Good Morning,

For those of you I have not met yet, my name is Lisa Payne. I am a Senior Project Lead with the Major Mines Permitting Office (MMPO) of the Ministry of Energy, Mines and Petroleum Resources (EMPR). I am coordinating the Mine Review Committee (MRC) for the proposed East Bullmoose expansion to the Wolverine Mine Project.

**Major Mines Permitting Office:**
The MMPO is responsible for leading the Coordinated Authorizations Review process for major mining projects. The MMPO is accountable to the MMPO Board, comprised of Assistant Deputy Ministers from the provincial Natural Resource Sector (Ministry of Energy and Mines; Environmental Assessment Office; Ministry of Forests, Lands, Natural Resource Operations and Rural Development; Ministry of Environment; Ministry of Indigenous Relations and Reconciliation). The MMPO Board meets bi-monthly to discuss key issues related to major mine projects.

**Project Information:**
Conuma Coal Resources Ltd (Conuma) is proposing to build and operate the East Bullmoose (EBM) pit in the existing Wolverine Mine complex (metallurgical coal). The East Bullmoose pit was included in the Wolverine Environmental Assessment (EA) process. An EA Certificate was issued in 2004.

Wolverine is located 15 km west of Tumbler Ridge and within Treaty 8 Territory. The Wolverine Mine is currently operating. The expected life of the EBM pit is nine years, with a production rate of 2.0 Mt/a.

Please see the attached project description for more detailed information on Conuma’s East Bullmoose proposal.

**Proposed List of Permits:**
Conuma currently anticipates applying for the below-listed permit amendments and applications:

- Amendment to Mines Act Permit C-223;
- Amendment to Environmental Management Act (EMA) effluent permit PE-17756;
- Amendment to Environmental Management Act (EMA) air permit PA-17759;
- Application for Occupant Licence to Cut;
- Application for Wildlife Handling Permits;
- Application for Water Licence; and
- Application for Well Use.

It is my current understanding that Conuma will be applying to widen the Perry Creek road through a separate, regionally-administered process.
Permitting Process:
Conuma is currently drafting their permit applications for East Bullmoose. Conuma anticipates providing the MRC with their permits for screening in May 2018. I have attached a draft schedule for your review and comments. Please focus on the schedule durations, as the dates are included as an example only. I will revise the schedule after I receive your comments and when I have a better idea of when Conuma will be submitting their applications for screening. I would appreciate your comments back on the schedule by Monday, April 30, 2018.

The schedule ultimately gets approved by the MMPO Board to provide MRC members and Conuma timeline certainty, and allow MRC members to plan accordingly. Changes in the schedule that may result in a change in the overall timeline of the coordinated authorizations process must be proposed to the MMPO Board for their decision whether to approve/reject the change.

Wolverine East Bullmoose Mine Review Committee:
The Wolverine East Bullmoose MRC is a multi-agency review committee that includes representatives from First Nations and provincial and local government agencies – based on the project location and the permits that Conuma will be applying for. Please confirm whether you are the appropriate person from your First Nation, agency or branch to participate in the MRC by April 20, 2018.

Conuma is currently drafting their permit applications. The MMPO anticipates holding topic-specific meetings in April and May (e.g. to discuss Water Sustainability Act and Forest Act Authorizations). The MMPO will contact you to arrange these meetings shortly.

The MMPO will be holding an introductory full MRC meeting (teleconferencing will be available) before application screening, to discuss the role of the MRC, the coordinated authorizations process, the MRC terms of reference, and provide a project overview. I am currently looking to book this meeting the week of April 30, or the week of May 7. Please let me know any dates that will not work for your First Nation or agency to attend this MRC kick-off meeting within that two week time period (April 30 – May 11). I would appreciate you letting me know your preference on the date for the introductory MRC meeting by April 20, 2018 so I can make appropriate arrangements.

Please see the attached Wolverine East Bullmoose Terms of Reference (TOR) that sets out the roles and responsibilities of the Wolverine East Bullmoose MRC. Please review the Wolverine East Bullmoose MRC TOR and let me know if you have any comments on the MRC TOR by April 30, 2018. We will discuss the MRC TOR at our first MRC meeting.

SharePoint:
The MMPO will post materials related to the proposed East Bullmoose expansion on the NE Coal Projects SharePoint site: https://spc-mem.gov.bc.ca/necp/SitePages/Home.aspx. For MRC members not in the provincial government, you can gain access to the SharePoint Site by following these instructions:
To access the SharePoint MMPO project site with BCeID:
1. Open the link for the SharePoint project site
2. Sign in on the SharePoint site with your BCEID credentials (ID and password); when providing the user name, ensure it is prefaced with the domain, i.e. BCEID: BCEID\your_chosen_id
3. If you do not have a BCeID, you may submit your existing BCeID to the MRC Chair to be added to the SharePoint site. You may also use this generic BCeID information that I have created for this project:
   • Login: BCEID\EBM2018
   • Password: EBM_mrc!1
Alternatively, if you would like to sign up for a basic BCeID, here are the instructions:
   • Visit: https://www.bceid.ca
   • Click “Begin Registration”
   • Click “Basic BCeID”
   • Enter your details & OK.
   • Provide BCeID user name to me so I can to provide you access to the SharePoint site. Once this has been done, you will receive an automated notification.

Next Steps:
• **By April 20, 2018:**
  o Please confirm whether you are the appropriate person from your First Nation, agency or branch to participate in the MRC.
  o Please let me know any dates that will not work for your First Nation or agency to attend the MRC kick-off meeting within the two week time period of April 30 – May 11.
• **By April 30, 2018:**
  o Please review the Wolverine East Bullmoose MRC TOR and let me know if you have any comments or edits.
  o Please review the draft schedule and let me know if you have any comments or edits regarding the durations or specific dates (for example, a conflict with a week-long conference).

If you have any questions please do not hesitate to contact me at 778-698-7260 or Lisa.Payne@gov.bc.ca.

I look forward to working with you on the proposed Wolverine East Bullmoose expansion review.

Lisa

Lisa Payne
Senior Project Lead, Major Mines Permitting Office
BC Ministry of Energy, Mines and Petroleum Resources
Office: 778-698-7260
Cell: 250-812-8872
Lisa.Payne@gov.bc.ca

May 3, 2018
## DRAFT Wolverine East Bullmoose Permit Review Schedule

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<td>Conuma</td>
<td>Proponent develops Application</td>
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<tr>
<td>Conuma</td>
<td>Proponent Submits Permit Application Package for Screening Review</td>
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<td><strong>Application Screening</strong></td>
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<tr>
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<td>Application Screening</td>
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<td>MRC / Permitting agencies provide screening comments to MEM / Proponent</td>
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<td>FLNR prepare First Nations Consultation Report</td>
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<td>MMPO</td>
<td>MEM prepares draft MRC Report and Issue Tracking and Resolution document</td>
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*note that the RCAs allow for modifications to the timeline if the First Nations are participating in an MRC/MRC process*

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<th>23-Oct-18</th>
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**Decision**

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<td>SDMs</td>
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COORDINATED AUTHORIZATION PROCESS

DRAFT TERMS OF REFERENCE

FOR THE

WOLVERINE EAST BULLMOOSE MINE REVIEW COMMITTEE

WITH RESPECT TO THE

CONUMA COAL RESOURCES LTD

EAST BULLMOOSE EXPANSION TO THE WOLVERINE MINE

APRIL 2018
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DRAFT TERMS OF REFERENCE FOR THE
WOLVERINE EAST BULLMOOSE MINE REVIEW COMMITTEE

1  MINE REVIEW COMMITTEE GOALS AND OBJECTIVES

The goal of the Wolverine East Bullmoose Mine Review Committee (MRC) is to provide an open, transparent, efficient, and timely Coordinated Authorizations process for the review of permit applications submitted by Conuma Coal Resources Ltd (Conuma).

Coordinated Authorization Review Process: a British Columbia Natural Resource Sector (NRS) government policy-endorsed process that coordinates First Nations consultation and review of multiple authorizations required from the various natural resource agencies for major mines. This process is meant to improve consistency, eliminate overlap and duplication in process and information requirements by the various agencies.

The MRC is established under Section 9 of the Mines Act. It is chaired by the Province, and serves as a forum for the coordinated authorizations.

The purpose of the MRC is to:

- conduct a coordinated review of application information provided by Conuma for authorizations submitted;
- ensure opportunities for First Nations to receive and share information and, where appropriate, contribute to the development of proposed mitigation measures for potential adverse environmental effects;
- identify technical issues related to the project, and coordinate recommended solutions for those issues;
- refer issues related to the development of the project that are raised but not within the responsibilities of the MRC to the appropriate authority or forum;
- work with The Ministry of Forests, Lands and Natural Resource Operations’ (FLNR) First Nation Consultation Advisor to ensure the Province’s duty to consult and accommodate is fulfilled; and
- provide a report to Statutory Decision Makers (SDMs) regarding applications under review.

Key Contacts
MRC Project Director: Sean LeRoy – Sean.Leroy@gov.bc.ca
MRC Project Lead: Lisa Payne – Lisa.Payne@gov.bc.ca

May 3, 2018
2 DELIVERABLES

The MRC will provide a report to SDMs regarding applications under review, including:

- a summary of the coordinated authorizations process for the project;
- a record of issues raised, which venue was most appropriate to address the issues, and how the issues have been resolved or if not, why not;
- a summary of the approach and conclusions of the First Nation consultation process (a consultation report will be provided to the SDMs); and
- any other relevant materials for the consideration by the SDMs.

3 COORDINATED AUTHORIZATIONS PROCESS

Project timelines are tracked and managed through the associated Permitting Schedule, which is ultimately approved by the Major Mines Permitting Board (MMPO). Barriers to Conuma, First Nations, or the Province providing high-quality and timely preparation, input, and review of applications will be referred to the MMPO Board for resolution.

4 PROJECT DEVELOPMENT AND TARGET TIMELINES

Project Development
Provide a project description summary including onsite and offsite components (facilities and activities) which are scoped into the review.

Target Timelines
Review processes for major mine projects are complex and iterative. Issues may be raised during the review which require further research, analysis or new information. In the event that new information or analysis is required, target timelines may be amended to ensure a full and adequate review. Please see the Permit Application Review Schedule for more information.

5 MRC MEMBERSHIP

The names, agencies, and contact details for all designated local, provincial and federal government representatives, as well as First Nations and representatives on the MRC are listed in the table below. This list will be populated based on your responses to the MRC email.

<table>
<thead>
<tr>
<th>Agency/Affiliation</th>
<th>Name</th>
<th>Role</th>
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<tr>
<td>Environment</td>
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</table>

May 3, 2018
6 PUBLIC REVIEW

Public involvement in this review will be guided by statutory requirements for public consultation including advertising, review and comment periods. The MRC Chair will work with Conuma to determine who and how issues raised by the public will be managed and included in the report to SDMs.

Applicants for a Mines Act permit are subject to a legal requirement to advertise project proposals and make information available for public review, with 30 days available for public review and comment. [Part 10.2.1 and 10.2.2 of the Mine Code]

The Public Notification Regulation under the Environmental Management Act places certain notification responsibilities on an applicant for an effluent discharge permit. The regulation is available at http://www.bclaws.ca/.

Although members of the public do not sit on the MRC, representatives of local governments in the project area have been invited to participate in the review in order to represent the broad views of the public and to ensure that local and regional government programs and policies are taken into account in the project review.

Individual members of the public and overlapping tenure stakeholders have several opportunities to participate in the review of a mine project and therefore potentially influence the proposed project through:

- access to Conuma-sponsored outreach to the public;
- notification by the Conuma of the application under review, access to the application and related materials, and opportunities to review and comment;
opportunities to attend MRC meetings, on invitation by the MRC Chair, to discuss concerns with MRC members and Conuma; and
access to MRC meeting summaries, upon request.

7 FIRST NATIONS CONSULTATION AND ACCOMMODATION

Background
The Wolverine Coal Mine is located within the consultative area boundaries of Saulteau First Nations, West Moberly First Nations, McLeod Lake Indian Band, Halfway River First Nation, Horse Lake First Nation, Blueberry River First Nation, and Doig River First Nation. The Wolverine Mine is located within the Tumbler Ridge Zone. The Province’s consultation with Saulteau First Nations, West Moberly First Nations, and Halfway River First Nation will guide be guided by the Regional Coal Agreements.

Before issuing authorizations for any project activity, the Province has a legal responsibility to consult and, where appropriate, accommodate First Nations with Aboriginal Interests in the Wolverine East Bullmoose project area.

MRC and Conuma’s activities can contribute to the consultation process through:

- First Nations participation as members of the MRC;
- accommodation through recommendations leading to permit conditions;
- Government-to-Government agreements;
- Conuma outreach and information sharing;
- Conuma – First Nation agreements; and
- Conuma-developed initiatives to address issues raised by First Nations.

Government and First Nations may choose to meet outside of the MRC forum to discuss how the East Bullmoose expansion of the Wolverine Mine may impact Aboriginal Interests.

Accommodation, where appropriate, can include a range of mitigation and environmental protection and management strategies developed by the MRC, or through other forums. Accommodation recommendations can be developed through the MRC review process.

8 ROLES AND RESPONSIBILITIES

Project Manager and MRC Chair
- Ensure the overall MRC process is managed in a fair, open and transparent manner, and that the MRC strives to meet target timelines.
- Provide advice to Conuma on meeting the public consultation requirements of various statutes.
- Manage communications between the MRC members and Conuma with an objective of minimizing the time taken to complete the review stage of the process.
Ensure that issues are either addressed by the MRC or referred to the appropriate authority.
Elevate any identified strategic policy or related issues raised by MRC members or Conuma to a senior level of government for advice.

FLNR Consultation Advisor
- Maintain tracking tables and shared engagement records related to First Nations consultations, including the work of the any government-to-government working groups.
- Manage the consultation process.
- Develop and submit a First Nations Consultation Report to SDMs as quickly as possible and practicable following the completion of the technical review and report of the MRC to SDMs.

Mine Review Committee Members
- Work cooperatively with other members and Conuma to complete a coordinated, timely technical review.
- Identify technical, non-technical, and other public policy issues related to the development of the proposed project.
- Address identified issues to the extent allowed by the scope of the authorizations under review and assist locating a venue for issues not covered under statutes.
- Keep the MRC Chair updated with respect to issues, timelines and statutory authorities.

First Nations
First Nations may also be members of the MRC, and have a primary role as identified above. Other roles include:
- representing interests of their communities and membership;
- identifying interests and issues that need to be addressed in the application information;
- assisting Conuma and government to understand First Nations’ concerns with respect to the applications; and
- working with communities, other MRC members, and Conuma to address issues.

Conuma
Conuma is solely responsible for the business decisions regarding their East Bullmoose expansion of the Wolverine mine, including:
- whether the project is feasible and ready to pursue mine approvals and whether Conuma has the resources and staff to participate in the assessment and authorizations review processes; and
- which applications to bundle, in consultation with the MRC, keeping in mind the spirit and intent of the province’s coordinated authorization process.

In addition to business decisions, Conuma will be expected to support the coordinated authorizations process through:
attending MRC meetings, as invited, and providing project related information;
working with individual technical specialists of each SDM as appropriate to assist the completion of a timely review;
meeting with the identified First Nations, outside of the MRC meetings, possibly with the Province, to describe how specific aspects of the project may affect the interests of First Nations;
considering ways to avoid or mitigate impacts or concerns respecting aboriginal or treaty interests brought forward by the First Nations; and
• documenting engagement including details where project modifications are made to address aboriginal and treaty interests and provide this record to the Province to assist in its decision making.

9 INFORMATION SHARING AND ISSUE TRACKING

The MRC Chair will provide MRC members with information primarily electronically via email or the NE Coal Projects SharePoint site, located at: https://spc-mem.gov.bc.ca/necp/SitePages/Home.aspx.

External clients outside BC government require a BCeID account to access the NE Coal Projects SharePoint site.

To access the SharePoint MMPO project site with BCeID:
1. Open the link for the SharePoint project site
2. Sign in on the SharePoint site with your BCeID credentials (ID and password); when providing the user name, ensure it is prefaced with the domain, i.e. BCEID: BCEID\your_chosen_id
3. If you do not have a BCeID, you may submit your existing BCeID to the MRC Chair to be added to the SharePoint site. You may also use this generic BCeID information:
   • Login: BCeID\EBM2018
   • Password: EBM_mrc!1

The MRC Chair will track issues raised by MRC members throughout the coordinated authorizations process in an Issues Tracking Table. Once established, the issue tracking table will be posted to the NE Coal Projects SharePoint site.

The issue tracking table will contain the following key components:

• a description of the issue and who raised it;
• the specific authorization(s) that the issue relates to;
• the section of the document the issue refers to (e.g. section 5 of the Mines Act Permit Application);
• the date the issue was raised;
• Conuma’s response to the issue, including any action items or commitments;
the iterative chronology of information exchange and responses until the issue has been addressed or no further ability to address has been reached; and

- the status of the issue.

The management and responsibility for the issue tracking should be worked out among all review participants, including Conuma, to ensure efficiencies, accuracy, objectivity, and ensure it is useful to SDMs.

10 MEETINGS

The MRC Chair will convene MRC meetings on an as-needed basis, and will develop agendas. Meeting notes will be taken which will include major discussion points and action items only will be circulated to the MRC for a no more than two-week (calendar) review period. The MRC Chair will then review comments, finalize meeting notes, and post them to the SharePoint site.

11 Change Management/Amendments

A change to project plans may requested by Conuma. Change requests that could affect the project schedule will be actioned according to the Schedule Change Control Flowchart (see figure below).

A delay in reaching a milestone or undertaking an activity as contemplated in the Permit Review Schedule that does not impact critical timelines related to Project construction and operations and Provincial decisions related to these activities and can likely be mitigated and managed within the parameters of the Permit Review Schedule is considered a Level 1 Change. Level 1 Changes require approval by the MMPO Project Director and equivalent representative within Conuma’s corporate structure.

A delay in reaching a milestone or undertaking an activity as contemplated in the Permit Review Schedule, which risks affecting critical timelines related to Project construction, and operations and Provincial decisions related to these activities, but can likely be mitigated and managed within the parameters of the Permit Review Schedule is a Level 2 Change. Level 2 Changes require approval by the MMPO Project Director and equivalent representative within Conuma’s corporate structure.

A delay in reaching a milestone or undertaking an activity as contemplated in the Permit Review Schedule which risks impacting critical timelines related to Project construction and operations and Provincial decisions related to these activities, and cannot be mitigated and managed within the parameters of the Permit Review Schedule, and results in an overall extension to the referral date to SDMs is a Level 3 Change. Level 3 Changes require review and approval by the MMPO Board.
12 ISSUE MANAGEMENT AND DISPUTE RESOLUTION

The MRC will strive for consensus when reviewing the project effects and proposed mitigation plans and making recommendations. From time to time, however, issues may arise regarding interpretation of policy, challenges in meeting legislated time limits, or difficulty in resolving technical issues that cannot be resolved at the MRC level. In the event that consensus cannot be reached by members of the MRC, the following procedures will apply:

1. Members will make reasonable efforts to achieve consensus.
2. MRC Chair will refer lack of consensus on technical issues to the MMPO Executive Director for early resolution, with a potential to refer the issue to the ADM Project Board for advice and direction.
3. At the end of the review and reporting stages, the MRC Chair will describe any remaining unresolved issues in the report of the MRC, which will include: consensus on issues resolved, description of unresolved issues, and views of all parties on unresolved issues, for all technical issues on all permits being considered.
4. SDMs and/or senior executive levels of government have the option of referring issues back to the MRC at any time for further review, information-sharing, and/or resolution.
5. Non-technical issues or issues raised by First Nations outside of the scope of the MRC will be referred to any government to government established work groups to consider the most appropriate course of action to address them.

13 REPORT OF THE COMMITTEE

At the end of the coordinated authorization process, the MRC Chair will have developed an MRC report to be provided to SDMs for consideration, along with a First Nations consultation report, and any other relevant materials for SDM consideration in making a decision.

The draft report will be circulated to MRC members for review and comment to ensure there are no misrepresentations, misunderstanding or other concerns with the content of the report. The MRC report is intended to provide information on the process, issues raised, the means to address those issues, and other related matters for the SDMs to take into consideration when making a decision.

The report will be submitted to SDMs within the time limits for the overall review process.

14 LIMITS OF THESE TERMS OF REFERENCE

Nothing in these Terms of Reference limits or abrogates the responsibilities or duties assigned to individual ministries or agencies under their own legislation. First Nations participation on the MRC will contribute to Crown’s legal responsibility to consult and, where appropriate, accommodate, but may not constitute the full level of engagement that may be required to address asserted aboriginal interests. SDMs will be provided with the report of the MRC which, combined with other information, will supplement the suite of information from which to make informed decisions.
Wolverine Mine Project – EB Mine Integrated Mine, Effluent and Air Permit Amendments

EB Mine Revised Project Description

Prepared by:

Conuma Coal Resources Limited
200-235 Front Street (PO Box 2140)
Tumbler Ridge, British Columbia V0C 2W0

25 October 2017
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EB Mine Project Description

1 INTRODUCTION

This updated project description of Conuma Coal Resources Limited’s (Conuma’s) proposed EB Mine Project has been prepared in accordance with guidance provided by the Mine Development Review Committee (MDRC) (EAO, 2012; 2016), for submission in advance of an integrated application for an amendment of the Wolverine Mine mine, effluent, and air permits. The contents of this report also address the federal guidelines for preparation of a project description (Canadian Environmental Assessment Agency, 2016) under the Canadian Environmental Assessment Act (CEAA).

This project description will also be distributed to interested First Nations to provide an orientation to the current EB Mine design and to support development of environmental mitigation measures and management plans with their input and recommendations.

This document is based upon, and substantially revised and updated from, a previously-written project description submitted for provincial review in May of 2014. Revisions reflect the change in ownership of the East Bullmoose (EB) coal property, within which the EB Mine is proposed to be constructed, operated, and reclaimed, as well as progress of supporting environmental studies. Dates of proposed operations have been adjusted from the previous submission, as a consequence of the previous project owner’s (Walter Energy’s) entry into a care and maintenance status for several years.

1.1 The EB Mine Project

The EB Mine, a component of the operating Wolverine mining complex, is a proposed open-pit metallurgical coal mine, located in the Inner Foothills of the Canadian Rocky Mountains, within the Perry Creek basin, situated near the town of Tumbler Ridge and about 725 kilometres (km) northeast of Vancouver (55° 06’ 29.521” north latitude; 121° 42’ 3.920” west longitude); see Figure 1-1. The EB Mine site is readily accessible from the towns of Chetwynd and Tumbler Ridge via British Columbia (BC) provincial Highway 29. Local access, shown in Figure 1-2, is provided via Wolverine Forest Service Road (17.5 km) and the non-status Perry Creek Road (15 km).

The Wolverine Mine Project (including the EB Mine) has already been approved under the BC Environmental Assessment Certificate (EA Certificate) M04-01. The Wolverine mining complex includes both the existing Perry Creek Mine and the proposed EB Mine developments. Conuma currently operates the Perry Creek Mine, the Wolverine coal preparation plant (Wolverine Plant) and rail loadout facilities under Wolverine Coal Mine Permit C-223. The operating mine and processing facilities are located in the Wolverine River valley just west of the Perry Creek confluence.

EB Mine is located in the upper Perry Creek basin approximately 15 km west-northwest of the Perry Creek Pit (Figure 1-2). The EB Mine is scheduled to come into production in 2020, just as the Perry Creek Pit resources are depleted. Mining equipment, currently in use at Perry Creek Mine, would be moved to EB Mine, and workers would likewise move from Perry Creek Mine to EB Mine. Coal processing and rail loading would continue at the current Wolverine Plant, at approximately the same rate of production as the Perry Creek Mine. EB Mine is planned to have a productive life of nine years.

The planned scheduling of mine operation requires EB Mine to be brought online as an active producer, to offset the decline and cessation of coal production from Perry Creek Mine. The EB Mine Project will extend the productive life of the Wolverine mining complex by nine years.
Based on initial discussions with regulators, Conuma expects to submit an integrated application late in December 2017, for amendments to the Wolverine mine, effluent and air permits approving the development of EB Mine. Specific requirements will be determined in consultation with the MDRC and member agencies and First Nations. In May 2014, the BC Environmental Assessment Office confirmed that the EB Mine Project did not trigger an EA Certificate amendment. It is not expected that a federal EA will be required under Regulations Designating Physical Activities.

1.2 Proponent identification

Conuma is a closely-held private corporation with financial headquarters in Vancouver, British Columbia, and with operational offices in Tumbler Ridge, British Columbia. Conuma holds contiguous coal licences (the Wolverine Group), which encompass the Perry Creek Mine and EB Pit project areas. Conuma will be the legal entity applying for integrated mine, effluent and air permit amendments to construct and operate the EB Project, as part of the Wolverine Mining Complex.

The upcoming integrated application will be prepared through the combined efforts of Conuma’s corporate project, permitting and community relations staff as well as environmental personnel at Wolverine Mine and external consultants. In this report, 'Conuma' is an umbrella term used to refer to the legal entity for permitting purposes and proponent corporate and operations personnel responsible for developing and operating the project in compliance with permit conditions (see below).

1.2.1 Corporate contact information

Conuma Coal Resources Limited
2210-1177 West Hastings Street, Vancouver, BC V6B 1P1
(604) 900-3747

Conuma Coal Resources Limited, Northeastern British Columbia Operations
P.O. Box 2140, Tumbler Ridge, BC V0C 2W0
(250) 242-3764 Facsimile: (250) 984-0749

1.2.2 Managerial contact information

The following key personnel will be responsible for the development and implementation of the EB Project in compliance with permit conditions and environmental management commitments.

Brian Sullivan, Chief Executive Officer, Conuma Coal Resources Limited
2210-1177 West Hastings Street, Vancouver, BC V6B 1P1
(604) 900-3747 local 116

Mark Bartkowski, P.E., M.Sc., President
P.O. Box 2140, Tumbler Ridge, BC V0C 2W0
(250) 242-3764

Jim Crawford, MBA, M.Sc., Vice-President, Business Development
P.O. Box 2140, Tumbler Ridge, BC V0C 2W0
(250) 242-7467

Todd Dahlman, MBA, P.E., Vice-President, Technical Services
P.O. Box 2140, Tumbler Ridge, BC V0C 2W0
(250) 242-3764
Andre LaForest, P.Eng. M.Sc., Senior Environmental Manager  
P.O. Box 2140, Tumbler Ridge, BC V0C 2W0  
(250) 242-3764

C.G. (Gwyneth) Cathyl-Huhn, P.Geo.(BC) Lic.Geol.(WA), RMSME, Chief Geologist  
P.O. Box 2140, Tumbler Ridge, BC V0C 2W0  
(250) 242-7216

For further information or clarification regarding this project description please contact Jim Crawford or Gwyneth Cathyl-Huhn.

Figure 1-1: General location map
Project layout plan: Figure 1-3.
2 PROJECT BACKGROUND

2.1 Project history and current operations

Coal exploration at EB commenced in 1971 (Berkeley, 1992), with air-photo interpretation and geological mapping by Teck Corporation. Work continued in 1975 with further geological mapping and diamond-drilling, undertaken by Mitsui Mining (Shima and Nishio, 1975), in support of a joint venture between Bramerda Resources Limited and Nichimen Resources Limited. Exploration, including additional drilling, continued in the EB area until the early 1980s, when a downturn in coal prices led to the project's suspension. Coal licences covering the EB coal deposit were re-acquired by Western Canadian Coal Corporation in 2000, subsequently purchased by Walter Energy Inc. (Walter) in 2011, and in turn acquired by Conuma in 2016. Although numerous boreholes have been drilled, and seven adits have been driven to obtain samples of coal, commercial production has not yet occurred at East Bullmoose.

Western Canadian Coal Corporation's East Bullmoose Mine project was originally reviewed and approved under EA Certificate M04-01, as a component of the Wolverine Coal Project (Western Canadian Coal, 2004). The Wolverine Coal Project encompasses two minesites (the presently-operating Perry Creek Pit and the proposed EB Pit), to be operated semi-concurrently. Development of the Wolverine Coal Project commenced under Mines Act Permit C-223, issued to Western Canadian Coal in 2005. Mine, effluent and air permits were also granted for mining of the Perry Creek Pit, coal processing at the associated Wolverine coal preparation plant (at a rate of 1.6 million tonnes/year (Mt/a)), and nearby loadout facilities (for transport of coal along CN Rail’s Tumbler Ridge subdivision).

Subsequent permit amendments were issued, most significantly, in 2006 (a Mine Permit and an EA Certificate Amendment for production of 2.4 Mt/a) and in 2008 (a Mine Permit Amendment). The 2008 permit amendment allowed for the production of up to 3.0 Mt/a of metallurgical coal, including an expansion of Perry Creek Mine, and the processing of coal from EB Mine. Coal was mainly intended for sale to export markets. The 2008 amendment application evaluated volumetric, geochemical, and air quality effects of EB coal consequential to coal processing and management of tailings and coarse coal reject (CCR) materials at the Wolverine plantsite. Effluent and air permit amendments for increased production from the Perry Creek Mine were approved concurrently with the mine permit amendment.

The Perry Creek Mine currently produces 1.5 to 2.0 Mt/a, with scheduled end of coal production in 2020. Exploration activities and mine planning have continued in the EB area, leading to regulatory review initiation of a detailed mine plan in 2011. Subsequent exploration, and revised production scheduling for Perry Creek Mine, have led to an expansion of the planned EB Mine. The current proposal would see coal production commencing in 2019-2020 to replace the coal production from Perry Creek Mine. The proposed EB Mine is designed to produce metallurgical coal at an effective strip ratio of approximately 7.3:1 (on a run-of-mine basis) from the A, B, C, and D seams of the Gates Formation. Run-of-mine (ROM) coal will be stockpiled at the EB minesite, and hauled by truck to the Wolverine coal preparation plant via an upgraded Perry Creek Road. EB coal will be processed at the Wolverine Plant at a sustained clean coal production rate of up to 2.0 Mt/a.

2.2 Development schedule

Conuma proposes to begin mine development late in 2018, contingent upon regulatory approval and receipt of required licences and permits. Conuma (and Walter Energy, before Conuma’s purchase of their Canadian operations) has conducted detailed design and assessment work in order to submit an integrated application for amendment of the Wolverine permits related to development of EB Mine. The application is scheduled for submission in late-December 2017. The scope and status of environmental baseline and assessment studies that will be reflected in the application are described in Section 12 of this document.
The projected operational life of mine (LOM) for the EB Mine is nine years. Key phases of project development and completion are: construction/pre-production, operation, closure, and post-closure. A brief summary of each phase is presented below.

2.2.1 Construction/preproduction

The construction/preproduction phase includes all pre-production development work, prerequisite to commencement of coal production from the EB Mine. Activities under this phase include:

- tree clearing;
- grubbing and topsoil removal/stockpiling from the initial pit and dump development areas;
- construction of water management facilities (ponds and ditches);
- development of interim construction-phase water management measures as needed to prevent sedimentation of downstream water bodies;
- development of facilities site platforms;
- construction of facilities (office and maintenance buildings, fuel storage, ROM coal stockpile platforms);
- upgrading of the Perry Creek Road for coal haul (widening and bridge replacement);
- construction of power lines as required; and
- transport of mining equipment from Perry Creek Mine to EB Mine.

Work is expected to start in late 2018, and to occur over a period of approximately 18 months, as seasonal conditions allow. All necessary infrastructure would be constructed and mining equipment would be assembled and operational no later than the end of 2019.

2.2.2 Operations

The EB Mine is expected to be in full operation no later than the summer of 2020 (as markets allow), commencing with waste rock removal from the pits followed by coal removal and stockpiling. Coal production will continue for nine years through 2028, with an estimated total coal extraction of 19.088 Mt of ROM coal, and total clean coal production of 12,569 Mt. Clean coal production rate will be up to 2.0 Mt/a.

Activities during this phase include:

- ongoing waste rock removal and hauling and placement of rock in external and in-pit dumps;
- coal mining (drilling, blasting, coal haul from pit to ROM stockpiles); and
- related equipment fuelling, servicing and maintenance;
- operation and maintenance of water management facilities, including
  - groundwater abstraction for wash water;
- truck loading and hauling of ROM coal to the Wolverine coal preparation plant;
- ongoing operation of the Wolverine plant to process coal;
- ongoing loading of coal to rail cars at the Wolverine rail loadout; and
- progressive reclamation (resloping, topsoil replacement, and planting) of completed dump areas at EB Mine.

2.2.3 Closure

When EB Mine has been completed in 2028, the remaining unreclaimed dump areas will be reclaimed and the facilities areas will be decommissioned and also reclaimed. Activities will include:
dismantling and removal of equipment and facilities that are no longer required; and

resloping, topsoil placement and revegetation of remaining dumps and the facilities areas.

Site access, power supply and water management facilities will remain in place until monitoring indicates that the quality of site runoff is acceptable without further management. At that time, ponds and ditches will be filled and recontoured to natural drainage patterns. Collection ditches for contact and non-contact water will be progressively decommissioned and reclaimed, as the minesite is re-vegetated and stabilized. Perry Creek Road will remain in place for use by other industrial users and by the public. The closure process is projected to take two years but final closure will depend on water quality monitoring which will dictate the time of final decommissioning of ditches and ponds.

2.2.4 Post-closure

'Post-closure' refers to mine site conditions after all reclamation activities have been completed in accordance with the reclamation plan and objectives for EB Mine. This phase will be limited to periodic long-term monitoring of water chemistry, geotechnical stability, and re-vegetation progress in reclaimed areas. Access to the site will be maintained for long-term monitoring. The post-closure phase will extend from the completion of final closure until such time as Conuma is released from regulatory requirements for further monitoring.

3 PROJECT RATIONALE

Coal production from the EB and Perry Creek mines is being scheduled to maintain the plant feed for the Wolverine coal preparation plant at its current rate, well within the plant’s permitted capacity of 3 Mt/a of clean coal. EB Mine’s ROM coal will be washed to provide up to 2 Mt/a of medium-volatile coking coal for sale in the export market. The total expected clean coking coal available for export over the nine year life of EB Mine is 12.569 million tonnes.

The principal market for EB coking coal will be the international steel industry, which purchases its coal from various metallurgical coal producers throughout the world. The main suppliers of seaborne coking coal are mines located in Australia, the United States, and Canada. The major markets for seaborne coking coal are located in Asia, Europe, and the Americas. Worldwide, the Chinese steel industry is currently the largest importer of coking coals, followed by Japan and India. The global demand for metallurgical coal is expected to continue over the long term. Western Canada, including northeastern British Columbia, is an attractive place for a stable, secure, and long-term supply source of metallurgical coal.

The development of sufficient high-quality coal deposits to feed low-cost, high-output preparation plants like the Wolverine plant is a crucial element in securing sales contracts with the world’s dominant steel-producing companies. Securing contracts with such steel mills will provide stability to Conuma, its employees, and the region within which the company operates. The EB Mine will provide a nine-year source of high-quality coking coal, and thus is important to further developing Conuma’s foundation in the international marketplace as a reputable and reliable supplier of metallurgical coal.

As part of Conuma’s plans to be a stable, long-term presence in northeastern BC and to ensure adequate coal-handling facilities for its product, the company has committed to a long term throughput agreement with Ridley Terminals, Inc., in Prince Rupert, BC. This agreement requires committed production in future years to provide certainty to Ridley Terminals, so that they can invest appropriately for future demand, and in turn provide certainty to Conuma that the port facilities will be able to handle the company's product. The EB Mine is scheduled to be in production in 2019 (as markets allow) to help meet those commitments. The terms of the agreement provide that Conuma must pay for a minimum throughput, whether it utilizes the facility or not. The coal production from EB Mine will also help
maintain Conuma’s overall Wolverine production profile when Perry Creek Mine is completed in 2020.

The EB Mine project will help to sustain economic activity in northeastern BC. Further details on socio-economic benefits to the region are provided in Section 11 of this document.

4 FIRST NATIONS

The EB Mine lies within the area covered by Treaty 8 (Figure 4-1) and within the traditional territories of three Treaty 8 First Nations and Indian Bands: West Moberly First Nations (WMFN), Saulteau First Nations (SFN), and of the McLeod Lake Indian Band (MLIB). Figure 4-2 shows the Aboriginal Communities in proximity to the EB Mine (near Tumbler Ridge on the figure).

![Figure 4-1: Area covered by Treaty 8](Source: HCF Alberta Online Encyclopedia (Heritage Community Foundation, 2010), via wayback.archive-it.org/2217/20101208160701/http://www.albertasource.ca/treaty8/eng/The_Treaty/i_treaty_8_map.html, accessed September 12, 2017.)

WMFN, SFN, and MLIB actively confer with Conuma in relation to review, monitoring and management and construction and reclamation of all of Conuma’s projects in northeastern BC, through the Communities and Environmental Partnership (CEP), jointly established by the Aboriginal Communities and Conuma. In addition, Conuma meets with First Nations and Indian Band Lands Department representatives and with Chiefs and Councils to review project specific activities and initiatives to develop commercial and training opportunities. All three Aboriginal communities have indicated their intention to participate in the review of the EB Mine project. Contact information for these Aboriginal communities is provided in Table 4-1.

The CEP provides a platform for open and transparent discussions on community, environmental and other matters relating to and affecting the partners. It also provides a forum for the active participation of Conuma’s host Communities in environmental planning, assessment, monitoring and
reclamation of Conuma’s mine developments. As a result, Conuma and the local Aboriginal Communities have worked closely together whenever possible and have completed several million dollars’ worth of project development and reclamation work each year.

**Table 4-1: Aboriginal Communities interested in and potentially affected by the EB Mine**

<table>
<thead>
<tr>
<th>First Nations or Indian Band</th>
<th>Mailing Address</th>
<th>Telephone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saulteau First Nations</td>
<td>Box 1020, Chetwynd, BC, V0C 1J0</td>
<td>(250) 788-3955</td>
</tr>
<tr>
<td>West Moberly First Nations</td>
<td>Box 90, Moberly Lake, BC V0C 1X0</td>
<td>(250) 788-3663</td>
</tr>
<tr>
<td>McLeod Lake Indian Band</td>
<td>General Delivery, McLeod Lake, BC V0J 2G0</td>
<td>(250) 750-4415</td>
</tr>
</tbody>
</table>


**Figure 4-2: Treaty 8 Aboriginal Communities in proximity to the EB Mine**

Of particular interest and concern to the Aboriginal Communities are the cumulative effects of various resource development activities in northeastern BC on their treaty rights to pursue traditional use of the land. Conuma is working in partnership with the Aboriginal Communities and various levels of government to generate useful information (e.g., caribou penning studies, regional caribou telemetry studies) and initiatives (e.g., site restoration with native plant species, progressive reclamation approaches to protect caribou habitat) to better understand and ameliorate effects on treaty rights.

One such initiative is the development of the Twin Sisters Greenhouse enterprise in Moberly Lake, in partnership with West Moberly First Nations and Saulteau First Nations. Construction of two commercial greenhouses has been completed, and the greenhouses are in operation. Training programs have been conducted on site with the objective of developing a commercially viable greenhouse operation, with a focus on propagating native and traditional use plant species for reclamation of industrial sites, including Conuma’s mines, in the area. Orders to fill one greenhouse have been secured.
and Conuma’s requirements for ongoing reclamation and closure of Perry Creek Mine will also be met by the facility. Government funding to support the operation is in place.

Discussion of the EB Mine project has been part of Walter’s previous relationships, and Conuma’s ongoing engagement and relationship building activities with the local Aboriginal Communities. Walter held meetings with SFN, WMFN and MLIB in summer 2011 on the mine plan under consideration at that time, and further arranged EB site visits attended by SFN and MLIB members to review proposed fieldwork and the development plan. Since then, planning updates have been part of ongoing community partnership meetings, and more detailed project-specific meetings are planned for the fourth quarter of 2017 and the first quarter of 2018.

Conuma will provide the First Nations and Indian Band with funding to address administrative costs associated with the project review and to allow the Nations and Band to engage and direct a technical review of the project by an environmental consulting firm. The consultant’s scope will be set by the First Nations and Band. The scope of the review includes:

- technical scoping for EB assessment studies;
- pre-application input to environmental management, mitigation and monitoring plans;
- pre-application review of selected application sections and assessment findings; and
- post-application review.

Conuma is currently discussing cooperation agreements with West Moberly First Nation, Saulteau First Nation, and the McLeod Lake Indian Band. Furthermore, Conuma is developing a Memorandum of Understanding with the Halfway River First Nation.

5 PUBLIC COMMUNICATIONS AND CONSULTATION

Tenure holders in the area will be notified about the EB Mine project planning and permit amendment application process. Tenures in the project area include forestry lands (Canadian Forest Products Ltd.’s Tree Farm Licence 48), gas wells (active and abandoned) and pipelines, a registered trap line, and a guide-outfitting license (Section 7). Agreements are in place regarding effects of the Wolverine Mine on affected tenure holders, including the EB Mine area. These tenure holders will be notified of current EB Mine planning and schedule and invited to discuss any further questions or concerns.

Walter Energy has previously engaged in ongoing discussions with Talisman Energy, formerly the other principal industrial operator in the Perry Creek basin, to coordinate ongoing facilities development and road use in the area. Conuma will continue these discussions with Sukunka Natural Resources Inc. (SNRI), who have recently purchased Talisman’s petroleum and natural gas (PNG) assets in the Perry Creek basin, including areas proposed to be within the EB Mine’s disturbance footprint. SNRI are the managers and maintainers of the Perry Creek Road. With respect to the EB Mine, discussions have been and shall continue to be directed towards development of proximity and crossing agreements related to mining in the vicinity of existing pipelines and pipeline crossings by access roads and water conveyance structures.

There has been some periodic recreational use of Perry Creek Road for access by hikers, hunters and snowmobilers. Any currently active recreational groups (Wolverine Mountain and Nordic Society, Ridge Riders Snowmobile Association) will be notified of current EB planning, and will be consulted regarding opportunities for impact mitigation. Requirements for further public consultation will be confirmed with the Mine Development Review Committee. The results of those consultation activities, which are not held in confidence, will be reflected in an updated assessment of the project effects on other land uses in the area. Stakeholders with a potential interest in the EB Mine are listed in Table 5-1.
### Table 5-1: Stakeholders with an interest in or potentially affected by the EB Mine

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Mailing Address</th>
<th>Telephone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canadian Forest Products Ltd.</td>
<td>Box 180, 4700-50th St, Chetwynd, BC V0C 1J0</td>
<td>(250) 788-2231</td>
</tr>
<tr>
<td>Sukunka Natural Resources Inc.</td>
<td>Suite 213, 5016 50th Ave NW, Chetwynd, BC V0C 1J0</td>
<td>(250) 788-9246</td>
</tr>
<tr>
<td>Peace River Coal</td>
<td>Suite 1900, 1055 W Hastings St, Vancouver, BC V6E 2E9</td>
<td>(778) 786-7400</td>
</tr>
<tr>
<td>Pattern Energy</td>
<td>Pier 1, Bay 3, San Francisco, California 94111 USA</td>
<td>(415) 283-4000</td>
</tr>
<tr>
<td>Registered Trapline TR0721T006</td>
<td>Guy Dyer, Box 328, Tumbler Ridge, BC V0C 2W0 and</td>
<td>(250) 242-5880</td>
</tr>
<tr>
<td></td>
<td>Chris Caisley, PO Box 1804, Tumbler Ridge, BC V0C 2W0</td>
<td>(250) 242-3065</td>
</tr>
<tr>
<td>Alpine Valley Outfitters</td>
<td>1465 McDonald St., Regina SK, S4N 2Y2</td>
<td>(306) 621-7982</td>
</tr>
<tr>
<td>Ridge Riders Snowmobile</td>
<td>Box 944, Tumbler Ridge, BC V0C 2W0</td>
<td>(250) 242-3008</td>
</tr>
<tr>
<td>Association</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wolverine Nordic Mountain</td>
<td>Box 1690, Tumbler Ridge, BC V0C 2W0</td>
<td><a href="mailto:ksharman@telus.net">ksharman@telus.net</a></td>
</tr>
<tr>
<td>Society</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Terry Ranch</td>
<td>Mary Ann Terry, Tumbler Ridge, BC V0C 2W0</td>
<td></td>
</tr>
<tr>
<td>District of Tumbler Ridge</td>
<td>305 Founders St, Box 100, Tumbler Ridge, BC V0C 2W0</td>
<td>(250) 242-4242</td>
</tr>
<tr>
<td>Peace River Regional District</td>
<td>Box 810, 1981 Alaska Ave, Dawson Creek, BC V1G 4H8</td>
<td>(250) 784-3200</td>
</tr>
</tbody>
</table>

### 6 BIOPHYSICAL SETTING

The EB Mine project area is located in the eastern Rocky Mountains of British Columbia, at elevations between 1400 metres and 1875 metres above sea level. Freezing conditions are possible throughout the year at these higher elevations. Mean daily temperatures range from 15 Celsius (C) in summer to -10 C in winter, being generally above freezing between April and October. Very cold weather (-30 C) frequently occurs in January and February. Substantial annual precipitation (approx. 600 millimetres) is expected, with several metres' snow accumulation in winter.

During spring freshet there are increased flows from the EB Mine area into Perry Creek and its tributaries (the EB Mine project footprint comprises approximately 10% of the Perry Creek drainage basin). Mining activities and site water management must take into account the major precipitation, wind and snow loadings that will be encountered.

#### 6.1 Biogeoclimatic zonation

The EB Mine project area straddles three upper-elevation biogeoclimatic zones:

- Alpine tundra zone, which is restricted to the highest elevations;
- Subalpine Engelmann spruce-subalpine fir zone (ESSF); and
- Boreal white spruce zone, below the ESSF.

The ESSF zone is divided into several variants. Most of the EB project area falls within the ESSFmv2 variant, which is the driest and coldest of the ESSF variants. A thin strip of the ESSFmvp2 (parkland) variant occurs above the ESSFmv2.

The EB Mine is located within subalpine terrain, situated below alpine ridges to the west and north. The alpine ridges contain the Perry Creek basin and connect with Mt. Spieker, across Perry Creek to the east (Plate 6-1). As such, the mine will be adjacent to alpine ridge habitat favoured by caribou in the early and late winter. The Perry Creek Road extends down into the boreal white spruce zone.
6.2 Caribou range

The proposed EB Mine falls within the range of the Quintette caribou herd (Figures 12-4 and 12-5). Parts of the minesite footprint overlap with core caribou habitat as mapped by the Province, based on interpretation of habitat features such as slope, aspect, and elevation.

Telemetry data from tracking studies undertaken since 2002 indicates more concentrated caribou use of the higher-elevation ridges outside of the proposed development footprint. Some scattered telemetry points lower down in the Perry Creek basin suggest movement of individuals between ridges, through the subalpine, but the ridges appear to be the preferred pathways for movement through the Mt Spieker area.

The Quintette herd, as part of the Southern Mountain Woodland Caribou population, is listed as Threatened on Schedule 1 of the Species At Risk Act (SARA). Potential project effects on alpine and subalpine habitat and implications to sensitive species, such as caribou and grizzly bear, will be a key focus of the EA update (see Section 12.8).

6.3 Surface waters and fish habitat

The EB Mine and the coal haul road (Perry Creek Road) to the Wolverine Plant lie entirely within the catchment area (60.1 square kilometres) of Perry Creek. Perry Creek (Plates 6-2 and 6-3) is a tributary of the Wolverine River, which is in turn a tributary of the Murray River. Seepage from the Perry Creek Mine's East and North dumps, which is not intercepted by the site water management system, is also expected to drain towards lower Perry Creek. Perry Creek has a number of long-term flow and water quality monitoring sites, including operational monitoring sites for Perry Creek Mine. These monitoring sites will provide detailed information for the updating of environmental knowledge of the EB Mine area.
Plate 6-2: Upper Perry Creek in the vicinity of EB Mine

Plate 6-3: Perry Creek bridge, upstream of rock barrier to passage of fish. This bridge will require replacement with a wider structure, as part of the proposed haul road upgrading work.
For many years prior to 2009, fish movement from Wolverine River into Perry Creek was limited to the lower 900 metres of the creek by a CN rail culvert. The culvert was removed in 2009, allowing fish to move into the lower 6.9 km of the creek, up to a series of bedrock barriers blocking further upstream passage, situated downstream from the bridge seen in Plate 6-3, and about 10 km downstream of the proposed EB Mine. There are no resident fish populations above the rock barrier.

The reach of Perry Creek below the bedrock barrier provides fish habitat with year-round suitability for sport and non-sport species, including spawning, rearing and over-wintering habitat. Previous studies have indicated resident populations of slimy sculpin and bull trout in this reach, but with the opening of the CN culvert, juvenile mountain whitefish, Arctic grayling and migratory bull trout have recently been observed to use this reach on a seasonal basis.

## 7 LAND USE AND LAND USE PLANNING

### 7.1 Provincial land use planning and resource management zonation

The long-term management of lands within the EB Mine project area is guided by the Dawson Creek Land and Resource Management Plan (LRMP). The EB Mine falls entirely within the Foothills Resource Management Zone (RMZ), and within the Bullmoose Creek Resource Management Subzone. Coal mining is an accepted land use in this RMZ.

### 7.2 Coal tenures

Conuma owns all the coal licences required for mining in the EB area. These licences are referred to as the Mt. Spieker (EB) Property. Coal tenures held by Peace River Coal Inc. lie immediately east and south of the EB licences. Teck Resources Ltd. tenures are located north of EB Mine, in the Bullmoose Mine area, and on the south side of the Wolverine River in the Quintette Mine area.

### 7.3 Petroleum and Natural Gas (PNG) tenures

There are a number of PNG leases (covering the Bullmoose gas field), covering the EB project area, including Perry Creek Road. The majority of these tenures are jointly held by several firms, with Sukunka Natural Resources Inc. (SNRI) acting as operator. Some of the wells are active for gas production, or for the injection of acid gas (an unwanted by-product of SNRI's nearby Bullmoose gas plant). At least one of the wells is currently suspended from production, and two of the wells are abandoned. An active sour gas pipeline traverses the project area from east to west on the north side of Perry Creek. Walter Energy had been in discussions with Talisman to relocate a small section of this line in order to accommodate the North Pit design, and Conuma will continue coordinated planning of this work with SNRI, who have purchased Talisman's former interests and operations at and near the proposed EB Mine.

A gas pipeline crossing and proximity agreement is currently in place, outlining the guidelines to be followed regarding any road improvements and water management facilities development by Conuma in close proximity to these pipelines. This agreement will be updated as required to allow development of the current mine plan.

### 7.4 Access

The Wolverine FSR and Perry Creek Road are radio-controlled public roads which shall be used by mine traffic, and they are also open to use by other industrial and public users. Conuma is currently the primary road user on the Wolverine FSR, whereas the Perry Creek Road is currently used primarily for oil and gas activities, and therefore managed and maintained by SNRI. However, during the construction and operation of EB Mine, Conuma will become the predominant user of Perry Creek Road.
Approximately 10 km of the Perry Creek Road will be widened (from 5 to 12 metres’ running surface) and upgraded for the coal haul from EB to the Wolverine Plant (see also Section 10.2, and Figure 10-2). Traffic controls, traffic management plans, and pipeline crossing and proximity agreements will be updated as required for the Perry Creek Road upgrade.

A new access road (1.5 km) will be constructed from Perry Creek Road to the active mine area of the EB operation, to provide access to the mine offices, maintenance complex and raw coal stockpiles. This new road segment will also have a 12 metre wide running surface, allowing for coal haul.

There is a network of existing minor roads and trails (including seismic lines cleared through the forest) in and around the project site, which has been developed in conjunction with PNG and coal exploration and development.

7.5 Forestry

The entire EB Mine project area falls within area T5 of Canadian Forest Products Ltd.’s (Canfor's) Tree Farm License (TFL) 48. There has been no commercial logging within the footprint of EB Mine, although there has been some timber harvest further to the east-southeast, within the Perry Creek basin.

A License to Cut will be required to clear the mine footprint area and to salvage any merchantable timber. Portions of the EB Mine project area are planned for future logging, within Canfor's current harvesting plan (Canfor, 2017).

Timber volume estimates for the EB Mine disturbance area have not yet been located within the project files passed along by Walter Energy. In the event that such estimates cannot be located, a timber cruise will be undertaken (when weather and snowpack conditions permit) in 2018.

7.6 Private or residential lands

There are no private land holdings in the EB Mine project area. The nearest private property is the Terry Creek Ranch, adjacent to Perry Creek Mine. Conuma has leased the ranch for the duration of mine operations.

7.7 Agricultural or range lands

There are no agricultural or range lands within the EB Mine project area.

7.8 Trapping

The Foothills RMZ is under tenure to trappers, and the maintenance of furbearers and furbearer habitat is important to the continuation of these trapping tenures. The Wolverine River valley and Perry Creek basin fall within Registered Trapline TR0721T006. Marten, squirrel, fisher, weasel, mink, wolverine, coyote, wolf and beaver have been previously trapped along this trapline. The trapping season is from October 15 to May 31. Trapping records indicate that there has been limited trapping in this registered area in recent years.

7.9 Guide-outfitting

The Wolverine Mine area falls within Guide-Outfitter Licence 701258, held by Alpine Valley Outfitters. The area was recently purchased by the current owner. A compensation agreement covering the Wolverine Mine (including EB) was negotiated in 2005 with the former owner of the commercial recreation lease. The new owner will be notified of the plans for EB Mine development.
7.10 **Dispersed recreational use**

Recreation activities in the EB Mine area include hunting, berry-picking, all-terrain vehicle (ATV) riding, and snowmobiling. Until 2013, access along Perry Creek Road to the EB area had been via the Wolverine Mine gate. Records of public access kept at the Wolverine gatehouse indicated infrequent travel to the area by recreationists for hiking, snowmobiling and hunting up to the end of 2013.

In 2014, Walter Energy reconstructed and reopened the lower section of Perry Creek Road, northeast of Perry Creek Mine, allowing ungated public access to the Perry Creek valley and the East Bullmoose - Mt. Spieker area. Recreation Opportunity Spectrum (ROS) classes within the RMZ are mainly 'semi-primitive motorized' (ROS class SPM) and 'resource road' (ROS class RR) with some 'semi-primitive non-motorized' (ROS class SPNM). Conuma will notify the Wolverine Nordic and Mountain Society and the Tumbler Ridge Riders Snowmobile Association of the EB Mine planning and permitting activities.

7.11 **Wildlife and fisheries resources**

Both fish and wildlife are valued for recreational fishing and hunting, and for First Nations traditional values including sustenance use. As noted above, there is a low level of hunting activity within the EB Mine area. Fish occurrence in lower Perry Creek is limited primarily to rearing juvenile bull trout and whitefish.

7.12 **Visual resources**

The LRMP recognizes the limitations to visual management with regard to the fixed location of coal deposits (i.e., it is not possible to relocate open-pit activity to meet visual quality objectives). The 1970s-era construction of exploration roads within the Perry Creek watershed greatly increased access and hence the use and visibility of the project area, and as a result, the watershed has high visual vulnerability in relation to recreational use in the area.

7.13 **Environmentally Sensitive Areas**

There are no federally-protected wildlife or ecological reserves in the project area. A provincial notation of interest covers much of the project area, corresponding to provincial core habitat mapping. A British Columbia Fish and Wildlife Designated Use Area (DUA #8015612) covers a wildlife reserve for the purpose of protecting wintering habitat of the Quintette caribou herd (refer to Section 12.8). The nearest park area is Monkman Provincial Park, located on the Murray River, about 50 km south of Tumbler Ridge.

There are a number of small, high-elevation wetland areas immediately west and up-gradient of the project area. In 2004, one of these areas (the 'Alpine Wetland', as shown in Plate 12-1) was identified by First Nations as a habitat feature for protection. The mine footprint was modified to avoid encroachment on this wetland basin. There are also various wetland/oxbow features in the Wolverine River valley in the vicinity of the Perry Creek Mine. These features have been assessed and monitored in relation to the operations at Perry Creek Mine.
8 REGULATORY CONTEXT: PERMITS, LICENCES, AND APPROVALS

8.1 Regulatory history

EA Certificate M04-01 was issued for the Wolverine Coal Project in December 2004. The EA Certificate included several components of the project:

- Perry Creek Mine;
- EB Mine and Perry Creek Haul Road;
- Wolverine Plant and rail loadout; and
- 1.6 Mt/a clean coal production from Perry Creek Mine.

Details of the EB Mine project as proposed in 2004 are provided in the Wolverine Environmental Assessment Additional Information Report compiled by Western Canadian Coal Corp (WCCC 2004), and posted on the EAO's E-PIC website at https://projects.eao.gov.bc.ca/p/wolverine-coal-mine/docs (most recently accessed on September 13, 2017).

In March 2005, Mine Permit C-223 was granted for construction and operation of Perry Creek Mine and the Wolverine Plant at 1.6 Mt/a of clean coal production, with associated dumps, rail loadout, access and infrastructure. A number of EA Certificate and Mine Permit amendments followed in subsequent years, including an amendment for increased production to 2.4 Mt/a in 2006 (with details provided in an amendment application (WCCC, 2005).

In June 2008, Mine Permit C-233 was amended to allow production up to 3 Mt/a, including increased coal production from Perry Creek Pit in combination with projected production from EB Mine. The amendment application (WCCC, 2007) examined volumetric, geochemical and air quality effects related to processing EB coal, and related tailings and coarse coal rejects (CCR) management at the Wolverine Mine site. Amendments of the effluent permit and the air permit, to cover increased production from the Perry Creek Pit and Wolverine Plant, were approved in tandem with an amendment of Mines Act Permit C-223.

In 2008, application was made for a mine lease covering the proposed EB Mine; the application was subsequently put on hold, and reactivated in 2010. Conuma currently holds coal licences in all blocks proposed for mining.

Conuma intends to submit a comprehensive integrated application for mine, effluent and air permitting, a Water License under the Water Act, and a Licence to Cut, in December 2017. Conuma further proposes to confirm this approach with the British Columbia ministries of Energy and Mines (MEM), Environment (MoE), and Forest, Lands, and Natural Resource Operations (MFLNRO). EB Mine's permitting will be addressed as amendments to the existing Wolverine Project mine, effluent and air permits.

The current integrated application includes a request to increase the disturbance footprint (Figure 8-1) of EB Mine, in keeping with the increased volume and area of the North Pit, and the addition of the South Pit, as well as increased areas of out-of-pit waste rock dumps.

8.2 BC Environmental Assessment Act requirements

In 2011, Walter Energy made a written request to the BC Environmental Assessment Office (EAO) for a determination on whether an environmental assessment update would be required under the BC Environmental Assessment Act (BCEAA). Based on the mine plan at that time, the EAO determined that an EA Certificate Amendment would not be required. The current EB Mine plan, which entails an
<table>
<thead>
<tr>
<th>Item</th>
<th>Condition</th>
<th>Reference</th>
<th>Responsible agency</th>
<th>Activity</th>
<th>Condition status</th>
</tr>
</thead>
<tbody>
<tr>
<td>18: ARD/ML</td>
<td>EB Pit ARD management: waste sequencing and detailed dump design, ARD mitigation and management plans will be re-evaluated and refined at permitting</td>
<td>Issue tracking table (ITT) - Agencies</td>
<td>MEM (Mines Act Permit)</td>
<td>To be addressed with EB permitting. Detailed dump design is being revised and updated by Norwest, for submission as Appendix 3.3–2 of the Integrated Application. An ML/ARD management plan has been produced (Golder, 2015d), for submission as Appendix 7.2.1 of the Integrated Application.</td>
<td>Ongoing</td>
</tr>
<tr>
<td>22: ARD/ML</td>
<td>Additional site investigation, design studies, and stability analyses for EB Mine waste rock dumps. Final designs for EB Mine waste rock dumps. Pre-mine drainage ditching plans for EB Mine waste rock dumps. Construction and stability monitoring procedures for the EB Mine waste rock dumps. Closure design concepts for the EB Mine waste rock dumps. EB Pit wall design during operating stages of pit development. Monitoring and inspection program for pit wall stability.</td>
<td>ITT - Agencies</td>
<td>MEM (Mines Act Permit)</td>
<td>Requirements for EB to be addressed at EB permitting. Detailed dump design is being revised and updated by Norwest, for submission as Appendix 3.3–2 of the Integrated Application. Norwest are addressing pit walls as Appendix 3.3–1. Expect both reports on 15 December.</td>
<td>Ongoing</td>
</tr>
<tr>
<td>36: Water Mgmt. Plan</td>
<td>Water management at the site will involve the diversion of clean catchments around or through areas that are disturbed by mining, and collection of runoff from disturbed areas for treatment in settling ponds prior to discharge. Two ponds will service the EB area.</td>
<td>AIR 3.8</td>
<td>MWLAP / LWBC</td>
<td>EB Pond design is finished (Golder, 2015b), and will be submitted as Appendix 7.1–1 of the Integrated Application.</td>
<td>Ongoing</td>
</tr>
<tr>
<td>62 Selenium Mgmt. Plan</td>
<td>Monitoring of aquatic resources (e.g. water, sediments, periphyton) in the EB pit lakes at closure will be used to identify potential impacts to waterfowl and other wildlife. If pit lake water quality is shown to be incompatible with wildlife, both pits will be backfilled above the pit decant elevations to prevent any surface ponding. A 5 m deep channel would be constructed from the East Pit Lake to lower the water level and reduce total backfill requirements to approximately 100,000 cubic metres. In the low probability event that acidic conditions develop within the backfilled lakes, final contingency will include the collection and treatment of site effluents.</td>
<td>AIR 10.5.3</td>
<td>MEM / MWLAP</td>
<td>To be addressed at EB permitting. Permit-level water management plan has been produced (Golder, 2015b), and will be submitted as Appendix 7.1–1 of Integrated Application. Mine plan is currently being updated by Norwest, and will be submitted as part of Integrated Application. Current planning calls for backfilling of pits to avoid formation of pit lakes.</td>
<td>Ongoing</td>
</tr>
</tbody>
</table>
### Table 8-1: Conditions and actions under EA Certificate M04-01 (continued)

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Action details</th>
<th>Responsible Agency</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>66: Selenium Mgmt. Plan</td>
<td>Conuma commits to enhanced management (collection and treatment of site effluents) at EB, if necessary. If, at the time of permitting for EB pit, the predicted maximum selenium concentrations in Perry Creek exceed acceptable limits, Conuma commits to, as appropriate and as agreed with EPD, to 1) assess fish tissue selenium levels and their biological significance; and 2) demonstrate that effluent quality will be acceptable for discharge to Perry Creek, or, if effluent quality is not acceptable for discharge, to: 1) implement selenium treatment options, or 2) pipeline the discharge to the Wolverine River, based on discharge to the Wolverine River being acceptable. Conuma recognises the requirement for a mutually acceptable effluent management option.</td>
<td>ITT - Agencies</td>
<td>MEM / MWLAP</td>
<td>To be addressed at EB Pit permitting; refer to Section 4 of the Effluent Permit Amendment Technical Assessment Report (Golder, 2015c), to be presented as Appendix 1.5-4 of the Integrated Application.</td>
</tr>
<tr>
<td>67: Selenium Mgmt. Plan</td>
<td>Through their Waste Management Plan, Conuma will minimize the potential for impacts from metal release, and in particular, selenium from the facilities during operations and post-closure. Specifically, from the EB Pit, risk to Perry Creek from metal leaching (selenium) will be inhibited by controlled disposal of potentially acid-generating wastes. Appropriate monitoring of EB sedimentation pond discharges and aquatic resources (water, sediments, fish, periphyton and benthos) in Perry Creek.</td>
<td>AIR 10.2.4</td>
<td>MEM / MWLAP</td>
<td>To be addressed at EB Pit permitting. Waste Management Plan (Walter, 2015) will be presented as Appendix 7.10-1 of the Integrated Application.</td>
</tr>
<tr>
<td>77: Climate</td>
<td>Two meteorological stations have been sited in the project area to collect the necessary climate data, one near the Plantsite and one in the EB West Waste Dump Area. Monitored parameters will include temperature, rainfall and snowpack.</td>
<td>AIR 10.9.3.1</td>
<td>MWLAP</td>
<td>Climate data were collected for the late summer and fall of 2004, and data collection continued through 2005. Snow pack data were collected in early April 2005. Climate data for EB were lost during downloading, but the Perry Creek Plantsite data were obtained, and were summarised in the EA 2.4 Mtpa Amendment. Snow pack data were collected in March 2006. No data available for 2007 due to granular snow and most of it blowing away. New snow depth monitoring equipment installed at Perry Creek and in EB pit. Hydrology and climate report (Golder, 2015c) will be presented as Section 8.3 of Integrated Application. EB meteorological station was damaged some time prior to summer of 2017, and will be repaired.</td>
</tr>
<tr>
<td>78: Climate</td>
<td>Data logger systems will be employed during pre-construction as personnel will not be on site on a continual basis. Temperature will be monitored hourly at the station near the Plantsite using a thermistor and a data logger, as well as a max-min thermometer at the EB site. Rainfall will be recorded with tipping bucket rain gauges at both sites. Snow pack accumulations will be measured by taking snow cores at the two rainfall monitoring sites. Cores will be taken at the end of March, April and May.</td>
<td>AIR 10.9.3.1.1</td>
<td>MWLAP</td>
<td>(August 2006) EB Pit precipitation gauge installed. Full weather station installed at SP 6 and operating - temperature, wind speed and direction and tipping rain gauge. Snow pack was only taken at EB in March 2006. Negligible snowfall at two sites after March. December 2008: snow pack monitoring being investigated. EB meteorological station was damaged some time prior to summer of 2017, and will be repaired.</td>
</tr>
<tr>
<td>79: Climate</td>
<td>The tipping bucket rain gauges at the Plantsite and EB stations will be upgraded to heated models, and will be maintained through the Construction, Operations and Closure Phase. Thermistor monitoring will also continue through Construction, Operations and Closure. A manual rain gauge and maximum-minimum thermometer will also be established at the EB Office, when mining operations are underway in this area. This station will be monitored daily while personnel are on site in the Operations and Closure Phase. Snowpack accumulations will be measured by taking snow cores at the two rainfall monitoring sites. Cores will be taken at the end of February, March, April and May. No meteorological monitoring is proposed during Post Closure, contingent on the measures that are incorporated into the final Closure Plan. Monitoring data and mitigation measures that are implemented over the course of Mine Operations and Closure may mandate that climate data monitoring be continued through the initial Post Closure phase.</td>
<td>AIR 10.9.3.1.2</td>
<td>MWLAP</td>
<td>Upgrading to heated rain gauges will be done during operations, when power is available on the site. Monitoring of snow cores was initiated in early April 2005, and will be ongoing. Heated rain gauge for winter precipitation not installed as of yet. Will install for fall 2006. December 2008 - no heated model. We have installed rain gauges. EB meteorological station was damaged some time prior to summer of 2017, and will be repaired. Snow core records not available, and no snow coring is believed to have been done at EB following Wolverine Mine shutdown in April 2014.</td>
</tr>
<tr>
<td>88: Wildlife and vegetation</td>
<td>Conuma will contribute to efforts related to caribou recovery monitoring studies and management planning, in the context of the Caribou Recovery Program. Actions undertaken by Conuma will be in the context of an overall strategy led by government for cumulative effects management, and commensurate with our level of impact on key factors affecting the population. Conuma notes that the EB area is the key area of concern for this project and we will not be developing this area for about eight years. In the meantime, other industrial users (Oil and Gas) are active in the area. No major caribou migratory route has been confirmed, but available data are not definitive. Conuma will contribute to studies needed to confirm movement through EB area in the context of the studies mentioned above.</td>
<td>ITT - Agencies</td>
<td>MWLAP / MEM</td>
<td>(August 2006) WCCC has contributed funds to the regional caribou monitoring program. WCCC attended the two meetings held to date for caribou recovery / management planning (one in December 2004 held by MOF, and one in May 2006 held by MOE). The 2006 report from the program will inform decisions on future actions. (December 2006) Updated Wildlife Protection Plan and caribou report in the 3.0 MTA application. (October 2017) Eight year future timeline has run its course, and permit application is now underway. Caribou Mitigation and Monitoring Plan (Golder, 2014b) will be presented as Appendix 7.8-1 of the Integrated Application.</td>
</tr>
</tbody>
</table>
### Table 8-1: Conditions and actions under EA Certificate M04-01 (concluded)

<table>
<thead>
<tr>
<th>Condition and action</th>
<th>Description</th>
<th>Actions</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>89: Wildlife and vegetation</td>
<td>WCC commits to conduct a ground evaluation of caribou migration routes (e.g., trails) in the area of EB Pit prior to EB Mine Permit Application, and also commits to integrate data from the ongoing caribou monitoring program.</td>
<td>WWG Aug 26 Action Item 8 WWG July 23 Action Items 4 &amp; 8</td>
<td>MWLAP / MEM Commitment re-affirmed. WCC conducted ground level evaluation of trails in EB Pit and will report results in EB Permitting. Caribou Mitigation and Monitoring Plan (Golder, 2014b) will be presented as Appendix 7.8-1 of the Integrated Application.</td>
</tr>
<tr>
<td>98: Surface water</td>
<td>Conuma's water management plan for the Wolverine Project includes plans for local diversion, routing, storage, groundwater withdrawal, use, collection, and treatment of water at various sites within the Project. Conuma is committed to surface water monitoring and has designed a program to meet the following objectives: provide streamflow data specific to the mine site in order to develop an accurate understanding of watershed response to rainfall / snowmelt and to verify the rainfall-runoff hydrologic model developed for this project; quantify watershed baseflows; document existing runoff water quality and measure the effectiveness of erosion control and sedimentation measures; along with water sampling and ARD/ML program results, provide data to update predictions of water quality impacts, and to support ongoing review of mine water and waste management strategies during operations and at closure; provide long term surface flow data for Perry Creek for use in applications for the Mine and Reclamation Permit, and the Waste Management Permit for EB Pit.</td>
<td>AIR 10.4 and 10.9.4 MWLAP</td>
<td>Proposed monitoring programs are presented in the TAR. EB Pit items to be addressed at permitting, hydrology and WQ monitoring ongoing. Water quality has been provided in ML/ARD report (Golder, 2015e), to be presented as Appendix 7.2-1 of the Integrated Application. Water balance modelling has been done (Golder, 2015 c), to be presented as Appendix 7.1-2 of the Integrated Application.</td>
</tr>
<tr>
<td>A-5: AFN Comms Environmental Review and Advisory Committee (ERAC) will have input on any caribou research funded by Conuma.</td>
<td>ITT 2.4 Mtpa March 17, 2006</td>
<td>EAO</td>
<td>See item A-12.</td>
</tr>
<tr>
<td>A-12: Wildlife and vegetation</td>
<td>Conuma commits to ongoing participation in caribou studies as needed to obtain information on caribou movements and habitat for use in scientifically sound decision-making at the EB Mine permitting stage, and in the caribou protection planning related to EB Pit.</td>
<td>EA Application, WCC commitment</td>
<td>EAO Caribou Mitigation and Monitoring Plan (Golder, 2014b) will be presented as Appendix 7.8-1 of the Integrated Application.</td>
</tr>
</tbody>
</table>
expansion of the pit and dump area, was evaluated in relation to the Reviewable Projects Regulation for a mine expansion (Table 8-2). In Section 8(1) of the Reviewable Projects Regulation, modification of the EB Mine project would constitute a reviewable project if it results in the disturbance of:

- at least 750 hectares of land that was not previously permitted for disturbance; or
- an area of land that was not previously permitted for disturbance and that is at least 50% of the area of land that was previously permitted for disturbance at the existing facility.

The total Wolverine Mine (including EB and Perry Creek mines) disturbance area approved under EA Certificate M04-01 was 969.5 hectares, including 253.1 hectares for EB Mine and 716 hectares for Perry Creek Mine and Wolverine Plant area. The proposed total disturbance area for the current EB Mine design is 580.6 hectares, an increase of 327.5 hectares (Table 8-2). This increase represents an approximate 34% increase to the EA Certificate-approved Wolverine Mine footprint.

In 2008, the area of Perry Creek Mine was increased by an amendment to Mine Permit C-223 allowing increased production to 3 Mt/a. The amendment application included a comprehensive update of the Wolverine Mine EA, which was reviewed by the Northeast British Columbia Mine Development Review Committee. Based on the current mine permit-approved Perry Creek Mine area and the EA certificate-approved EB Mine area, the expansion of the EB Mine disturbance area represents an approximate 27% increase in the total permitted disturbance area for the Wolverine Mine (Table 8-2).

On March 24, 2014, Walter Energy submitted a detailed request to the EAO, for determination of any requirements for an environmental assessment update under BCEAA based on the current EB Mine plan. The EAO subsequently determined that an amendment to the current Wolverine Coal Project EA Certificate is not required based on the current configuration and scope of the proposed EB Mine.

### Table 8-2: Effect of current EB Project total disturbance area on previous EA Certificate-approved and Mine Permit-approved disturbance footprints for the Wolverine Mine

<table>
<thead>
<tr>
<th></th>
<th>Original EB Mine Area</th>
<th>Perry Creek Mine Area</th>
<th>Total Wolverine Mine Area</th>
<th>Current EB Mine Area</th>
<th>Increase in EB Mine Area</th>
<th>Percentage Increase in Wolverine Mine Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004 EA Certificate Application</td>
<td>253.1 ha</td>
<td>716.4 ha</td>
<td>969.5 ha</td>
<td>580.6 ha</td>
<td>327.5 ha</td>
<td>33.8%</td>
</tr>
<tr>
<td>Current Mine Permit (based on the Wolverine 3 Mt/a permit amendment application)</td>
<td>253.1 ha</td>
<td>975.4 ha</td>
<td>1228.5 ha</td>
<td>580.6 ha</td>
<td>327.5 ha</td>
<td>26.7%</td>
</tr>
</tbody>
</table>

### 8.3 Canadian Environmental Assessment Act requirements

The Canadian Environmental Assessment Agency determined that, based on the 2011 EB Mine Plan, they would not have a role in the EA for the project under the Canadian Environmental Assessment Act (CEAA). Requirements for a potential screening by Natural Resources Canada under Section 7(1) (a) of the Explosives Act were under consideration. In May 2014, Walter Energy requested a further determination of federal review status given the 2014 mine plan (whose disturbance extent was identical with the current mine plan).

Under the federal Regulations Designating Physical Activities pursuant to CEAA, the Physical Activities Schedule, section 17 (d), states that an expansion of an existing coal mine that would result in an increase in the area of mine operations of 50% or more and a total coal production capacity of 3,000 or more tonnes per day would be subject to an EA under CEAA. Conuma understands that, under the federal Regulations Designating Physical Activities, the ‘area of mine operations’ is interpreted as the area of pits and dumps only. A summary of the changed area of mine operations due to the expansion of the EB Mine design is provided in Table 8-3.
The increase in EB Mine's pits and dump areas under the current design represents a 26% increase in the EA Certificate-approved area of mine operations and an approximate 20% increase in the currently approved Wolverine Mine area, including the EB Mine area of 241.3 hectares approved under the existing EA Certificate and the Perry Creek Mine area of 740.7 hectares approved under Mine Permit C-223. There will be no change in the production capacity of Wolverine Mine with the development of the EB Mine.

| Table 8-3: Effect of the current EB Project pit and dump disturbance areas on previous EA Certificate-approved and Mine Permit-approved pit and dump disturbance footprints for the Wolverine Mine |
|---------------------------------|----------------|--------------------|----------------|----------------|--------------------------|
|                                 | Original EB Mine Area | Perry Creek Mine Area | Total Wolverine Mine Area | Current EB Mine Area | Increase in EB Mine Area | % Increase in Wolverine Mine Area |
| 2004 EA Certificate Application  | 241.3 ha              | 492.7 ha           | 734.0 ha          | 431.0 ha           | 189.7 ha                 | 25.8%                       |
| Current Permit (Wolverine 3 Mt/a permit amendment application) | 241.3 ha              | 740.7 ha           | 982.0 ha          | 431.0 ha           | 189.7 ha                 | 19.3%                       |

Other federal interests related to potential requirements for federal review and/or authorizations are summarized in subsequent sections of this document.

8.3.1 Federal lands or financial support

There is no proposed or anticipated federal financial support for development of the EB Mine. The EB Mine project development will not affect lands under federal jurisdiction. The project falls within the area covered by Treaty 8 and the traditional territories of the Saulteau First Nations, West Moberly First Nations, and McLeod Lake Indian Band. Project effects on treaty rights and mitigation measures have been under discussion with the interested First Nations (as mentioned in Section 4 of this document).

8.3.2 Fisheries Act

Section 35 (1) of the Fisheries Act states that, “No person shall carry on any work, undertaking or activity that results in serious harm to fish that are part of a commercial, recreational or Aboriginal fishery, or to fish that support such a fishery.” Section 36 (3) states, “Subject to subsection (4), no person shall deposit or permit the deposit of a deleterious substance of any type in water frequented by fish or in any place under any conditions where the deleterious substance or any other deleterious substance that results from the deposit of the deleterious substance may enter any such water.”

As noted in Section 12.5 of this document, lower Perry Creek provides limited seasonal feeding habitat for juvenile whitefish, arctic grayling and migratory bull trout which contribute to fish populations in the Wolverine River. These populations may support recreational and/or Aboriginal fisheries. In addition, there is a small resident bull trout population in lower Perry Creek. Potential effects of the EB Mine on fish in lower Perry Creek, without the application of appropriate mitigation, include:

- effects on water quality and physical habitat due to increased sediment loads from the mine disturbance area;
- effects on flows due to water management in the mine area;
- effects on water quality due to increased concentrations of mine-related constituents in pit and dump drainage (principally selenium, sulphate and nitrate, and possibly trace elements, such as cadmium); and
- increased suspended sediments due to bridge and culvert upgrades on the Perry Creek Road - one existing bridge will be replaced 3 kilometres upstream of the fish bearing reach of Perry Creek, 11 culverts will be extended or replaced on tributary streams upstream of the replaced bridge, and a new culvert will be installed on upper Perry Creek in the vicinity of EB Mine.
The majority of these potential effects will be mediated through management of discharges from sedimentation ponds, designed to reduce suspended sediment loads to achieve receiving water quality objectives. Discharge outlets from two ponds will be located approximately 9 and 10 kilometres upstream of the upper limit of fish distribution in Perry Creek.

For the Effluent Permit Amendment Application, Conuma will update the source term predictions for mine drainage quality, water quality predictions, cumulative effects assessment, and the selenium management plan. Site-specific water quality targets shall be established for the EB Mine. The proposed approach and concentrations for defining the targets will be confirmed through consultation with the BC Ministry of Environment, in addition to thresholds for additional data collection and water management contingencies. Mitigation measures will be employed as required to meet water quality targets.

Predicted effects of EB Mine water management on Perry Creek flows are expected to be small. The sediment ponds will capture surface runoff and shallow seepage from the mine disturbance footprint, which comprises approximately 10% of the Perry Creek watershed. Mitigation measures will be integrated in the sedimentation pond design and operation, as necessary with the objective of meeting provincial instream flow guidelines and providing adequate instream flows to protect fish and fish habitat in lower Perry Creek.

With respect to stream crossing upgrades on the Perry Creek Road upstream of fish habitat, the new bridge will be designed and installed in accordance with Department of Fisheries and Oceans (DFO) guidance to avoid causing harm to fish habitat. All crossing work will be done according to provincial requirements for working in and about a stream, and according to the British Columbia Fish Stream Crossing Guidebook (MFLNRO, 2012). The objectives for all crossing upgrades will be to protect riparian habitat and prevent downstream siltation.

8.3.3 Navigable Waters Protection Act

Perry Creek's flows do not support navigation and are not known to be used for recreational purposes; therefore bridge construction is not expected to require authorization under the Navigable Waters Protection Act.

8.3.4 Species at Risk Act (SARA)

Information on species at risk in the project area is provided in Sections 12.7 and 12.8 of this document. The primary species of concern in the EB Mine area is woodland caribou, northern ecotype, which is listed as Threatened ('Schedule 1: Threatened' under SARA. The proposed EB Mine is located within the range of the Quintette Herd, and caribou were identified as a species of concern in the original environmental assessment for EB Mine. As part of the EA certificate, a commitment was made to support monitoring activities that will enhance understanding of potential project effects on the Quintette Herd:

- since 2005, Walter Energy regularly contributed to radio collar studies, which have generated a substantial database on seasonal movements of the Quintette and other South Peace herds;
- in 2011, Walter Energy initiated a lichen exclosure study on Mt. Spieker and Mt. Chamberlain in the project area, to better understand the use and importance of high elevation range in the vicinity of the proposed EB Mine; and
- in 2014, Walter Energy contributed to a caribou maternal penning study aimed at protecting caribou from predation during sensitive life stages.

Together with Treaty 8 First Nations who have an interest in Walter Energy’s (and now, Conuma’s) project activities, Walter Energy formed the Communities and Environment Partnership (CEP) with the Saulteau First Nations, West Moberly First Nations and McLeod Lake Indian Band. The CEP provides a quarterly forum to review project plans, monitoring programs and reclamation plans, with the objective of...
reducing cumulative effects on First Nations treaty rights, and to support attainment of the communities’ social and economic goals.

One outcome of this partnership is the establishment of a greenhouse enterprise, to be owned and run by the First Nations, which will focus on propagation of native and traditional use plant species for use in reclamation of industrial sites. Through the CEP and in project specific meetings with First Nations, Conuma will continue to develop a comprehensive Caribou Mitigation and Monitoring Plan focused on achieving measureable improvements in the status of the Quintette Herd.

As noted in Section 12.8 of this document, a Caribou Mitigation and Monitoring Plan will be prepared with reference to MoE guidance for protection of the South Peace Northern Caribou populations, and with input from First Nations. Conuma will continue to consult with federal agencies as required to integrate additional guidance from the federal recovery strategy for the Woodland Caribou Southern Mountain population (Environment Canada, 2014).

8.3.5 Migratory Birds Convention Act

As noted in Section 12.8, the EB Mine area provides limited habitat for some migratory songbirds, including some of conservation concern. The EB Mine area provides relatively limited habitat for most migratory songbirds of conservation concern, particularly those reliant on deciduous and mixed-wood forests, including black-throated green warbler and Connecticut warbler, and tall dense coniferous forest, including Cape May warbler and olive-sided flycatcher.

To date, no listed migratory birds have been observed in the project area. The species most frequently observed within the project area were chipping sparrow, fox sparrow, grey jay, and hermit thrush. Project development activities will adhere to requirements for protection of breeding birds (e.g. Environment Canada recommended restricted activity periods, and MoE clearing window for protection of breeding birds).

8.3.6 Explosives Act

In the current mine plan for EB Mine (Norwest, 2017), the explosives and detonator magazine site will remain in its current position at Perry Creek. Further information is provided in Section 10.2.4.

8.4 British Columbia Water Sustainability Act

In keeping with the Water Sustainability Act and the Water Sustainability Regulation, Conuma will apply for authorisation to divert and use water from an aquifer, and will obtain appropriate licences for the construction of water wells.

8.5 Changes to the EB mine plan

A description of the current mine plan is provided in Section 10. The layout for the updated EB Mine plan is provided in Figure 10-1. The main design changes related to the original 2004 EB Mine design involve:

- southward and westward extension of the North Pit;
- addition of the South Pit and South Dump, on the south side of Perry Creek;
- increased backfill of waste rock into pits; and
- addition of a second sediment pond (the South Pond), on the south side of Perry Creek.
Incremental area added to and subtracted from year-2004 EB Mine footprint: **Figure 8-1.**
Further details of EB Mine project design changes and associated environmental assessments and management plans include the following:

- increase in total pit shell area from 73 to 199 hectares with associated increase in coal resources from 8 to 19 million tonnes ROM coal; changes include a southward and westward extension of the North Pit (Figures 8-1 and 10-1) and the addition of a smaller South Pit situated south of Perry Creek;
- increase in coal resources at EB Mine, extending the overall productive life of the Wolverine Mine complex by nine years;
- sequential development of EB Mine as Perry Creek Mine is completed, rather than as simultaneous operations;
- transfer of mining equipment from Perry Creek Mine to EB Mine;
- owing to sequential development, no change in production from Wolverine Plant;
- increase in total overburden and waste rock removal at EB Mine with corresponding increase in waste rock dumps;
- elimination of pit lake at closure, reducing risk of potential wildlife exposure to elevated selenium in pit lake;
- updated water management plan and site water balance;
- increased sediment pond capacity with single point discharge on the north side of Perry Creek to allow more effective management and treatment of mine drainage water;
- new sediment pond on the south side of Perry Creek to manage mine area drainage south of Perry Creek;
- updated metal leaching/acid rock drainage (ML/ARD) management plan and source terms, based on updated waste rock composition and volumes, and site specific static and kinetic testing data;
- updated water quality predictions incorporating enhanced mitigation measures, and enhanced baseline data and operational monitoring data for Perry Creek and the Wolverine River; development of comprehensive Selenium Management Plan, including definition of concentration thresholds for progressive monitoring and mitigation as required;
- updated caribou mitigation and monitoring plan, in alignment with South Peace Northern Caribou Plan guidance (MoE, 2013) and incorporating progressive approaches to reclamation and increasing herd recruitment; and
- updated assessments of cumulative effects on valued air, aquatic and terrestrial resources.

Changes in dump designs include:

- reconfiguration of the North Dump to avoid encroachment upon the Alpine Wetland basin situated to the west of the mine, in response to First Nations request for protection of habitat in this area;
- reconfiguration of the North Dump to avoid steeper slopes above the facilities area, resulting in extension of the North Dump around the north side of the pit and eastward (Figure 8-1);
- addition of a new South Dump located east of the South Pit (Figures 8-1 and 10-1);
- increased in-pit waste rock dumps to reduce ex-pit dump areas and maximize passive selenium attenuation in saturated backfill, resulting in net increase of waste rock dump footprint from 168 to 232 hectares;
- overall in-pit to ex-pit dump design capacity ratio of 1.2:1;
- approximately 10 million cubic meters of saturated backfill capacity at end-of-mine; and
- detailed dump design incorporating updated site geotechnical data and consistent with target safety factors provided in provincial guidance documents.

8.6 Regulatory approvals required

Specific requirements for permits, licences and other regulatory authorizations (Table 8-3) will be confirmed in consultation with the Mine Development Review Committee. In December 2017, Conuma expects to submit an integrated application for a major amendment of Mine Permit C-223, and amendments to Wolverine Mine Effluent Permit PE 17756 and Air Permit PA 17759. A water licence
application will be made for the EB Mine sedimentation ponds and dams. A Licence to Cut will be required for site clearing and a Special Use Permit will be required to upgrade the section of Perry Creek Road that falls outside of the mine license areas. Licences will be needed for water wells.

**Table 8-3: Key regulatory approvals, scope, and approach**

<table>
<thead>
<tr>
<th>Agency</th>
<th>Key regulatory approval</th>
<th>General scope and approach</th>
</tr>
</thead>
</table>
| MEM        | Mine Permit C-223 Amendment | • Amendment application to allow development of EB Mine and reclamation plan – 2 Mt/a  
• Environmental Management Plans, including updated ML/ARD, Water Management and Wildlife Management plans and a new Caribou Mitigation and Monitoring Plan  
• Updated data & effects assessments including cumulative effects  
• EB-related effects related to coal processing at Wolverine Plant have been addressed in Wolverine 3.0 Mt/a amendment and will be updated in terms of current plans for tailings and CCR management at the Wolverine site. |
| MoE-EPD    | Effluent Permit PE 17756 Amendment | • EB mine water management and Sediment Pond discharges  
• A Technical Assessment Report (TAR) for the Effluent Permit Amendment will be submitted as part of the integrated application  
• Environmental assessment updates will reference mine plan, ML/ARD and water management plans, and source term determinations provided in the Mine Permit Amendment Application text.  
• Updated water quality predictions will be provided in the TAR and will include updates to Perry Creek Mine source terms and water quality predictions as they contribute to combined effects of EB and Perry Creek mines.  
• Site performance objectives will be defined for selected parameters and a monitoring program proposed  
• An EB-specific Selenium Management Plan will be provided with an adaptive management framework which includes monitoring and concentration thresholds for increased monitoring, implementation of additional mitigation measures and contingency measures in the event of unexpected increases in selenium. The plan will reference and mesh with the existing Selenium Management Plan for Perry Creek Mine. |
| MoE-EPD    | Air Permit PA 17759 Amendment | • EB Mine area emissions, assuming raw coal stockpiles, coal haul to Wolverine Plant, on-site power supply by means of diesel generators.  
• A TAR for the Air Permit Amendment will be submitted as part of the integrated application.  
• EB Mine specific Air Quality Management Plan.  
• EB coal processing-related air quality issues have been addressed in Wolverine 3.0 Mt/a amendment; current production rate of approximately 2Mt/a will not change. |
| MFLNRO     | License to Cut (LTC) SUP and LTC | • EB Mine area  
• Perry Creek Road widening |
| MFLNRO     | Wildlife Act permits for handling of wildlife, destruction of nests, and removal of beaver dams | • EB Mine area  
• Perry Creek Road widening |
| MoE        | Water License | • Sedimentation pond, dam designs, water use for dust control |
| MoE        | Authorisation for diversion and use of water from an aquifer | • Construction and operation of water wells, for on-site water supply, as required by Water Sustainability Regulation. |
9   GEOLOGY

Regional and local geology of the EB Main project area are known mainly from the extensive work of the Geological Survey of Canada and the British Columbia Geological Survey, supported and extended by detailed work conducted by economic and structural geologists working for coal and PNG companies.

The EB Main project area, and its vicinity, is part of the Peace River coalfield. Coals of immediate interest for surface mining at EB are contained within the Gates Formation, of Early Cretaceous (Albian) age. Other coal occurrences are known from the coal-measures of the Gething Formation, of slightly earlier Early Cretaceous (Barremian to Aptian) age. The Gates and Gething coals formed in deltas bordering upon an extensive seaway, whose shorelines advanced and retreated cyclically, as well as changing orientation over time. As a result, the potentially-mineable coals are disposed in elongate trends following the ancient shorelines, punctuated by distributary channels of ancient rivers and streams.

9.1 Rock types

The majority of sedimentary rocks within the EB project area are detrital, ranging in grain size from very fine claystones to coarse pebble-conglomerates. A lesser but distinctive component of the Early Cretaceous basin-fill comprises biologically- and chemically-derived rocks such as coal, banded and nodular ironstone, glauconite-rich sandstone and gritstone, and silty or muddy dolomite. A thin but locally-continuous deposit of shell-bearing mudstone (the Blue Marker, as shown in Figure 9-1) is likely to have originated as an oyster reef (Leckie, 1985). Rocks at East Bullmoose are interpreted to have been deposited within both marine and non-marine environments, with the potentially-mineable coals having formed within a non-marine setting.

Pyroclastic volcanic rocks form another minor component of the basin fill, in the form of very thin (centimetres to decimetres) but regionally-persistent ‘ash bands’, originally deposited as air-fall deposits of fine-textured tuff, subsequently altered to bentonites or tonsteins depending upon the chemistry of their receiving environments. Ash bands are not volumetrically significant as part of the Cretaceous rocks, but their correlation between boreholes is valuable in recognising the distribution and magnitude of faults.

9.2 Resource stratigraphy

Table 9-1 and Figure 9-1 set forth the stratigraphic architecture of the EB Mine and vicinity. Table 9-1 presents the stratigraphy of the Gates and Gething coal-measures, within a context of their intervening and overlying marine rocks (of the Hulcross and Moosebar formations respectively). The current mine plan for the EB pits focusses on the Gates coal-measures, with a lesser component of overburden planned for mining within the overlying Hulcross marine rocks.

Only the upper two of the Gates Formation's three members will be mined (except for local waste wedges which might be mined from the upper part of the formation's basal Torrens Member). Only the lower portion of the Hulcross Formation will be mined, confined to the deeper portions of the pits. The Hulcross Formation is known to be potentially acid-generating (PAG), and therefore its avoidable inclusion in the mined overburden is considered to be undesirable. The Gething Formation, and its contained coals, is not planned for mining within the proposed EB pits.

Internal stratigraphic details of the Gates Formation, its three lithostratigraphic members, and its readily correlatable coal beds, are presented in Figure 9-1.

- the uppermost member of the Gates Formation (the Notikewin Member) contains four closely-associated but generally-thin (a few to several decimetres thick) coal beds (P, Q, QR, and R coals) near its top, but none of these coals are presently considered to be consistently both thick enough, and
of sufficient quality, to be of immediate interest for mining;

- the medial member of the Gates Formation (the Falher Member) contains five thicker coal zones (A, B, C2, C, and D zones) which are widely-spaced within their bounding rocks. All of these zones locally attain sufficient thickness and quality to be considered mineable. A sixth coal zone (E) lies near the top of the Falher, but is too thin and dirty to be considered mineable; and

- the basal member of the Gates Formation (the Torrens Member) contains no known coal, other than isolated occurrences of a few centimetres' to decimetres' thickness, likely to represent isolated coalified driftwood.

Within the Gates Formation, the A, B, C and D coal zones (and, locally, the C2 coal zone) are considered of immediate interest for mining at EB. These coal zones have a cumulative thickness of about 13 metres. The B coal zone (typically 3.2 to 5.6 metres thick) contains about 41% of the coal resources in the area (Norwest, 2017), while the C and D coal zones are each typically 3 to 4 metres thick.

Most of the Falher Member's coal zones contain a doublet of closely-adjacent coal beds, separated by a parting of rock. The thicknesses of the internal rock partings vary locally, such that in some areas the partings attain sufficient thickness to be considered as removable in the course of mining, whereas in other areas the partings are so thin as to be non-removable during mining.

9.3 Geological structure

The coal-measures and bounding marine rocks at EB Mine have been faulted and folded, as a consequence of wide-ranging northeast-directed tectonic compression of the Rocky Mountains and Foothills of British Columbia and Alberta. The overall geological style of the Gates coals is 'complex', within the context of the Canadian national system for coal-resource estimation (Hughes et al., 1989).

Most of the known faults within the EB project area are northeast-directed thrusts (although southwest-directed backthrusts may also occur). The thrusts tend to rise as structural ramps, breaking across stratification of strong rocks such as sandstone and conglomerate, with intervening structural flats, where the thrusts tend to cut at relatively low angles across the stratification of weaker rocks such as mudstones and dirty coals. Local folding is associated with changes from ramp to flat thrust geometry. The resultant staircase-like alternation of moderate to steep-dipping monoclinal structural domains, and more gently-dipping structural domains, is characteristic of the Gates Formation coal-measures within the EB project area.

9.4 Exploration and coal-resource appraisal

To date, 18,512 metres of exploratory drilling in 134 boreholes have been conducted in the EB area. As well, numerous trenches have been dug by hand, bulldozer and backhoe. Seven adits have been driven into major coal zones within the EB project area and vicinity, to a total length of approximately 365 metres. From three of these adits, bulk samples totalling 60 tonnes of coal were removed for process testing. Exploration activities are summarized in Table 9-2.

Coal exploration at EB commenced in 1971 (Bergey, 1992), with air-photo interpretation and geological mapping by Teck Corporation. Work continued in 1975 with further geological mapping and diamond-drilling, undertaken by Mitsui Mining (Shima and Nishio, 1975), in support of a joint venture between Brameda Resources Limited and Nichimen Resources Limited.

Exploration was carried on intensively during the late 1970s and earliest 1980s, before stalling on account of a depression in coking-coal markets. Following Western Canadian Coal's acquisition of the EB property in 2000, exploration continued from 2001 onwards to 2014.
### Table 9-1: Stratigraphy of EB Mine area

<table>
<thead>
<tr>
<th>Geological Age (Period and Stage)</th>
<th>Lithostratigraphic Units</th>
<th>Thickness</th>
<th>Geological Map-Units</th>
<th>Coal Beds/Coal Zones</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Late Albian</strong></td>
<td>Hasler Fm.</td>
<td>&gt;20 m</td>
<td>8a</td>
<td></td>
</tr>
<tr>
<td></td>
<td>----- uppermost extent of drilled rocks at East Bullmoose -----</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Late Middle Albian</strong></td>
<td>Paddy Mb.</td>
<td>9 to 30 m</td>
<td>7c</td>
<td>V coal bed</td>
</tr>
<tr>
<td></td>
<td>Walton Creek Mb.</td>
<td>95 to 115 m</td>
<td>7b</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cadotte Mb.</td>
<td>20 to 40 m</td>
<td>7a</td>
<td></td>
</tr>
<tr>
<td><strong>Middle Albian</strong></td>
<td>Hulcross Fm.</td>
<td>105 to 125 m</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td><strong>Fort St. John Group</strong></td>
<td>Notikewin Mb.</td>
<td>63 to 105 m</td>
<td>5c</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Father A</td>
<td>P, Q and R coal beds (underlain by 'Blue Marker' bioherm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Father B</td>
<td>E (coaly rock only)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Father C</td>
<td>E</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Father D</td>
<td>DU</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Father E</td>
<td>DL</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Father F</td>
<td>CU</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Early Cretaceous</strong></td>
<td>Quintette sandstone</td>
<td>25 m</td>
<td>5a</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Medial siltstone</td>
<td>13 m</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Torrens sandstone</td>
<td>12 m</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Bullhead Group</strong></td>
<td>Moosebar Fm.</td>
<td>150 to 170 m</td>
<td>4c</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Speiker Mb.</td>
<td>75 to 110 m</td>
<td>4b</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cowmoose mudstone</td>
<td>nil to 2.4 m</td>
<td>4a</td>
<td></td>
</tr>
<tr>
<td></td>
<td>basal 'Green Marker'</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Hauterivian to Late Early Albian</strong></td>
<td>Chamberlain Mb.</td>
<td>(unnamed coal measures)</td>
<td>3d</td>
<td>Upper Bird coal bed</td>
</tr>
<tr>
<td></td>
<td>Chamberlain sandstone</td>
<td>11 to 17 m</td>
<td></td>
<td>Bird zone</td>
</tr>
<tr>
<td></td>
<td>Upper</td>
<td>16 to 21 m</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Middle</td>
<td>1.5 to 3 m</td>
<td></td>
<td>Skeeter coal bed</td>
</tr>
<tr>
<td></td>
<td>Lower</td>
<td>15 to 17 m</td>
<td></td>
<td>Chamberlain coal bed</td>
</tr>
<tr>
<td></td>
<td>Bluesky Mb.</td>
<td>0.3 to 3 m</td>
<td>3b</td>
<td></td>
</tr>
<tr>
<td><strong>Hauterivian to Barremian</strong></td>
<td>Gaylard Mb.</td>
<td>145 to 150 m</td>
<td>3a</td>
<td>'Middle and Lower Coals' (Gething A through Gething E)</td>
</tr>
<tr>
<td><strong>Berriasian to Valanginian</strong></td>
<td>Cadomin Fm.</td>
<td>50 m</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td><strong>Minnes Group</strong></td>
<td>Monach Fm.</td>
<td>&gt;300 m</td>
<td>1</td>
<td>not yet explored</td>
</tr>
</tbody>
</table>

Marker beds and divisions are local lithologic units without formal stratigraphic rank, although in most cases they extend across property boundaries.

--- lowermost extent of drilled rocks at East Bullmoose -----

--- uppermost extent of drilled rocks at East Bullmoose -----

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May 3, 2018
<table>
<thead>
<tr>
<th>Layer</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Huiqin cross siltstone</td>
<td>No mineable coal within the Huiqin Fm.</td>
</tr>
<tr>
<td>Basal Huiqin grt ca. 0.5m</td>
<td></td>
</tr>
<tr>
<td>Notikain Member Div. 4</td>
<td>‘Upper coals’ (P through R coal beds) are not currently considered workable.</td>
</tr>
<tr>
<td>Notikain Member Div. 3</td>
<td>Blue Marker (oyster reef)</td>
</tr>
<tr>
<td>Notikain Member Div. 2</td>
<td>Interburden ca. 72 m</td>
</tr>
<tr>
<td>Notikain Member Div. 1</td>
<td>Interburden ca. 3 m</td>
</tr>
<tr>
<td>Father Member Div. A</td>
<td>D coal zone</td>
</tr>
<tr>
<td>Father Member Div. B</td>
<td>Interburden ca. 20 m</td>
</tr>
<tr>
<td>Father Member Div. C</td>
<td>C coal zone</td>
</tr>
<tr>
<td></td>
<td>Interburden ca. 10 m</td>
</tr>
<tr>
<td>Father Member Div. D</td>
<td>Interburden ca. 20 m</td>
</tr>
<tr>
<td></td>
<td>B coal zone</td>
</tr>
<tr>
<td></td>
<td>Interburden ca. 12 m</td>
</tr>
<tr>
<td>Father Member Div. E</td>
<td>A coal bed 1.3 m</td>
</tr>
<tr>
<td>Father Member Div. F</td>
<td>No mineable coal within the Torrens Mb.</td>
</tr>
<tr>
<td>Torrens Member &gt;10 m</td>
<td></td>
</tr>
<tr>
<td>(Quintette sandstone)</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 9-1:** Coal bed details of Gates Formation within EB Mine project area
Early work included substantial programmes of geological mapping, and of core-drilling, aimed at establishing the gross geological structure, stratigraphy, and coal quality of the Gates and Gething coal-measures. In the mid-1970s the Nichimen/Brameda joint venture group, followed by Ranger Oil, drilled 45 diamond-drill holes and drove seven adits to obtain samples of coal for washability and coking tests. Later work, by Western Canadian Coal, Western Coal, and Walter Energy, concentrated on infill and step-out drilling of the North Pit and South Pit areas within the EB project area, with additional coal-quality testwork and a programme of geochemical characterisation of ML/ARD potential within the Hulcross and Gates formations. Downhole geophysical logs were run in nearly all of the boreholes. Drilled bulk samples, and composites of core samples from narrow-diameter boreholes, were used for washability test work for plant design and to predict clean coal quality.

In 2005, WCC contracted a mine feasibility study (Marston Canada, 2005) for open pit mines to be developed within the overall Wolverine project area. The 2005 study considered geology, geological modelling, geotechnical studies, process plant design and engineering, mine facilities, and infrastructure. Marston Canada recommended further drilling at EB, with the goal of increasing the level-of-assurance of coal resources and elucidating coal bed geometry and coal quality, in support of detailed mine planning.

In 2007, WCC drilled an additional 3,509 metres within and adjacent to the conceptual EB Mine outline. Given the additional information from drilling, a revised technical report (Marston and Marston, Inc., 2007) was commissioned, focussing on the concept of EB Mine as a concurrent satellite pit to the Perry Creek Mine. In the 2007 report, coal resources were estimated at 11.8 million tonnes, supporting an estimated 8.0 million tonnes of proven reserves, from a single pit at EB. From the 8.0 million tonnes, total saleable clean coal was estimated to be 5.1 million tonnes.

In 2011, Walter Energy acquired the EB Mine property along with WCC’s other assets. Walter continued to develop Marston’s mine plan concept for EB Mine, while concurrently conducting infill and step-out drilling for resource-estimation and coal quality investigations which continued until 2014.

### Table 9-2: EB Project summary of exploration activities (1975-2014)

<table>
<thead>
<tr>
<th>Year</th>
<th>Owner</th>
<th>Number of boreholes drilled</th>
<th>Total meters drilled</th>
<th>Borehole type (size)</th>
<th>Geophysical log types</th>
<th>Trenches</th>
<th>Bulk samples</th>
<th>Coal Assessment Report (CAR) reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1975</td>
<td>Nichimen / Brameda</td>
<td>3</td>
<td>976</td>
<td>D (NQ)</td>
<td>d,g,n,c</td>
<td>2 (m)</td>
<td>0</td>
<td>552</td>
</tr>
<tr>
<td>1976</td>
<td>Nichimen / Brameda</td>
<td>3</td>
<td>415</td>
<td>D (NQ)</td>
<td>g,n,c</td>
<td>2 (m)</td>
<td>0</td>
<td>553</td>
</tr>
<tr>
<td>1977</td>
<td>Nichimen / Brameda</td>
<td>9</td>
<td>2,611</td>
<td>D (NQ)</td>
<td>g,n,c</td>
<td>0</td>
<td>0</td>
<td>555</td>
</tr>
<tr>
<td>1978</td>
<td>Ranger Oil</td>
<td>18</td>
<td>1,963</td>
<td>D (HQ)</td>
<td>g,n,c,r</td>
<td>24 (m+h)</td>
<td>9 Adits (60t)</td>
<td>556</td>
</tr>
<tr>
<td>1979</td>
<td>Ranger Oil</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>557</td>
<td></td>
</tr>
<tr>
<td>1980</td>
<td>Ranger Oil</td>
<td>7</td>
<td>1,205</td>
<td>D (HQ)</td>
<td>g,n,c</td>
<td>0</td>
<td>4 Adits (60t)</td>
<td>558</td>
</tr>
<tr>
<td>1982</td>
<td>Ranger Oil</td>
<td>5</td>
<td>319</td>
<td>D (HQ+AX)</td>
<td>g,n,c,r</td>
<td>0</td>
<td>0</td>
<td>559</td>
</tr>
<tr>
<td>2001</td>
<td>WCC</td>
<td>18</td>
<td>2,244</td>
<td>18 R, 3 R/C</td>
<td>g,n,c,r</td>
<td>0</td>
<td>0</td>
<td>865</td>
</tr>
<tr>
<td>2007</td>
<td>WCC</td>
<td>26</td>
<td>3,243</td>
<td>22 R, 3 D (NQ), 2 BS</td>
<td>g,n,c</td>
<td>2 drilled (266 m)</td>
<td>665</td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>WCC</td>
<td>13</td>
<td>1,219</td>
<td>R</td>
<td>g,n,c</td>
<td>0</td>
<td>0</td>
<td>865</td>
</tr>
<tr>
<td>2011</td>
<td>WCC</td>
<td>1</td>
<td>137</td>
<td>D (HQ)</td>
<td>g,n,c</td>
<td>0</td>
<td>0</td>
<td>865</td>
</tr>
<tr>
<td>2013</td>
<td>WCC</td>
<td>18</td>
<td>2,776</td>
<td>D (NX), R</td>
<td>g,n,c</td>
<td>0</td>
<td>0</td>
<td>865</td>
</tr>
<tr>
<td>2014</td>
<td>WCC</td>
<td>11</td>
<td>570</td>
<td>5 R, 6 D (HQ), 1 BS</td>
<td>g,n,c</td>
<td>3 drilled</td>
<td>865, 1000</td>
<td></td>
</tr>
<tr>
<td>Totals</td>
<td></td>
<td>134</td>
<td>18,512</td>
<td></td>
<td>g,n,c</td>
<td></td>
<td>28 (60t)</td>
<td></td>
</tr>
</tbody>
</table>

Notes: D - diamond-drill hole; R - rotary-drill hole, R/C - rotary with cored sections; BS - 6-inch drilled bulk sample; (m) - mechanised trench; (h) - hand trench, (t) - tonnes of adit sample; d, g, n, c, r - density, gamma ray, neutron, caliper, resistivity logs in boreholes.
By 2012, exploration data supported expansion of the mine into the EB Trend area, southeast of the original EB pit area. The geological model was further updated by Golder Associates in 2014 and by Walter Energy in 2015, and an economic analysis conducted, resulting in a design incorporating two open pits and substantially increasing the measured and indicated coal resources. Walter’s 2015 geological model has been used as the basis for Norwest’s 2017 resource and reserve study, which presents the most recent determination of coal quantities (Tables 9-3 and 9-4) within the planned pits of EB Mine.

**Table 9-3:** Estimated ROM coal reserves as of December 31, 2016 (Norwest, 2017)

<table>
<thead>
<tr>
<th>Reserve type</th>
<th>Coal zone</th>
<th>ASTM coal rank</th>
<th>Volume (thousands of BCM)</th>
<th>Reserve level-of-assurance (thousands of tonnes)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Proven</td>
</tr>
<tr>
<td>ROM coal (at 4% moisture content)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>Medium volatile bituminous</td>
<td>2,249</td>
<td>3,953</td>
<td>53</td>
</tr>
<tr>
<td>C</td>
<td></td>
<td>2,633</td>
<td>4,584</td>
<td>24</td>
</tr>
<tr>
<td>C2</td>
<td></td>
<td>470</td>
<td>948</td>
<td>9</td>
</tr>
<tr>
<td>B</td>
<td></td>
<td>4,750</td>
<td>7,374</td>
<td>46</td>
</tr>
<tr>
<td>A</td>
<td></td>
<td>1,189</td>
<td>2,041</td>
<td>56</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>11,290</td>
<td>18,900</td>
<td>188</td>
</tr>
</tbody>
</table>

Source: adapted from Table 15.2 in Norwest (2017).

**Table 9-4:** Estimated clean coal reserves as of December 31, 2016 (Norwest, 2017)

<table>
<thead>
<tr>
<th>Reserve type</th>
<th>Coal zone</th>
<th>ASTM coal rank</th>
<th>Volume (thousands of BCM)</th>
<th>Reserve level-of-assurance (thousands of tonnes)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Proven</td>
</tr>
<tr>
<td>Clean coal (at 8% moisture content)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>Medium volatile bituminous</td>
<td>1,349</td>
<td>2,372</td>
<td>32</td>
</tr>
<tr>
<td>C</td>
<td></td>
<td>1,422</td>
<td>2,475</td>
<td>13</td>
</tr>
<tr>
<td>C2</td>
<td></td>
<td>254</td>
<td>512</td>
<td>5</td>
</tr>
<tr>
<td>B</td>
<td></td>
<td>3,657</td>
<td>5,678</td>
<td>36</td>
</tr>
<tr>
<td>A</td>
<td></td>
<td>820</td>
<td>1,408</td>
<td>38</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>7,502</td>
<td>12,445</td>
<td>124</td>
</tr>
</tbody>
</table>

Source: adapted from Table 15.2 in Norwest (2017).

Exploration for resource delineation has now been completed within the proposed North Pit and South Pit mining areas of EB Mine. Norwest Corporation is currently updating the mine plan for the EB pits and associated facilities. Norwest is also working updating their studies on the pit slope stability and dump geotechnics of the proposed EB Mine. All of these reports will be submitted with the upcoming EB Mine integrated permit application.

Figures 9-2 and 9-3 show cross-sections through the North Pit, as constructed by Norwest (2017; their Figures 7-3 and 7-4).
Source: adapted from Norwest (2017, Figure 7-3)

Cross-Section A-A': Figure 9-2.
Source: adapted from Norwest (2017, Figure 7-4)

Cross-Section B-B': Figure 9-3.
10 PROJECT DESCRIPTION

The following sections of this document describe the mine, coal processing and mine/processing waste components of the EB Mine project. Information on site water management is provided in Section 12.2.

10.1 General arrangements

Coal from the EB pits will be processed at the existing Wolverine Plant. Production from EB Mine will replace production from Perry Creek Mine, scheduled to end in 2020, and will continue at a rate of 505 to 2,921 ROM kilotonnes per year. In addition, Perry Creek Road will be upgraded to haul coal from the EB Mine to the Wolverine Plant. Details of site infrastructure and coal haul are provided in Section 10.2 and information concerning site reclamation and closure is provided in Section 10.3.

10.1.1 Mine design and operations

The EB Mine is located at the headwaters of Perry Creek. Components of the EB Mine project include the pit areas, waste rock dumps, facilities and ROM coal stockpile platforms, pit haul and access roads, and water management structures (Figure 10-1).

- The North Pit is contained between a shallow- to moderately-dipping (10° to 35°) A seam footwall (in the Quintette sandstone atop the Torrens Member) and a benched highwall. A kilometre-long section of a gas pipeline, operated by SNRI, will be relocated southward to accommodate the mine's pit design. An undisturbed buffer zone of 70 metres will be maintained between the pit and the pipeline to protect the pipeline from any potential adverse effects of blasting operations.

- The South Pit is a narrow, steep dipping coal development area along the outcrop south of Perry Creek. It is contained between a benched A seam footwall (into the Quintette sandstone) and a benched highwall.

- The South (S1) Dump will overlap an inactive SNRI pipeline to the east of the pit. An agreement will be formalized with SNRI, related to proximity of project facilities and crossings of their gas pipeline facilities.

The total disturbance area, required during development of the EB Mine, is approximately 581 hectares. The pit shells cover about 199 hectares and the ex-pit waste dumps occupy an additional 232 hectares. Mine area facilities (offices, maintenance shops), coal stockpiles, pit haul and access roads, water management facilities, and general use areas occupy the remaining area of approximately 150 hectares.

Mining in the EB pits will take place by conventional excavator-truck methods. Consolidated overburden will be drilled, blasted, and loaded into trucks for hauling to external waste dumps or to mined-out pit areas. ROM coal will be loaded and hauled to the minesite stockpiles and subsequently transported to the Wolverine Plant by haul truck over the Perry Creek Haul Road and through the Perry Creek Pit area by a network of pit roads.

10.1.2 Phasing

The mining of the EB pits is divided into several phases. In overview, the pit sequencing accommodates pit development in both the North and South Pit areas in the initial years, with completion of the South Pit in the third year. The South Pit will then be available for waste rock disposal. Development in the North Pit will generally proceed from the south to the north over the life of mine. The north end of the North Pit will be completed in the final years of the mine life, while the south end of the pit will be available for waste rock disposal.
A summary of the projected annual waste production, coal production, and strip ratio is provided in Table 10-1. The objectives of the pit development sequence include:

- steady ROM coal release after start-up of 2 to 2.9 million tonnes per year, with ROM strip ratio ranging from 3.94 to 10.43 BCM/tonne.
- release of sufficient non-acid generating (NAG) waste rock for mixing with PAG waste at an annual ratio of no less than 6:1; and
- creation of available space in the open pits to optimize in-pit waste rock disposal over the life of mine.

10.1.3 Waste rock dumps

Waste rock dumps are designed to maximize the potential for backfilling waste into pit areas where coal reserves have been extracted. The waste backfill reduces the total mine disturbance area, the lateral and vertical extent of exposed highwalls in each pit at the end of mining, and provides an opportunity for potential attenuation of selenium in saturated pit backfill.

The North Pit will contain all of N4 Dump and most of N3 Dump, and the South Pit will contain part of the S3 Dump. The total in-pit waste rock capacity is approximately 143 million bank cubic meters (MBCM). The total amount of waste rock to be moved and dumped (both within and adjacent to pits) is approximately 153 MBCM.

External waste rock dumps (N1, N2, S1 and S3) are designed as side-hill fills, which in total will contain about 117 MBCM of end dumped waste material. The external dumps are designed and sequenced to ensure stability during construction and after final reclamation. N3 Dump is scheduled to be completed in Year 3, N4 in Year 4 and the south in-pit and ex-pit dumps (S1, S2) will be completed in Year 7. Completed dumps will be progressively reclaimed as they are completed.

10.1.4 Coal and waste schedule

Full coal production is proposed to begin in 2019 (as markets allow) and continue through 2028. Over the productive life of the mine approximately 19.1 million tonnes of ROM coal would be processed to yield approximately 12.6 million tonnes of saleable metallurgical coal. ROM coal will be hauled to the EB Mine ROM coal stockpiles, which will have an approximate capacity of 150,000 tonnes (to be confirmed in permit-level mine planning). Coal from these stockpiles will be transported using heavy hauler tractor trailer trucks to the Wolverine Plant for processing. Approximately 153 million BCM of waste will be relocated to uncover this coal, giving an overall strip ratio of 8.01 BCM of waste per tonne of ROM coal.

Table 10-1 provides a schedule of coal production and waste rock removal.

After completion of the mine in Year 9, another two years will be required for final reclamation and initial closure of the mine. Essential access and water management facilities will remain in place to facilitate ongoing reclamation-related and water quality monitoring, until such time as the site is deemed by regulators as stable and the water quality satisfactory to allow decommissioning and reclamation of remaining water management structures and final closure of the site.

10.1.5 Coal processing

ROM coal from EB Mine will be trucked to the ROM coal stockpiles at the Wolverine Plant site. The existing Wolverine Plant has the capacity to produce up to 3 Mt/a of clean coal, including production from the Perry Creek and EB mines. Accordingly, no changes are required in the process circuit for EB Mine. As the EB Mine will be developed sequentially to Perry Creek Mine, there will be no increase in...
the current production rate of up to 2 Mt/a. Plant make-up water-supply sources identified in the current Wolverine Mine permit are adequate to address production from the EB pits. Water sources include reclaimed tailings water, intercepted seepage, and pit water.

ROM coal stockpiles at the Wolverine Plant have sufficient capacity under the current mine permit to accommodate raw coal hauled from EB Mine. No changes to the existing permit are required. The existing permit includes provision for increasing clean coal stockpiles to accommodate production up to 3 Mt/a, and to address train availability. No changes in clean coal stockpile capacity or segregation of coal products are required for EB coal processing.

Existing dust control measures, as described in the Wolverine Mine Air Quality Management Plan and permitted under Air Permit PA-17759, are designed to address production up to 3 Mt/a. No changes are required for EB coal handling and processing, and no air permit amendments are anticipated in relation to plant operations.

10.1.6 Tailings disposal
Tailings and CCR from processing EB coal will be similar to those from Perry Creek Pit; therefore, no special handling will be required for PAG materials in processing waste from EB coal. The current tailings pond at Perry Creek Pit has sufficient capacity for tailings from the processing of EB coal. CCR will be placed in the CCR dump at Perry Creek Pit and added to the tailings pond embankment.

10.2 Infrastructure

10.2.1 Mine site facilities and access
Proposed site plans include a series of three platforms south of the N1 Dump, which will accommodate a maintenance facility and fuel/lubricant storage facility; an office/dry facility; and a ROM coal stockpile area (Figure 10-1). The ROM coal stockpile platform will accommodate four stockpiles, with a wind berm to be constructed on the west side of the stockpile platform. A new access road, located south of the existing SNRI pipeline access road, will connect the Perry Creek Haul Road with the ROM coal stockpiles and provide access to the facilities area. The new road will also allow non-mine related traffic to access the existing pipeline road west of the facilities site. The existing pipeline road will remain in place to allow SNRI ongoing access to all sections of the pipeline.

10.2.2 Water supply
Water requirements for washing and maintenance will be supplied by water wells, which have not yet been constructed. It is anticipated that the water wells will be situated near the facilities area of EB Mine. Drilling and development of the wells will be conducted in accordance with the provisions of the British Columbia Water Sustainability Act and Water Sustainability Regulation. Bottled water will be provided for potable supplies. A sewage plant and tile disposal field will be located on the office/dry platform. Wash water will be disposed of in the North Pond.

10.2.3 Power supply
Electrical power will be supplied to EB Mine by onsite diesel-driven generators. The mine's power requirements are expected to be lower than those historically experienced at Perry Creek Mine, owing to the existing coal preparation plant remaining in its current location by the CN Rail loadout. On-site fuel storage will provide for a minimum of five days' supply of diesel fuel for the generators and appropriate fuels for engine-driven equipment and for vehicles.
General layout at end of mine: Figure 10-1.
EB Mine summary schedule of mine development and coal production: **Table 10-1**

<table>
<thead>
<tr>
<th></th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
<th>Year 6</th>
<th>Year 7</th>
<th>Year 8</th>
<th>Year 9</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total waste volume (in BCM)</td>
<td>6,009</td>
<td>20,020</td>
<td>25,234</td>
<td>24,946</td>
<td>24,981</td>
<td>23,811</td>
<td>14,409</td>
<td>11,510</td>
<td>2,008</td>
<td>152,928</td>
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<tr>
<td>ROM coal (in thousands of tonnes)</td>
<td>576</td>
<td>2,069</td>
<td>2,579</td>
<td>2,639</td>
<td>2,819</td>
<td>2,891</td>
<td>2,090</td>
<td>2,921</td>
<td>505</td>
<td>19,089</td>
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<tr>
<td>ROM strip ratio (BCM waste per tonne of ROM coal)</td>
<td>10.43</td>
<td>9.68</td>
<td>9.78</td>
<td>9.45</td>
<td>8.86</td>
<td>8.24</td>
<td>6.89</td>
<td>3.94</td>
<td>3.98</td>
<td>8.01</td>
</tr>
<tr>
<td>Clean coal (in thousands of tonnes)</td>
<td>379</td>
<td>1,362</td>
<td>1,698</td>
<td>1,738</td>
<td>1,856</td>
<td>1,903</td>
<td>1,376</td>
<td>1,923</td>
<td>333</td>
<td>12,569</td>
</tr>
</tbody>
</table>

Source: Norwest (2017)
Perry Creek haul road: Figure 10-2.
10.2.4 Explosives

Although consideration had previously been given to constructing a new explosives and detonators magazine site at EB Mine, the current mine plan (Norwest, 2017) calls for the explosives plant and magazines to remain in their present location near Perry Creek Mine. The existing magazines are licensed in compliance with Oil and Gas Commission guidelines and federal Explosives Act requirements.

10.2.5 Perry Creek Haul Road

The Perry Creek Haul Road will consist of four segments with varying tenures and requirements for construction, upgrade and permitting (Figure 10-2). Starting from the EB Mine, the general specifications and permitting requirements for each segment are as follow:

- **Segment A-B – EB Access Road**: 1.5 kilometre new road joining Perry Creek Haul Road and CNRL Pipeline Road, accessing the ROM coal stockpiles and mine site facilities area. The running surface of this section will be 12 metres wide. The section connecting the EB coal stockpiles to Perry Creek Haul Road will be built to serve the coal haul. This section is within the existing coal licences, and will be permitted as part of the Mine Permit Amendment. An existing bridge across the south-flowing tributary of Perry Creek will be replaced to accommodate equipment transfer from Perry Creek Mine, as well as allowing movement of coal haul trucks.

- **Segment B-C – Perry Creek Haul Road**: 5.6 kilometre section of Perry Creek Road which will be widened from current nominal 5 metres to 12 metres running surface to accommodate equipment movement from Perry Creek Pit and for subsequent coal haul. This section is outside of Conuma’s mine lease or license area and the road upgrade will be conducted under a Special Use Permit, an application for which will be included in the integrated permit application. An existing bridge across Perry Creek will be replaced to accommodate coal haul trucks and equipment transfer from Perry Creek Mine. Existing culvert crossings will be extended and upgraded as required.

- **Segment C-D – Perry Creek Haul Road**: 2.7 kilometre section of Perry Creek Road within the Perry Creek Mine License area, up to the gate of the existing Perry Creek Mine. This segment will be upgraded as for segment B-C, and will be permitted under the Mine Permit Amendment. Existing culvert crossings will be extended and upgraded as required.

- **Segment D-E – Perry Creek Pit Road**: 7 kilometres of Perry Creek Pit's in-pit haul roads will be maintained for the final leg of the coal haul from EB Mine to the Wolverine Plant. This section of the haul route is already permitted under Mine Permit C-223.

10.2.6 Clean coal shipment

Approximately 2 million tonnes of clean coal per year will be shipped by rail from the Wolverine Mine loadout to the Ridley marine port facilities in Prince Rupert. Conuma has a long term throughput agreement with Ridley Terminals, including shipment of coal from EB Mine. Coal from EB Mine will replace coal from Perry Creek Mine, which is currently being shipped from Ridley. No modifications to marine shipping arrangements are required for the EB Mine project.

10.3 Reclamation and closure

Reclamation of EB Mine will be progressive, following resloping of areas no longer scheduled for use.

10.3.1 Disturbance footprint

The EB Mine Project’s North and South pits, waste dumps, facilities and associated infrastructure will
have a disturbance footprint at end of mine (at full buildout) of 581 hectares, including a total pit area of 199 hectares and a total ex-pit dump area of 232 hectares. The remaining area includes the facilities site and coal stockpiles, water management structures, including two sediment ponds and ditching, access roads, and soil stockpiles. A substantial area of the pits will be backfilled by end of mine, leaving 26.1 hectares of exposed pit highwalls at closure.

10.3.2 Reclamation objectives

A Reclamation Plan will be prepared, identifying proposed target end land-use and capability objectives, and the planned means of achieving these, beginning at the construction stage and continuing throughout mine life to site closure and post-closure. A key element of reclamation planning will be the participation of First Nations in identifying the end land-use objectives and planning related reclamation prescriptions.

The reclamation plan will emphasize use and establishment of pre-disturbance vegetation species and traditional use species where possible. Effects on caribou habitat will be mitigated through innovative research into lichen propagation on reclaimed land, minimizing the attraction of other wildlife that would in turn attract predators into the area, and avoiding creation of movement corridors for predators into core caribou habitat.

Plate 10-1: Propagation of Northern Willows for reclamation at Wolverine Mine

The Reclamation Plan will provide information to demonstrate that EB Mine reclamation is being planned in a manner that will enable Conuma to meet the reclamation standards specified in the Health, Safety and Reclamation Code for Mines in British Columbia (the HSR Code). Facility design standards described in HSR Code Part 10, and other relevant sections, will be addressed in the Mine Plan and Water Management Plan sections of the integrated permit amendment application.

Key components of the Reclamation Plan will include:
• a soil management plan that describes soil characteristics and suitability for use in reclamation based on a pre-development soil survey, and which presents a soils handling balance and sequential plans for soil salvage, storage and replacement;
• a conceptual final reclamation plan describing end land-use and capability objectives, treatment of structures and equipment at closure, plans to achieve long-term site stability, revegetation methods, reclamation prescriptions for site features, and operational and post-closure monitoring;
• a detailed 5 year plan that presents reclamation measures to be implemented during the construction period and each of the first five years of mine life;
• reclamation cost estimates; and
• a proposed reclamation research program.

Reclamation planning for the EB Mine is central to preventing long term adverse environmental effects. As above, the plan will also be directed towards achieving compliance with the HSR Code.

10.3.3 Projected end land use

The EB Mine project conceptual reclamation plan will be designed to create wildlife habitat within self-sustaining ecosystems. The end land-use objective of wildlife habitat will fit within the HSR Code requirement for creating stable landforms. Project design features that facilitate reclamation (e.g. waste dump design) and additional measures implemented during construction and operations to protect water (e.g., clean water diversions) and conserve soil resources (salvage and storage) will create conditions such that at final reclamation, the landscape can be revegetated and will be capable of supporting the end land use objective. The wildlife habitat end land use objective for EB Mine reclamation also incorporates land capability targets based on existing land capabilities of the EB Mine project site for:
• wildlife habitat;
• forest production;
• Aboriginal peoples' land use; and
• existing land management designations and land use (e.g., Ungulate Winter Range [UWR U-9-002], and/or caribou habitat).

10.4 Project emissions and wastes

10.4.1 Air emissions sources

As noted in Section 8.5 of this document, an air permit amendment will be required to address air emissions at the EB Mine. Sources of air emissions include topsoil stripping and stockpiling, blasting, drilling of overburden, overburden bulldozing, coal handling, ROM coal stockpile erosion grading, coal haulage on pit roads and Perry Creek Haul Road, vehicle emissions, and operation of diesel-driven equipment. Electrical power will be provided by onsite diesel-powered generators. Emissions related to these sources include dustfall (fugitive crustal dust as well as coal dust), nitrogen oxides (NOx) and sulphur dioxide (SO2). Emissions associated with coal handling and processing at the Wolverine Plant are addressed by the existing air permit.

10.4.2 Effluent / water discharge sources

Non-contact water will be intercepted by perimeter ditches, situated upslope from EB Mine's highwalls. Contact water will be collected within the mine, and diverted to two sedimentation ponds (the North Pond and the South Pond, as shown in Figure 10-1). The ponds will capture runoff and shallow seepage from
the project disturbance footprint and provide retention for settlement of suspended solids.

Ditches and ponds at EB Mine will be new construction, inasmuch as the minesite has not previously been the source of coal production other than small quantities of coal taken as bulk samples from exploratory adits. A permit-level design has been completed for water management infrastructure, including ditches and the two ponds (Golder Associates, 2015b).

An effluent permit amendment (to the existing PE-17756) will be required for water discharges from EB Mine's sedimentation ponds. Pond discharges are expected to have elevated constituents associated with runoff from pit faces, and with drainage from waste rock dumps and coal stockpiles, in particular selenium, sulphate and nitrates. Effluents associated with water and tailings management at Perry Creek Mine and Wolverine Plant site have already been addressed by the existing permit.

10.4.3 Waste management

Waste rock will form the majority of EB Mine's solid waste, to be addressed by the design of waste rock dumps and associated ML/ARD and water management plans, as part of the Mine Permit amendment. Other solid wastes (packaging, maintenance waste, domestic garbage) will be addressed by the existing Waste Management Plan and procedures already established for Wolverine Mine. Food wastes will be minimal on site, but any such wastes will be handled in accordance with requirements of a site-specific Wildlife Management Plan to avoid wildlife attractants.

Hazardous wastes include waste from equipment maintenance (such as waste oil, or oily rags) or potential wastes associated with fuel spills or maintenance chemicals. Conuma will tailor the existing Wolverine Mine Fuel Management Plan and the corresponding Chemical and Materials Handling Plan to the site-specific circumstances of the EB minesite, as required to prevent spills and to detail spill response and waste disposal procedures.

11 SOCIO-ECONOMICS

Northeastern British Columbia has seen robust economic conditions for much of the past decade, fuelled by the energy and mining sectors. The labour market has at times been tight, with the region typically having the lowest unemployment rates in the province. Declining commodity prices slowed growth between 2013 and 2016, with commencement of mining operations remaining dependent on global commodity pricing.

General economic conditions within British Columbia are expected to support sustained or modest economic growth in the Northeast of the province (Pastrick et al., 2012). The Wolverine Mine (including both Perry Creek Mine and the proposed EB Mine) is well-positioned to continue to supply coal to global markets using existing processing facilities, infrastructure and equipment. With the projected completion of Perry Creek Mine in 2020, the proposed construction of the EB Mine project will provide the opportunity for continued employment in the area, and also ongoing opportunities for First Nations and private contractors in the region. Work will include decommissioning and reclamation of the Perry Creek Mine, and work related to construction, operation, decommissioning and reclamation of EB Mine.

11.1 Workforce

There will be substantial numbers of contractor-employed and independent trade workers required, providing employment opportunities for over 100 workers to assist in development during the construction seasons from the autumn of 2018 through the autumn of 2019. Contracting opportunities are
likely to include site preparation and construction of EB Mine site infrastructure, upgrade of the Perry Creek Road and transport of new and existing mining equipment to the site. These tasks need to be completed before significant snowfall and no later than the end of October 2019, to ensure uninterrupted employment within the Wolverine mining complex.

During the production phase, workforce requirements will be stable at EB Mine. As is customary within the Canadian coal-mining industry, EB Mine will be organized as a year-round 24 hour/day operation. The majority of the workforce will be transported to EB Mine by buses coming from Tumbler Ridge. The workforce required at EB Mine for full production is estimated to be the same as at the existing operation at Perry Creek Mine. Additional contractor support will likely be required for trucking of ROM coal from EB Mine to the Wolverine Plant.

11.2 Socio-economic benefits

The major economic benefits of this project will be in the Tumbler Ridge area where the majority of employees have been based, providing opportunities for additional employment as the Perry Creek Mine is completed. Development of EB Mine will also provide ongoing opportunities for First Nations and private construction and supply contractors in Northeastern British Columbia. Increased use of the rail line from Wolverine to the West Coast, and of the port facilities at Ridley Terminals, will generate economic benefits within the transportation industry. This project will be a significant contributor to the economic health of northern British Columbia.

11.3 Capital and operating costs

The estimated capital requirement for EB Mine is $169 million (Norwest, 2017). This capital expenditure will be for the initial preparation of the minesite, construction of the minesite infrastructure, and the Perry Creek Road and bridge upgrades. Additionally, the ongoing operation of the EB Mine will require the transport of the existing equipment from Perry Creek Mine to EB, as well as the ongoing maintenance and replacement of equipment as required to produce coal.

The expected annual capital expenditure, associated with the replacement of capital equipment, is estimated to average $18.8 million/year over the nine year life of the mine. Site operating costs to operate and maintain EB Mine (comprising items such as explosives, labour, diesel fuel, maintenance, and waste handling) are forecast to be $11.68/BCM, reflecting the experienced workforce of the Wolverine Project. Off-site operating costs (comprising items such as truck haulage to the Wolverine Plant, processing and handling of the coal, transportation to Ridley, and general and administrative expenses) are forecast to be $52.73/tonne, considered to be consistent with other operations in Western Canada.

11.4 Taxes

Conuma will comply with all applicable federal and provincial tax codes as required by law.

11.5 Local services

Apart from upgrading of the Perry Creek Road for coal haulage, no additional services or infrastructure is required for the project to proceed.
12 ENVIRONMENTAL BASELINE ASSESSMENT AND MANAGEMENT

Environmental baseline studies and a comprehensive EA for EB Mine were completed for the 2004 EA Certificate Application, including supplemental caribou studies which were conducted as required by EA commitments. Various monitoring programs were implemented, post-EA, to expand the EB baseline data, and as required by operational permits for Perry Creek Mine. Environmental studies were also conducted at EB in 2007 and 2011 to support EB project design and planning at those times. Additional studies were conducted from 2012 to 2015, in support of the upcoming integrated amendment application for amendments to the Wolverine Coal Project’s mine, air, and effluent (waste discharge) permits.

An overview of environmental conditions and baseline data is provided below, along with information on related environmental management plans which shall form components of the integrated amendment application.

12.1 Climate, weather, and meteorology

As noted in Section 6, the EB Mine area is located in the eastern Rocky Mountains, at elevations ranging from approximately 1,400 to 1,900 metres above sea level. Mean daily temperatures range from 11°C in summer to -11°C in winter with the coldest conditions (down to -30°C or below) typically occurring in January and February. The estimated annual precipitation is 1,370 millimetres, and there can be significant snow accumulation in winter. The prevailing winds at the EB site are from the west or west-southwest. Effects of weather on the project include effects of precipitation on runoff, site water balance, and receiving water flows and water quality, effects on the dispersion and deposition of air emissions from project sources, and effect of winter snow accumulation and spring break-up on operations. Site-specific and regional precipitation and flow data will be incorporated in an updated hydrologic assessment of the EB Mine and development of a site water balance and water management plan.

The primary air quality concern at EB is fugitive dust and coal dust from mining, coal stockpiling and coal haul activities. Information on prevailing winds will be incorporated in the dispersion modelling technical report for the EB Project.

A recording precipitation gauge was installed at the proposed EB minesite in 2007. The EB meteorological station was damaged in 2010, and repaired in the spring of 2011; data are therefore only available for 2011 and 2012.

Maintenance of the site has been hampered by access and wildlife damage; however, a new meteorological station was installed in the spring of 2014. Ongoing exploration and field programs at EB have improved site access, such that the EB meteorological station is now more readily accessible, easing the checking and maintenance of the station. Snow pack data were collected at EB in March 2006, and a snow gauge was installed in 2010. The EB meteorological station was damaged, apparently by a high wind event or a severe icing event, at some time prior to the late summer of 2017.

Another meteorological station, located near the Wolverine coal preparation plant, measures temperature, wind speed and direction, and rainfall. Available data from the Wolverine station, and from regional meteorological stations (e.g., Tumbler Ridge, Quintette Mine, and Chetwynd) are also being used to characterize local climate and meteorological conditions. The approach to the development of the dispersion meteorology and subsequent dispersion modelling will be confirmed with MoE in advance of modelling.

The air quality and hydrological assessments, to be provided in the Technical Assessment Report for the air permit and mine permit amendment applications, will include recommendations for...
meteorological monitoring to support ongoing assessment and management of EB Mine project effects.

12.2 Surface hydrology and groundwater

Surface hydrology and groundwater assessments are important for developing a representative water balance for the project, for supporting development of the site Water Management Plan (Section 12.2.3), for determining project effects on flows and water quality loadings from various mine area features, and for establishing a baseline by which to monitor future project effects. The focus of the current work is to:

- consolidate and expand the baseline data;
- calibrate project area hydrographs with site specific data;
- confirm and clarify assumptions for groundwater flows; and with this information,
- develop the site water balance for the current mine plan.

12.2.1 Surface hydrology

The EB Mine project area is located entirely within the upper Perry Creek watershed. The creek's catchment is approximately 62 square kilometres and its length is approximately 17 kilometres, debouching into Wolverine River, which in turn has a catchment of approximately 357 square kilometres at its confluence with Perry Creek. Perry Creek Mine intersects a number of small tributary drainages of Wolverine River west of Perry Creek. The easterly extents of the North and East Dumps at Perry Creek Mine extend into the lower Perry Creek watershed.

Since the original EA was submitted, a record of Perry Creek flows have been collected during the open water periods from 2007 to 2013, with a continuous flow monitor at site PC 1 (Figure 12-1). Hydrographs developed for Perry Creek using regional hydrology data have been compared with Perry Creek flow monitoring data and good correlations were found. Flows simulated from rainfall and snowpack data also correlate well with measured flows.

Updated hydrology and climate data will be analysed and incorporated in the site water balance to predict seasonal average, wet and dry years and seven day 1:10 year low (7Q10) flows from various components of the EB Mine site at full development and at post closure. The water balance flows will be incorporated in the water quality model to characterize loadings of water quality constituents from various mine areas to receiving waters.

In order to update the combined effects of EB Mine and Perry Creek Mine on lower Perry Creek and the Wolverine River, the water quality modelling assumptions for Perry Creek Mine, including those related to the water balance, will be reviewed and updated as appropriate to reflect the currently approved operation. Operational monitoring data from the Perry Creek Mine will be compared to flow predictions based on the Wolverine 3 Mt/a application and subsequent updates, and water quality predictions for the Perry Creek Mine area will be updated as appropriate.

12.2.2 Groundwater

In 2013, the EB Mine groundwater monitoring network was expanded to reflect the expanded mine footprint area in the southern EB trend area (Figure 12-2). Four hydrological wells were added to the existing network of five hydrological wells in the EB area. The purpose of these wells is to:

- refine predictions for shallow and deep groundwater flows and redox potential for selenium attenuation;
- increase understanding of baseline groundwater quality for operational monitoring; and
update and confirm the groundwater components of site water balance.

Findings of the monitoring program will be included in the integrated permit application, and incorporated as appropriate in the updated water balance.

12.2.3 Water management plan (WMP)

Surface water management will include ditching and sedimentation ponds to ensure water quality objectives are achieved. Perry Creek will be the receiving body of water for the EB Mine Project.

Clean (non-contact) water will be intercepted and routed around disturbed areas, whereas mine run-off (contact water) will be collected and directed to ponds for settlement of sediment prior to release to Perry Creek. Two ponds (the North Pond and the South Pond -- see Figure 10.1) will be situated to the north and the south, respectively, of Perry Creek. The ponds will be sized to provide adequate settlement of 1:10 year flood flows with spillways designed to pass the 1:200 year flood.

The WMP will include consideration of requirements for managing site drainage quality in general and for protecting aquatic health in receiving streams (Section 12.3). Field investigations in support of water management design include geotechnical investigations and test pits for waste dumps and water management structures located on:

- the north side of Perry Creek, (investigated from 2001 to 2007 and in 2013); and
- the expanded mine footprint south of Perry Creek (investigated in 2013).

The WMP will be supported by permit-level designs for ditches and ponds (Golder, 2015b). Interim water management measures for project construction will also be developed and provided.

12.3 Water quality and sediment quality

The focus of the water and sediment quality studies will be to update the water quality effects assessment for EB Mine and the EB/Perry Creek mines combined.

Baseline water quality and sediment data were collected during the 2004 EA and ongoing sampling has been conducted in accordance with EA Certificate commitments and permit monitoring requirements for Wolverine Mine (Figure 12-1). Additional baseline data have been gathered in the EB Mine area to enhance baseline data in relation to EB Mine plans developed in 2007, 2011 and 2013 (Figure 12-2).

Water quality conditions in Perry Creek are generally typical of Rocky Mountain streams unaffected by development activities. Water quality data from Perry Creek show little evidence of mine-related influence with the exception of nitrate which is slightly elevated downstream from where East Dump seepage enters Perry Creek. Water quality data for Wolverine River indicate that water quality upstream of the Perry Creek Mine is influenced by inputs from Quintette Mine, with increases in the concentrations of sulphate, selenium and nitrate. The data also suggest that the Perry Creek Mine is having a smaller, though measureable, effect on nitrate, sulphate, and selenium concentrations in Wolverine River.

Water quality predictions for Perry Creek and the Wolverine River will be developed based on the current EB Mine design and predicted end-of-mine conditions for current Perry Creek Mine operations. The assessment will focus on parameters of concern associated with coal mining including, selenium, sulphate, nitrogen compounds and other trace metals/metalloids.

Baseline data for upper Perry Creek will be compiled and used in the water quality predictive model to predict effects of the EB Mine on Perry Creek. Monitoring data in lower Perry Creek and the
Wolverine River will be analysed and applied to a review and update of water quality predictions for the combined effects of EB and Perry Creek mines on lower Perry Creek and the Wolverine River. An updated assessment of the cumulative effects of Wolverine Mine (including EB and Perry Creek mines) and other projects (e.g., the Quintette Mine) will also be provided. Updated water quality predictions and the cumulative effects assessment will incorporate and consider:

- improved detection limits for many parameters;
- ML/ARD source term updates for both EB and Perry Creek mines;
- updates to the EB and Perry Creek mine water balances (Section 12.1);
- mitigation measures incorporated in mine and water management plans;
- current water quality data for the Wolverine and Murray Rivers, reflecting cumulative water quality effects of operating projects to date; and
- water quality predictions (where available) for other projects in the Wolverine and Murray River basins that could interact with effects of the Wolverine Mine.

Available data for aquatic resources in Perry Creek (Section 12.4) will be considered in a risk-based approach to derive science based environmental benchmarks (SBEB) to protect aquatic health in EB Mine area receiving waters. These SBEBs will drive water quality predictions and design of mitigation measures to arrive at a satisfactory mine WMP (Section 12.2.1) and Selenium Management Plan, (Section 12.3.1) that will protect aquatic health in the mine area. The water quality effects assessment will be included in the Technical Assessment Report for the Effluent Permit Amendment.

### 12.3.1 Selenium Management Plan (SeMP)

Selenium is of particular concern regarding metal leaching from most of the coal-bearing formations in British Columbia. A SeMP for EB Mine, developed in consultation with MoE, will summarise and compile all available site data and current knowledge related to selenium leaching and selenium's effects on ecosystems, as well as water quality predictions for EB Mine. The plan will detail Conuma’s commitments to selenium management throughout the life of the mine.

These commitments will include an adaptive management framework for monitoring, with identified thresholds for selenium concentrations in the receiving environment that will trigger adaptive responses to prevent unacceptable selenium loadings from the EB Mine to the environment. Such responses will include additional monitoring to clarify risks, possible research to better understand causes and effects, additional mitigation measures that may be invoked if required, and contingency measures that can be invoked if identified mitigations do not achieve desired outcomes. Development of the SeMP will draw on current experience and research (Lorax, 2013) into management approaches at Brule Mine in Northeastern British Columbia. Aspects include research into attenuation mechanisms (e.g., saturated backfill, sequestration of selenium using PAG material) and pilot-scale selenium treatment studies. Selenium management approaches for the EB Mine will be informed by this experience.

### 12.4 Aquatic health

The 2004 EA characterized baseline conditions for aquatic resources in Perry Creek (PC-2 and PC-3; Figure 12-1) in terms of, benthic invertebrate and periphyton community structure and abundance. Additional benthic community baseline data was collected in 2005, 2006, 2008 and 2010 and 2012 under baseline and operational conditions for the Wolverine Mine. These data form the pre-development baseline for the proposed EB Mine.
Long-term monitoring of selenium in benthic invertebrate and fish (slimy sculpin) tissues has been conducted in lower Perry Creek and the Wolverine River in fall, at a minimum of every two years between 2004 and 2013, as part of the Wolverine Mine Environmental Effects Monitoring (EEM) program. Sampling of juvenile bull trout tissue in lower Perry Creek has been conducted less frequently (autumn 2004, 2011 and 2013) than sampling of sculpin. The long-term fish tissue monitoring program was expanded in 2013 to include additional sampling locations for juvenile bull trout, *(i.e., a reference tributary and an upstream station)* in the headwaters of the Wolverine River. The autumnal fish tissue data collected by Walter Energy were supplemented with the inclusion of spring fish tissue data (sculpin, bull trout) and fish egg data collected by Teck Resources Limited. These data were obtained through a data sharing agreement between the two companies. Metals and metalloids, other than selenium, have also been typically analysed in the collected tissue samples, with data having been presented within the corresponding monitoring reports.

Furthermore, various studies related to potential selenium bioaccumulation have been conducted in the Wolverine River floodplain, including sampling of macrophyte 'super accumulators', and analysis of egg tissue concentrations in sandpipers and red-winged blackbirds. Relevant baseline data will be compiled, summarised, and interpreted in terms of assessing the sensitivity of the receiving aquatic environment to potential project effects. As noted above, tissue concentrations and associated water concentrations will be considered in the development of appropriate selenium SBEBs for EB Mine's receiving environment, as part of the aquatic health assessment. The proposed SBEBs will inform mitigation planning and an adaptive management framework for selenium management.

### 12.5  Fish and fish habitat

The lower 6.9 km section of Perry Creek, below the bedrock barrier, is accessible to fish from the adjacent Wolverine River *(Figure 12-1)*. This reach supports a low number of resident bull trout and resident slimy sculpin, with seasonal use by juvenile mountain whitefish, arctic grayling and migratory bull trout. Some migratory bull trout may overwinter in the creek. No bull trout fish spawning or spawning redds have been observed in Perry Creek. Upstream of the bedrock barrier, fisheries assessments done in 1998 *(Down, 1998)* and 1999 *(Hatfield, 2000)* confirm the absence of resident fish populations. All Perry Creek tributaries are classified as non-fish bearing due to ephemeral discharge, high stream gradients, and no fish captures.

In terms of potential exposure of fish to elevated selenium levels in lower Perry Creek and possible bioaccumulation, resident slimy sculpin and bull trout are the populations of potential concern. Fish tissue data together with water quality predictions will provide a basis for predicting and monitoring potential project effects.

The footprint of the EB Mine development will not result in direct effects on fish habitat. The proposed improvements to Perry Creek Road for coal haulage purposes are all well upstream of fish habitat in Perry Creek and will follow DFO measures to avoid harm *(e.g., isolation of instream work areas, sediment control and, riparian habitat protection)*, as appropriate to avoid effects on downstream fish and fish habitat. The upcoming integrated permit application will describe fish habitat and fish distribution and it will also describe the mitigation measures that will be used to avoid impacts on fish and fish habitat. The environmental assessment update for fisheries will describe potential project effects based on the assessment of potential effects on water quality, aquatic resources and instream flows.
Regional groundwater and surface water monitoring stations: Figure 12-1
EB Mine area groundwater and surface water monitoring stations: Figure 12-2.
12.6 Soils and terrain

Terrain mapping was completed for the 2004 EA and included a characterization of the surficial geology, geomorphological processes, and general soil map units in the EB Mine area. Soils in the EB Mine area were characterized for reclamation planning and the bioterrain component of Terrestrial Ecosystem Mapping (TEM) for the 2004 EA.

Map coverage has been expanded to include the expanded footprint area and a buffer zone established for assessing indirect effects of the project on habitat. The project footprint has increased since the original 2004 application and the study area for TEM, baseline soil map units (SMUs), terrain stability, and soil erosion potential mapping, to address the larger disturbance footprint and buffer zone.

Soils have been sampled and characterized within this expanded area as required for soil management and reclamation permitting and permit requirements for vegetation trace element data collection for TEM (see Section 12.7). Soil samples have been tested for trace elements and baseline metal concentrations. The compiled baseline data and an updated assessment of project effects on terrain and soils, including an updated soil management section for the reclamation plan (Section 10.3), will be provided in the Mine Permit amendment application. In addition to soils mapping for ecological mapping and reclamation planning purposes, geotechnical investigations have been carried out for design of waste rock dump foundations, pit walls and water management structures, including pond dams. This information will be detailed in project design reports.

12.7 Vegetation

As noted in Section 6, the EB Mine project lies within three upper-elevation biogeoclimatic zones:

- Boreal Altai Fescue Alpine Undifferentiated (BAFAun) zone;
- Engelmann Spruce Subalpine Fir Bullmoose Moist Very Cold variant (ESSFmv2) of the Engelmann Spruce Subalpine Fir zone (ESSF); and
- Engelmann Spruce Subalpine Fir Bullmoose Moist Very Cold Parkland variant (ESSFmvp2) of the Engelmann Spruce Subalpine Fir zone (ESSF).

The Boreal Altai Fescue Alpine Undifferentiated (BAFAun) zone is found at the highest elevations in the project area, above 1,800 meters above sea level. MacKenzie (2006) describes the harsh alpine climate of this zone as being cold, windy, and snowy with low growing season temperatures and a very short frost-free period. Mean annual precipitation varies between 700 and 3000 millimetres, 70% to 80% of which falls as snow. By definition, 'alpine' is described as being treeless. The BAFAun zone is dominated by rock, talus slopes, boulder fields, and sparsely to well-vegetated morainal and colluvial materials. Vegetation consists of heaths and other dwarf shrubs, graminoids (grasses, sedges and woodrushes), mosses, lichens and sporadic trees in krummholz form.

The Engelmann Spruce Subalpine Fir zone (ESSF) is represented by two climatic variants, the Engelmann Spruce Subalpine Fir Bullmoose Moist Very Cold variant (ESSFmv2), and the Engelmann Spruce Subalpine Fir Bullmoose Moist Very Cold Parkland variant (ESSFmvp2):

Much of the EB Mine falls within the Engelmann Spruce Subalpine Fir Bullmoose Moist Very Cold Variant (ESSFmv2), ranging from 1,000 to 1,400 metres above sea level in elevation. Forest stands are dominated by Engelmann spruce and subalpine fir forests. Lodgepole pine occurs on dry sites and black spruce may occur on wet sites. White-flowered rhododendron, black huckleberry, and black gooseberry are common in the shrub understory (Meidinger and Pajar 1991).
Plate 12-1: Alpine wetland west of EB Mine project site

The Engelmann Spruce Subalpine Fir Bullmoose Moist Very Cold Parkland variant (ESSFmvp2) occurs between the ESSFmv2 and BAFAn, ranging from ca.1400 to 1800 metres above sea level in elevation. Vegetation in this subzone transitions with increasing elevation, from open canopy parkland forest to patches of parkland forest interspersed with expanses of non-forested ecosystems. Subalpine fir is the dominant tree species in the parkland forest. White-flowered rhododendron, black huckleberry, scrub birch, crowberry, and mountain heathers are common in the understory. Herbs and grasses such as mountain arnica, Sitka valerian, subalpine daisy, pussytoes, Altai fescue, and woodrushes are common in the herb layer.

The vegetation assessment is important in characterizing biodiversity in the project area, including identification of listed plant species and associations, characterizing wildlife habitat, understanding traditional use value of the area, and developing suitable reclamation plans.

Characterization of baseline vegetation conditions and an effects assessment were conducted as part of the 2004 EA. Further field work was conducted over a period of several years to support the Mines Act Permit Amendment. In 2007, the following studies were conducted in and around the current-proposed EB Mine development footprint:

- survey plots to update the terrestrial ecosystem mapping (TEM) for the larger project footprint;
• additional surveying for listed plant species and ecological communities; and
• targeted surveys of wetlands and riparian areas, rare plants, rare ecosystems and old forest potentially affected by the larger project footprint.

Additional fieldwork was undertaken in September 2011 and 2013 to extend the TEM coverage and to support reclamation planning (e.g., soils and vegetation sampling for metals), with a focus on traditional use and wildlife forage plants. The TEM coverage has been increased to include the expanded footprint and a 500 metre buffer around the EB Mine footprint, as a basis for assessment of potential indirect effects on vegetation resources. Additional studies may be conducted based on feedback from First Nations.

Plate 12-2: Moss Campion (*Silene acaulis*) in bloom at EB minesite.

The vegetation EA update will compile and analyse additional data gathered since the 2004 EA Certificate Application to refine the effects assessment for multiple vegetation components (e.g., old forest, wetlands, riparian ecosystems, alpine and parkland ecosystems, rare plants and ecosystems) and to make residual and cumulative effects predictions for the current mine plan.
12.7.1 Vegetation / Environmentally Sensitive Areas

Based on the British Columbia CDC database for rare vascular and non-vascular plant species known to occur in the ESSF and BAFA zones of the Peace Forest District, there are 41 red and blue listed species with the potential to occur in the EB Mine area. Based on a search of the federal SARA for rare vascular and non-vascular plants in the Peace Forest District, none of the plant species identified in the project area are federally listed rare plant species. A search of the British Columbia CDC database for provincially-listed ecological communities known to occur in the ESSF and BAFA zones of the Peace Forest District resulted in identification of the following two blue-listed ecological communities:

- Subalpine fir – Alder – Horsetail or ESSFmv2/06 site series; and
- Scrub birch – Water sedge or ESSFmv2/Wf02 wetland community.

The Subalpine fir – Alder – Horsetail community (FH) was identified and mapped at several locations in the project area and typically occurs in riparian areas along Perry Creek and its tributaries. Riparian setbacks and surveys of proposed stream crossing sites will minimize impacts on this community. In addition to the listed plants and plant associations above, the following sensitive vegetation types were identified within the EB Mine disturbance footprint:

- a small area of wetland ecosystems, including sedge-dwarf willow, sedge fen and willow-sedge fen ecosystems; and
- three types of riparian ecosystems, including subalpine fir-alder-horsetail, willow-herb-horsetail and subalpine fir-rhododendron-willow ecosystems.

12.8 Wildlife

Wildlife in the project area represents the biodiversity and overall ecological health of the area and has cultural and socio-economic importance to Aboriginal peoples and other local stakeholders. Wildlife is of specific management concern to regulators. Fifty-five wildlife species have been documented in the EB Mine area. Among these species, grizzly bear and woodland caribou are the species of highest conservation concern at the provincial and federal levels and to First Nations. Most caribou observations were associated with the alpine, but tracks were also documented at lower elevations. Grizzly bear sign was recorded throughout the project area. Moose were widely noted at lower elevation sites, while mountain goat sign was predominantly in the alpine. Other mammal species include marten, black bear, deer, elk, grey wolf, Canada lynx, porcupine, red fox, and red squirrel. A number of birds have been recorded including golden eagle, spruce grouse, merlin, and white-tailed ptarmigan.

Using current species status and distribution information, the list of key wildlife indicator species was defined to focus the assessment of project effects on wildlife (Table 12-1). Criteria used to select the wildlife key indicators include:

- presence within the project area;
- status as provincially Red/Blue-listed, SARA-federally listed and/or regionally-important wildlife species (see additional information on species at risk in Section 12.9);
- availability of sufficient information on natural history and habitat requirements to use for the basis of assessments for individual species or groups; and
- interest and/or concern expressed by federal and provincial wildlife authorities and with First Nations/aboriginal representatives.

In addition to specific species and wildlife groups, important wildlife habitat features such as mineral licks, large stick nests, and grizzly bear dens are considered in this update.

Characterization of baseline wildlife conditions and an effects assessment were conducted as part
of the 2004 EA. Further field work was conducted in 2007 in and around the currently-proposed EB Mine footprint. This work consisted of:

- wildlife transects to document evidence of habitat use;
- evaluation of wildlife habitat value for key species, particularly grizzly bear and caribou; and
- a breeding bird survey.

### Table 12-1: Key indicator species for EB Mine wildlife assessment

<table>
<thead>
<tr>
<th>Species</th>
<th>Status</th>
<th>Habitat requirements</th>
<th>Likelihood of occurrence in EB Mine area</th>
<th>Cultural significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northern caribou</td>
<td>BC: Blue Federal: Threatened (Schedule 1; SARA)</td>
<td>Alpine and high elevation forest with lichen (BAFA, ESSF)</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Mountain goat</td>
<td>BC: Yellow Federal: n/a</td>
<td>Alpine and parkland (BAFA, ESSF)</td>
<td>Moderate</td>
<td>High</td>
</tr>
<tr>
<td>Moose</td>
<td>BC: Yellow Federal: n/a</td>
<td>Early-seral stands, wetlands</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Grizzly bear</td>
<td>BC: Blue Federal: Special Concern (COSEWIC)</td>
<td>Berry-producing shrubs, herbs in spring</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Wolverine</td>
<td>BC: Blue Federal: Special Concern (COSEWIC)</td>
<td>Ungulate winter kill; undisturbed forest</td>
<td>Moderate</td>
<td>High</td>
</tr>
<tr>
<td>Marten</td>
<td>BC: Yellow Federal: n/a</td>
<td>Mature or old coniferous forest</td>
<td>Moderate</td>
<td>High</td>
</tr>
<tr>
<td>Hoary marmot</td>
<td>BC: Yellow Federal: n/a</td>
<td>Alpine and open parkland</td>
<td>High</td>
<td>High (noted in discussions with First Nations)</td>
</tr>
<tr>
<td>Rusty Blackbird</td>
<td>BC: Blue Federal: Special Concern (Schedule 1; SARA)</td>
<td>Shrubby wetlands in coniferous forest</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Olive-sided Flycatcher</td>
<td>BC: Blue Federal: Threatened (Schedule 1; SARA)</td>
<td>Edges of mature and old-growth coniferous and mixed wood</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Harlequin Duck</td>
<td>BC: Yellow Federal: n/a</td>
<td>Fast-flowing streams and rivers</td>
<td>Low (but potential downstream exposure pathway via water quality effects)</td>
<td>Low</td>
</tr>
<tr>
<td>Other water birds and waterfowl</td>
<td>Variable</td>
<td>Watercourses, water bodies and wetlands</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Amphibians and reptiles</td>
<td>Variable Western Toad - BC: Yellow Federal: Special Concern (Schedule 1; SARA)</td>
<td>Water bodies and wetlands</td>
<td>High</td>
<td>Low</td>
</tr>
</tbody>
</table>

As described above for vegetation, additional TEM surveys were undertaken in September 2011 and 2013 to extend the TEM coverage and developed a more detailed map of the habitat for caribou and other wildlife that may be affected by disturbance from the mine area. A wildlife biologist accompanied the TEM team and collected information on baseline wildlife habitat values, location and characteristics of trails and other important habitat features (e.g., key habitats, movement corridors, mineral licks);
presence of habitat for fall staging waterfowl, and identification of sites that could be used to monitor the effect of the mine on wildlife activity. A winter wildlife snow track survey was conducted in February 2014. Additional traditional ecological knowledge data may be collected based on consultation with First Nations.

The wildlife EA update will compile and analyse additional data gathered since the 2004 EA Certificate Application to refine the effects assessment for a broad spectrum of focal species including those closely associated with alpine and subalpine habitats (e.g., caribou, grizzly bear) and others of conservation, socio-economic, and cultural importance (e.g., moose, furbearers, migratory birds, listed species). The wildlife EA update will also predict the residual and cumulative effects of the current mine plan, after considering the effects of mitigations that will be implemented.

Indirect effects (e.g., sensory disturbance) of the project have the potential to affect wildlife habitat use. The integrated application will provide an assessment of both direct and indirect project effects on wildlife and habitat. To better understand the potential indirect effects on caribou and other wildlife in the area surrounding the mine, an assessment of noise disturbance will be conducted (Section 12.10). An assessment of the cumulative effects of the project on wildlife will also be completed, with a particular focus on caribou and caribou habitat.

The proposed EB Mine falls within designated core caribou habitat as delineated by the provincial government (Figure 12-3) and ungulate winter range mapping (UWR-9-0002)(Figure 12-4), with 150 telemetry points having been observed within the footprint and buffer zone of the EB. A key focus of the wildlife EA update is to further assess effects of EB Mine development on caribou core habitat.

Conuma contributes to long-term caribou telemetry monitoring of the Quintette herd, in accordance with EA commitments. There is now a substantive database describing caribou seasonal habitat use and movements in the vicinity of EB Mine that will be used to assist in understanding potential project effects, developing protection plans and mitigating impacts. The telemetry collar data from the Quintette herd have been used to estimate a Resource Selection Function (RSF) habitat suitability model (Williamson-Ehlers, Johnson, and Seip, 2013; Johnson, Ehlers, and Seip, 2015). This RSF model will be applied to produce an accurate estimate of the effects of the project on caribou habitat and contribute to a comprehensive assessment of effects on the Quintette caribou herd.

A multi-year lichen exclosure study has been conducted by Walter Energy within the Quintette caribou herd’s range, including plots on Mt. Spieker (in the vicinity of EB Mine) and Bullmoose Mountain. Over time, the study may provide information relevant to understanding spatial patterns in caribou habitat use as observed with telemetry.

Walter Energy contributed to a maternal caribou penning study led by West Moberly and Saulteau First Nations in the Klinse-za caribou herd range. This project was conducted in partnership with Wildlife Informetrics Inc. and West Fraser. It represented implementation of an emergency measure recommended in a recovery plan for the Klinse-Za herd, which was developed by West Moberly First Nations. The outcome is expected to lead to increased caribou calf survival rates and hence a reduction in the current rate of decline in the Klinse-Za herd. Information arising from this project will inform approaches to be adopted by Conuma in mitigating potential effects of the EB Mine on the Quintette herd.

Conuma will develop a comprehensive wildlife protection plan (a WPP: Section 12.8.1), tailored to the EB Mine area, as well as a Caribou Mitigation and Monitoring Plan (CMMP) (Section 12.8.2), as per MFLNRO guidance, and input from First Nations, for protection of the South Peace Northern Caribou populations. In addition, a key element of mitigating effects on wildlife in general, and caribou in particular, will be the site reclamation.
As noted in Section 4, Walter Energy and First Nations jointly developed a greenhouse enterprise with the objective of propagating native plant species, including culturally important plants, to supply site reclamation. Approaches currently used at the Perry Creek Mine, involving use of reference ecosystem sites to guide reclamation outcomes, will be applied at EB Mine. In addition, in keeping with CMMP objectives, findings of research on the propagation of beneficial forage for caribou and avoiding attraction of predators into the project area will be fully integrated into reclamation planning.

12.8.1 Wildlife protection plan (WPP)

Conuma will produce a comprehensive WPP to address all aspects of potential project interactions with wildlife and wildlife habitat, including protection of wildlife habitat and habitat features, waste management to avoid wildlife attraction and associated dangers or wildlife exposure to toxins, personnel wildlife awareness and safety training, traffic management to avoid wildlife collisions, reporting of wildlife observations and incidents and operational protocols to minimize, and where possible, to avoid disturbance to caribou and caribou habitat.

Aboriginal peoples will be involved in determining the content of the WPP and in defining wildlife monitoring programs to assess the effectiveness of wildlife protection measures.

12.8.2 Caribou mitigation and monitoring plan (CMPP)

Conuma will consult with FLNRO and First Nations to develop a CMMP with the objective of achieving positive outcomes for protection and enhancement of the Quintette Herd in the project area. In addition to assimilating published guidance (MoE, 2013), Conuma will develop progressive approaches, in discussion and partnership with First Nations, to mitigate the potential effects of EB Mine on:

- the availability of habitat,
- the availability of lichen (alpine ground lichen, arboreal lichen),
- the effect of disturbance on creation of early seral habitat that may attract other prey species and predators; and
- the facilitation of predator movement into core habitat via cleared corridors from lower elevation to high elevation core habitat.

Elements of the CMMP will include research into reclamation and propagation of caribou forage, ongoing participation in regional telemetry studies, participation in a caribou penning initiative to determine potential for application in the Quintette herd range, and other areas of monitoring and mitigation to be developed with interested First Nations.

12.9 Air quality

The EB Mine site is remote, with no residences or cabins within more than 10 kilometres' distance. The 2004 EA focused on air quality related to the Perry Creek Mine and plant site. The current EA update will provide a detailed inventory of air emissions from the EB Mine operation which will relate primarily to mining activities, coal stockpiles and truck loading, waste rock handling, stand-by diesel generation and coal haul. Baseline data for dust fall has been gathered in the project area, reflecting existing sources of emissions, primarily construction and maintenance of, and access to, gas pipeline facilities.

The Technical Assessment Report for the Air Permit Amendment will include:

- dispersion modelling to predict ambient concentrations of particulates, NO$_x$ and SO$_2$ and to predict deposition of particulates in the vicinity of EB Mine;
- an air quality management plan (AQMP); and
- an air quality monitoring program.
The model will incorporate local and regional meteorological data as described in Section 12.1. A cumulative effects assessment with consider effects of existing gas wells and pipeline facilities as well as the Perry Creek Mine and any other reasonably foreseeable projects in the area. The modelling results will be used by other disciplines, such as wildlife, vegetation to support the effects assessment for those disciplines.

12.10 Noise

As noted in Section 12.8, noise levels associated with minesite activities such as excavating, bulldozing, electrical generation, and truck hauling, will be assessed to characterize potential for noise disturbance in surrounding caribou habitat. The analysis will include topographic and meteorological data (e.g., temperature and wind effects) to produce sound level contours in relation to the mine site.

Figure 12-3: Caribou core habitat map. Very high-quality habitat areas are shown dark green. High-quality habitat areas are shown light green. Mine disturbance area is cross-hatched in yellow.
Quintette Caribou Herd VHF, GPS, and satellite telemetry locations during the winter period (2012-2013): **Figure 12-4.**
Quintette Caribou Herd VHF, GPS, and satellite telemetry locations during the spring, calving, and summer/fall periods (2002-2013): Figure 12-5.
12.11 Heritage and historic resources

Previous archaeological assessments, including archaeological impact assessments (AIAs) conducted for the Perry Creek Mine, have resulted in the identification of two archaeological sites within the Wolverine valley: GgRh-001 and GgRg-003. Archaeological site GgRg-001 is located adjacent to the Wolverine River airstrip. This site consists of a single artifact recovered on the surface in a disturbed context. Archaeological site GgRg-003 is located approximately 7.5 km northeast of the project area, in close proximity to the confluence of Two Creek and the Wolverine River. This site consists of a surface lithic scatter. These sites are not in conflict with, or within close proximity to the proposed development.

During November 2001 and June 2002 an AIA of the original project area was conducted by Landsong Heritage Consulting Limited (Landsong) under British Columbia *Heritage Conservation Act (HCA)* permit 2001-331. No archaeological resources were identified during the 2001 and 2002 assessments, and Landsong recommended no further archaeological work for the original Project.

In 2004, Landsong completed an archaeological overview assessment (AOA) and AIA of the revised Wolverine Mine Project area, which included the re-configuration of EB Mine plan, under *HCA* permit 2003-227. During the 2004 AOA and AIA, a helicopter overflight of the re-configured EB Mine did not result in the identification of any areas of archaeological potential and Landsong recommended that no further archaeological work be completed for the re-configured footprint of EB Mine.

In 2011, Landsong completed an AIA to the south and west of the original project area, and within the Perry Creek Road upgrade corridor, under *HCA* permit 2011-0241. No archaeological sites were identified. During the year-2011 AIA, an archaeological potential assessment of a buffer area around the proposed mine and haul road corridor was completed to guide the scope of any further archaeological assessment that might be required based on detailed design. Landsong identified 58 areas of archaeological potential within the assessed buffer area. The AIA was completed with the assistance of representatives of First Nations and Metis communities within whose traditional territory the project is located.

In 2013, Golder Associates Ltd. (Golder) completed an archaeological potential assessment of the previously unassessed areas of the current EB Mine project area. A review of background information and a preliminary field reconnaissance (PFR) resulted in the identification of 15 areas of high archaeological potential.

In 2015, an AIA was done for the EB Pit footprint and the Perry Creek road. First Nations were involved in the AIA (Landsong, 2015). The AIA was conducted under *HCA* permit 2013-0283 previously issued to Golder. The results of the AIA will be provided in the application for mine permit amendment.

As required under the *HCA* permit, a separate report summarizing the results of the AIA has been provided to the Archaeology Branch at the MFLNRO, and to First Nations identified by the Archaeology Branch as having Aboriginal interests in the project area.

12.12 Potential for metal leaching and acid rock drainage (ML/ARD)

Rock from the Hulcross Formation, overlying the coal-measures of the Gates Formation, is known to be PAG. Isolated zones of PAG rock are also known to occur within the Gates Formation. The currently-proposed mine plan for the EB pits calls for the mining of portions of both the Gates and Hulcross formations, with the latter formation being present in a highwall wedge atop the Gates coal-measures.

During drilling programs in 2002, 2007, 2011 and 2013, 245 samples of rock from the Gates and Hulcross formations were collected and analysed for acid-base accounting (ABA) and metals. A subset of these samples was subjected to short-term leach testwork and mineralogy. The sample dataset is spatially and compositionally representative of the rock types that will be encountered at the EB Mine project.
The laboratory-scale kinetic testing program includes five humidity cells from the Gates Formation representing argillaceous sandstone, sandstone, siltstone, mudstone, and coal of the C2 coal zone. These samples were tested and analysed over a period of 77 weeks. In February 2014, a further sample representing the Hulcross Formation was submitted for humidity cell testing.

The field kinetic testing program includes two field bins, containing argillaceous sandstone and mudstone, respectively. The field bins were constructed on-site at East Bullmoose in the summer of 2012, and leachate samples were collected and analysed between June 2012 and June 2013. A third field bin, constructed in the spring of 2014, was composed of samples representing the Hulcross Formation. Furthermore, a composite sample of A-zone through D-zone interburden rocks (from the Falher Member of the Gates Formation), as cored in borehole EB-63c, was used to construct a field leach pad. Mineable coal seams were excluded from the field leach pad. Leachates from 11 years (2002-2013) were collected and analysed to aid in determining the in-situ leach potential of waste rock materials.

In addition to test data for the EB Mine area, a substantial database now exists for contact waters at Perry Creek Mine, including groundwater, seeps and sediment ponds. The source terms and contact water predictions for the EB Mine will be compared with monitoring data from the Perry Creek Mine, and other available regional data, and refined where necessary.

To date, assessment of ML/ARD potential at EB Mine indicates that PAG material is present at low abundances in the Gates Formation. Rocks of the Hulcross Formation, on the other hand, are PAG and shall accordingly be handled according to the ML/ARD Management Plan. Selenium will constitute the main element of concern with regards to metal leaching, where the highest selenium leaching potential is associated with fine-grained lithologies (mudstone and siltstone) and the C2 coal zone.

A comprehensive ML/ARD assessment and source terms, based on the current mine plan will be provided in the mine permit amendment application. A site-specific ML/ARD management plan (Section 12.12.1) will be developed for EB Mine, along with the water and selenium management plans (Sections 12.2.3 and 12.3.1), to address effects of ML/ARD on receiving water quality.

12.12.1 ML/ARD management plan (ML/ARD plan)
The ML/ARD plan will build on operational experience gained at Perry Creek Mine, with respect to ARD management. The key objective of the ML/ARD plan will be management of PAG rock, specifically those derived from the Hulcross Formation, to prevent the development of ARD. Rocks of the Gates Formation generally have abundant neutralizing potential. With proper mixing and blending of PAG and NAG rocks, the Gates Formation NAG rocks will serve to effectively manage the potential for ARD. Waste sequencing and placement will be designed to achieve a conservative PAG:NAG ratio of 6.

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