

**FINAL TERMS OF REFERENCE**

**ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT**

**FOR THE PROPOSED**

**PARSONS CREEK RESOURCES PROJECT**  
**A Limestone Quarry**

**ISSUED BY:** Alberta Environment

**DATE:** June 18, 2007

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## **1. INTRODUCTION**

### **1.1. Parsons Creek Resources and Scope of Environmental Impact Assessment (EIA) Report**

The purpose of this document is to identify for the public and Parsons Creek Resources, a Joint Venture of Graymont Western Canada Inc. and Inland Aggregates Limited (Parsons Creek Resources), the information required by provincial government agencies for an Environmental Impact Assessment (EIA) report with respect to the proposed Parsons Creek Resources Project (A Limestone Quarry) on Metallic and Industrial Mineral Lease 9404120901 in Township 90-9-W4M in the Regional Municipality of Wood Buffalo, located between Highway 63 and the Athabasca River just north of the For McMurray Urban Service Area.

Parsons Creek Resources will prepare and submit an EIA report to describe the environmental effects of its proposed Parsons Creek Resources Project (the Project) and associated activities related to the Project. Parsons Creek Resources is responsible for the preparation of the EIA report and related applications. The final submission will be based upon these Terms of Reference and issues raised during the public consultation process.

The EIA report will include a glossary of terms and a list of abbreviations to assist the reader in understanding the material presented. The EIA report will include tables that cross-reference the report to the EIA Terms of Reference and to any current applications submitted pursuant to the *Environmental Protection and Enhancement Act* (EPEA) and the *Water Act*.

The EIA report will be prepared in accordance with the requirements prescribed under the EPEA, and any federal legislation, which may apply to the Project. It will form part of Parsons Creek Resources' application to the Natural Resources Conservation Board (NRCB).

### **1.2. Public Consultation**

Parsons Creek Resources must provide the public with opportunities to obtain information about the Project, and to identify their concerns. The public consultation program is to communicate with those members of the public who may be affected by the Project and to provide them with an opportunity to participate in the Environmental Assessment process. The EIA report will document public concerns or suggestions and demonstrate how they have been addressed.

## **2. PROJECT OVERVIEW**

Provide a corporate profile, clearly outlining the ownership structure of the Corporation, an overview of the Project, the key environmental, resource management and economic issues that are important for a public-interest decision and the results of the Environmental Assessment. Describe who will be responsible for the development, management and operation of the Project. Indicate what, if any, environmental management system the corporation responsible for the development, management and operation of the Project will follow.

### **3. REGULATORY AND PLANNING FRAMEWORK**

Identify the legislation, policies, approvals and current multi-stakeholder planning initiatives applicable to the review of the Project. Discuss the primary focus of each regulatory requirement, such as resource allocation, environmental protection, land use development and the elements of the Project that are subject to each regulatory requirement. List the major components of the Project that will be applied for and constructed under the EPEA, *Water Act* and the *Public Lands Act*.

Address other regulatory approvals that exist or will be required for the Project under provincial, municipal and applicable federal government requirements.

Discuss any regulatory systems that apply to the Project, such as solid waste, air pollution classifications [e.g., National Pollutant Release Inventory (NPRI), Accelerated Reduction and Elimination of Toxics (ARET), Priority Substances List (PSL1), PSL2], land use zones, wildlife management areas and forest management areas.

Address the relevant parts of the Fort McMurray Athabasca Oil Sands Integrated Resource Plan (IRP) that have been reviewed and considered in the preparation of the EIA report.

### **4. PROJECT DESCRIPTION AND MANAGEMENT PLANS**

The scope and detail of the project description information shall be sufficient to allow quantitative assessment of the environmental consequences.

Describe the project components including infrastructure and activities at the anticipated development stages (e.g., construction, operations, decommissioning and reclamation), project schedule and timing of the key construction and operational activities. Discuss the site alternatives considered, the potential effects that activities and infrastructures may have on the environment and the natural resources to be used for the Project. Outline the management plans to minimize the discharge of pollutants, manage wastes, reclaim disturbed lands and water bodies, optimize resource use and monitor effects.

#### **4.1. Project Need**

Discuss the need for the Project, the technical and operating systems considered for the project and the rationale for those ultimately selected for the application. Include a discussion of the implications of not proceeding with the Project or delaying the Project. Address the following:

- a) an analysis of the alternatives considered for carrying out the Project, including the environmental effects of utilizing these alternative, with the criteria and rationale for selecting the proposed option;
- b) how a balance among environmental, conservation, resource recovery and economic goals will be achieved through planning and preliminary design, highlighting any areas where planning focused on one goal to the exclusion of others;
- c) identify whether additional development phases will be considered at this site in the future and how the proposed plans for the Project takes this into consideration; and
- d) contingency plans if selected major components of the Project prove to be unfeasible.

#### **4.2. Project Components and Site Selection**

Describe the development of the site, and the nature, size, location and duration of the components of the Project including, but not limited to the following:

- a) the quarry areas;
- b) the proposed annual production required to support the life of the Project;
- c) the design capacities of the Project;
- d) the process components of the development focusing on material inputs and outputs including products, fuels, feedstocks, utility requirements (e.g., electricity and natural gas). As appropriate, provide material balances (energy and water), flow diagrams and descriptions of the processes to be used. Indicate any shared facilities with existing developments at the site;
- e) water control facilities and temporary structures;
- f) buildings and infrastructure, transportation, utilities and access routes;
- g) major operational components of the Project and a project layout showing the linkages among these components;
- h) a project development schedule;
- i) the total land area disturbed annually and during the life of the Project;
- j) how Parsons Creek Resources has incorporated community information into the project design and mitigation;
- k) the location, area and volume of merchantable timber to be removed and the timing;
- l) the process and factors (including exploration activities) that were considered in evaluating and delineating the limits of the limestone and aggregate reserves and discuss how this might affect initial and future pit development and disturbance activities;
- m) the rationale for selecting the proposed site and how technical, geotechnical and environmental criteria and stakeholder input were considered in decision-making;
- n) potential cooperative ventures with oil sands operators and other resource users (mineral and forestry) to maximize the efficiency for the Project and/or minimize the environmental impact of the Project; and
- o) a development plan of appropriate scale (including legal land description) showing the progression of project development, debris disposal, overburden and soil stockpile areas, storage areas and other site improvements required in support of the development.

Provide maps of appropriate scale (including legal description) showing:

- a) all existing surface leases and clearings and illustrate how these will be used or affected by the project development;
- b) all existing seismic lines, access roads and other linear corridors (e.g., pipelines, utility corridors, traplines, etc.);
- c) the location of the development relative to all terrestrial components (e.g., soils, topography, watercourses, vegetation, wildlife habitat, watersheds, wetlands, etc.).

#### **4.3. Water Supply, Water Management and Wastewater Management**

The EPEA and *Water Act* require approvals for the use of surface and/or subsurface water including water for processing, discharge of processing water and surface runoff from the site into a surface waterbody. Identify development activities that may affect surface water

or groundwater including water treatment processes and chemicals added. Identify the purpose of any drilled well(s).

Provide a water supply and water management plan to discuss the following:

- a) site runoff and containment, erosion control, groundwater protection, muskeg dewatering, quarry pit dewatering and disposal and/or treatment of wastewater;
- b) how water management facilities, will adequately protect quarry operations from precipitation events (including significant open water flood and ice jam occurrences) and address the application of *The Canadian Dam Association, Dam Safety Guidelines.*;
- c) permanent or temporary alterations or realignments to waterbodies and wetlands;
- d) process, sanitary and potable water requirements during normal operations and emergencies;
- e) water sources to be used including volumes expected from each source and location of diversion;
- f) the application of Alberta Environment's Groundwater Evaluation Guideline for non-saline groundwater sources and dewatering activities; and
- g) any water minimization considerations including plans to ensure efficient water use including any variability in water quantity required on an annual basis and during construction.

#### **4.4. Air Emissions Management**

Identify and describe project emission sources, including point and area sources, slash burning sources, mobile sources and fugitive emissions. Estimate the range of emissions from all sources identified above for normal and worst-case conditions. Discuss the following from a management perspective:

- a) potential odorous or visual emissions;
- b) probable deposition areas and effects to soils, vegetation and waterbodies;
- c) the emission control technologies proposed for the Project in the context of best-available technologies; and
- d) monitoring programs that will be implemented to assess air quality and the effectiveness of mitigation measures implemented during project development and operation.

#### **4.5. Chemical Handling and Waste Management**

Provide information on the character and volume of any materials used or solid or liquid waste material generated or stored on-site at the Project including a plot plan for on-site disposal areas that might be established. Describe strategies to minimize the potential for accidental release or spills and mitigation plans.

Identify the location and amount of all on-site storage of chemicals. Explain containment and environmental protection measures for handling chemicals, including explosives.

#### **4.6. Infrastructure, Utilities and Transportation**

Describe the project infrastructure requirements, existing and proposed, including, but not limited to, the following:

- a) haul roads routing and design, limestone crushing and handling facilities, stockpile sites, and transport facilities;
- b) volumes, timing (where applicable) and types of traffic associated with the movement of goods, services and personnel to and from the Project during the construction, operation and reclamation phases;
- c) the impact of increased vehicle traffic on the existing roadway system considering other existing and planned developments in the region;
- d) road access to and within the Project Area, the need to upgrade existing or construct new roads and the impacts of any new road construction or road improvements if required;
- e) how Parsons Creek Resources plans to address the provincial transportation department's concerns with regards to access to borrow materials, truck staging areas and the provision of adequate buffers to protect the future Highway 63 right-of-way;
- f) the result of consultation with the local transportation authorities and other stakeholders, including transportation studies that are underway or planned. Indicate how local community needs have been considered in access management; and
- g) how public access to, or within the Project will be managed during different development phases of the Project.

#### **4.7. Environmental Management System**

Outline the elements of Parsons Creek Resources' environmental, health and safety management system and discuss how it will be integrated into the Project. Provide corporate policies and procedures, spill and air emission reporting procedures and emergency response plans. Describe new monitoring initiatives that may be required as a result of the Project and outline Parsons Creek Resources' commitment to adaptive environmental management.

#### **4.8. Conservation and Reclamation**

Provide a conceptual Conservation and Reclamation Plan (C&R Plan) for the Project, including:

- a) the objectives for reclamation, proposed end land use objectives and other factors necessary for C&R Plan implementation including:
  - i) consideration of pre-development information with respect to land capability, vegetation, forest productivity, wildlife, aesthetics and land use resources;
  - ii) project development phasing;
  - iii) soil and reclamation material salvage, soil storage areas and soil handling procedures;
  - iv) the suitability and availability of soils within the project footprint for reclamation. Outline the criteria to be used in salvaging soils for reclamation and provide a soil balance for the Project;
  - v) soil replacement types, depths and volumes;
  - vi) re-establishment of a self-sustaining natural appearing topography, drainage and surface watercourses;

- vii) closure planning and reclamation activities/sequencing for each phase of development;
  - viii) post-development reforestation and forest productivity with information required for inclusion into forest management plans for the area;
  - ix) post-development capability for all uses, including traditional uses (traditional vegetation and wildlife species);
  - x) the species that will be used for revegetation and discuss the use of native species in the reclamation program;
- b) how the land will be returned to pre-disturbed equivalent capability having regard for regulatory requirements and end land use;
  - c) references to examples of demonstrated success with respect to proposed reclamation techniques, where applicable;
  - d) operational or mitigative procedures that may be required to ensure that water quality and quantity in the Athabasca River is not impacted as a result of the Project;
  - e) potential collaborative reclamation procedures considered among Parsons Creek Resources and any other developers should the Project Area be subject to more than one land use, and review any discussions that Parsons Creek Resources has had with these other developer(s); and
  - f) detailed supporting information demonstrating how the integrity of the reclaimed quarry can be protected during significant open water flooding and ice jam occurrences along the Athabasca River.

#### **4.9. Participation in Regional Cooperative Efforts**

Discuss Parsons Creek Resources' current and planned involvement in regional cooperative efforts that address environmental and socio-economic issues associated with regional development, including the Cumulative Environmental Management Association (CEMA), the Wood Buffalo Environmental Association (WBEA), the Regional Aquatics Monitoring Program (RAMP) and their working groups. Include Parsons Creek Resources' participation in regional air, water and other environmental monitoring programs, health studies, research, TEK and socio-economic studies.

Describe how Parsons Creek Resources will contribute to the effective design and implementation of proposed mitigation measures, monitoring programs and research programs within these regional cooperative efforts.

## **5. ENVIRONMENTAL ASSESSMENT AND CUMULATIVE EFFECTS ASSESSMENT**

Define assessment scenarios, including:

- a) a Baseline Scenario, which includes existing environmental conditions, existing and approved projects or activities;
- b) an Application Scenario, which includes the Baseline Scenario plus the Project; and
- c) a Cumulative Effects Assessment (CEA) Scenario, which includes the Application Scenario (Baseline Scenario plus Project) plus planned projects or activities.

*Note:* For the purposes of defining assessment scenarios, "approved" means approved by any federal, provincial or municipal regulatory authority, and "planned" means any project or activity

that has been publicly disclosed prior to the issuance of the Terms of Reference or up to six months prior to the submission of the Project Application and the EIA report, whichever is most recent.

For the cumulative effects assessment, each of the environmental, social, economic, health, and land use components will be evaluated, assessed and discussed where combined effects could reasonably be considered to result due to development of the Project in combination with other existing, approved and planned projects in the region. Include industrial projects as well as activities associated with other land uses and infrastructure.

### **5.1. Basic Information Requirements for the Environmental Assessment**

The EIA report will include the following basic environmental information:

- a) quantitative and qualitative information about the environment and ecological processes in the Study Area(s), including relevant information presented in previous environmental assessments;
- b) information about the human activities in the Study Area(s); e.g., land disturbance, discharges of substances, changes to access status and effects that the Project may have on the present and future capacity of renewable resources;
- c) a discussion of the process employed to classify and evaluate the effects associated with the Project;
- d) management plans to prevent, minimize or mitigate adverse effects and to monitor and respond to expected or unanticipated conditions; and
- e) a discussion of residual effects.

Where models are used, document any assumptions used in the EIA report to obtain predictions. Clearly identify the data used in the modeling including sources of error and relative accuracy, and identify the limitations of the models and steps taken to improve the accuracy. Describe the applicability and reasons for using a particular model,

### **5.2. Study Area(s)**

Define and provide the rationale for the spatial and temporal boundaries for the Study Area(s) used for the assessment. Discuss the selection criteria used to determine the Study Area(s), including information sources and assessment methods. The spatial boundaries shall include all areas where measurable changes in the environment may be caused by the Project regardless of any political boundaries.

### **5.3. Land Use and Access to Public Lands**

Describe baseline land use and access to public lands in the Study Area(s) and discuss the impacts on these for each scenario. Identify/discuss:

- a) the existing land uses and discuss the potential impact(s) of the Project to these land uses. Describe strategies to mitigate the impact(s);
- b) any land use policies and resource management initiatives that pertain to the Project Area and discuss how the Project will be consistent with these policies;
- c) any unique sites or rare features within the Project Area that may be impacted by the Project. Describe strategies to mitigate these impact(s);
- d) potential changes in land use, land management, other industrial uses in the region, and recreational uses that may result from the Project;

- e) how public access to the development area and adjacent Crown lands will be managed during the development phases and the need for access management;
- f) the impact of the proposed development and reclamation on commercial forest harvesting;
- g) the potential for increased access into the area that may be associated with project development and its impact on other resources and resource use such as increased hunter, off-highway vehicle and other recreational users;
- h) the results of consultation with other industry operators and Aboriginal communities regarding access to the Project Area; and
- i) the impact project development may have on any mineable oil sands resources in the Project Area. Discuss how project development has been coordinated with adjacent development(s). Discuss any limitations that the Project may have on other potential or approved developments.

#### **5.4. Air Quality**

Discuss baseline ambient air quality conditions. Review current emission sources and discuss changes as a result of anticipated future industrial development within the EIA Study Areas. Consider emission point sources as well as fugitive emissions. Identify components of the Project that will affect ambient air quality from a local and regional perspective by doing the following:

- a) discuss appropriate air quality parameters such as oxides of nitrogen (NO<sub>x</sub>), visibility, and particulates (road dust, PM<sub>10</sub> and PM<sub>2.5</sub>);
- b) estimate ground-level concentrations via modeling of appropriate air quality parameters. Discuss any expected changes to particulate deposition patterns. Include a comparison of modeled concentrations to recent monitoring results, as appropriate;
- c) identify the potential for reduced air quality (including odours and visibility) resulting from the Project and discuss any implications of the expected air quality for environmental protection and public health. Provide this information specifically for communities and sensitive receptors located close to the Project, as appropriate;
- d) describe air quality impacts resulting from the Project, and their implications for other environmental resources, including vegetation resources, and water and soil quality;
- e) for acid deposition modeling, provide deposition data predictions including magnitude and location of predicted maximum levels for all areas within the 0.25 keq/ha/yr and 0.17 keq/ha/yr Potential Acid Input (PAI) isopleth, including analysis of PAI deposition levels consistent with the CEMA Acid Deposition Management Framework;
- f) complete modeling and present results in accordance with Alberta Environment's *Air Quality Modeling Guidelines* (March 2003);
- g) describe how air quality impacts resulting from the Project will be mitigated and any monitoring programs to be implemented for assessing air quality or the effectiveness of mitigation measures;
- h) discuss the use of ozone depleting substances;
- i) describe meteorological conditions including wind speed, direction and inversions insofar as they affect dispersion and disposition; and
- j) estimate the quantity released of any compounds regulated under the NPRI.

#### **5.4.1 Greenhouse Gas Emissions**

Provide the following:

- a) the expected annual and total greenhouse gas (GHG) emissions over the construction, operation and decommissioning phases of the Project;
- b) the Project's contribution to total provincial and national GHG emissions on an annual basis;
- c) the intensity of GHG emissions per unit of product produced and how it compares with similar projects and technology performance;
- d) how the project design and GHG management plans take into account the need for continuous improvement with respect to GHG emissions and the plan *Albertans and Climate Changes; Taking Action*; and
- e) Graymont Western Canada Inc and Inland Aggregates Limited overall GHG management plans, any plans for the use of offsets (nationally or internationally) and the expected results of implementing the plans.

#### **5.4.2 Climate Change**

Discuss the following:

- a) climate change and the local and/or regional, inter-provincial/territorial changes to environmental conditions resulting from climate conditions, including trends and projections where available (in accordance with the guidance document *Incorporating Climate Change Considerations in Environmental Assessment: General Guidance for Practitioners*);
- b) stages or elements of the Project that are sensitive to changes or variability in climate parameters. Discuss what impacts the change to climate parameters may have on elements of the Project that are sensitive to climate parameters; and
- c) the adaptability of the Project in the event the region's climate changes. Discuss any follow-up programs and adaptive management considerations.

#### **5.5. Noise**

Provide baseline noise levels. Discuss;

- a) the results of a noise assessment as specified by EUB Directive 038 Noise Control (or the most recent version of the document) including: and
  - i. an estimate of the potential for increased noise resulting from the Project;
  - ii. identification of potentially affected people and wildlife; and
  - iii. the implications of any increased noise levels.
- b) mitigation options, considering such factors as intensity, magnitude, frequency, duration and time of day.

#### **5.6. Terrestrial and Aquatic Ecosystems**

##### **5.6.1 Geology, Soils, Terrain**

Describe the following:

- a) the baseline conditions of bedrock, bedrock topography and surficial geology, soils and terrain in the Study Area(s). Where appropriate, use maps, cross-sections and figures to illustrate these features;
- b) the soil types and their distribution in the Project Development Area and Study

- Areas. Provide an ecological context to the soil resource by supplying a soil survey report and maps; and
- c) changes to these baseline conditions that may occur due to development of the Project.

### **5.6.2 Vegetation**

Describe and map vegetation communities in the EIA Study Area(s), using as appropriate, the Alberta Vegetation Inventory (AVI) Standards Manual 2.1, *The Field Guide to Ecosites of Northern Alberta* (Beckingham and Archibald, 1996), and the Alberta Wetland Inventory Standards Manual (AWI) Version 1.0. For each assessment scenario, discuss the following:

- a) ecosite phases based on their potential to support rare plant species, old growth forests or other communities of restricted distribution (e.g., fens).
- b) the species associated with each ecosite phase and address:
  - i) special status plant species (rare, threatened or endangered);
  - ii) the importance of the size, distribution and variety of vegetation units assessed in habitat suitability indices for wildlife and riparian habitat;
  - iii) the importance of peatland and wetland species and landscape units for local and regional habitat, sustained forest growth and the hydrologic regime. Determine the rarity or abundance of peatlands and wetlands from local and regional perspectives; and
  - iv) the availability of plants used for food, medicinal and cultural purposes;
- c) the sensitivity to disturbance of each of the vegetation communities and their ability to be restored, as well as the techniques used to estimate sensitivity to disturbance and reclamation (e.g., sensitivity to air emissions);
- d) the nature, size, distribution and timing of changes to vegetation communities, including the effects of air emissions;
- e) the area of productive and non-productive forest land base that will be disturbed and taken out of production during the life of the Project. Describe plans for the return of pre-disturbance forest ecosites by area, species and productivity;
- f) introduction of non-native plant species on native species composition and potential plant changes to communities;
- g) the extent to which existing seismic lines, and linear corridors and other existing disturbances will be used for project facilities;
- h) the area and distribution of all vegetation communities existing prior to the project development and expected at closure; and
- i) plans to mitigate the adverse effects of site clearing and other development activities and operations on vegetation, including rare plant species.

### **5.6.3 Wildlife**

Describe existing wildlife resources and their use of habitats in the Study Area(s). Document the anticipated changes to wildlife in the Study Area(s) under each scenario. Specifically:

- a) discuss the criteria and process used in the selection of wildlife indicator species, including those listed by Alberta Fish and Wildlife (at risk, may be at risk and sensitive species in the *General Status of Alberta Wild Species 2000*)

- and COSEWIC (endangered, threatened, special concern in *Canadian Species at Risk 2002*);
- b) identify species composition, distribution, relative abundance, seasonal movements, movement corridors, habitat requirements, key habitat areas, and general life history in the Study Area(s);
  - c) include current field data, using recognized sampling protocols, for the species chosen for evaluation in the EIA report;
  - d) evaluate potential adverse impacts on, habitat availability, quality, and effective wildlife use of habitat due to the Project
  - e) describe the spatial and temporal changes to habitat and to wildlife distribution, relative abundance, movements, and the potential to return the area to pre-disturbed wildlife habitat conditions, including:
    - i) anticipated effects on wildlife as a result of changes to air and water, including both acute and chronic effects on animal health;
    - ii) anticipated effects on wildlife as a result of project activity; and
    - iii) anticipated effects on wildlife due to improved or altered access into the area (e.g., vehicle collisions with wildlife, obstructions to daily or seasonal movements, and hunting mortality during operations and after project closure);
  - f) discuss the protection of riparian habitats, interconnectivity of such habitat, and the movement by wildlife species using the habitat;
  - g) indicate what measures will be taken to prevent habituation of wildlife, the potential for human-wildlife encounters and consequent destruction of wildlife (e.g., black bears);
  - h) describe the effects of the Project on those wildlife species selected for evaluation. Identify residual impacts and discuss their significance at the local and regional scales; and
  - i) provide a strategy and mitigation plan to minimize impacts on habitat and wildlife populations through the life of the Project and to return productive wildlife habitat to the area, considering:
    - i) habitat enhancement measures in adjacent undisturbed areas, and a schedule for the return of habitat capability to areas impacted by the Project;
    - ii) consistency of the plan with applicable regional, provincial and federal wildlife habitat objectives and policies; and
    - iii) monitoring programs to assess wildlife impacts from the Project and the effectiveness of mitigation strategies and habitat enhancement measures.

#### **5.6.4 Biodiversity**

Describe ecosystem characteristics in the Study Area(s), and explain the significance of potential project impacts from the perspective of biodiversity, including consideration of potential local and regional project impacts on:

- a) ecosystem fragmentation;
- b) habitat diversity and quantity; and
- c) species diversity.

### 5.6.5 Groundwater

Describe the groundwater regime in the Study Area(s), using map(s), cross section(s) and/or other drawings as appropriate. Discuss the following:

- a) the lithology, stratigraphic and structural continuity, thickness, hydraulic properties, major groundwater features (aquifers, aquitards, aquicludes), groundwater flow direction and velocity, and groundwater quality of the geologic units in the Study Area(s);
- b) historical and current hydrogeological investigations, including methodology and results;
- c) the potential for hydraulic connection between geological zones affected by the Project (e.g., quarry zones, groundwater production and the land surface);
- d) parameters to be used as indicators of potential aquifer contamination;
- e) the potential for changes in the groundwater regime and the effects of these changes that may arise from the Project, including:
  - i) changes in groundwater quality, vertical gradients and aquifer recharge rates;
  - ii) changes resulting from any proposed diversion;
  - iii) an inventory of all groundwater users (field verified survey), and potential water use conflicts and proposed resolutions;
  - v) the effect(s) of groundwater withdrawal and/or surficial dewatering and their implications for other environmental resources, including habitat diversity and quantity, surface water quality and quantity, vegetation, wetlands and soil saturation;
- f) the inter-relationship of the groundwater to the surface water and the potential for impacts on water quality and quantity due to recharge from and discharge to local waterbodies and wetlands; and
- g) a conceptual plan and implementation program for the protection of groundwater resources, including the following:
  - i) the early detection of potential contamination and remediation planning;
  - ii) groundwater remediation options in the event that adverse effects are detected; and
  - iii) monitoring the sustainability of groundwater production or dewatering effects.

### 5.6.6 Surface Water

Discuss baseline hydrological conditions in the Study Area(s). Provide a water balance for the Study Area that includes inputs from precipitation and surface water flow (including runoff) and outputs from evapotranspiration, seepage to groundwater and surface water outflow (including runoff). Identify project activities that may affect surface water quality and quantity during all stages of the Project and mitigation measures to prevent or minimize potential impacts, including:

- a) appropriate surface water quality and hydrological parameters, their seasonal variations (provide hydrographs as appropriate) and relationships between flows and water quality as they pertain to the Project;

- b) the project components or activities during construction, operation and reclamation that have the potential to affect surface water quality and flows, including:
  - i) any changes in water quality and quantity resulting from the Project that may indicate a potential adverse effect or non-compliance with appropriate guidelines;
  - ii) the significance of any impacts on water quality and quantity and implications to aquatic resources (e.g., biota, biodiversity and habitat);
  - iii) the effect on water quality and quantity in surface waterbodies due to the change in groundwater discharge; and
  - iv) the significance of any seasonal change to surface water flows;
- c) any activities to be conducted in or near waterbodies and describe the connection(s) between these activities and the affected waterbodies;
- d) the selection of monitoring locations, and the integration of these sites into an overall aquatic assessment and monitoring program. Identify any cooperative monitoring and assessment initiatives; and
- e) any aspect of the Project that is likely to affect a navigable waterway.

#### **5.6.7 Fisheries and Aquatic Resources**

Describe existing fisheries and aquatic resources, their use and potential use of habitats in the Study Area(s). Document the anticipated changes to the fisheries and aquatic resources in the Study Area(s). Specifically:

- a) Identify fisheries species composition, distribution, relative abundance, seasonal movements, habitat requirements, key habitat areas, and general life history in the Study Area(s);
- b) describe the spatial and temporal changes to habitat and to fish distribution, relative abundance, movements, including:
  - i) anticipated effects on fisheries as a result of changes to air and water, including both acute and chronic effects on fish health; and
  - ii) anticipated effects on fisheries due to improved or altered access into the area (e.g., increased fishing pressure during operations and after project closure);
- c) discuss the use of setbacks to provide for the protection of riparian habitats, fish and aquatic habitat and evidence to support their effectiveness. Identify any construction, operation and reclamation activities that may affect aquatic resources. Indicate whether blasting could harm aquatic resources;
- d) identify plans proposed to offset any loss in the productivity of fish habitats. Indicate how environmental protection plans address applicable provincial and federal policies on fish habitat including the development of a “No Net Loss” fish habitat objective; and
- e) describe mitigation to prevent adverse impacts; and monitoring programs, as applicable, to assess fisheries and aquatic resource impacts from the Project and the effectiveness of mitigation strategies.

## **6. ENVIRONMENTAL MONITORING**

Describe any additional environmental monitoring, not already described elsewhere, that Parsons Creek Resources will undertake to manage predicted effects and improve environmental protection strategies. Describe any proposed mitigation plans not already described, and identify any anticipated residual effects.

## **7. PUBLIC HEALTH AND SAFETY**

Describe those aspects of the Project that may have implications for public health or the delivery of health services. Determine whether there may be implications for public health arising from the Project. Specifically:

- a) identify and discuss the data and methods Parsons Creek Resources used to assess impacts of the Project on human health and safety;
- b) assess the potential health implications of the compounds that will be released to the environment from the proposed operation in relation to exposure limits established to prevent acute and chronic adverse effects on human health;
- c) identify the human health impact of the potential contamination of country foods and natural food sources taking into consideration all project activities;
- d) provide information on samples of selected species of vegetation known to be consumed by humans;
- e) discuss the potential to increase human exposure to contaminants from changes to water quality, air quality and soil quality taking into consideration all project activities;
- f) document any health concerns identified by Aboriginal stakeholders due to the impacts of the Project specifically on their traditional lifestyle. Determine the potential impact of the Project on the overall health of Aboriginal stakeholders and identify possible mitigation strategies;
- g) assess cumulative health effects to receptors that are likely to result from the Project in combination with other existing, approved and planned projects;
- h) identify, as appropriate, the anticipated follow-up work, including regional cooperative studies. Identify how such work will be implemented and coordinated with ongoing air, soil and water quality initiatives;
- i) identify and discuss the potential health and safety impacts due to higher regional traffic volumes and the increased risk of accidental leaks and spills;
- j) document the health and safety concerns raised by stakeholders during consultation on the Project;
- k) provide a summary of Parsons Creek Resources' emergency response plan and discuss mitigation plans to ensure workforce and public safety during pre-construction, construction, operation and reclamation of the Project. Include prevention and safety measures for wildfire occurrences, accidental release or spill of chemicals to the environment and failures of structures retaining water or fluid wastes;
- l) describe how local residents will be contacted during an emergency and the type of information that will be communicated to them; and
- m) describe the existing agreements with area municipalities or industry groups such as safety co-operatives, emergency response associations and municipal emergency response agencies.

## 8. HISTORICAL RESOURCES

Describe those aspects of the Project that may have implications for historical resources and provide the following:

- a) a general overview of the results of any previous historic resources studies that have been conducted in the Study Area(s) as defined within the *Historical Resources Act*;
- b) details of the consultation with the Heritage Resources Management Branch with respect to historical resources;
- c) a summary of the results of the Historical Resources Impact Assessment;
- d) details of the participation of Aboriginal peoples in the Historical Resources Impact Assessment;
- e) details of any stakeholder concerns with respect to the development of the Project based on the historical significance of the Local Study Area; and
- f) an outline of the historical resources management program and schedule of field investigations that may be required to assess and mitigate the effect of the Project on historical resources pursuant to the *Historical Resources Act*;

## 9. TRADITIONAL LAND USE

Describe the following:

- a) historical and current traditional use of the Study Area(s) by First Nations and Métis, including fishing, hunting, trapping, plant harvesting and any other traditional or cultural uses as identified by Aboriginal groups;
- b) Parsons Creek Resources' consultation with Aboriginal stakeholders to determine their concerns regarding project development on traditional use of the Study Area(s); and
- c) the effects of the Project on First Nations and Métis traditional land use and culture, and identify possible mitigation strategies.
- d) how Traditional Environmental Knowledge (TEK) will be incorporated into the Environmental Impact Assessment; and
- e) how TEK will be utilized during operations i.e. using TEK in reclamation plans.

Provide map(s) of appropriate scale(s) showing the traditional land use areas of Aboriginal peoples.

## 10. SOCIO-ECONOMIC FACTORS

Discuss the following:

- a) socio-economic conditions before and after project development, including the number of people who may be affected, population changes, local employment, local procurement, traffic and existing local and regional services including existing social agencies, education initiatives, training programs and business development initiatives;
- b) the impacts of the proposed Project on the availability of affordable housing and the quality of health care services. Identify and discuss the mitigation plans that will be undertaken to address these issues. Provide a summary of any discussions that have taken place with the Municipality and Regional Health Authority concerning housing availability and health care services respectively;
- c) capital investment, labour requirements, and other operating costs and revenue from services relating to the Project. Include an estimated breakdown of the Alberta, other Canadian and foreign industrial benefits relating to project management and engineering, equipment and materials, construction labour. Estimate the total overall project costs and revenues;

- d) the employment and business development opportunities the Project may create and the economic impact in the Study Area(s), region, province and Canada;
- e) Parsons Creek Resources' Aboriginal procurement policies, and Aboriginal training and hiring policies and practices for the project;
- f) Parsons Creek Resources' policy for managing site access (e.g. hunting, fishing etc.) by contractors during construction and employees and contractors during operations;
- g) Parsons Creek Resources' policies and programs respecting the use of local, regional, Alberta and Canadian goods and services;
- h) potential project demands upon local services and infrastructure; and
- i) quantify local, regional and provincial economic benefits arising from the Project.

## **11. PUBLIC CONSULTATION REQUIREMENTS**

Describe the following:

- a) the public consultation process implemented for the Project including the involvement of local residents, and other key stakeholders such as oil sands operators, special interest groups, First Nations and Métis within the Study Area(s);
- b) the methods by which information was provided to the public, the type of information provided, and the nature of responses received including:
  - i. where and when public meetings were held and, to the extent possible, list attendees;
  - ii. how concerns and ideas were brought to the attention of Parsons Creek Resources and the actions taken to address the concerns;
  - iii. how issues and resolution of concerns were incorporated into the project development, impact mitigation and monitoring;
- c) plans to maintain the public consultation process following completion of the Environmental Assessment review to ensure that the public will have an appropriate forum for providing their input and expressing their views on the ongoing development, operation and reclamation of the Project.