the southern portion of the property to prevent any intrusion into the area characterized as wetland. The area currently being extracted will continue to be extracted within both expansion areas to an average depth of 16 to 18 metres above sea level (see Figure 8). This phase of extraction is currently scheduled to be completed approximately 5 to 8 years after grubbing and extraction begin.

Site Development: Phase 2

Phase 2 will begin prior to the completion of Phase I. Phase 2 will include grubbing and extraction as shown in Figure 6 and reclamation of areas previously disturbed during Phase 1. The north-westerly area, labelled 'Expansion Area Phase 2' in Figure 6 will be grubbed and subsequently extracted to a depth of 16 to 18 metres above sea level. All overburden will be stockpiled within the project area for future use in site reclamation. The area

labelled ‘Phase 2 Reclamation Area’ will be reclaimed to the current NSEL standards starting with areas on the eastern property boundary working westerly. Phase 2 is slated for excavation completion, approximately 2 to 5 years after grubbing begins.

The rationale for this strategy is to facilitate the efficient removal of the overburden and its replacement over the distributed areas, once the desired aggregates have been excavated. If vegetation does not regenerate on the overburden piles with the first year, they will be seeded with grasses to stabilize the soils until used in the reclamation process. With regards to the location of overburden piles, the applicable separation distances and site-specific conditions detailed in Section 5.6, Operation and Maintenance will be followed.

Please note that under no circumstances will topsoil be removed from the site.


Figure 3
Project
Test Sites
Aggregate Sample
Current Site
Proposed Site
Lease Boundary
Arterial Highway
Trunk Highway
Local Road
Track
Trail
Index Contour
Contour
River / Stream
Land
Waterbody
Swamp
Pit /Quarry
Picnic Area
Parking Area
Proposed Site
Current Site
03-B
03-9
03-8
03-7
03-C
03-1
03-2
03-5
03-6
03-4
03-3
03-12(D)
Inactive
Lafarge Pit
Cornwallis River
Ells Road
Lovett Road
Lafarge Road
Tupper Brook
Coldbrook
101
64°34'30"W
45°04'30"N
25m
N
Scale 1: 3000
0
metres
250
Projection: Zone 20 UTM
Datum: NAD 83
www.gov.ns.ca/geonova
Cartography: Monica Lloyd
May 2007

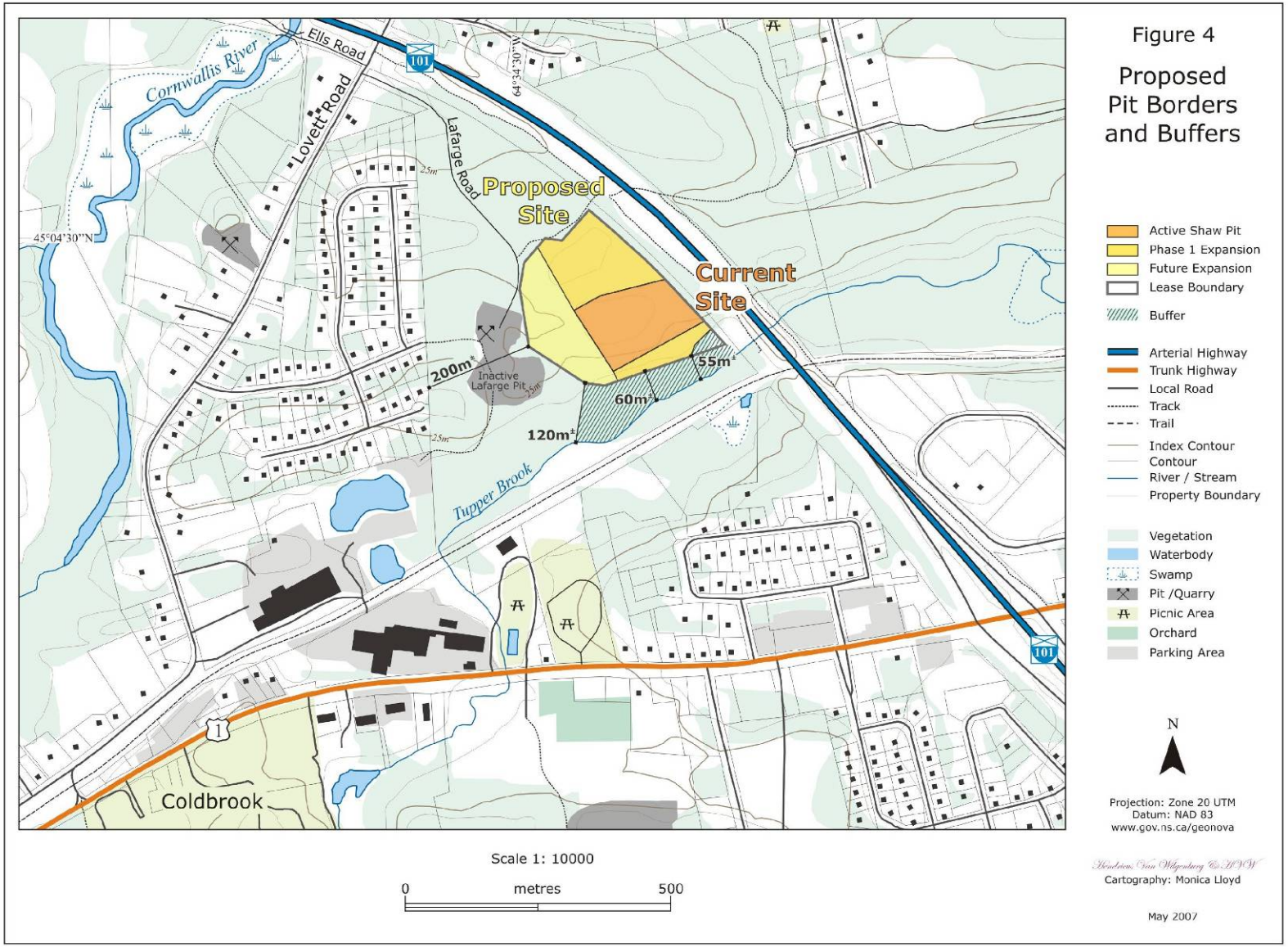
Figure 4
Proposed Pit Borders and Buffers
Cornwallis River
Ells Road
Lovett Road
Lafarge Road
Proposed Site
Current Site
45°04'30"N
64°34'30"W
200m±
Inactive Lafarge Pit
120m±
60m±
55m±
Tupper Brook
Coldbrook
101
1
Active Shaw Pit
Phase 1 Expansion
Future Expansion
Lease Boundary
Buffer
Arterial Highway
Trunk Highway
Local Road
Track
Trail
Index Contour
Contour
River / Stream
Property Boundary
Vegetation
Waterbody
Swamp
Pit /Quarry
Picnic Area
Orchard
Parking Area
N
Scale 1: 10000
0
metres
500
Projection: Zone 20 UTM
Datum: NAD 83
www.gov.ns.ca/geonova
Cartography: Monica Lloyd
May 2007

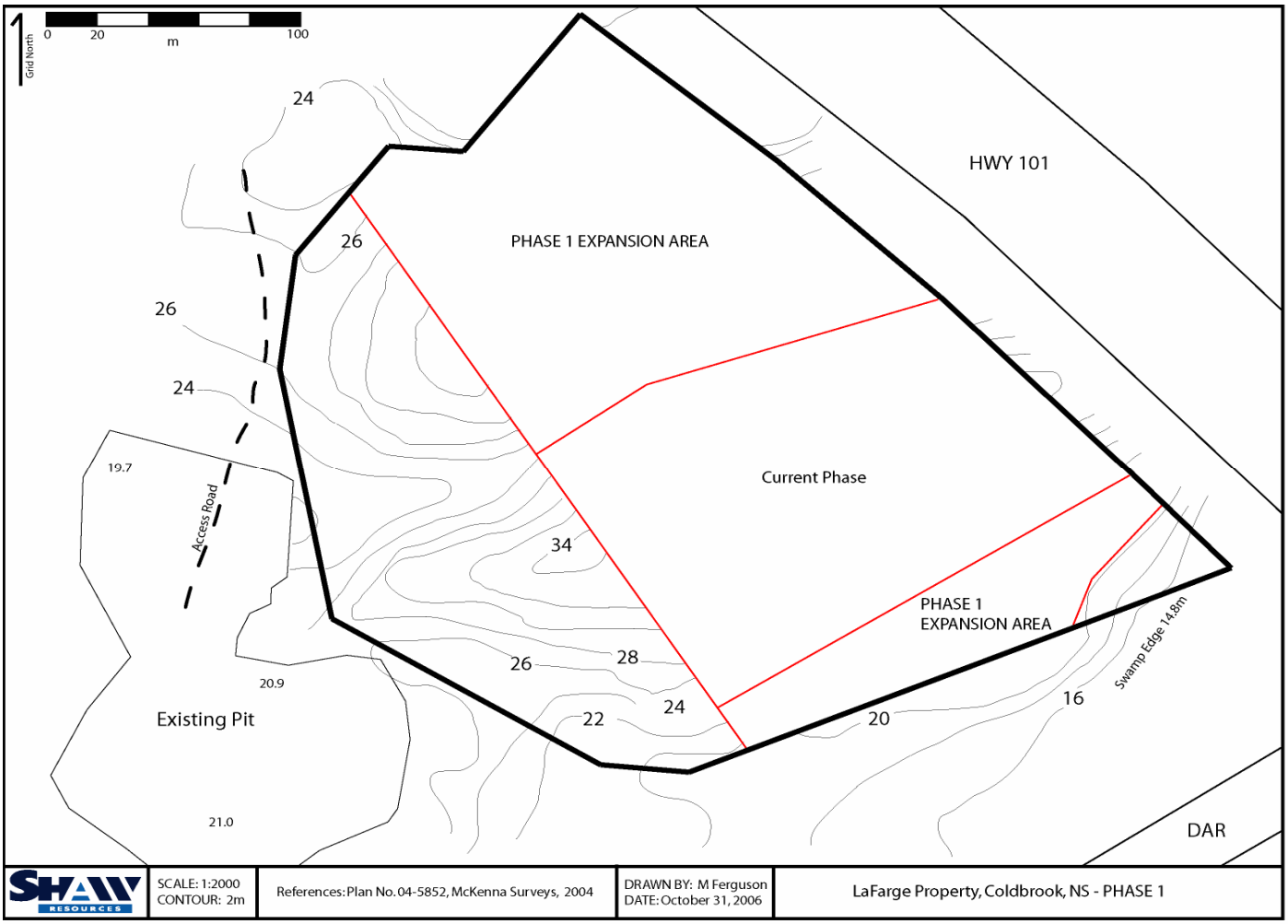

Figure 5: Current Phase and Phase I Expansion Area Proposed for the Lovett Road Property

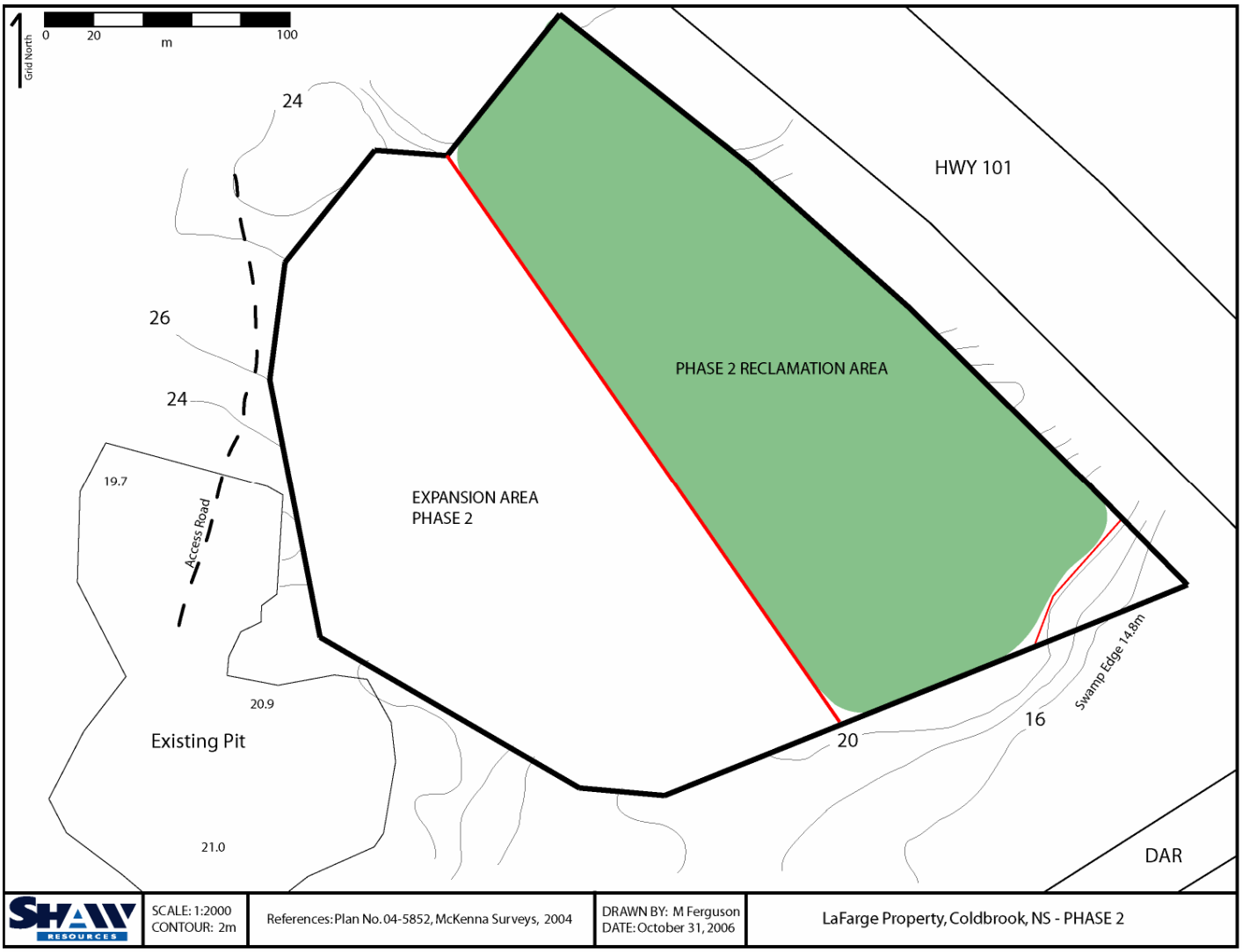

Figure 6: Phase II Expansion Area Proposed for the Lovett Road Property

5.6 Operation and Maintenance

The proposed operating schedule for the Undertaking will be 12 hours/day, 5 days/week, Monday to Friday, year round (environmental conditions permitting). Although Shaw Resources plans to extract and haul aggregate primarily in the spring and summer, it is anticipated that the bulk of the work will be occur in June and July. Activity at the site will commence at 7:00 a.m. and discontinue at 7:00 p.m. Site operations will be closed on Saturdays, Sundays and statutory holidays.

Equipment at the site will be minimal because of the nature of the site and the materials found there. Typically, equipment at the site will include: a dozer for grubbing and pit

preparation; a 4WD rubber-tired loader for excavating and loading aggregate; and occasionally, there may be a portable screening unit, fitted with a conveyor/stacker for screening aggregates.

At the pit face, the aggregate will be excavated using a 4WD rubber-tired loader to a depth of 16 to 18 metres above sea level. Stockpiling of aggregate will not take place on the Lovett Road property. Instead, the aggregate will be loaded on trucks using a 4WD rubber-tired loader and then transported from the Lovett Road property to the Keddy Operation for processing. Shaw Resources anticipates that 100 to 150 truck loads—using tandem trucks and trailer-trucks—of aggregate will leave the Lovett Road property daily.

There is a possibility that screening of aggregates will occur at the Lovett Road pit. Shaw Resources anticipates that such occurrences will be rare, if at all required. If screening is required at the Lovett Road site, the extracted aggregates will be placed in the screener using a 4WD rubber-tired loader and then loaded onto trucks to be transported through the Keddy site and onto markets.

Shaw Resources anticipates that the average production will be approximately 50,000 tonnes of aggregate per year. All processing and stockpiling of excavated aggregate from the Lovett Road property will occur at the Keddy Operation. At the Keddy Operation, applicable separation distances and site-specific conditions, specific to the Industrial Approval for the Keddy operation, will be followed. In the rare event that screening is required at the Lovett Road property, all processing of excavated material will take place within the active area of the proposed pit.

At all times, excavation on the proposed site will take place above the water table and in accordance with the following separation distances and site-specific conditions. Shaw Resources wishes to make it clear that at no time will blasting, pumping from watercourses at the site, or wash operations be part of the existing or proposed project on the Lovett Road site.

Separation distances & site-specific conditions

The proposed active area of the Undertaking will adhere to the following separation distances:

a) Shaw Resources will not locate the Active Area of the pit within:

i) 30 metres of the boundary of a public or common highway;
ii) 55 metres of the bank of any watercourse or established riparian zone;
iii) 30 metres of the boundary of the Lafarge property; and
iv) 30 metres of the boundary of any cemetery.

b) Shaw Resources will not locate the excavation "Working Face" of the pit or stockpiles within:

i) 30 metres of the boundary of a public or common highway;
ii) 55 metres of the bank of any watercourse or established riparian zone;
iii) 100 metres of the foundation or base of a structure; and
iv) 30 metres of the property boundary when a structure on the abutting property is not involved.

Relevant Considerations

Shaw Resources will adhere to the following site-specific conditions:

i) The boundaries of the site shall be clearly marked and kept reasonably clear of new growth;
ii) The corner boundaries shall be clearly marked with permanent markers no less than 1.2 m high;
iii) No soils will be transported to the site;
iv) No topsoil will be removed from the site;
v) No blasting, pumping from watercourses at the site, or wash operations will be associated with the proposed project; and
vi) No facilities will be constructed for the proposed Undertaking.

5.7 Project Timeline

The proposed Undertaking is scheduled to begin immediately after receiving NSEL approvals. The project is designed to proceed in stages beginning with the pit area currently approved (Table 2).

Table 2: Development/Reclamation Plan & Timeline

Phase		Site Preparation	Active Pit Footprint	Site Reclamation	Total Area Reclaimed
Current			2.2 ha	-	-
1	Year 2 - 5	2.0 ha	4.2 ha	-	-
2	Year 5 – 9	2.9 ha	7.1263 ha	4.2 ha	4.2 ha
	Year 10		2.9 ha	2.9 ha	7.1263 ha
Decommissioning					7.1263 ha

Note that if the property owner permits Shaw Resources to include the inactive Lafarge pit in the reclamation plan, the total area reclaimed will amount to roughly 11 hectares.

The details in Table 2 are approximations. At the proposed extraction levels, operations are expected to be sustainable for at least 10 years. If additional aggregates are required, Shaw Resources may wish to increase the yearly tonnage of aggregate excavated on the property, thus shorting the life of the project. However, the actual tonnage is difficult to predict, as the amount of end-product required is contingent on market demand and environmental conditions.

5.8 Effluents and Emissions

5.8.1 Erosion and Sediment Impacts

The sources of soil erosion and sedimentation include wind erosion and sedimentation of watercourses due to runoff from melting ice/snow or precipitation events. Shaw Resources will rely on three basic rules for erosion and sediment control: (1) soil stabilization; (2) runoff control; and, (3) sediment control. Although there is always the potential for soil erosion and sedimentation with the disruption of the soils, effluent/runoff at the site from weather events (i.e., precipitation) is not likely to be a significant issue because of the high infiltration capacity and relatively low silt/clay content of the soils in the study area. For that reason, overland flow, surface runoff, and subsequent siltation rarely occur (see Section 7.1.6 Groundwater Resources and Hydrogeology).

Nonetheless, Shaw Resources will follow latest Best Management Practices (BMP) and standard NSEL requirements for erosion and sedimentation controls to ensure that any runoff generated during pit activities is managed properly. The NSEL *Erosion and Sedimentation Control Handbook for Construction Sites* (1988) will serve as the reference

document for all erosion control measures. Shaw Resources will adhere to the following site design, management, and maintenance principles:[2]

i) Site activities will be coordinated with climate conditions.

ii) Cut benches in overburden piles or other unconsolidated material likely to erode and slope away from the center of the bench to allow drainage to either side.

iii) Maintain and promote growth of natural vegetative barriers along the borders of the property.

iv) Maintain an undisturbed thirty (30) metre buffer of native vegetation between all watercourses, any established riparian zone, and any rare and sensitive vegetation.

v) Keep infill material free of contaminants (i.e., for reclamation).

vi) Slope stockpiles toward the appropriate drainage or vegetated areas.

vii) Monitor receiving watercourses on the site.

viii) Preserve and protect areas of natural vegetation that lie beyond the project footprint.

ix) Prevent the sedimentation of watercourses by taking special measures to prevent damages that could result from project activity by maintaining a thirty (30) metre buffer between the active area of the proposed pit or established riparian zone.

x) Control wind erosion by minimizing the scope and duration of the area exposed by carrying out site preparation and reclamation in phases.

xi) Control raindrop erosion by implementing and maintaining sediment control measures to stabilize exposed soils and prevent on-site damage, such as sediment basins or traps, filter barriers and diversions, and perimeter control practices prior to site clearing, grubbing, excavation, and grading to protect disturbed areas from off-site and on-site runoff and to prevent sedimentation damage to areas off the development site.

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[2] Cf. Natural Resources Conservation Service (1995). Accessed on, June 05, 2005. Accessed at, http://www.il.nrcs.usda.gov/engineer/urban/index.html.

xii) Control surface erosion by keeping runoff velocities low and retain runoff within the active area of the site.

xiii) Control storm water erosion by diverting storm water and overland flow within the project area into the pit floor.

xiv) Prevent sediment from being tracked onto public roadways by maintaining road surface.

xv) Follow a segmented reclamation strategy by implementing final grading and replacement of topsoil and vegetative materials, and replant disturbed areas as soon as possible (e.g., grasses and/or trees, while taking into account CLC suggestions), but within the growing season.

xvi) Follow up with a thorough inspection, maintenance, and mitigation measures of the site during and upon decommissioning.

Effluent/runoff at the site will be controlled and contained within the active area of the pit using the aforementioned erosion and sedimentation control measures. During and after large precipitation events, runoff will be contained within the pit area and allowed to evaporate and infiltrate the pit floor. Based on previous experience and the porosity of the aggregate at the site, it is anticipated that standing water and muddy working conditions will not be an issue. The soil at the site is such that any liquid will move quickly into the soils and into the groundwater.

The necessary silt fences and diversion controls will be properly constructed and maintained to control potential runoff prior to commencement of site preparation and excavation activities. However, it is highly unlikely that erosion and sedimentation will be of significant concern because the water at the site infiltrates the soil quickly. Shaw Resources is committed to following industry standards such as the *Aggregate Operators Best Management Practices Handbook Volume II* (2002) and the *Reclamation and Environmental Protection Handbook for Aggregate, Gravel and Quarry Operations* (2002) produced by the British Columbia Ministry of Water, Land and Air Protection Vancouver Island Region.

5.8.2 Dust

Open sources such as paved and unpaved roads, construction, agriculture, and forest fires are the source of 94% of total particulate matter. Total particulate matter can consist of airborne particles in either solid or liquid form, with an upper size limit of approximately 100 micro metres (µm) in aerodynamic equivalent diameter.[3] The potential sources of dust emissions associated with this project will likely come from wind erosion, excavation, loading, and truck traffic. It is anticipated that dust from wind erosion will be minimal because the aggregate is practically devoid of nonsettleable solids (i.e., claysize particles) and contains only minor amounts of fine particles. The impacts of fugitive dust on residents from excavation are expected to be negligible because these activities will take place at least 200 m from the nearest residence. If screening is required at the site, it is anticipated that fugitive dust (arising from the screening process) will be negligible because the sand normally contains sufficient moisture to suppress dust emissions. If the sand is too dry and hence the screening process creates excessive dust, sand will not be screened until moisture conditions are adequate.

The most likely source of dust emissions is from truck travel. Dust emissions from roadways will be controlled in two ways: first, by maintaining road surface quality; and second, by applying dust palliatives/ suppressants. We have identified what we believe to be the most viable dust palliatives. They include water, calcium chloride (a water absorbing product), and lignosulfonate (an organic nonpetroleum product). However, there are environmental concerns with the application of dust palliatives. The primary environmental concern with dust palliatives is how they impact the groundwater quality, freshwater aquatic environment, and plant community (Bolander 1999). While water as a dust suppressant poses no direct environmental impact, it evaporates readily; thus, it is the least cost-effective suppressant in of terms of resource use such as labour, equipment, and fuel consumption. Water quality impacts from calcium chloride are generally negligible where

[3] Source: Environment Canada. Accessed at, http://www.ec.gc.ca/cleanair-airpur/PM_2.5,10-WS2C68B45C-1_En.htm.2006-02-28; accessed on, 2006-02-28.

proper buffer areas are maintained between treated area and water. However, the Ells roadway on both sides of the Cornwallis River slopes toward the Cornwallis River. A fresh water aquatic impact may develop at chloride concentrations as low as 400 ppm for trout (Bolander 1999).

For those reasons, Shaw Resources will not use calcium chloride as a dust suppressant on the Lafarge and Ells Roadways. Instead, Shaw Resources will use lignosulfonate (brand name – lignosol) on the Lafarge and Ells Roadways. Research shows that impacts on water quality and fresh water aquatic habitat from lignosulfonate use are negligible (Bolander 1999). Nonetheless, Shaw Resources will take all necessary precautions to keep dust palliative material out of water drainages and roadway ditches leading to streams. To further reduce the potential for fugitive dust, the road surface of the Lafarge and Ells Roadways will be maintained or upgraded when and wherever necessary. Under no circumstance will used-oil be used for dust suppression.

The proponent will adhere to the suspended particulate levels as outlined in the *Nova Scotia Guidelines for Pits and Quarries (1999)* (see Table 3).

Table 3: Suspended Particulate Levels

Parameter	Max. Limit
Annual Geometric Mean	70 ug/m 3 annual geometric mean
Daily average (24 hrs)	120 ug/m

Source: Nova Scotia Pit and Quarry Guidelines (May 1999).

5.8.3 Noise

The potential for fugitive noise impacts on residents and wildlife in and adjacent to the site is a genuine concern for Shaw Resources. There will be some noise from truck backup alarms, trucks traveling to and from the site—on the Lafarge and Ells roadways—and equipment working at the site will generate noise. We anticipate that noise impacts from the proposed project operations will also be minimal. To minimize noise impacts, the Shaw Resources will maintain road quality and keep all equipment used at the site in good operating order to keep noise levels from pit operations to a minimum. The truck route in the pit area will be organized in such a way that minimal backing up will be required, thus lessening noise from backup alarms. Moreover, the working face of the pit will be oriented

toward the northwest, or to the greatest degree possible, away from the Bessview subdivision to deflect noise impacts away from the subdivision.

The proponent will not exceed the sound level exposure limits as outlined in the Nova Scotia *Guidelines for Pits and Quarries (1999)* (see Table 4). Sound monitoring will be carried out at the request of NSEL.

Table 4: Sound Level Limits (Leg.)

07:00 – 19:00 (Days)	19:00 – 23:00 (Evenings)	23:00 – 07:00 (Nights)
Leq. 65dBA	Leq. 60dBA	Leq. 55dBA

Source: NSEL

5.8.4 GHG Emissions

The release of emissions into the atmosphere from fossil fuel combustion will be generated from trucks and equipment operating at the site. The emissions include carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). These emissions are likely to be minimal and localized because of the scope of the proposed project. Shaw Resources recognizes that greenhouse gas (GHG) contributes to the "greenhouse effect," and hence, will seek to reduce GHG emissions during the excavation and transportation of aggregates from the Lovett Road project through the following reduction strategies:

- Ensure vehicle speeds are appropriate for the site.
- Ensure vehicles are properly maintained.
- Enforce anti-idling policy.

5.8.5 Solid Waste

There will be little solid waste generated at the site. All solid waste will be stored in waste receptacles and transported to a recycling facility when appropriate or disposed of at a provincially approved waste disposal facility.

5.9 Natural Barriers

There exists a natural barrier of roughly 400 metres between Lovett Road and the project area. The existing barriers include a mixture of native plants and trees in varying densities,

which line the roadway into and around the site (see e.g., Plates 1 & 2). Shaw Resources will not remove any existing natural barriers that currently border the proposed project area. These natural barriers will reduce dust and noise impacts that may be associated with project activities. Furthermore, the natural barriers will screen project operations, thus maintaining the aesthetic quality of the area.

Plate 5: Lovett Road passing under Highway 101 overpass—facing north

Plate 6: From Ells roadway facing Lovett Road—southeast

Plate 7: From entrance to Lovett Road property, facing Ells roadway—northwest

Plate 8: From Lovett Road, facing Lafarge roadway—southeast

5.10 Hazardous Materials and Contingency Planning

Any spills of toxic materials will be dealt with expeditiously in accordance with *the Nova Scotia Activities Designation Regulations, N.S. Reg. 47/95,* and the *Petroleum Storage Regulations* of the *Environment Act, N.S. Reg. 52/2005*. All equipment refilling with oils and other fluids and maintenance will be conducted at Keddy Operation (see Table 5, for chemicals to be used on site). Further, all equipment will be removed from the site when daily pit operations come to a close.

All contaminant spillages (e.g., fuel oil, hydraulic oil, or antifreeze) will be cleaned up and spills of 100 litres or more will be reported immediately to the 24-hour environmental emergencies centre at (902) 426-6030 or 1-800-565-1633 as set out in the *Nova Scotia Emergency Spill Regulations, N.S. Reg. 59/95*. All Shaw Resources trucks and the loader will be equipped with a spill kit to contain any contaminants spilled. Once the spillage is contained, the contaminated materials will be promptly collected and transported to the Envirosoil (or other approved facility) recycling facility in Bedford, Nova Scotia for processing. All refuse associated with this project will be placed in refuse containers or kept in vehicles/equipment, and recycled or disposed of properly.

In the event of a fire, the local fire authority and the Department of Natural Resources (in the case of the forested areas) will be contacted immediately. As a component of this contingency plan, operators will have access to mobile-radios or phones on site.

Shaw Resources will promote safety and conscientiousness among its staff and customers. Moreover, Shaw Resources will not in the life of the proposed project:

- Deposit deleterious substances in any watercourse or on the Lovett Road property;
- Leave any solid waste on the Lovett Road property;
- Remove water from any watercourse on or near the Lovett Road property;
- Divert any watercourse on or near the Lovett Road property; or,
- Allow any equipment to enter any watercourse on or near the Lovett Road property.

All staff working at the site will be familiar with contingency plans and procedures, and have received the relevant training to deal with hazardous materials at the site. Shaw Resources

has in place a protocol that all employees must follow: 1) how contain and cleanup spillages (and associate materials); and 2) to whom, when, and how spillages (and other emergencies) should be reported (see Appendix XII: Contingency Plans for Emergencies).

Recognizing that pollution and waste costs money and can adversely impact the environment, the overall goal of the proponent is to make pollution prevention part of their day-to-day decision making, thereby protecting the environment and reducing potential business liabilities, while enhancing productivity and competitiveness. Shaw Resources will follow the *Pollution Prevention Workbook for Business in Nova Scotia* (2003), the NSEL *Contingency Planning Guidelines* (2004), and refer to the *Aggregate Operators Best Management Practices Handbook for British Columbia*, Volume II (2002).

Table 5: Hydrocarbons/Chemicals Used

Chemicals	Use	Environmental Effects	Ecological Information
Diesel fuel and hydraulic oil	In trucks, payloaders, & excavators	May cause physical fouling of aquatic organisms.	• Not readily biodegradable. • Potential for bioaccumulation. • May be harmful to aquatic life. Toxicological Data: Fuels, Diesel, No. 2 EL50 - growth rate Algae (72hr) 10 - 100 mg/L.; EL50 Daphnia Magna (48hr) 10 - 100 mg/L. LL50 (WAF method); Rainbow Trout (96hr) 10 - 100 mg/L.
Grease and other Lubricants	In trucks, payloaders, & excavators	May cause physical fouling of aquatic organisms.	• Not readily biodegradable.
Antifreeze/coolant	In trucks, payloaders, & excavators	Ethylene glycol is harmful to aquatic life in high concentrations.	• Potentially biodegradable. • Not expected to bioconcentrate.

Source: Material Safety Data Sheets from Shell Canada Limited. Accessed on, 25.10.2006; accessed at, http://www.shell.ca.

5.11 History of Proponent's Practices

Shaw Resources operate a number of NSEL permitted properties for their aggregate requirements. Shaw Resources has shown its commitment to protecting the environment and its components through putting in place strict contingency plans for responding and reporting to accidents and fuel spillages that employees are required to follow. At its Keddy Operation, Shaw Resources has reclaimed those areas of the site where mining, processing, or stockpiling no longer takes place. Reclamation at the Keddy Operation includes sloping of pit embankments, planting of trees, and seeding of grasses. Shaw Resources has extensive experience in reclamation. Shaw Resources will also carry forward its commitment to the principles of environmental sustainability at the Lovett Road site.

6.0 RECLAMATION AND DECOMMISSIONING

6.1 Reclamation

Policy objective

Shaw Resources shall commence with the reclamation and restoration of the excavated areas using grasses and/or trees, and overburden found on site, as soon as is practically possible and weather conditions permitting. Shaw Resources shall follow a segmented reclamation plan, once the desired aggregates are exhausted in the existing and proposed project aggregate pits. Shaw Resources will work with the Community Liaison Committee to incorporate community suggestions into the reclamation process.

Reclamation in this project is defined as the rehabilitation of the area of land affected by aggregate extraction, which may include, but not limited to, the stabilization of slopes and creation of safety benches, the planting of forests, the seeding of grasses and legumes, the enhancement of wildlife and aquatic habitat and aquatic resources, and the development of the site for residential, commercial, recreational or industrial use.[4] Reclamation is not taken

[4] This reference is noted only to acknowledge the source of the definition of reclamation used in this document. Waters and Navigation Act, Article 8-A "Performance Standards for Quarries", State of Maine, U.S.A, 1995.

here to mean the filling in of pits with solid materials unless necessary for the protection of groundwater or for reasons of safety.

Rationale

We believe that there are four viable reclamation strategies for the Lovett Road property (see Table 6). They include the following options:

(1) Post-extraction Reclamation;
(2) Interim Reclamation;
(3) Concurrent Reclamation (Progressive or Continuous); and
(4) Segmented Reclamation.

Although Option (1) may be the most efficient in terms of time and resources, we consider it the least viable because waiting until all extraction stops before reclamation begins would leave soil in the distributed areas of the site exposed to wind and water erosion. Moreover, valuable time is lost re-establishing the plant and animal habitat. We consider the combination of options (2) and (3) to also be non viable options. Given the slow progression of aggregate extraction at the site and the need for sufficient space to effectively carry out shaping and grading of the excavated area, the small size of the project area undermines these two options.

We believe that Option (4)—segmented reclamation—is the most viable strategy. As outlined in the Section 5.5 (Site Development), the area labelled 'Phase 2 Reclamation Area' in Figure 6 will be reclaimed to the current NSEL standards starting with areas on the south-eastern property boundary, working north-westerly. Phase 2 will begin prior the completion of Phase 1. This approach will not be typical of segmented reclamation because extraction in one area of the pit will not have stopped completely. Rather than being distinctly separate site activities, reclamation and site preparation will involve some overlap, thus limiting the area that will be exposed to wind and water erosion. Final reclamation of the south-western area, labelled 'Expansion Area Phase 2' (Figure 6) will occur once excavation is completed—2 to 5 years after site preparation (see Table 8). We believe this approach will minimize wind and water erosion and facilitate the speedy return of plant life to the disturbed areas.

Table 6: Reclamation strategies

Reclamation Strategy	Notes
Post-extraction Reclamation	• reclamation initiated only after all extraction stops
Interim Reclamation	• temporary reclamation during operation to stabilize disturbed areas
Concurrent Reclamation - (Progressive or Continuous)	• on-going reclamation as aggregate resources are removed • overburden and soil is immediately replaced
Segmented Reclamation	• reclamation after extraction has stopped in one area of the pit or quarry

Source: Norman *et al.* (1997); cited in *Aggregate Operators Best Management Practices Handbook for British Columbia* (2002).

Current situation

The proposed project area has been used for forestry and aggregate extraction. While a variety of plants and trees have been able to re-establish themselves post harvest, the inactive aggregate pit that lies outside the proposed project area is a blemish. Furthermore, the inactive pit is a draw for noisy OHVs, hence undermining the relative quiet of the area.

The residents living in Lovett Road area have asked to have input into the reclamation plan for the proposed project (see Section 4.0 Public Involvement). While there is no legislative requirement in place that calls for community involvement in reclamation or any specific kind of reclamation plan, Shaw Resources is willing to work with the community in the reclamation process. Shaw Resources believes that residents of Lovett Road should have a say in what the project area will look like once decommissioning occurs. At this stage of the process, Shaw Resources has considered the following two options for final reclamation of the project site:

Final Site Option I

Figure 6, Reclamation Option 1, shows the currently predicted topography of the site following extraction and reclamation of the area. Reclamation in this option is limited to the site boundaries and excludes the existing Lafarge Pit to the south. Shaw Resources will work with the Community Liaison Committee to determine how the area will be re-

vegetated with plants, grasses and/or trees that are suitable for the area and soil. All stockpiled overburden will be spread over the area to facilitate growth of this vegetation.

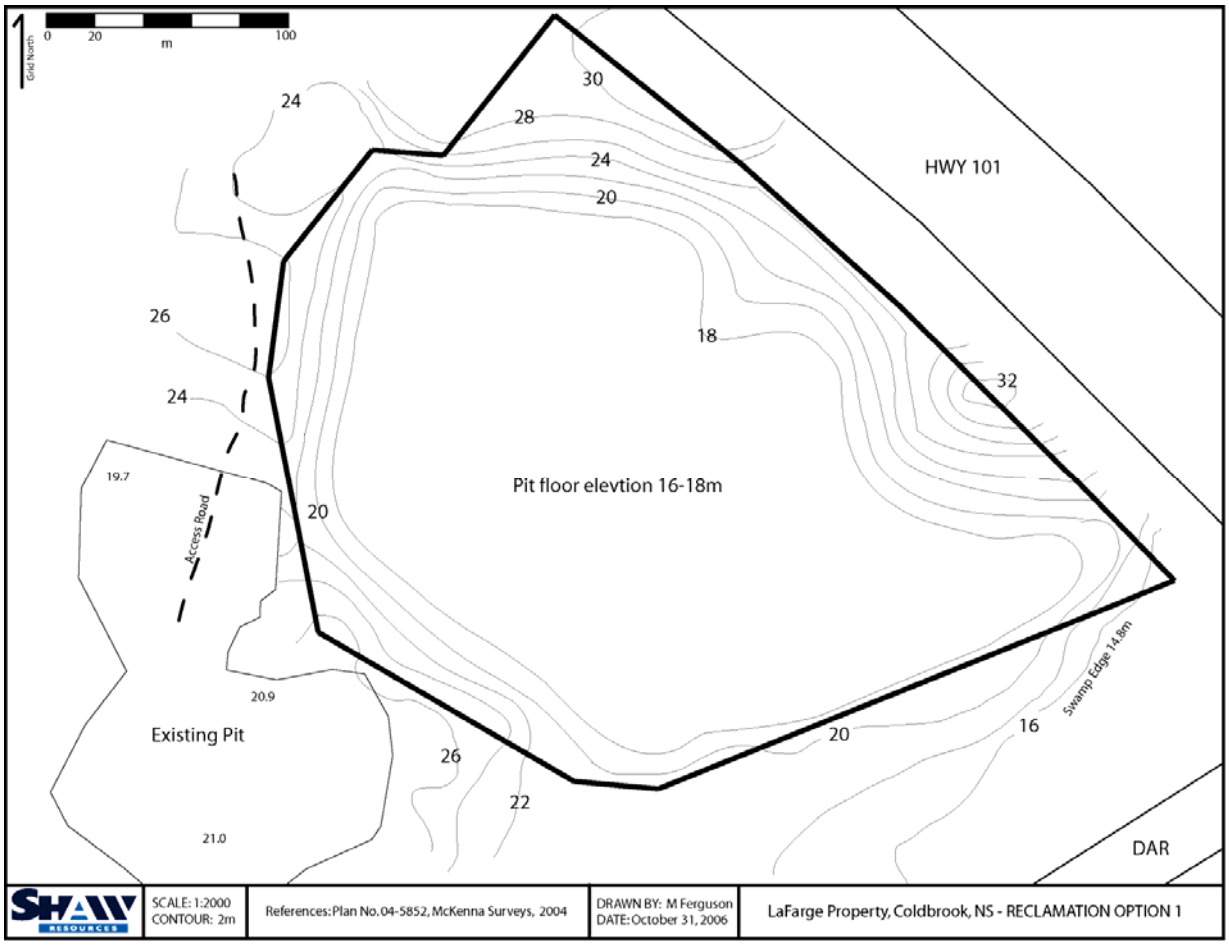

Figure 7: Reclamation Option 1

Final Site Option II

Figure 8, Reclamation Option II, shows currently predicted topography of the site following extraction and reclamation of the area along with reclamation of the existing Lafarge Pit to the southwest. Material currently located between the pits will be sloped to minimize topographic extremes while retaining a natural appearance. The Community Liaison Committee and Shaw Resources will work together to determine how the area will be re-vegetated with plants, grasses or trees that are suitable for the area and soil. All stockpiled overburden will be spread over the area to facilitate growth of this vegetation. The main difference between the two reclamation options is that in Option 2 Shaw Resources will step outside the actual designated pit boundary and blend the existing Lafarge Pit into the

proposed expansion. Instead of leaving a large ridge between the two pits, Shaw Resources will smooth material into the deeper pit, thus making slopes much more gradual. This strategy will create a more undulating landscape rather than a 'bowl'-like perspective. Option I basically shows reclamation at a minimum. While Option II is the preferred option, carrying out this option will depend on the approval of NSEL and the property owners.

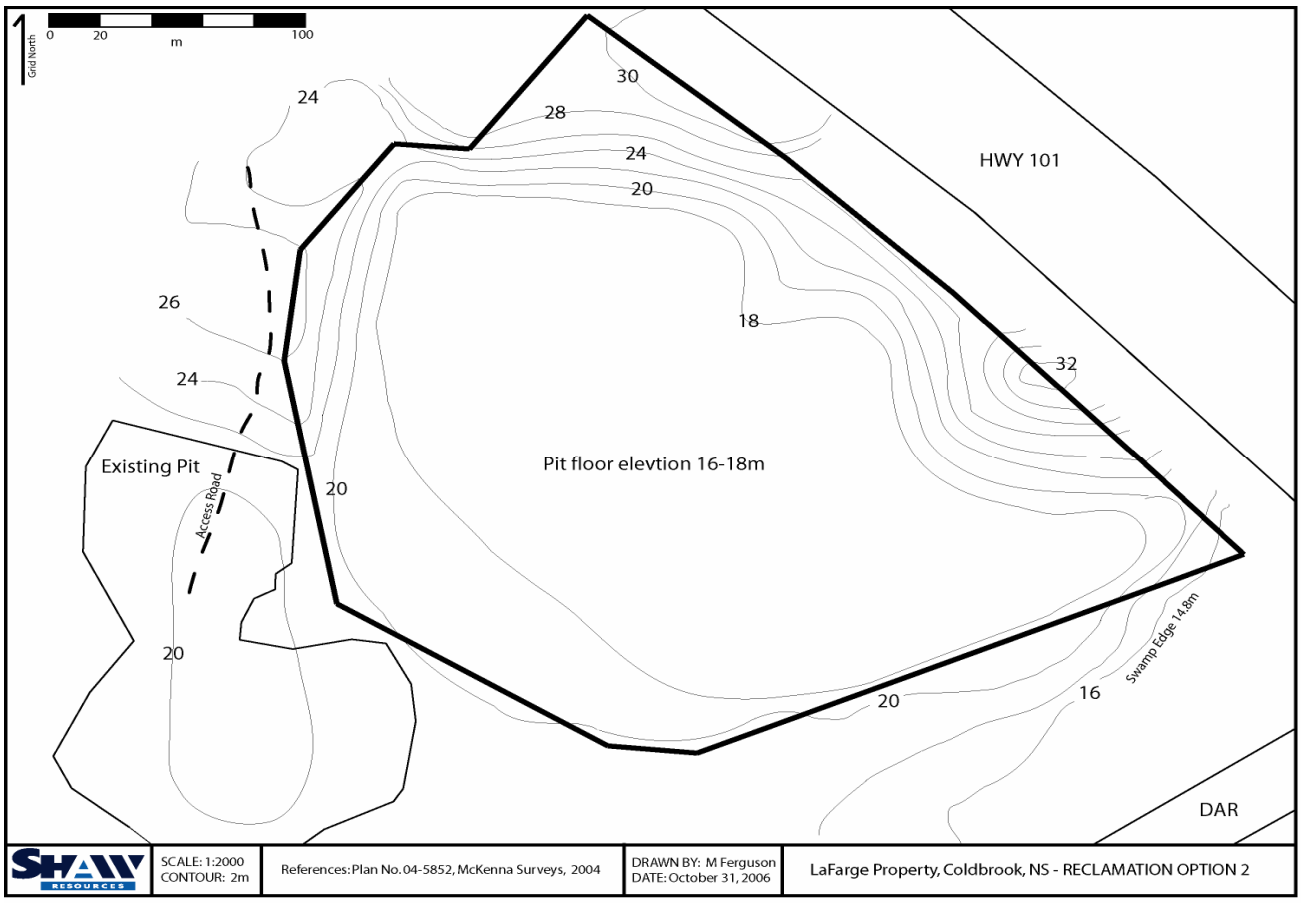

Figure 8: Reclamation Option 2

Action plan

The proposed strategy to achieve the policy objectives will integrate site development/ preparation with site restoration and reclamation. The reclamation phase of the project will begin within 2 to 5 years of the proposed project's development. It is anticipated that it will take 2 to 5 years before an area is suitable to allow for proper sloping of the excavated area. Rehabilitation treatments such as the distribution of available topsoil and overburden will begin as soon as is practical within seasonal constraints and continue throughout construction and post-construction activities. The excavated area will be graded / shaped

so that the landscape is undulating and the slopes will be 1V:2H or shallower (Norman *et al.* 1997). In Phase 2, the areas excavated in Phase 1 will be covered with available topsoil and vegetative materials from existing overburden stockpiles (see Section 7.1.1 Flora Species and Habitat). After grading, the excavated area will be seeded using native grasses and/or trees to stabilize the soils. The benefits of this strategy include:

(1) Viable seeds of native vegetation included in redistributed soils can germinate;
(2) The overburden will control wind and water erosion;
(3) Removing plants and their root systems with the associated soils will be more successful in re-establishing the excavated area;
(4) Efficient use of time and resources;
(5) Improve the aesthetic quality of the landscape;
(6) Respond to community requests for reclamation of the inactive Lafarge pit; and
(7) Shaw Resources will approach the property owners for permission to include the inactive pit in their final reclamation plan (i.e., Option 2).

These suppositions are supported by comments from the community and research on mine reclamation. Norman *et al.* (1997) suggest that native plants will often out-compete introduced species over time and are the most useful to wildlife. This approach will be less expensive and likely more successful than the inclusion of soil from outside sources (see Table 7).

Success criteria

Indicators used to gauge the progress and achievement of the policy objectives will be the successful re-establishment and survival of plants and trees, and satisfaction regarding the development and reclamation of the project site by residents of the Lovett Road area. If it is determined that less than two-thirds of the plant life fails to survive after seeding or transplantation, the proponent will draw on relevant expertise to revise measures to enhance the survival rate. To achieve the policy objectives, the proponent will meet the Province of Nova Scotia requirements, consider Community Liaison Committee suggestions for this project, and refer to latest BMPs, for example, in *Reclamation and Environmental Protection Handbook for Aggregate, Gravel and Quarry Operations in British Columbia* (2002).

6.1.1 Summary

While the topography of the site will have been changed, it is anticipated that, with the proposed site development and reclamation plans, the plant life will eventually regenerate to a state approximating current conditions.

Table 7: Reclamation Plans

Issue	*Objective*	*Action Plan Strategies*
(1) Destruction of nesting habitat (2) Destruction of common plant species (3) Impact on aesthetic quality of the site (4) Potential for soil erosion (5) Residual effects	▪ To rehabilitate, reclaim, and restore excavated areas of the site ▪ To re-establish common plant species ▪ To maintain sightlines that screen project activities ▪ To establish erosion control ▪ To sustain and/or improve on the aesthetic quality of the site ▪ To minimize or eliminate any residual effects of aggregate extraction on the site ▪ To re-establish habitats for plant and wildlife species ▪ To re-establish nesting habitat	(5) When shaping land, long continuous slopes will be avoided; will be broken up with complex surface contours; the steepest above-water excavated slopes left after aggregate extraction will be 1V:2H or shallower; and the depth of the pit floor will be one metre above water table (recommended minimum for transplanting trees is 12 inches of soil above the water table) (1), (3) Use trees and/or grasses, and materials native to the site. (4), (5) Plant appropriate tree species in excavated areas (1), (2), (3), (4) Ongoing site-specific evaluations will occur during construction and reclamation; for the most part, the relocation / transplantation and reclamation processes will need to proceed in concert.

6.2 Decommissioning

Upon completion of the final extraction phase, it is the intention of Shaw Resources to have all excavated areas of the site restored with native grasses and/or trees. It is Shaw Resources' intention to allow land to revert to a state similar to present conditions. Final grading and installation of permanent vegetation on disturbed areas will be followed up with a thorough inspection of the site and any necessary maintenance. The appropriate mitigation and monitoring measures for the overall site and groundwater will remain in place until all activities associated with the proposed Undertaking have ceased and the site has stabilized.

At the time of decommissioning, all temporary erosion control structures will be removed or upgraded. A final walk-through will be completed at the end of construction or at site closeout to determine whether modifications to restoration design(s) are needed, or

additional plantings of grasses and/or trees are required to replace those that failed to survive.

6.2.1 Summary

It is anticipated that soil erosion from wind and water will be minimal, and thus, the risk of sedimentation of local watercourses is considered to be negligible. Shaw Resources acknowledges that externalities, such as noise, smells, dust, and so forth can impair the reasonable enjoyment of life or property; hence, Shaw Resources will make every effort to eliminate or mitigate those externalities. Shaw Resources also understands the seriousness of any petroleum leak or spill; hence, Shaw Resources will make every effort to eliminate or mitigate the potential for such through proper equipment and vehicle maintenance and inspection (e.g., daily monitoring of hydraulic equipment). Equipment operators, truck drivers, and other relevant Shaw Resources staff will be made aware of the importance of proper equipment and truck maintenance and inspection, in addition to the proper storage, handling, and disposal of petroleum products and containers to prevent leaks or spills from entering the environment. All steps necessary will be taken: (1) to contain, handle, and dispose of wastes, effluents, and sediments, in a manner which prevents their entry into surface or groundwater; and (2) to end a petroleum leak or spill (no matter how small) and to clean the area affected and the environment according to the specifications of the Ministry of Environment.

It is considered that the adherence to the measures outlined in this report will mean that the activities connected to the proposed Undertaking will have a modest adverse affect on the enjoyment of life and property of residents of the Lovett Road area and a residual affect on the overall environment. It is also believed that if the site development, restoration, and reclamation program outlined is adhered to the proposed Undertaking, the plant life that makes up the habitat and wildlife that inhabit it will return in time to conditions that reflect its current state.

Once the Undertaking has been approved by NSEL, Shaw Resources will have the appropriate survey maps (identifying location of proposed pit areas, overburden stockpiles, etc.), and hydrology report (identifying location of monitoring wells, etc.) prepared and submitted to NSEL (i.e., the Environmental Monitoring and Compliance Office, NSEL, Kentville, NS) with specific information detailing the overall site, the location of the planned

area, location of the overburden and aggregate stockpiles, location of groundwater monitoring wells, and other details that may be required.

7.0 VALUED ENVIRONMENTAL COMPONENTS AND EFFECTS MANAGEMENT

7.1 BIOPHYSICAL ENVIRONMENT

For the purposes of this environmental assessment registration, six (6) ecosystem components were considered and five (5) were investigated to identify and qualify possible project/environment interactions. Ruth Newell, M.Sc., Wolfville NS conducted a plant survey, specifically looking for rare and sensitive flora. George Allison, PhD, CWB, Wolfville, NS was asked to conduct a wildlife survey, specifically looking for evidence of rare or endangered wildlife species, and to identify potential impacts of the proposed operations on wildlife at the site. Ian Spooner, Ph.D., Wolfville, NS, was asked to conduct an assessment of the geology, geomorphology, and surface water of the site to identify potential impacts of the proposed project operations on surface water. Terry Hennigar, M.Sc., P. Eng., Wolfville, NS conducted an assessment of the hydrogeology of the site to identify potential impacts of the proposed project operations on groundwater, and to determine an appropriate groundwater monitoring program. The potential impact of project operations on fish and fish habitat were also considered. We believe that a detailed study of local fish and fish habitat is not merited because of the distance the proposed project is from watercourses.

7.1.1 Flora Species and Habitat

In the spring of 2006, Ms. Ruth E. Newell, B.Sc. (Hons.), M.Sc., was retained on behalf of the proponent to carry out a vascular plant survey of the property of interest (Appendix VI: Botanical Survey). Ms. Newell visited all habitats twice over the growing season to ensure that both early and late season plants were documented. A small wetland adjacent to the property was also surveyed for species at risk. Prior to fieldwork, Ms. Newell generated a short list of priority species based on information provided by the Atlantic Canada Conservation Data Centre and the Nova Scotia Museum of Natural History.

7.1.1.1 Description of Existing Environment

The proposed project site is composed of two wooded ridges, one immediately south of the active sand extraction pit and the other immediately north of the same pit, which are

composed of similar vegetation. The dominant trees on the south ridge include Red Oak (*Quercus rubra),* Red Maple (*Acer rubrum),* White Pine (*Pinus strobus),* and Red Pine (*Pinus resinosa).* The understory is relatively open with thinly scattered shrubs. One plant of interest due to unusually high numbers was Pinesap (*Monotropa hypopithys).* Habitat on the north ridge is similar, with less Red Oak, and more Large-toothed Aspen (*Populus grandidentata)* and White Birch (*Betula papyrifera).* A small wetland is located immediately south of the proposed area of development, and is made up largely of an alder thicket and open meadow with associated wetland species. The Tupper Brook flows through the wetland.

Ms. Newell found no evidence of plant species listed by COSEWIC under the Federal *Species-at-Risk Act* (SARA 2003) or under the *Nova Scotia Endangered Species Act* (NSESA 1999) in the study area itself.

One plant species of Conservation Concern, as listed under the Nova Scotia General Status of Wild Species website, was found scattered in the small wetland situated immediately adjacent to the Lovett Road property. This species, Stout Wood Reed Grass (*Cinna arundinacea)* is a Red-listed species under the Nova Scotia categorization, which means it is known to be or thought to be at risk.

In addition to the Stout Wood Reed Grass, several other species were present in the wetland, and although not listed as species at risk, are considered to be sensitive and uncommon species by the Atlantic Canada Conservation Data Centre index. These species include Brome-like Sedge (*Care bromoides),* Tall Hairy Agrimony (*Agrimonia gryposepala),* False Pimpenel (*Lindernia dubia),* and Pennsylvania Smartweed (*Polygonum pensylvanicum).*

7.1.1.2 Potential Effects, Proposed Mitigation, Follow-up Monitoring

Policy objective

Shaw Resources shall mitigate the impacts the proposed project may have on the adjacent wetland habitat to the south of the proposed property during project development and operations. Shaw Resources will also mitigate negative impacts on the plant life on the site in general through the site regeneration and reclamation following the proposed activities.

Rationale

Although no species at risk were found on the proposed project site itself, there are potential events, including erosion and run-off of contaminated water, which may adversely impact the identified Red-listed species and other species of concern in the adjacent wetland area through development and operation activities. Failure to mitigate impacts to these species may result in the loss of these species from the wetland and an impact on the overall structure of the wetland ecosystem.

Current situation

Stout Wood Reed Grass, a Red-listed species, and four other species of concern may be threatened, if the proposed project impacts the adjacent wetland to the south of the property. While the more common plant species also are subject to the impacts from these activities, the concern is not as great because they are not considered rare species or species of concern.

Action Plan

In order to ensure that there is minimal impact on the adjacent wetland property, Shaw Resources will carry out measures to ensure 1) soil stabilization, 2) runoff control and 3) sediment control, as outlined in section 5.8.1. Any spills of toxic materials will be dealt with expeditiously in accordance with the Nova Scotia *Activities Designation Regulations, N.S. Reg. 47/95*, and the *Petroleum Storage Regulations* of the *Environment Act, N.S. Reg. 52/2005* as described in section 5.10. The proponent will refrain from the use of herbicides and pesticides which have the potential to harm both plants and pollinators of rare plant and species of concern. In addition, the 55 metre buffer—as shown in Figure 4—will keep all proposed project activities away from plants of concern—as identified in the botanical study—and any project activities.

Criteria for Monitoring Success

The success of the proposed strategies will require monitoring of the adjacent wetland in order to identify unanticipated or undesirable outcomes of project activities, and to determine whether additional measures are required for the protection and preservation of the Stout Wood Reed Grass and other species of concern. Visual inspections will be carried out regularly by Shaw Resources staff—especially after a heavy rain—to ensure that the

fabric barriers are in good working order and effective; that is, that no sediment is found beyond the barriers.

7.1.1.3 Summary

Botanical surveys indicated that there are no plant species considered at risk provincially or federally currently located on the proposed site. There is, however, one species considered at risk (Stout Wood Reed Grass), and four additional species of concern located in the adjacent wetland to the south of the proposed project area. It is anticipated that with the measures previously outlined, the five plant species of conservation concern located adjacent to the project site will not be adversely affected by activities associated with the proposed project.

7.1.2 Fauna / Wildlife Species and Habitat

In 2006, George Alliston, PhD, was retained on behalf of the proponent to carry out wildlife surveys and field studies of the proposed aggregate pit expansion area. Conducted between April and July 2006, these studies assessed the use of the property and immediately adjacent habitat by species of amphibians, reptiles, breeding birds, and mammals, and focused especially on those species considered at risk in Nova Scotia and/or Canada (see Appendix VII: Faunal Study). After initial field studies, Dr. Alliston was able to narrow down the list of priority species that required further assessment, as a suitable habitat was not present at the site for all species at risk on COSEWIC or Nova Scotia listings. Detailed surveys were therefore conducted for five priority species: Wood Turtle, Northern Goshawk, Long-Eared Owl, Rusty Blackbird, and the Southern Flying Squirrel. Dr. Alliston was also asked to make recommendations for potential impact mitigation measures based on his findings.

7.1.2.1 Description of Existing Environment

The results of Dr. Alliston's surveys show that there are three amphibian species, one reptile species, thirty-seven bird species, and seven mammal species that are currently using the proposed aggregate pit expansion area (Appendix VII: Faunal Study). Of the five species at risk prioritized for further study, Dr. Alliston reported that there is no evidence of Wood Turtles using the proposed site or adjacent stream banks. There is no evidence of individuals or new or old nest sites of the Northern Goshawk or Long-Eared Owl, nor any

evidence of breeding activity of the Rusty Blackbird at the proposed site or adjacent areas. There is also no evidence of Southern Flying Squirrels in any of the potential tree nesting crevices on the proposed site. Overall, Dr. Alliston reports that it is highly unlikely that any of the five species at risk that are of priority concern are using the proposed aggregate pit expansion site or immediately adjacent areas.

7.1.2.2 Potential Effects, Proposed Mitigation, Follow-up Monitoring

Policy objective

Shaw Resources shall eliminate or mitigate any negative effects that the proposed project activities may have on wildlife species that are or may use habitat contained on the proposed site as much as possible. As there are no species that are considered at risk provincially or federally using the proposed site, it is determined that no species-specific mitigation plans are required at the site.

Rationale

The potential effects of the proposed project may include disturbance of wildlife and bird nesting habitat on the proposed site and exposure to toxic materials from accidental spills from machinery used on site.

Current Situation

There are a variety of wildlife species using habitat contained on the proposed site (Appendix VII: Faunal Study). The thirty-seven bird species using the site are protected under the *Migratory Birds Convention Act* (1994), a federal regulation that applies to situations where nests of breeding birds may be damaged, destroyed, removed or disturbed.

Action Plan

In order to meet the obligations under the *Migratory Birds Convention Act (1994)*, and eliminate or mitigate negative impacts to all wildlife species using the proposed site, Shaw Resources will:

1. Remove vegetation and overburden, and the wildlife and bird nesting habitat it supports, only during the time period when migratory birds do not normally nest (August through March);
2. Not remove sand from embankments used for nesting by such species as the Belted Kingfisher and Bank Swallow during periods when their nests are active (May through July);
3. Avoid, where possible, the nests of ground-nesting bird species that are sometimes attracted to extraction pits (e.g. Killdeer, Spotted Sandpiper, Common Nighthawk); and
4. Ensure that all toxic materials that might be used in the pit operations (e.g. Gasoline, diesel fuel, engine oil, hydraulic fluid, antifreeze, etc.) Are not accessible to birds and other wildlife and that any accidental spills of toxic materials will be dealt with expeditiously using appropriate protocols. In that regard, all equipment will be removed daily; all filling of equipment with petroleum products, and regular equipment maintenance will be conducted off the Lovett Road property.

Criteria for Monitoring Success

The success of the proposed strategies will depend on no visual evidence of contamination or oil spillages in and around the pit area and no evidence of contamination in groundwater samples taken from groundwater test wells. Success will also depend on no visual evidence of destruction of nesting birds or birds by project activities.

7.1.2.3 Summary

Wildlife surveys indicated that there are no species of amphibians, reptiles, birds or mammals that are considered at risk provincially or federally that are using the proposed site. It is anticipated that the proposed undertaking will have little adverse affect on local

and migratory fauna/wildlife in the area. All activities connected with the proposed project will be in accordance with the *Migratory Bird Convention Act* (1994).

7.1.3 Fish and Fish Habitat

Two watercourses have been identified in the Lovett Road area, namely the Cornwallis River and the Tupper Brook, which both flow in a north-easterly direction. The Cornwallis River is located 150 metres northwest of Lovett Road and flows under Lovett Road roughly 850 metres north of Highway 101. The Tupper Brook flows in north-easterly direction roughly 55 metres south of the proposed project area. An assessment of water quality, fish habitat, and the presence of fish in the Cornwallis River and Tupper Brook was not conducted because the watercourses in question lay well beyond what we believe to be the project area of influence, with one exception—the Ells roadway, which crosses the Cornwallis River west of Lovett Road. Moreover, a fish and fish habitat assessment has already been carried out on the Tupper Brook south of Highway 1 in 2003 (see Van Wilgenburg 2003).

7.1.3.1 Description of Existing Environment

Previous studies carried out by Ocean Valley Aquatics found that the two water bodies identified presently sustain a healthy population of several coldwater fish species (Van Wilgenburg 2003). The Cornwallis River is the main channel of the Cornwallis watershed which is also part of the Inner Bay of Fundy waterways and one of the main watersheds within the Minas Basin Watershed. In 2003, Ocean Valley Aquatics found that fish are present in the Tupper Brook. All fish species appeared in good visual health, and in abundance. The general fish habitat and water quality parameters are suitable for the species present to thrive. The condition of the fish in the Tupper Lake Brook sites is very good. In particular, the Brook Trout and American Eel are abundant

7.1.3.2 Effects, Proposed Mitigation, Follow-up Monitoring

Policy objective

Shaw Resources shall eliminate or mitigate any effect that the proposed project or activities connected to it may have on the fish and fish habitat from erosion and sedimentation and chemical contamination of adjacent waterways.

Rationale

The potential effects of the proposed project include trapping, blocking migration, and restricting the distribution of the local fish population due to excessive erosion and in-stream sedimentation as well as contamination of fish habitat from accidental fuel spills. The activities connected to the proposed project could increase the potential for sediment erosion and sedimentation of adjacent waterways from prolonged and sustained periods of rainfall, if erosion control measures are not in place. There is potential for sedimentation of waterways from wind erosion of exposed areas, overburden piles, and from transportation activities. Chemical contamination of the ground water and adjacent waterways could occur, if petroleum products spilled, because of the high porosity of the aggregate at the site.

Current situation

The proposed site is composed primarily of well sorted aggregate, thus the surface water is absorbed quickly and transferred to the watertable as through-flow rather than overland flow (see Section 7.1.6, Groundwater Resources and Hydrogeology).

Action plan

The proposed strategy to achieve the policy objectives includes the following:

(1) Construction of suitable sediment control structures before site preparation commences to mitigate potential erosion and in-stream sedimentation;
(2) Placement of sediment control structures along the down-slope of all overburden piles, at least thirty (30) metres from the outer edge of all established riparian zones (see Section 5.5, Site Preparation and Development); and
(3) Spread overburden over the disturbed area, once the aggregate extraction is complete in an area sufficient for grading.

It is highly unlikely that drainage ditches will be required to divert water runoff because of the high porosity of the aggregate at the site. Erosion and sedimentation of waterways from stockpile runoff will be eliminated because runoff will be contained within the pit and fabric barriers constructed around the down-slope of all overburden piles. Potential wind erosion will be negligible or inconsequential because treed buffers will be maintained on all sides of the existing and proposed pit areas, thus minimizing exposure to wind.

Roadways will be properly maintained also to reduce the potential for fugitive dust and sedimentation of waterways from transportation activities, although this is likely to be insignificant in light of the distance of project operations from watercourses, and characteristics of the aggregate and the site.

No chemicals or petroleum products will be stored on the proposed site and no refilling of equipment with oils will be carried out on site. There will not be any work conducted in the watercourses or within suggested buffer zones on the property, nor will any water be removed from watercourses or travel across riparian zones.

Criteria for Measuring Success

Indicators used to gauge the progress and achievement of the policy objectives will be no indication of undesirable impacts on the fish and fish habitat, which are attributable to the proposed project. They would include: (1) no sedimentation of local watercourses; (2) no contamination of local watercourses either directly or indirectly by means of contaminated water runoff or groundwater; and (3) no significant reduction in the base flow of the Tupper Brook.

While it is not possible to control all the variables that influence the condition of the groundwater and the fish and fish habitat in the local watercourses, the success of policy objectives will be determined and documented by sampling and analyzing the three (3) groundwater monitoring wells to track the quantity and quality groundwater over time (see Action Plan in Groundwater Resources section). In addition, the surface water in the Tupper Brook will be monitored through visual inspections and data collection (see Action Plan in Surface Water Resources section).

Surface water samples and flow measurements will be taken in the Tupper Brook at the Highway 101 culvert (immediately downstream) as well as the DAR culvert (approx. 400+/- M upstream) of the proposed project to identify natural seasonal variations, trends, anomalies, and suspected impacts, and the need for appropriate response(s) (see Action Plan in Surface Water section). Further, vigilant monitoring of the site, by means of visual observations, will be carried out by project managers to identify occurrences of excessive fugitive dust, erosion from runoff, and failing sediment control structures, particularly during heavy and prolonged rainfall. The success of the policy objectives for protecting the fish and fish habitat require not only regular groundwater and surface water monitoring, but

that employees working at the site (e.g., equipment operators) are aware of setbacks, and the importance of maintaining sediment control structures.

7.1.3.3 Summary

It is anticipated that with the mitigation and follow-up monitoring measures previously outlined, there is little potential for the fish and fish habitat to be adversely impacted by activities connected to the proposed project.

7.1.4 Geology

In 2006 Ian Spooner, P. Geo, Ph.D., was retained on behalf of the proponent to carry out a study of the proposed aggregate pit expansion site to provide a geological assessment of the site and an assessment of the proposed activities on the geomorphology of the site. This study was carried out between January and June 2006 (see Appendix VIII: Geology, Geomorphology and Surface Water).

7.1.4.1 Description of Existing Environment

The study showed that the proposed aggregate expansion site is characterised by moderately rolling topography, with slopes up to 25°, and well developed surface drainage. A thin layer of soil (<15 cm) covers a layer of well sorted sand and gravel deposits (kame) formed during the retreat of glaciers at the study site, which has a depth of anywhere from 14 to 28 metres. Including the subsequent layer of glacial till, consisting of larger sized stones and cobbles, the thickness of unconsolidated material could be greater than 30 metres. Regional bedrock maps indicate that the Wolfville Formation sandstone underlies sediments at the study site, and based on well records and nearby wells, the depth of this contact may be between 20 metres to 40 metres below the floor of the present excavation site. The bedrock is likely below the water table at the site. The assessment did not identify any bedrock outcrop on the property.

The soils at the site are classified as Class 4, which are considered low to fair in agricultural productivity and susceptible to drought. This restricts the range of crops that can be grown on the soil and indicates the site is poor crop land. There was some evidence of sediment creep at the site, as indicated by the accumulation of soil on the upslope side of trees,

however significant movement of this sediment is not expected. Some erosion has also occurred along OHV trails on the site.

7.1.4.2 Potential Effects, Proposed Mitigation, Follow-up Monitoring

The impact of aggregate extraction on the geology and geomorphology at the site was concluded to be minimal. Due to the estimated depth of bedrock, there is no indication that the excavation at the site will result in exposure to bedrock. According to Dr. Ian Spooner, no geological Valued Ecological Components (VEC's) were noted at the site. It is therefore determined that no mitigation plans are necessary with respect to geology or geomorphology of the site.

7.1.4.3 Summary

It is anticipated that the proposed aggregate pit expansion will have little adverse effects on the geology or geomorphology of the site and surrounding areas.

7.1.5 Surface Water

In 2006 Ian Spooner, P. Geo, Ph. D., was retained on behalf of the proponent to carry out a study of the proposed aggregate pit expansion site to provide a description of surface water resources and an assessment of the impact of proposed activities on surface water at the site. This study was carried out between January and June 2006 (see Appendix VIII: Geology, Geomorphology and Surface Water). In May 2007, a supplemental assessment was carried out by Terry Hennigar on behalf of the proponent to further assess any potential interactions between the project and the Tupper Brook, and the possibility and need for surface water monitoring in the Tupper Brook (see Appendix XI: Acid Rock Drainage & Surface Water Assessment Supplemental). In addition, a review of known water withdrawal from Tupper Brook was carried out by Hendricus Van Wilgenburg.

According to NSEL Kentville, there are no formal approvals for water withdrawals from the Tupper Brook. Yet, there is some surface water usage on the Tupper Brook roughly five (5) km upstream of the project area (i.e., south of highway #1. That surface water is being used for irrigating agricultural land. The surface water (for irrigation purposes) is not drawn directly from the Tupper Brook, but rather from a pond which is part of the Tupper Brook watershed. Water is also being withdrawn from the Cornwallis River for agricultural

production, both up-and down-stream of the project area. Accurate data does not appear to be available on amount of water sourced from the Cornwallis River and the Tupper Brook for agricultural production.

7.1.5.1 Description of Existing Environment

The study showed that there are no active surface drainage corridors in the study site. Although a secondary corridor does exist to the east of the study area, flowing water was not observed at the site, and there are no natural lakes or ponds on the property. There are also no significant peat deposits in the study region. The site is covered entirely by Cornwallis soil which is excessively drained, and as a result, almost all precipitation enters the groundwater system as through-flow. Limited sampling indicated that surface water quality, taken along the periphery of the site, was moderate to good. The potential production of acid rock drainage and their resulting impacts to receiving waters down gradient of the site from activities connected to this project are close to, if not, nil because the depth of the bottom of the pit is estimated to be ten to fifteen (10 to 15) metres or more above the bedrock underlying the site (see Appendix XI: Acid Rock Drainage & Surface Water Assessment Supplemental). We believe the main concern with respect to surface water quality deterioration and/or contamination at the site would be the result of a release(s) of petroleum products and/or hydraulic fluids into the groundwater. These concerns and measures to address them have been addressed in this document, specifically in the *Hazardous Materials and Contingency Planning* section.

With regards to heavy rain events, the largest daily precipitation recorded in Kings County, recorded at Greenwood, was 113.3mm.[5] The Greenwood data is reliable because it was measured by trained observers and meets World Meteorological Standards. The current pit embankments are more than sufficient to contain runoff from rain events of that magnitude, as well as all runoff from melting snow, even when the ground is frozen.

[5] Source: Environment Canada. Accessed at, http://www.climate.weatheroffice.ec.gc.ca/climate_normals/index_e.html. Accessed on, 2007-05-12.

7.1.5.2 Effects, Proposed Mitigation, Follow-up Monitoring

Policy Objective

Shaw Resources shall minimize any potential soil erosion due to runoff resulting from the proposed project or associated activities.

Rationale

The impact of aggregate extraction on the surface water at the site and surrounding areas was concluded to be minimal. The Spooner and Hennigar studies indicate that there should be little impact on the quantity or quality of surface water entering into the groundwater system as a result of excavation because of characteristics of the soils and the fact that all runoff will be contained within the pit area. It is therefore determined that no extraordinary mitigation plans are necessary with respect to surface water at the proposed site. Nonetheless, the south-eastern section of the project site is especially sensitive because the landscape slopes toward the Tupper Brook. For that reason, all surface water will be drained toward and contained within the pit floor.

Action Plan

To contain runoff from heavy rain events and when the ground is frozen, an overburden pile will be established along the south-eastern boundary of the proposed project. To eliminate potential soil erosion from wind and runoff, the overburden will be seeded with mixed grasses to stabilize the piles. In addition, a sediment control structure will be erected along the down-slope of the overburden pile to control erosion that may result from runoff. Lastly, at least a fifty-five (55) metres of undisturbed buffer will be maintained between any pit activity on the southern boundary of the project area and the highest seasonal high-water mark along the Tupper Brook (see Figure 4: Pit Borders and Buffers). This buffer exceeds the required buffer by at least twenty-five (25) metres. We believe the aforementioned approaches will eliminate any undesirable impacts from project and environment interactions, especially on the fish and fish habitat.

In addition, Shaw Resourses proposes to monitor surface water in the Tupper Brook through visual inspections and data collection. Surface water samples and flow measurements will be taken in the Tupper Brook at the Highway 101 culvert (immediately downstream) as well as the DAR culvert (approx. 400+/- M upstream) of the proposed project. Shaw Resources

will submit annual reports to NSEL on the results, at the same frequency and schedule as the groundwater monitoring program. The proposed surface monitoring program will identify the natural seasonal variations, trends, anomalies, suspected impacts, and the need for alternative actions. In the event that NSEL or other regulatory agency determines that the project is having a negative impact on the Tupper Brook, Shaw Resources will work with the appropriate agencies to assess the cause, and then identify and institute the appropriate mitigation measures, if it has been established that the cause is attributable to the project.

Once the project is approved, final site designs for overburden piles and site sediment and erosion control and surface water sampling parameters will be submitted with the Industrial Approval application. All active pit areas will be monitored and maintained until the project site is stabilized, reclaimed and the project decommissioned.

Criteria for Monitoring Success

The success of the proposed strategy will depend on the following: (1) no visual evidence of soil erosion due to wind and runoff outside the proposed project area or sedimentation of the Tupper Brook—attributable to the project; and (2), no evidence of any anomalies or suspected impacts (e.g., reductions in water flow, contamination due to hydrocarbons, or the intrusion of cloudy water) on the fish and fish habitat in the Tupper Brook—attributable to the project (see Criteria for Monitoring Success in Fish and Fish Habitat section). The value of stream flow measurements may be somewhat limited because of storage capacity and other stream uses upstream of the site, and the unstable stream channel.

The data collected from the Tupper Brook will be compared to *Canadian Water Quality Guidelines for the Protection of Aquatic Life*.

7.1.5.3 Summary

It is anticipated that, with adherence to the measures outline in this document, there will be little adverse impact on the surface water at the proposed expansion site. The high infiltration capacity of the soils retards overland flow and ameliorates the effects of sustained precipitation events. We believe that the data collected during water quality and quantity monitoring activities as proposed in this document will address any concerns with respect to surface water quality and quantity. Moreover, Shaw Resources is not considering water withdrawals from any watercourse in this area for use in this project.

7.1.6 Groundwater Resources and Hydrogeology

In fall of 2006, Terry Hennigar was retained on behalf of the proponent to carry out a study of the Lovett Road property to determine and provide the following information: (1) a description of the groundwater resources; and (2) measures to monitor the quantity and quality of the groundwater in the study area. Mr. Hennigar carried out this study in September of 2006 (see Appendix X: Hydrogeology Assessment and Groundwater Monitoring Program).

7.1.6.1 Description of Existing Environment

Mr. Hennigar tells us that ridges and hills of sand and gravel deposits form the topography on the valley floor in the vicinity of the proposed project. Two major hydrostratigraphic units underlie the study area—the Wolfville Formation and the ice-contact sand and gravel deposits. Well data for the study area show that well depths vary from 44 feet to 162 feet. Water levels in those wells vary from 5 to 56 feet below ground surface, with yields ranging from 4 to 70 imperial gallons per minute. Mr. Hennigar reports that no wells were within the foot print of the site, but there are wells located about 205 metres from the proposed project area. Those wells are considered to be representative and typical of the hydrogeological conditions found within the site. He further reports that the Kentville well-field lies east of the project area.

Mr. Hennigar advises that preservation of the integrity of groundwater resources in the vicinity of the project area is critical to protecting the Kentville well-field and the private water supply wells in the Coldbrook area. While the lowering of the water table, thus decreasing the yield of surrounding private wells is not anticipated, Mr. Hennigar advises that aggregate extraction not exceed a depth defined by the highest seasonal water table elevation—the maximum water level recorded being roughly 15 metres (49.90 ft.) above mean sea level.

7.1.6.2 Potential Effects, Proposed Mitigation, Follow-up Monitoring

Policy objective

Shaw Resources shall eliminate or mitigate any effect that the proposed project may have on the surface water and the integrity of groundwater resources.

Rationale

The potential effects of the proposed project include: (1) impeding the natural movement of surface water, by intersecting the water table; (2) impeding the natural movement of groundwater by lowering of the water table, thus decreasing the yield of surrounding private wells; and (3), introducing a deleterious substance such as the spillage of fuels into the sediments, thus contaminating the quality of groundwater and surrounding wells and wellfield, and also the quality of surface water. In light of those potential effects, there is a need to have in place guidelines to direct aggregate extraction operations. It is also important that Shaw Resources is able to track changes over time in order to judge the integrity of the groundwater resources in the project area.

Current situation

While it is known that surface water is being transferred through the sediments to the groundwater in the study area and to Cornwallis River, we have no direct knowledge of the groundwater gradients within the study area, thus a monitoring system and testing is necessary. There are no wells, residential or other, with 100 metres of the proposed project area.[6]

Action Plan

The proposed strategy to achieve the policy objectives is to extract aggregates to a depth no greater than the highest seasonal water table elevation. The plan is to excavate

[6] The Director of Engineering & Works Department for the Town of Kentville was notified and details of the proposed project provided because of the close proximity of the Kentville Wellfield.

aggregates to a depth of 16 – 18 metres above sea level, which is one (1) to three (3) metres above the highest seasonal water table elevation. Prior to extraction, the appropriate excavation depth will be established using groundwater measurements in the groundwater monitoring wells in year 1 of proposed project. Operators should be aware of the fact that they can recognize when they are excavating close (within 0.5 metres or so) to the water table. When the water content within the aggregate is greater than 50%, the operator will notice water dripping from the extracted aggregate. At this point the operator will also notice water beginning to accumulate in the base of the pit and recognize that they are extracting aggregate from the "saturated zone."

Hydrologists tell us that the radius of influence of an event—digging up to 100 tonnes of aggregate in the saturated zone—is only a few tens of metres from the digging point. It is unlikely that such an event will adversely affect private wells located greater than a few tens of metres from the digging point. Excavation will halt immediately where an operator inadvertently digs into the saturated zone and the incident will be reported to Shaw Resources management and advice on more appropriate excavation depths secured.

To avoid any adverse effects on the integrity of the groundwater resources and the surrounding private wells, and the Kentville well-field, it is important to know the direction and velocity of groundwater flow. As there is no direct knowledge of potential groundwater gradients within the study area, Shaw Resources proposes to construct a network of groundwater monitoring wells, at three (3) strategic locations just within the perimeter of the project area, to provide a suitable effects monitoring system. To achieve the policy objectives, the three (3) monitoring wells will be constructed at a minimum of two (2) metres below the water table at the time of construction (and according to industry standards) to determine the direction and velocity of groundwater flow and monitor groundwater quality and quantity within the project area. The first monitoring well will be located in the northern portion of the site, the second in the western portion, and third in the south portion, equidistant from the site boundaries (see Appendix X: Hydrogeology Assessment and Groundwater Monitoring Program). While we are proposing three (3) groundwater monitoring wells, the number may need to be increased to four (4) wells and/or thier location adjusted. We propose to make those determinations (specific number and location) during the Industrial Approval process.

We propose a minimum of one (1) measurement in the spring will occur in all years of operation, with four (4) measurements occurring in years 1 – 3. In year four (4), the frequency of measurements will be reduced, provided that no significant change in groundwater quantity and

quality is noted. Should test results show an increase in parameter levels, testing will return to the preceding schedule (e.g., from annual to semi-annual). Although not generally a regulatory requirement, Shaw Resources will also monitor for hydrocarbons in groundwater. Should a significant change occur, the change will be documented and reported to NSEL. In addition, the source of the changes will be investigated and rectified—if attributable to the project.

Criteria for Measuring Success

The monitoring program described herein will be utilized to determine groundwater gradients and to facilitate groundwater sampling and analyses in order to determine base line water quality and to track changes in groundwater over time. The results of the groundwater monitoring program will be compiled and interpreted by qualified persons. The results will be documented and submitted to NSEL annually, on the proviso that no significant changes are noted. The performance indicators used to gauge the achievement of policy objectives will be no contamination (e.g., hydrocarbons) of or significant change in groundwater quantity and quality over time. The quantity and quality field measurement parameters found in Table 8 will be documented during each monitoring event and compared to *Canadian Water Quality Guidelines for the Protection of Aquatic Life* and the *Guidelines for Canadian Drinking Water Quality* (also reported as Table 7 in the Hydrogeology Assessment and Groundwater Monitoring Program section)

Table 8: Groundwater Monitoring Schedule and Parameters

	Parameter	Source	Monitoring Frequency – Year 1 -3	Monitoring Frequency – Year 4	Monitoring Frequency – Year 5 and thereafter
Quantity	Water level	MWs	Quarterly	Semi-annually	Annually
	Water level	BRs	Quarterly	Semi-annually	Annually
Quality	Field measurements:			Semi-annually	Annually
	Conductance	All MWs	Quarterly	Semi-annually	Annually
	Temperature	All MWs	Quarterly	Semi-annually	Annually
	PH	All MWs	Quarterly	Semi-annually	Annually
	Laboratory analysis				
	RcAP-MS	All MWs	Annually	Annually	Annually
	Other analysis:				
	Iron	All MWs	Quarterly	Semi-annually	Annually
	Manganese	All MWs	Quarterly	Semi-annually	Annually
	Calcium	All MWs	Quarterly	Semi-annually	Annually
	Magnesium	All MWs	Quarterly	Semi-annually	Annually
	Potassium	All MWs	Quarterly	Semi-annually	Annually
	Chloride	All MWs	Quarterly	Semi-annually	Annually
	Total hardness	All MWs	Quarterly	Semi-annually	Annually
	Alkalinity	All MWs	Quarterly	Semi-annually	Annually
	pH	All MWs	Quarterly	Semi-annually	Annually
	Sulphate	All MWs	Quarterly	Semi-annually	Annually
	Specific conductance	All MWs	Quarterly	Semi-annually	Annually
	Copper	All MWs	Quarterly	Semi-annually	Annually
	Zinc	All MWs	Quarterly	Semi-annually	Annually
	Nitrate-N	All MWs	Quarterly	Semi-annually	Annually
	sodium	All MWs	Quarterly	Semi-annually	Annually
	Ammonia	All MWs	Quarterly	Semi-annually	Annually
	Total dissolved solids	All MWs	Quarterly	Semi-annually	Annually
	TPH	All MWs	Semi-annually	Semi-annually	Annually

Legend: MWs=monitoring wells; BRs=brooks; TPH=total petroleum hydrocarbons.

7.1.6.3 Summary

Provided that aggregate extraction does not intersect the water table and no deleterious substance is introduced into the groundwater, it assumed that the groundwater mitigation and follow-up monitoring program outlined in this report will preserve the integrity of groundwater resources and protect private water supplies in the vicinity of the Lovett Road Aggregate Pit Expansion Project. Given that all private water supply wells in the area lie

outside the immediate project area, current well depths and the propensity towards use of bedrock wells, it is anticipated that the proposed project is unlikely to have any adverse effect on the integrity of the groundwater, the surrounding private wells, and the Kentville well-field.

7.1.7 Atmospheric Conditions/Air Quality

7.1.7.1 Description of Existing Environment

NSEL monitors ambient air quality at ten locations across Nova Scotia. Generally, ambient air quality in Nova Scotia meets or exceeds national standards in most communities. The common air pollutants monitored regularly are sulphur dioxide (SO_2), carbon monoxide (CO), ground level ozone (O_3), nitrogen dioxide (N_2O), and hydrogen sulphide (H_2S). Exceedences for these pollutants are, typically, small and infrequent in Nova Scotia; thus, Nova Scotians have the benefit of good air quality. Aylesford is the nearest NSEL monitoring site to the proposed project, approximately twenty (20) kilometres north of site. The nearest Environment Canada monitoring site is in Kejimkujik, Nova Scotia.

The source of most air pollutants in Nova Scotia are either generated by motor vehicles and industrial activities in Nova Scotia or from trans-boundary air pollution from other areas in Canada and the United States (NSEL 1998). The Lovett Road Aggregate Pit expansion is located in a rural setting with no large industry within a ten (10) kilometre radius. It is anticipated that the proposed project will not contribute substantially to the concentration of air pollutants in the Coldbrook area because of separation distances between the project and urban and industrial centres.

7.1.7.2 Potential Effects, Proposed Mitigation, Follow-up Monitoring

It is acknowledged that activities associated with the Undertaking will generate dust (i.e., particulates) and vehicle emissions; those emissions will be in accordance with the *Nova Scotia Pit and Quarry Guidelines (1999)* for total particulate matter. Open sources of fugitive dust emissions will be controlled with the application of lignosulfonate on designated road surfaces and by maintaining road surface quality and natural barriers. The vehicle emissions will be controlled via proper equipment maintenance and inspection.

7.1.7.3 Summary

Dust emissions are expected to be negligible because of the particle size of the aggregate at the site. It is anticipated, with the implementation of the mitigation and monitoring measures outlined in this report, the proposed Undertaking will have little adverse affect on air quality in the Lovett Road and Coldbrook area. All activities connected with the proposed project will be in accordance with NSEL *Air Quality Regulations* (1995).

7.2 SOCIO-ECONOMIC CONDITIONS

7.2.1 Description of Existing Environment

Population and Demographics

2001 is the most recent census data available for Subdivision A of King's County, which includes the village of Coldbrook and the surrounding area (see Table 9). In general, the demographic statistics for Subdivision A are comparable to those for all of Nova Scotia, with a few exceptions.

From 1991-1996, Subdivision A experienced a 6.8% increase in population. However the subsequent five years, from 1996 to 2001, there was a 1.2% reduction in the number of persons living in the area. The population density in 2001 was 18.2 persons per square kilometre, with an average age of 37.2 years. 78.5% of the population was over the age of 15 in 2001.

Of those persons reporting an income in Subdivision A, the average total income was $18,320. The unemployment rate in 2001 was slightly lower than the rest of Nova Scotia, at 8.4%, compared to a provincial unemployment rate of 10.9%. Of the 10,780 persons employed, the majority worked in tertiary service industries (9030 persons).

The percentage of the population aged 20 to 64 years that had less than a high school level of education was 27.3%, whereas the percent of this age group holding a trade or college certificate or diploma was 37.2%. The percentage of the population (aged 20 to 64 years) that held a university certificate, diploma or degree was lower than the provincial percentage, at 12.95% compared to 19.97% for all of Nova Scotia.

Land Use

Land use in the proposed project area is a mix of residential, commercial, open space, institutional developments, and farming (see Appendix VIII: Geology, Geomorphology and Surface Water for soils classification). The proposed aggregate extraction operation is located entirely within an area zoned as R1. Properties immediately adjacent to the site are zoned as follows: East side zoning is R1, Residential; North side zoning is R1, Residential; West side zoning is R1, Residential; and South side zoning is M1, Light Commercial Industrial, and R2, Residential.

Aggregate extraction is allowed in areas zoned R1, provided that no topsoil is removed from the site—regardless of its source. While aggregate extraction falls under provincial jurisdiction, mixing of topsoils and their removal falls under municipal jurisdiction. We wish to make it abundantly clear that topsoils will not be removed by Shaw Resources from the project area, regardless of their source.

Table 9: Socio-Economic Information

Socio-Economic Data - General Population Information	**Kings County Subdivision A**	**Nova Scotia**
Population Count 2001	22,430	908,007
Population Count 1996	22,700	909,282
Population Change 1996-2001 (%)	-1.2	-0.1
Population Density per km^2	18.2	17.2
Percent of Population 15 Years and Over	78.5	81.8
Median Population Age	37.2	38.8
Education		
Total Population 15 Years and Older Attending School Full Time	1,665	82,685
% Population Aged 20-64 with Less than High School Graduation Certificate	27.29	25.31
% Population Aged 20-64 with a Trades Certificate, Diploma or College Certificate, Diploma	37.19	34.06
% Population Aged 20-64 with a University Certificate, Diploma or Degree	12.95	19.97
Income		
Median Total Income of Persons 15 Years of Age and Over ($)	18,320	18,735
Labour Force Indicators		
Participation Rate (%)	63.4	61.6
Employment Rate (%)	58	54.9
Unemployment Rate (%)	8.4	10.9
Industry		
Total - Experienced labour force	10,780	442,425
Agriculture and other resource-based industries	975	29,000
Manufacturing and construction industries	1,755	70,955

Wholesale and retail trade	1,645	71,085
Finance and real estate	295	20,620
Health and education	1,685	80,700
Business services	1,105	70,270
Other services	3,325	99,790

Income Characteristics	**Kings County Subdivision A**			**Nova Scotia**		
Earnings	**Total**	**Male**	**Female**	**Total**	**Male**	**Female**
All persons with earnings (counts)	11,325	6,230	5,095	468,830	246,110	222,720
Average earnings (all persons with earnings ($))	24,582	30,861	16,901	26,632	32,328	20,338
Worked full year, full time (counts)	5,880	3,865	2,015	234,950	135,960	98,990
Average earnings (worked full year, full time ($))	35,217	39,595	26,821	37,872	43,166	30,601

Source: Statistics Canada 2001a

Municipal Planning Strategy

The primary aim of the Municipal Planning Strategy for the County of Kings is the protection of the agricultural land-base.[7] The County of Kings has enacted policies and regulations that prohibit the removal of topsoil for commercial purposes. Accordingly, Shaw Resources *will not* remove any topsoil or overburden from the site. Responsibility for the excavation of aggregate in the County of Kings falls under the authority of the Province of Nova Scotia.

Recreation and Tourism

Anecdotal information suggests that the proposed project area is currently utilized by local residents for nature/recreational walks. Highway 1 serves as corridor for many tourists travelling through the Valley and to parts beyond. While there are no recreational or tourist sites along Lovett Road or near the Lovett Road property, there is a campground and golf course on Highway 1, roughly one kilometre directly south of the Lovett Road property. The proposed project is not visible from those facilities or from Highway 1, as it is shielded by buildings, a hilly terrain, and forest cover.

[7] Municipal Planning Strategy. Municipality of the County of Kings. Accessed at http://www.county.kings.ns.ca/ Accessed on June 05, 2005.

Human Health

The health of residents in Subdivision A (which includes the Village of Coldbrook and North Coldbrook) is similar to that of other Nova Scotians. In some categories, such as infant morality, and lung cancer, Coldbrook and area residents are below the provincial average (see Table 10). Based on existing health information and scope of the proposed project, there is nothing to suggest that the Undertaking will have any adverse effects on the health and well-being of residents in the Village of Coldbrook and the Lovett Road area.

Table 10: Health Information

Health Data	Kings County Subdivision A	Nova Scotia
Life Expectancy at Birth for Both Sexes in Years (1997)	78.7	77.7
Life Expectancy at Birth for Males in Years (1997)	76.3	74.9
Life Expectancy at Birth for Females in Years (1997)	81.2	80.4
Average Rate of Infant Mortality per 1,000 Live Birth (1997)	3.9	4.9
Total Incidence of Cancer per 100,000 for Both Sexes (1997-1998)	374	420.2
Total Incidence of Cancer per 100,000 Males (1997-1998)	429.8	498.8
Total Incidence of Cancer per 100,000 Females (1997-1998)	332.1	368.4
Rate of Death due to Respiratory Disease per 100,000 for Both Sexes (1997)	83.5	76.3
Rate of Death due to Respiratory Disease per 100,000 Males (1997)	122.7	108.5
Rate of Death due to Respiratory Disease per 100,000 Females (1997)	60.7	57.7
Rate of Death due to Pneumonia and Influenza per 100,000 for Both Sexes (1997)	41.5	33.1
Rate of Death due to Pneumonia and Influenza per 100,000 Males (1997)	51.1	42.6
Rate of Death due to Pneumonia and Influenza per 100,000 Females (1997)	36	27.7
Rate of Death due to Bronchitis, Asthma, and Emphysema per 100,000 for Both Sexes (1997)	6.6	5.8
Rate of Death due to Bronchitis, Asthma, and Emphysema per 100,000 Males (1997)	12.3	8.2
Rate of Death due to Bronchitis, Asthma, and Emphysema per 100,000 Females (1997)	3	4.5
Rate of Death due to Lung Cancer per 100,000 for Both Sexes (1997)	52.8	57.7
Rate of Death due to Lung Cancer per 100,000 Males (1997)	78.3	80.5
Rate of Death due to Lung Cancer per 100,000 Females (1997)	33	41.1
Rate of Death due to Circulatory Disease per 100,000 for Both Sexes (1997)	231.7	252
Rate of Death due to Circulatory Disease per 100,000 Males (1997)	295.9	334.9
Rate of Death due to Circulatory Disease per 100,000 Females (1997)	185.6	191.1

Source: Statistics Canada 2001b

7.2.2 Visual / aesthetic Environment

Generally, the Lovett Road property is aesthetically appealing because much of landscape is comprised of small plants and trees that cover the property, particularly the stand of large pine trees. That aesthetic appeal is enhanced by the rolling landscape, which runs up away from Lovett Road. While there are a number of roadways and trails that crisscross the property, they serve as walking trails for local residents. The forest cover surrounding the existing and proposed pit areas restricts sightlines, making project operations difficult to observe from almost any angle. If a person is travelling on Highway 101, they may catch sight of the project area, but only if they are exceptionally attentive. The project area is virtually impossible to see from Lovett Road, and is only visible from discrete locations along the southern portions of the property. Although the pit area is virtually impossible to see from the Bessview subdivision, a few homeowners may be able to see—through the trees—trucks and equipment travelling to and from the pit area.

7.2.3 Transportation

It is anticipated that 100-150 truck loads of product will exit the site daily. The trucks accessing and exiting the Lovett Road property will do so from the Ells roadway. The Ells roadway is roughly 20 metres south of the Highway 101 overpass on Lovett Road. The Lafarge roadway is roughly 20 metres south of the Ells roadway. Thus, equipment and trucks transporting aggregates will cross, almost directly, the Lovett Road. The trucks will follow a circular route to the Lovett Road project site—along the Ells roadway and the Lafarge roadway—and return to the Keddy Operations on the South Bishop road. The Lovett Road is subject to spring weight restrictions. Shaw Resources will transport product in accordance with the Nova Scotia Department of Transportation and Public Works Guidelines.

The proposed project will not increase the level of truck traffic from the Keddy operation, as the purpose of the proposed project is to maintain current production levels. It is expected that the trucks travelling through the Village of Coldbrook will not add to the level of noise and dust currently experienced by the residents. Proper vehicle inspection and maintenance and adherence to posted speed limits should lessen, if not eliminate, a number of community concerns.

It is anticipated that significant improvements in the surface of the access road (e.g., paving) will not be required because the site is not subject to muddy working conditions due to the porosity of the aggregate. The entrance to the Lovett Road property is paved, but if mud is being tracked onto Lovett Road, the proponent is prepared to upgrade the road surface at the entrance to the site to resolve the issue.

No additional access roads are required for the proposed project, nor are any road upgrades required given the relatively low level of truck traffic.

Shaw Resources will adhere to the following conditions as suggested by the Nova Scotia Department of Transportation and Public Works, New Minas branch, before transporting aggregate across the Lovett Road from the existing and proposed project:

- Stop signs shall be erected at the end of each haul road.
- Truck Entrance signs (TC-54R and TC-54L) shall be installed approx. 150-200 metres in advance of each entrance road and shall be double posted to indicate that trucks may be entering Lovett Rd. from either the east or west haul roads. Signs shall be covered or removed during non-hauling periods (nights and weekends).
- Dust control shall be applied and maintained on the haul roads for a distance sufficient to prevent dust from the haul roads from being problematic for motorists or residents on Lovett Rd.
- Lovett Rd. shall be kept clean of all loose sand, aggregate, and debris arising from the hauling.
- The Department of Transportation shall receive 48 hrs notification of the intent to start hauling operations.
- The Department shall be provided with a contact name and telephone number at Shaw Resources for communication in the event the Department has questions or concerns with the operation.[8]

[8] Source: Paul Lincoln, Area Manager-New Minas, Nova Scotia Department of Transportation and Public Works. Received on, May 15, 2007.

7.2.4 Potential Effects, Proposed Mitigation, Follow-up Monitoring

While it is acknowledged that some activities associated with the Undertaking will have an impact on quality of life, for example, air quality, traffic, noise, vibration, and visual/aesthetic qualities, they are expected to be minimal. It is anticipated that the proposed expansion will contribute positively to the local and provincial economy either directly (within the company; i.e., principles, current employees, and their families) or indirectly (outside the company; i.e., in tertiary service industries). Accepting that jobs contribute to individual and community wealth, and wealth contributes to individual and community health and well-being, Shaw Resources makes an important contribution to the health and well-being of its principles, employees, and the community generally.

Shaw Resources currently employs a local workforce of about eleven (11) people. The employees work carry out a range of duties including: two (2) clerical staff, three (3) truck drivers, six (6) plant employees, and from five (5) to fifteen (15) contract truckers. Moreover, the Keddy operation relies on staff from other company operations to service the Keddy operation. The proposed project will not require additional employees; but nevertheless, this project is required to maintain Shaw Resources current production, its current workforce, and its socio-economic contribution, locally and provincially.

7.2.5 Summary

In summary, it is anticipated that the proposed aggregate pit expansion will not negatively and may contribute positively to the health and well-being of the people living in the local area.

7.3 Archaeological and Heritage Resources

In the spring of 2006, Laird Niven, Archaeologist, was retained on behalf of the proponent to carry out an archaeological assessment of the Lovett Road property. The purpose of the assessment was to identify any reported or unreported archaeological sites or heritage resources within the proposed aggregate pit expansion site. The study included a review of background historical documents, early maps dated from 1872, and aerial photographs dated from 1931 to 2002 (see Appendix IX: Archaeological and Heritage Study). As this preliminary historical research resulted in no indication of significant settlement in the study area, Mr. Niven concluded there was no need for further archaeological fieldwork at the site.

7.3.1 Description of Existing Environment

A review of historical maps and aerial photographs did not suggest any significant settlement in the study area. Although early maps indicate Acadian settlement from the Minas Basin west towards Annapolis Royal, these would have been based around rivers and salt marshes, neither of which are present in the study area. In the 1800s, small towns such as Kentville and Coldbrook were established, however a map dated 1872 does not show any built structures in the study area, which was located in what was then called Cold Brook Station.

From aerial photographs, the study area was completely cleared in 1931 with some cultivation along the former railway bed. There was no evidence of settlement features. In 1955, the aerial photographs again show no evidence of settlement, apart from a few trails and paths. By 2002 the study area was almost completely covered with mature trees, with only the road to the sand pit and a few paths visible.

The historical research found no recorded archaeological sites within the study area. The assessment concluded that the study area contains few resources that would have attracted settlement by First Nations (e.g. water source, portage routes), and therefore the First Nation's archaeological potential is low. As the background research indicated no historic settlement within the study area, the historical archaeological potential is also considered to be low. Overall, the archaeological potential of the study area was considered to be low, and Mr. Niven concluded that no further archaeological assessment is required.

7.3.2 Potential Effects, Proposed Mitigation, Follow-up Monitoring

Policy Objectives

Shaw Resources will ensure that the proposed activities will have no negative impacts on any archaeological and heritage resources if any are found on site during project activities.

Rationale

As there were no archaeological resources found at the proposed aggregate pit expansion site, it is determined that no archaeological mitigation plans are required. If, however, any are found during the proposed excavation operations, potential impact could include total or partial destruction of the archaeological material, if the action plan is not taken.

Current Situation

A review of historical maps and aerial photographs did not suggest any significant settlement in the study area and the historical archaeological potential of the site is considered to be low.

Action Plan

If any archaeological remains are found during site preparation or excavation, pit operations in that area will halt immediately and archaeological staff at the Heritage Division, Nova Scotia Museum will be contacted for the appropriate protocol to take in recovering or mitigating impacts on the remains.

Criteria for Monitoring Success

The success of the policy objectives for protecting potential archaeological and heritage resources will require that equipment operators watch for unique or unusual objects while excavating. If any unusual objects or articles are uncovered, operations in that area will cease immediately and the findings reported to the Nova Scotia Museum of Natural History.

7.3.3 Summary

In summary, as no significant archaeological resources were discovered at the site, it is anticipated that the proposed expansion will not negatively impact archaeological or heritage resources in the Coldbrook area.

8.0 OTHER UNDERTAKINGS IN THE AREA

There are about nine (9) other aggregate pits within a five (5) kilometre radius of the proposed pit site, of which we understand four are active. The pits that are active do add to the traffic density/flow in the Valley corridor—along Highway #1 and in the Lovett Road area. Given that Shaw Resources does not anticipate increasing its production levels at the Keddy Operation, truck traffic from its activities will not increase traffic density or vehicle emissions.

9.0 OVERALL EFFECTS OF THE UNDERTAKING ON THE ENVIRONMENT

As with most projects, there are advantages and disadvantages associated with this project. Understandably, some short-term undesirable environmental effects connected to the proposed project are anticipated. Firstly, it is anticipated that the project described in this document will result in some short-term loss of terrestrial habitat within the expanded pit footprint. In light of the area being disturbed, the loss of habit is minimal. Hence, the impact of activities connected with this project on flora and fauna are not expected to be significant. The proposed development and reclamation strategies will limit the adverse impacts of the proposed project activities.

Secondly, the removal of surface aggregate in the quantities indicated in this study is expected to have little effect on both the quality and the quantity of the surface water and groundwater on or adjacent to the site. Close attention to groundwater monitoring should identify potential impacts of excavation at the site before impacts occur or become significant. Potential impacts associated with this project include both positive and negative impacts, namely air quality, traffic, noise, vibration, and visual/aesthetic qualities. Although the aforementioned impacts are not expected to be significant, close attention to timely monitoring should diminish such occurrences.

Thirdly, there is the potential for sedimentation and contamination arising from pit activities that may afterward spoil the aquatic habitat of the watercourses on and off the site. Vigilant monitoring of all site activities is crucial. Lastly, trucks crossing the Lovett Road pose a safety concern, especially for vehicular traffic travelling on Lovett Road. While trucks travelling to and from the site will be periodic, stop signs will be placed at the entrances to the Ells and Lafarge roadways to minimize the potential for accidents. Further, Shaw Resources drivers will be advised to adhere to the posted signs.

The advantages of the project are mostly in the form of socio-economic benefits. The project will provide continued employment opportunities for those individuals employed in activities closely related with the project (e.g., Shaw Resources employees and their families). There are also those who work in tertiary industries that service individuals and organizations associated with the project. The aggregate excavated from the Lovett Road property is important to the continued success of Shaw Resources and the Shaw Group Limited.

The goal of the proposed project is to service the needs of Nova Scotians, without significantly adversely affecting the environment and the people who live in the Lovett Road area. With careful application of the monitoring and mitigating measures outlined in this document, Shaw Resources believes that potential adverse effects, identified and evaluated in this document, can be avoided, lessened or ameliorated.

10.0 EFFECTS OF THE ENVIRONMENT ON THE UNDERTAKING

The environment may affect this Undertaking primarily by way of climatic conditions. Input events (e.g., precipitation) or runoff may hold up the timely preparation, excavation, and reclamation of land within the active area of the proposed project or available markets because of inactivity at construction sites. If the environmental conditions are not conducive to the applicable activity, the activity will have to be delayed until conditions are more amenable.

11.0 REGULATORY COMPLIANCE AND APPROVALS

Approval for this project will be sought in accordance with the requirements of the following provincial legislation and the regulations made pursuant to them:

- *Nova Scotia Environment Act,* N.S. Reg. 52/2005, *and*
- *Industrial Approval for Pit and Quarry Development under the Activities Designation Regulations,* N.S. Reg. 47/2005.

The proposed Lovett Road Aggregate Operations will adhere to the most recent versions of the relevant NSEL guidelines and specifications including: *Pit and Quarry Guidelines (1999); Erosion and Sedimentation Control Handbook for Construction Sites (1988),* and *Guidelines for Environmental Noise Measurement and Assessment (2003)*. In addition, the following joint provincial guidelines and specifications may apply: *Guidelines for Development on Slates in Nova Scotia (1991)*. All work at the Site will be carried out in accordance with the *Nova Scotia Occupational Safety General Regulations (1999)*, or the relevant legislation in force at the time of construction.

Approvals for this project may not be required in accordance with the following federal and provincial legislation and the regulations made pursuant to them; nonetheless, the activities associated with this project must comply with the following:

- *Canadian Environmental Protection Act (1999)*;
- *Canadian Fisheries Act (1985)*;
- *Canadian Migratory Birds Conservation Act (!994)*;
- *Nova Scotia Dangerous Goods Transportation Act (1989)*;
- *Nova Scotia Environment Act (2005)*;
- *Nova Scotia Special Places Protection Act (1989)*;
- *Nova Scotia Water Act*; and,
- *Nova Scotia Wildlife Act (1989)*.

12.0 FUNDING

The proposed Undertaking will be 100 percent privately funded.

13.0 CONCLUSIONS

The studies captured in this document identify and evaluate the Valued Ecosystem Components, Valued Socio-economic Components, and potential environmental impacts of activities connected to the proposed Lovett Road Aggregate Pit Expansion. In addition, this study identifies appropriate mitigation and monitoring measures to eliminate, lessen and mitigate any potential impacts. Part of Shaw Resource's site management strategy is to carry out a monitoring and mitigation program, as proposed herein, to ameliorate, lessen or eliminate any potential impacts connected to project activities on surface water, groundwater, flora, fauna, and residents in close proximity to the Lovett Road project area.

Once the aggregate is exhausted, Shaw Resources will reclaim the disturbed areas to eventually return the project area to conditions approximating its current vegetative state (rather than topographical), and eventually the habitat to a state approximating current conditions. Toward that end, Shaw Resources will use an adaptive management strategy, that is, management of the project, which "involves a continual learning process that cannot conveniently be separated into functions like…ongoing regulatory activities", for example, the approval of projects or the reporting of monitoring results (see Walters 1986: 8; Gunderson, Holling and Light 1995). The strategy here is to envision the biophysical and

socio-economic environments as dynamic entities that are interrelated and interconnected, which may require unanticipated, but fitting management responses from Shaw Resources.

For Shaw Resources, the proposed Lovett Road Aggregate Pit Expansion is an important and necessary part of its economic stability, the needs and well being of the principles, their employees and their families, and Nova Scotians generally. Travel to and from the site will follow the established routes. Treed areas along property borders will be maintained to screen project activities and potential emissions, such as noise or dust. It is acknowledged that the Undertaking will result in a short-term loss of terrestrial habitat within the physical footprint of the project, but these impacts are not expected to have a long-term adverse impact. Shaw Resources will not remove overburden or topsoil from the property. Reclamation will occur at the site as soon as it is practically possible. Lastly, Shaw Resources seeks to maintain its strong relationship with the residents and the community of Coldbrook, and the surrounding area.

Assuming that the monitoring and mitigating measures outlined in this report are implemented and adhered to, and the pit is operated according to existing provincial guidelines and approvals, the information collected for this report indicates that that no significant adverse residual socio-economic effects are likely to occur. The removal of aggregate will result in some significant adverse residual environmental effects in the short term, namely disruption of the terrestrial habitat. With the implementation of the buffer zones and reclamation approach outlined in this report, those adverse residual environmental effects, in time, will be alleviated.

14.0 REFERENCES

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15.0 APPENDICES