Acknowledgements

The Guidelines supersede A Guide to Surface Material Extraction on Public Land, ASRD, 2002. The information in the Guidelines is based on the following government documents:

- A Guide to Surface Material Extraction on Public Land, ASRD, 2002;
- The Alberta Aggregate (Sand and Gravel) Allocation Policy for Commercial Use on Public Land, ASRD, March 1, 2006;
- Surface Material Lease Level II Requirements Conservation and Reclamation Business Plan Requirements for Leases over 40 acres (16 ha), November 1 2003;
- Instructions for Submissions Environmental Field Reports with Surface Disposition Applications Under the Public Lands Act ASRD November 5, 2002;
- Alberta Transportation Pre-Disturbance Assessment Procedures For Borrow Excavations For Road Construction, 2002; and

The final document was prepared with the input of members from Alberta Sustainable Resource Development, Alberta Environment, Alberta Infrastructure and Transportation, and consultants at Green Plan Ltd. and Pedocan Land Evaluation Ltd.

Information and copies may be obtained from:

Alberta Sustainable Resource Development
Industrial and Commercial Land Use Section
Land Management Branch
3rd Floor, 9915 – 108 Street
Petroleum Plaza South Tower
Edmonton, AB T5K 2G8
Phone: 780-427-3570
Fax: 780-427-1185
Website: http://www.srd.gov.ab.ca/
## Table of Contents

1.0 Introduction ........................................................................................................... 1

1.1 Background ............................................................................................................ 1

1.2 About The Guidelines ......................................................................................... 2

1.3 What You Should Know Before You Apply ....................................................... 3

1.4 Additional Resources .......................................................................................... 5

1.4.1 ASRD and Other Government Resources ....................................................... 5

1.4.2 Area Management Plans .................................................................................. 6

1.4.3 Alberta Sand and Gravel Association (ASGA) .................................................. 6

1.5 Guideline Limitations .......................................................................................... 6

2.0 Surface Material Extraction by Lease Approval (SML) ........................................... 9

2.1 Surface Material Leases For Sites Up to 80 Acres ............................................... 9

2.2 Surface Material Leases For Sites Over 80 Acres ................................................ 12

2.3 Surface Material Exploration (SME) .................................................................... 14

2.4 Conservation and Reclamation Business Plan (CRBP) ........................................ 17

2.5 Other SML Requirements ................................................................................... 19

2.5.1 Legal Responsibilities for Lease Boundaries .................................................... 19

2.5.2 Land Disposition Holder Permission ............................................................... 19

2.5.3 Other Regulatory Requirements ...................................................................... 19

2.5.4 Security .......................................................................................................... 20

2.5.5 Royalties and Fees ......................................................................................... 20

2.5.6 Access Requirements .................................................................................... 20

2.6 SML Submission And Approval Process ................................................................ 21

2.7 Post Approval Requirements ............................................................................. 24

2.7.1 Change in Status and Failure to Comply ......................................................... 24

2.7.1.1 Changes to Corporate Status ........................................................................ 24

2.7.1.2 Plan Amendments ....................................................................................... 24

2.7.1.3 Renewal of Lease ....................................................................................... 24

2.7.1.4 Assignments .............................................................................................. 25

2.7.1.5 Failure to Comply and Develop ................................................................. 26

2.8 Monitoring and Reporting Requirements ............................................................ 27

2.8.1 Non-Compliance Reports .............................................................................. 27

2.8.2 Annual Reports ............................................................................................. 27

2.8.3 Environmental Reports ................................................................................. 29
2.8.4 ASRD Site Inspections .....................................................................................29
2.9 Site Closure And Reclamation Certification .........................................................29
  2.9.1 Reclamation Certificate ..................................................................................29
  2.9.2 Liability .........................................................................................................30

3.0 Other Dispositions ...............................................................................................31
  3.1 Public Pit Licences (PPL) ..................................................................................31
  3.2 Surface Material Licences (SMC) ......................................................................32
  3.3 Surface Material Extraction Government Reservations .....................................32
  3.4 Surface Material Extraction Temporary Field Authority ..................................33

4.0 Surface Material Exploration ................................................................................34
  4.1 SME Information Requirements .........................................................................34
  4.2 Subsurface Investigation Methodology ...............................................................35
    4.2.1 Site Reconnaissance ....................................................................................35
    4.2.2 Establish Exploration Grid ..........................................................................35
    4.2.3 Test Holes and Test Pitting .........................................................................36
    4.2.4 Use of Non Intrusive Methods ....................................................................36
    4.2.5 Laboratory Analysis ....................................................................................36
  4.3 Evaluation of Subsurface Conditions ....................................................................38
    4.3.1 Describe Overburden and Aggregate .........................................................38
    4.3.2 Groundwater Conditions ............................................................................38
    4.3.3 Logging Test Hole Data .............................................................................39
  4.4 Post Exploration Reclamation ...............................................................................39
  4.5 Documenting Findings .......................................................................................40

5.0 Land Use Investigation .........................................................................................41
  5.1 Land Dispositions ...............................................................................................41
  5.2 Land Use And Land Management Plans ............................................................42
  5.3 FMA Holders (FMA) .........................................................................................42
  5.4 Permanent Research Sample Plots (PSP) ............................................................43
  5.5 First Nations ......................................................................................................45
  5.6 Protected Areas ..................................................................................................46
  5.7 Impacts to Other Land Uses ...............................................................................47
  5.8 Documenting Findings .......................................................................................47

Guidelines For Acquiring Surface Material Dispositions on Public Land
Alberta Sustainable Resources Development – 2007 Edition
6.0 Biophysical Investigation.........................................................................................................49
   6.1 Assessment Methodology ..................................................................................................49
   6.2 Soil, Landform And Vegetation (SLVA) ..............................................................................50
      6.2.1 Ecosystem Approach ..................................................................................................50
      6.2.2 Terrain and Land Use Mapping ...............................................................................52
      6.2.3 Soil and Vegetation Sampling and Mapping ............................................................53
         6.2.3.1 Soil Information ..................................................................................................53
         6.2.3.2 Vegetation Information .......................................................................................54
         6.2.3.3 Rare Plants ......................................................................................................56
         6.2.3.4 Problem Vegetation/Weeds/Invasive Plants .........................................................56
   6.3 Geology And Hydrogeology ............................................................................................56
   6.4 Wildlife ........................................................................................................................57
      6.4.1 Critical Wildlife Habitat ............................................................................................58
      6.4.2 Species at Risk (Animals) ........................................................................................59
      6.4.3 Migratory Birds ....................................................................................................59
   6.5 Fish And Aquatic Resources ..........................................................................................60
   6.6 Historical Resources ....................................................................................................61
   6.7 Noise And Air Quality....................................................................................................62
   6.8 Documenting Findings ..................................................................................................63

7.0 Development Planning.............................................................................................................65
   7.1 Site Feasibility Analysis ..................................................................................................66
   7.2 Pit Size And Configuration .............................................................................................66
      7.2.1 Topsoil, Subsoil, Overburden and Aggregate ............................................................66
      7.2.2 Undisturbed Buffer Zones and Setbacks ..................................................................67
      7.2.3 Sensitive Areas ...................................................................................................70
      7.2.4 Wildlife Considerations ..........................................................................................70
      7.2.5 Wildlife Considerations ..........................................................................................70
      7.2.6 Urban and Rural Residential Areas ...........................................................................70
      7.2.7 End Land Uses ....................................................................................................71
   7.3 Utility Right-of-Ways .....................................................................................................71
   7.4 Access Right-of-Ways ....................................................................................................71
   7.5 Site Improvements........................................................................................................74
   7.6 Pit Development And Sequencing ..................................................................................74
      7.6.1 Construction Start Date and Ground Conditions .......................................................74
      7.6.2 Extraction Sequencing and Soil Handling .................................................................74
      7.6.3 Timber Management and Woody Debris Disposal ....................................................74
9.3.1 Topsoil Seedbank Salvage ................................................................. 94
9.3.2 Topsoil Salvage .............................................................................. 94
9.3.3 Subsoil Salvage ............................................................................. 95
9.3.4 Overburden Removal .................................................................... 95
9.3.5 Stockpiles .................................................................................... 95
9.3.6 Soil Replacement Depths ................................................................. 96
9.3.7 Use of Alternative Reclamation Materials ......................................... 97
9.4 Soil Replacement ................................................................................ 97
  9.4.1 Sequence .................................................................................... 97
  9.4.2 Decompaction ............................................................................. 98
9.5 Drainage ........................................................................................... 99
9.6 Revegetation .................................................................................... 99
9.7 Weed Control .................................................................................. 101
  9.7.1 Definitions ................................................................................ 101
  9.7.2 Regulatory Framework ................................................................. 101
  9.7.3 Responsibilities of Operators ....................................................... 101
  9.7.4 Guidelines for Operators ............................................................. 101
  9.7.5 Weed Control Measures ............................................................. 102
9.8 Documenting Findings ..................................................................... 103

Appendices

Appendix 1
  • Glossary of Terms

Appendix 2
  • Table of On-Line Resources For Surface Material Applications

Appendix 3
  • Sample Application Drawings and Attachments

Appendix 4
  • ASRD Aggregate Allocation Policy For Commercial Use on Public Land
  • Overview of Other Regulations and Planning Policies
  • Overview of the Water Act - Code of Practice for Water Crossings

Appendix 5
  • Conservation & Reclamation Business Plan-Example Table of Contents
Back Pocket

- Information on Fees and Royalties
- Miscellaneous Information

Figures

1.0 Common Dispositions – Surface Material Extractions on Public Land 3
2.0 Surface Material Extraction Planning Roadmap 4
3.0 SML Application Process 10
4.0 Content Requirements for SML/SMC Application Plan and Legal Survey 11
5.0 Content Requirements for SME Disposition Sketch Plans 16
6.0 Content Requirements – Conservation and Reclamation Business Plans 18
7.0 Flowchart of SML Application Review Process 23
8.0 Annual Operating Reporting Requirements for an SML 28
9.0 Natural Subregions of Alberta Map 52

Tables

1.0 Dispositions Related to Surface Material Extraction on Public Land 7
2.0 Example of a Land Use Assessment 49
3.0 Example Analyses of Potential Adverse Environmental Effects 65
1.0 Introduction

1.1 Background

Approximately 60 per cent of Alberta’s land base is public land that is managed under an integrated resource management (IRM) philosophy that supports forest production, watershed protection, wildlife habitat, recreation, oil and gas operations, agricultural production and industrial development including surface material extraction.

As the demand for surface material extraction on public land increases, IRM becomes more complicated as industry, government and municipal users compete to develop the diminishing resource. Locating and protecting potential sources, allocating those resources appropriately, monitoring surface material extraction operations and promoting good resource management, are goals of IRM that have far-reaching economic and environmental benefits. Stringent government regulations and policies to control surface material extraction activities on public land provide a means to achieve the IRM goals.

The main provincial statute governing surface material extraction is the Public Lands Act - Disposition and Fees Regulation which is administered by Alberta Sustainable Resource Development (ASRD). The Disposition and Fees Regulation grants approvals for surface material extraction activities through an application and lease and licensing system. Table 1.0 provides a complete list of land dispositions that are related to surface material extraction on public land.

The Alberta Aggregate (Sand and Gravel) Allocation Policy for Commercial Use on Public Land, ASRD, March 1, 2006 (Appendix 4A) is ASRD’s principal policy for allocating sand and gravel operations for commercial use. The policy provides a management framework to ensure that there is a fair and equitable use of Alberta’s aggregate resources on public land.

ASRD’s responsibilities in administering these directives include:

- allocating and protecting aggregate resources appropriately, monitoring surface material extraction operations and promoting good resource management;
- reviewing applications and making a decision based on the best interest of the public, other affected land users and the environment;
- providing guidance with regards to the approval process, including the application of these guidelines;
- conducting random, unannounced inspections, as well as planned inspections, to determine if disposition holders are following the approval requirements; and
- Issuing reclamation certificates.
1.2 About The Manual

The Guidelines for Acquiring Surface Material Dispositions on Public Land, 2008 is a manual that provides guidelines for obtaining approvals to extract surface materials from public land in accordance with the aforementioned regulatory and policy regime.

The information in the manual is organized under the following main headings:

Part 1: Application and Approval Process includes Sections 1, 2 and 3. Guidance is provided on the application/approval process and post application requirements for surface material extraction including preparing a Conservation and Reclamation Business Plan (CRBP).

Part 2: Site Investigations includes Sections 4, 5 and 6. Guidance is provided on conducting the required site investigations to support the application, including surface material exploration to prove the aggregate reserve, land use disposition assessments to identify land use conflicts and biophysical investigations to identify potential adverse environmental impacts.

Part 3: Site Development Planning includes Sections 7, 8 and 9. Guidance is provided on preparing the sequential activity plans required for pit development including site development plans, operation plans and reclamation plans.

Note: Parts 2 and 3 of the manual provide important information to assist applicants with developing Conservation and Reclamation Business Plans (CRBPs) which are mandatory for all Surface Material Applications (SMLs).

The following important terminology is used throughout the manual. A complete glossary of terms is provided in Appendix 1.

- Surface Materials include clay (manufacturing and non-manufacturing), peat, marl, silt and sand and gravel.
- The term approval is defined as a license, lease or any other form of authorization granted from ASRD to extract surface materials from public land.
- The term applicant means the applicant for an application in the case of an unapproved pit.
- Disposition is a tenure to use public land for a specific time frame and land use activity.
- Disposition-holder refers to the approval-holder in the case of an approved pit.
- Public land means provincial Crown-owned lands where the Public Lands Act applies.
- Extraction activities include any means to remove and/or process surface materials from public land.
- The words must, shall and required describe actions that a disposition-holder or person carrying out activity at a pit is obliged to undertake or is not allowed to undertake by virtue of an Act, a regulation or policy.
• Words such as, should or recommended describe actions that are encouraged and that will likely lead to greater chances of successful pit operation.

1.3 What You Should Know Before You Apply

Figure 1.0 illustrates the most common dispositions that are acquired from ASRD and Figure 2.0 provides a road map to help guide applicants through the ASRD application and approval process.

Applicants should become familiar with the application requirements before applying for a lease or license. This is because the application process and corresponding land management responsibilities can be comprehensive, involving significant time and resources. Applicants should also allow enough time to prepare the application and have it reviewed by ASRD. Approvals for complex applications can take from 6 months to a year to process.

Figure 1.0 Common Dispositions - Surface Material Extraction on Public Land
Figure 2.0 Surface Material Extraction Planning Roadmap

**Establish Aggregate Needs:**
- Estimate the quantity of aggregate required
- Identify suitable parcel(s) by legal description
- Determine land use requirements for operations, access, equipment, water etc.

**Determine Type of Disposition:**
- Surface Material Lease (SML)
- Surface Material Licence (SMC)
- Public Pit Licence (PPL)
  
  *Note: An SME is required to support all SML and SMC applications.*

**Determine if Land is Suitable for the Intended Use:**
- Conduct site inspection
- Review aerial photos and topo maps for environmental concerns
- Review LSAS Records for land use conflicts
- Identify potential regulatory requirements
- Consult the local ASRD office

If an SML is required:
Refer to Section 2.4 regarding the need to prepare a Conservation and Reclamation Business Plan.

**Determine Approval Requirements:**
- Refer to Sections 2.0 and 3.0 of the Guidelines to determine the specific planning and requirements associated with the required disposition.
- Determine the level of effort required and obtain professional assistance as needed.

Prepare and Submit the Application to ASRD

Obtain Approval and Commence Operations
1.4 Additional Resources

1.4.1 ASRD and Other Government Resources

Additional information related to surface material extraction approvals including electronic forms, applications and publications are available on the ASRD website at [http://srd.alberta.ca/lands/usingpublicland/default.aspx](http://srd.alberta.ca/lands/usingpublicland/default.aspx) or by referencing the Resource Table provided in Appendix 2. The information in the Table is provided under the main headings:

- applications, forms publications – ASRD reports, applications, policies and regulations;
- general resources – mapping, air photos, geological maps, etc.;
- environmental resource information – research information on soil, water, vegetation, wildlife, historic sites, First Nations, etc.; and
- land-use information – Land Status Automated System (LSAS) and other related resources.

For further information on this manual, contact the main ASRD office in Edmonton at 780-427-3570. ASRD office locations and phone numbers can be found online at [http://srd.alberta.ca/informationcentre/offices.aspx](http://srd.alberta.ca/informationcentre/offices.aspx) or by calling the RITE operator toll-free at 310-0000.

Note: Applicants should check the ASRD website and consult with ASRD for updates and revisions to the application process.
1.4.2 Area Management Plans

Applications submitted to ASRD must conform to the various local and regional land-use planning strategies including Integrated Resource Management Plans (IRM), Watershed Management Plans and Municipal Land-use Bylaws and planning policies. Links to some of these resources are provided in Appendix 2.

Applicants should consult with the local ASRD Range Specialist, Forester and/or Biologist to determine site-specific planning polices that may apply to the project area.

1.4.3 Alberta Sand and Gravel Association (ASGA)

Applicants and existing aggregate operators should be aware that that the Alberta Sand and Gravel Association (ASGA) is available as an industry resource. The ASGA is a non government association that represents the interests of Alberta sand and gravel operators on key industry-related issues and proposed regulatory changes.

Information about the ASGA may be obtained from http://www.asga.ab.ca/aboutus.htm or by phoning their head office in Edmonton at (780) 435-2844.

1.5 Manual Limitations

Peat
The manual does not apply to the mining of peat on public land. For more information related to peat, contact the ASRD Edmonton office.

Pits on Private Land
This manual does not apply to pits located on private land. Pits on private land are subject to the requirements of the Conservation and Reclamation Regulation - Code of Practice for Pits which may be obtained from Alberta Environment at http://www3.gov.ab.ca/env/land/quality/html/use/gravel.html

Other Legislation
The manual should not be used in substitution for other legislation that may apply to land-use development on public land nor should it be considered a complete review of, or interpretation of this legislation. See Section 2.5.3 for information on other legislation that may apply to surface material operations on public land.
### Table 1.0 Dispositions Related to Surface Material Extraction on Public Land

<table>
<thead>
<tr>
<th>Authorization</th>
<th>Material Type</th>
<th>Size Parameters</th>
<th>Term</th>
<th>Location</th>
<th>Consents</th>
<th>Requirements</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface Material Lease (SML) Disposition Reservation (DRS) - issued to govt. agencies</td>
<td>Clay, silt, sand, gravel, marl</td>
<td>Up to 80 ac. (32.39 ha) or greater than 80 ac. (Bonus Bid)</td>
<td>Up to 10 years with renewal option or as directed by the land manager 3 months for Alberta Transportation’s DRSs.</td>
<td>Any location on vacant public land</td>
<td>Requires written consent from any disposition holder, which must be submitted to Land Management Branch (LMB), prior to approval.</td>
<td>See Section 2.0 - Regular referral process – Reclamation certification required under Environmental Protection and Enhancement Act (EPEA). - Authorized by Dispositions and Fees Regulation – Public Lands Act (PLA)</td>
<td></td>
</tr>
<tr>
<td>Public Pit Licence (PPL) Dispositions and Fees Regulation – Public Lands Act (PLA)</td>
<td>Clay, silt, sand, gravel, marl</td>
<td>Maximum volume set for each pit (higher volumes are available with the justification of need)</td>
<td>Up to one year or when the approved volume has been removed</td>
<td>From a designated Reservation held by a Government agency (DRS)</td>
<td>None</td>
<td>See Section 3.1 - Regular referral process. - Letter of Clearance issued upon the confirmation of reclamation.</td>
<td>The licencsee must remove material as directed by the licence conditions of the pit.</td>
</tr>
<tr>
<td>Surface Material Exploration (SME) Section 19 – PLA</td>
<td>Sand, gravel, clay, marl</td>
<td>- Up to 320 ac. (exclusive rights)</td>
<td>180 days</td>
<td>Any location on vacant public land not under a surface material disposition.</td>
<td>Requires proponent to obtain consent from all interest holders prior to entry.</td>
<td>See Section 2.3 - Regular referral process. - Letter of Clearance issued upon the confirmation of reclamation.</td>
<td></td>
</tr>
<tr>
<td>Surface Material Licence (SMC) Dispositions and Fees Regulation – Public Lands Act (PLA)</td>
<td>Clay, silt, sand, gravel, marl</td>
<td>Maximum area 5 ac. (2 ha.)</td>
<td>Up to one year or when the approved volume has been removed or three months for Alberta Transportation’s DRSs.</td>
<td>For extraction proposals not meeting the parameters for borrow pits.</td>
<td>Requires written consent from any disposition holder, which must be submitted to Land Management Branch (LMB), prior to approval.</td>
<td>See Section 3.2 - Regular referral process. - Reclamation certification required under EPEA.</td>
<td></td>
</tr>
<tr>
<td>Authorization</td>
<td>Material Type</td>
<td>Size Parameters</td>
<td>Term</td>
<td>Location</td>
<td>Consents</td>
<td>Requirements</td>
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</tr>
<tr>
<td>Consultative &amp; Protective Notation Reservations (CNT &amp; PNT) (issued to government agencies)</td>
<td>clay, silt, sand, gravel, marl</td>
<td>Unlimited</td>
<td>As determined by ASRD.</td>
<td>Any location</td>
<td>Not required</td>
<td>See Section 3.3</td>
<td>- held by another government agency to identify an interest in a potential surface material source; - placed by the land manager to identify an area having a potential surface material source; - acts as a flag for as a potential surface material area when other land use/conservation decisions are being considered; - an area of known aggregate reserve held by Alberta Infrastructure and Transportation for their future use; - An area of know aggregate reserve held by ASRD for future disposal.</td>
</tr>
<tr>
<td>Temporary Field Authority (TFA)</td>
<td>clay, silt used as fill material (Borrow)</td>
<td>As directed by the land manager</td>
<td>Up to 1 year or as directed by the land manager</td>
<td>Requires written consent from any disposition holder, submitted to the Land Manager, prior to entry.</td>
<td>See Section 3.4</td>
<td>- Used when no other resource concerns (critical wildlife area, Water Act authorization required) exist. - Must meet material type, location, time and size parameters and only used as fill in the adjoining/adjacent disposition. - Used in situations where no royalty is to be collected. However, there are still land value and surface charges.</td>
<td></td>
</tr>
</tbody>
</table>

**Guidelines For Acquiring Surface Material Dispositions on Public Land**  
Alberta Sustainable Resources Development – 2007 Edition
2.0 Surface Material Extraction by Lease Approval (SML)

Surface material extraction by lease approval (SML) is designed for long-term tenure promoting orderly resource development and management through detailed assessment and planning. The SML application process allows ASRD to assess if the subject site is suitable for aggregate production. SMLs are issued based on the geological information substantiating the extent and quantity of the surface material resources as well as the size and environmental sensitivity of the lease.

The main requirements for obtaining an SML are addressed in *The Alberta Aggregate (Sand and Gravel) Allocation Policy for Commercial Use on Public Land, ASRD, March 1, 2006* (Appendix 4A). For planning purposes, SMLs are divided into two categories: leases up to 80 acres in size; and leases that are greater than 80 acres. The application process begins with a resource exploration program followed by an application to obtain a Surface Material Lease. Leases over 80 acres are subject to a public advertisement process known as a Bonus Bid. All SML applications must be supported by a Conservation and Reclamation Business Plan (CRBP).

Depending on the size and location of the SML, the application and approval process can be comprehensive involving several planning steps. A flowchart of the SML approval process is shown in Figure 3.0. A description of the approval process is provided in detail in the following section.

2.1 Surface Material Leases for Sites Up to 80 Acres

Exploration

SML applications must be supported by adequate exploration data that proves the resource quality and quantity. Surface material exploration work is typically conducted under a Surface Material Exploration (SME) which is issued for up to 180 days with no extensions. The maximum size of a surface material exploration approval giving exclusive rights is 320 acres. A non-transferable security deposit of $1,500 is required for each 80 acres, or portion thereof, applied for under a surface material exploration application. Requirements for obtaining Surface Material Exploration Approvals (SME) are provided in Section 2.3.

SML Application

Proponents interested in proceeding with their SML applications must file an application for an SML within 10 days of expiry of the surface material exploration approval. SML applications must include the exploration data including adequate mapping and test data that illustrates test hole locations, horizon profile, and any other data (e.g., photos) that depict the volume and degree of the gravel deposit (see Section 2.3); an acceptable plan showing the proposed lease boundary (see Figure 4.0); a statutory declaration; and required fees. Applicants are encouraged to have test data, methods, and volumes verified and signed by a qualified individual.¹

¹ ASRD will determine the definition of a qualified individual. A member of a professional association with the designation of P.Eng., P.Ag., RPF, or RPFT is initially considered to be a qualified individual under this provision.
Figure 3.0 SML Application Process

**SURFACE MATERIAL EXPLORATION APPLICATION (SME)**
- Submit SME application with sketch to ASRD. Note: SMEs are issued for 180 days. (SEE SECTION 2.3)

**SME APPROVAL**
- If the SME is approved, an approval letter is provided along with the requirements to undertake the work.
- Note: If the SME application is deficient, the applicant will be requested to make the changes within 30 days.

**SURFACE MATERIAL LEASE APPLICATION (SML)**
- Once the SME is completed, the SML application with boundary sketch and exploration results (SME results) must be submitted within 10 days of the SME expiration date to be protected by exclusive application rights. (SEE SECTION 2.3)
- Note: If the SML application is deficient, the applicant has 60 days to make changes.

**BONUS BID**
Note: Sites over 80 acres are subject to the Bonus Bid Process. See Section 2.2.

**SML APPROVAL IN PRINCIPAL**
- If the SML is acceptable, ASRD will issue a letter requesting a CRBP report along with other application requirements.

**CONSERVATION AND RECLAMATION BUSINESS PLAN (CRBP)**
- The CRBP must be submitted to ASRD within 6 months of receiving the Approval in Principal Letter. (SEE SECTION 2.4)
- Note: ASRD will issue a letter acknowledging acceptance of the CRBP. If the CRBP is deficient, the applicant will receive a second letter requesting that the changes be made within 60 days.

**FINAL APPROVAL LETTER/LEASE AGREEMENT**
- Final approval letter is issued stating the security requirement and the need for a legal survey.
- Final Lease is issued pending the security deposit and legal survey.
- (Note: Final approval (after the CRBP is submitted) may take up to 180 days

**COMMENCE OPERATIONS**
Referred to other interested agencies for review
An example plan is shown in Appendix 3E

- Plans must be originals, neat, CAD-generated and created accurate to scale.
- Scale may range from 1:500 to 1:10 000 maximum. (Details may be shown at any scale).
- The plan must not be more than 75 cm (29.5”) in width or 300 cm (118.1”) in length. No plan shall be smaller than 21.59 cm by 27.94 cm (8½” X 11”).
- A margin must outline not less than 1 cm (¼”) from the edge of the plan is to be drawn around all sides of the plan. Large white areas outside of the plan margin must be cropped out.
- Title block or heading must indicate:
  - legal description (township, range, meridian, section and/or plan, block, lot text);
  - applicants/survey company name (no company logos);
  - who prepared plan;
  - surveyor/client file # (optional);
  - purpose of activity;
  - scale of plan along with north arrow;
  - 5cm x 7cm wide space for Technical Service stamp; and
- Text must indicate when within unsurveyed territory.
- Area of the plan to be approved is to be outlined. The outline is to be 3 to 4 times the thickness of the normal line weight of the plan. It must be bold enough to eliminate any possible confusion as to the area that is to be approved under the plan. The outline shall not be dashed or obscure data on the plan.
- There must be full circle bearings and distances to/from survey evidence and on all intervening courses (i.e. pipelines) of the entire activity.
- Found and placed monuments shall be shown and symbols for same clearly explained in the legend.
- Include area of activity, in hectares, within each surveyed quarter section (excluding road allowance).
- Include total area of activity, in hectares, within unsurveyed territory (including road allowances).
- Include total length of activity by widths.
- Label named waterbodies/watercourses. Indicate how the bank was determined.
- The plan must not contain aerial imagery or coloured line work. Line work must be black (grey tones, fuzzy line work and fill/shading will not be accepted).
- If contours are to be shown it shall not obscure any plan data.

Note: Final disposition plans are required to be surveyed & monumented by an Alberta Land Surveyor.

Declaration (Sand & Gravel)
Applicants will be required to provide a signed declaration along with the SML application http://www.srd.gov.ab.ca/lands/formspublications/usingpublicland/default.aspx confirming all of their public land aggregate interests within a six-mile radius of the application area. In cases where the combined total area of an existing lease and any additional aggregate activity held by the proponent exceeds 80 acres, it will be assessed under the same criteria as sites that are over 80 acres.

Conservation and Reclamation Plan (CRBP)
The applicant will be required to complete a CRBP for the site within six months of receiving an Approval in Principal for an SML. The proposed plan must be prepared in accordance with Section 2.4 of this Guideline.
Final Lease Approval
Final approval of the CRBP will include a surface material lease document that will be issued for up to 10 years. Lessees must commence operations on the site within the first four years or the time specified in the CRBP if this time is less than four years. Operations will include reporting of volumes removed from the site on a yearly basis and payment of applicable royalties by a qualified individual.  

Quality Assurance Reviews
ASRD will periodically conduct quality assurance reviews during the term of the lease. This may entail random site inspections and audits of site documentation. Proponents will be required to undertake a pre-determined amount of development work in accordance with the approved CRBP. Progressive reclamation will also be required. Failure to meet performance requirements will result in cancellation of the lease. Renewal of the lease (for up to an additional 10 years) will be based on the findings of the quality assurance review and performance of the lessee.

Other Requirements
Refer to Section 2.5 for other requirements that apply to SML applications.

2.2 Surface Material Leases for Sites Over 80 Acres
Applications for SMLs that are greater than 80 acres will be subject to a Bonus Bid approval process. The bonus bid allows ASRD to allocate larger tracts of public land for aggregate operations based on public needs; general aggregate availability in the vicinity; and the most acceptable method of extraction.

The main difference in the application process (compared to SMLs under 80 acres), is that the SML application must undergo a public advertisement period to allow other interested parties to submit a bid to obtain exclusive rights to the SML.

Advertising for the Bonus Bid
ASRD will advertise the parcel of land by placing a notice on its web site. ASRD will also provide a notice of the advertisement to the Alberta Sand and Gravel Association, Alberta Road Builders, Heavy Construction Association, local paper, field office and the Members of the Legislative Assembly for the area.

In order to provide time for the exploration to be undertaken, the closing date for receipt of bonus bids specified in the advertisement will be around 240 days from the advertisement date. Those interested in submitting bids must do so before the specified deadline.

Bonus Bid Tender Requirements
The main conditions of the tender include:
- Those interested in the parcel are invited to apply for Surface Materials Exploration (SME) approval prior to submitting a bid. Exploration must be completed prior to the closing date of the tender. ASRD will charge a minimum exploration security deposit of $7,000 for up to 320 acres, or $1,500 per 80 acres or portion thereof, for sites over 320 acres. Holders of a SME are responsible for obtaining a Letter of Clearance upon expiration of the authority. Requirements for Surface Material Exploration Approvals (SME) are provided in Section 2.3.
• The lease will be subject to the Public Lands Act and the Dispositions and Fees Regulation.

• Access to the land under disposition is not included as part of the tender. The disposition-holder will be responsible for ensuring that access to the land under disposition is available, and suitable for the disposition holder’s needs.

• This is a one-time bid for the lease rights to the land for the term specified above, and is over and above the regular rental, fees and taxes when applicable. The “bonus” tendered is payable with the bid.

• Following the close of the bonus bid, the results will be announced and the successful party will be notified. Any bid that is improperly submitted will not be considered.

• Upon being advised that a bid has been accepted, should the successful bidder fail to submit any requested items by the dates indicated, the amount tendered will be forfeited and the disposition cancelled.

Requirements of the Successful Bidder:

• The successful bidder must submit a completed SML application form, the necessary fees, and a land survey that meets ASRD’s plan standards within 60 days from the date of notification of the successful bid. The Surface Materials Lease will be issued to the successful bidder only in the name(s) listed on the tender bid submission form. Changes will not be accepted.

• The successful bidder will be required to provide adequate mapping and test data with the SML application (obtained prior to the bonus bid) that illustrates test hole locations, horizon profile, and any other data (e.g., photos) that depicts the volume and degree of the gravel deposit. Test data, methods, and volumes will be verified by a qualified individual1. Failure to meet the requirements, particularly in providing the detailed test data, will result in forfeiture of the bonus bid and cancellation of the application.

• Once an Approval in Principal for an SML has been given, the successful party will be subject to the same conditions as required for sites that are less than 80 acres in size including a Conservation and Reclamation Business Plan, (CRBP), Quality Assurance Reviews and a Signed Declaration (See Section 2.1)

• The successful bidder must submit a CRBP and the appropriate security deposit within six months of notification of the successful bid. Security deposit and timber damage assessment will be based on information provided in the CRPB. Operations are not permitted until the CRBP is approved and appropriate fees are received.

• Approval of the CRBP will include a Surface Material Lease that will be issued for up to 10 years.

• Upon issuing the Surface Materials Lease document, the lessee is responsible for payment of annual municipal taxes and lease rental, plus GST. Annual reporting of the extracted volumes, AOR and payment of appropriate royalties are requirements of the lease.

• The lessee must commence operations on the site within the first three years (rather than four years) or the time specified in the plan, if this time is less than three years. Failure to

1 ASRD will determine the definition of a qualified individual. A member of a professional association with the designation of P.Eng., P.Ag., RPF, or RPFT is initially considered to be a qualified individual under this provision.
meet performance requirements will result in cancellation of the lease. Operations will include reporting of volumes removed from the site on a yearly basis and payment of applicable royalties.

2.3 Surface Material Exploration (SME)

Applications for an SML require an exploration program to determine if commercial quantities of aggregate are present on the site.

The SME approval authorizes the use of mechanized equipment during the exploration program that may result in a physical disturbance to public land, namely test pit digging with a hoe, and test hole drilling with a drill rig. The clearing of vegetation to open access routes or to create exploration lines is also defined as a surface disturbance and as such would require formal approval.

An exploration approval is not required if the use of hand tools or any other prospecting activity is undertaken that does not cause a surface disturbance. However, the operator should obtain the necessary consent from any leaseholder who has surface rights to the land being explored. Any non-disturbance exploration carried out without an exploration approval will not protect the rights to any surface materials located by the exploration program.

An SME application form is provided on the web at:

**Note:** An SME does not guarantee that an SML will be issued. Land in a sensitive area, critical wildlife area or having high recreation potential etc., may not be approved.

**Maximum Size and Statutory Declaration:** The maximum size of an SME is 320 acres and the holder has exclusive rights to any surface material applied for and found within the lands listed in the SME approval. All SME applicants must sign and submit a statutory declaration along with the SME application. The declaration confirms the applicant does not have any active applications nor are they the holder of any other surface material dispositions under the *Public Lands Act* within a six mile radius of the disposition that combined exceeds 320 acres.

A statutory declaration form is available at

**Security Requirements**

The applicant is required to submit a security before an SME is approved by ASRD. The security deposit is $1500.00 for each 80 acres (or portion of) and is refundable when the exploration disturbance area has been reclaimed.

**Timeframe**

Exploration approvals are issued to individuals or companies for a maximum of 180 days. During this time frame, the holder of the surface materials exploration (SME) approval has exclusive rights to explore for surface materials and ASRD will not accept any applications for surface material exploration or development within the SME area.
At any time during this 180-day period, the applicant may make application for either a surface materials lease (SML) or a surface materials license (SMC), however once the SME holder applies for an SMC or an SML, regardless of whether or not the 180 days has expired the SME is cancelled as the holder has chosen the area of interest. It is, therefore, in the best interest of the SME-holder to complete exploration on all the lands in the SME area to ensure the land area they select is best suited for their needs, before making an application for development.

During the conduct of the SME program, the holder of the SME approval must ensure that all terms and conditions of the exploration approval are complied with. This means contacting all parties with a registered interest in the area and ensuring that their interests are protected. Land use dispositions may be obtained from LSAS reports on the web at http://www.energy.alberta.ca/OurBusiness/1019.asp. Guidance on identifying land uses and interpreting LSAS reports can be found in Section 5.0.

Once the 180 day plus 10 day grace period has expired, the holder of the now cancelled SME may still make application for an SMC or an SML, however they no longer have exclusive rights and other companies may apply for an exploration program or development in the area. Since aggregate is allocated on a first-come, first-served basis, the new application will take priority.

**Reclamation and Letter of Clearance**

A letter of clearance is required for the approved exploration area that has been disturbed by the applicant which is not included in a follow-up approval for a surface material lease/licence. If the lease application is not approved, the applicant is responsible for reclaiming all disturbed areas governed by the surface material exploration authorization. A letter of clearance application can be obtained from the web at http://www.srd.gov.ab.ca/lands/formspublications/managingpublicland/default.aspx.

**Application and Submission Information**

All SME applications must be accompanied by a sketch showing the limits of the proposed SME, approximate bearings and distances relative to the survey fabric, and all intervening courses for the entire activity. Figure 5.0 provides the requirements for SME disposition sketch plans and an example SME Sketch is provided in Appendix 3D.
Figure 5.0 Content Requirements for SME Disposition Sketch Plans

An example SME Sketch is provided in Appendix 3D.

- Plans must be originals, neat, CAD-generated and created accurate to scale.
- For base map, the cadastral or DIDs Base Feature base is acceptable for use.
- Scale may range from 1:500 to 1:10 000 maximum (Oilsands areas may use 1:20 000, 1:25 000, 1:30 000 maximum). Show “Detail” drawing when required.
- The size of the plan must not be more than 75 cm (29.5”) in width or 300 cm (118.1”) in length. No plan shall be smaller than 21.59 cm by 27.94 cm (8½” X 11”).
- A margin outline not less than 1 cm (¼”) from the edge of the plan is to be drawn around all sides of the plan. Large white areas outside of the plan margin must be cropped out.
- Title block or heading must indicate:
  - legal description (township, range, meridian, section and/or plan, block, lot text);
  - applicants/survey company name (no company logos);
  - who prepared plan;
  - surveyor/client file # (optional);
  - purpose of activity;
  - scale of plan along with north arrow; and
  - 5cm x 7cm wide space for technical service stamp.
- Road allowances and section lines in unsurveyed territory must be shown as dashed lines. Text indicating ‘Unsurveyed Territory’ within sketch is required.
- Proposed SME boundary is to be outlined. The outline is to be 3 to 4 times the thickness of the normal line weight of the plan. It must be bold enough to eliminate any possible confusion as to the area that is to be approved under the plan. The outline shall not be dashed or obscure data on the plan.
- Proposed approximate full circle bearings and distances are required on all SME boundary lines that do not follow township section or LSD lines. Any disposition to be excluded within the SME requires the approximate bearings and distances.
- Size of SME, in hectares, within each surveyed quarter section must be indicated.
- Size of SME, in hectares, within unsurveyed territory (including road allowances) must be indicated.
- Label named waterbodies/watercourses.
- Show all existing dispositions within proposed SME area. For Oilsands no dispositions need to be shown.
- The plan must not contain aerial imagery or colors (must be monochrome). Line work must be black (grey tones, fuzzy line work and fill/shading will not be accepted).
- If contours are to be shown it shall not obscure any plan data.

Operational Requirements (not for Technical Service use):
- Use ‘TH’, ‘X’ or other symbols to indicate proposed test hole locations. Identify as such in the legend.
- Delineate all new and existing access.
- All developed roads or active LOC access must be shown and drawn using linework representing the perimeter of the road.
- Show any proposed cutlines or trails that will be used to gain access to test area.
- Show all creek crossing and the method of crossing to be used (i.e. log fill (lf), snow fill (sf), fording (f)).
2.4 Conservation and Reclamation Business Plan (CRBP)

All SML applications require an approved Conservation and Reclamation Business Plan (CRBP). The CRBP must be submitted within six months of the applicant receiving an approval in principal for the SML.

The CRBP is essentially a detailed plan describing how the applicant proposes to develop the aggregate resource and resolve any related environmental and/or land-use issues. The end-land use must be clearly defined in the CRBP.

The information in the CRBP provides ASRD and other government agencies that may have an interest in the project with the necessary information to determine if the project can proceed or if modifications are required to meet ASRD’s requirements. It also provides the applicant with a business management plan to carry out the project with regard to environmental standards and industry related best management practices (BMPs).

Applicants should discuss the proposed contents of their CRBP report with the local ASRD office to determine the scope of work and the need to retain professional assistance. This is because SMLs located in environmentally sensitive areas may require a more detailed CRBP.

Environmentally sensitive areas may exhibit one or more of the following characteristics:

- on or near a watercourse/high or fluctuating groundwater table;
- in close proximity to a populated area including a First Nation Reserve or Métis Settlement;
- located within or near a key wildlife area;
- located in an area that may contain rare plants or plant communities;
- areas with multiple-use activities;
- areas having high historical or paleontological importance;
- areas in the foothills fescue native grassland; and
- areas that are highly erodible or unstable.

The information requirements for a CRBP are shown in Figure 6.0. Applicants should refer to Sections 4 - 9 of the Guideline for guidance on acquiring the necessary information to compile a CRBP report.

CRBPs must be formatted under suitable headings and submitted as professional bound reports. An example of Table of Contents is provided in Appendix 5.
Figure 6.0 Content Requirements - Conservation and Reclamation Business Plans

CRBP Contents: The CRBP must provide the following information as a minimum:

- a brief history of the project operator and the market conditions;
- a description of the aggregate resource and proposed site operations;
- potential regulatory and planning policy requirements that may be triggered by the project;
- analysis of biophysical/land use conditions that may be affected by the project and a description of proposed mitigation measures; and
- sequential plans for site development, operation and reclamation of the pit

CRBP Report Format: The above noted information must be compiled into a CRBP report. An example Table of Contents is included in Appendix 5.

CRBP Appendices: The CRBP must also include the following Appendices as a minimum: (Sample drawings are provided in Appendix 3).

<table>
<thead>
<tr>
<th>Drawings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site Location Plan must show the property limits and location relative to the nearest population centre. A topographic map is suitable. (see appendix 3a).</td>
</tr>
<tr>
<td>SML Sketch Plan and Exploration Plan must showing the lease boundaries (scaled and matching the dimensions of the approved boundaries) township grid (section lines, road allowances), location of test holes, location of existing pit(s) access roads, buffers and adjoining or adjacent interests (within 100 m of lease boundaries) such as highways, power lines and pipeline rights of way or other extraction sites (see appendix 3e and 3f).</td>
</tr>
<tr>
<td>Biophysical Land-use Drawing must show the environmental and land use features, including hills, gullies, water bodies, trees, vegetation, wildlife, existing buildings etc. This is a conceptual drawing of the landscape and it need be approximate only (see appendix 3b). Wildlife information can be shown on land management referral mapping if applicable. (see appendix 3c).</td>
</tr>
<tr>
<td>Site Development and Operations Drawing must show the proposed site operations and improvements such as crushers, stockpile areas, fuelling areas etc. the plan should also show the cross section locations (see appendix 3g).</td>
</tr>
<tr>
<td>Phase Development Drawing must show the sequential stages of development including the excavation footprint and all areas to be developed outside of the excavation footprint (e.g., stockpiles, crusher area). (see appendix 3h).</td>
</tr>
<tr>
<td>Reclamation/Closure Drawing must show a conceptual drawing showing the landscape features of the reclaimed pit area. The original land surface can be added to show clearly the difference between original and reclaimed ground levels. (see appendix 3i).</td>
</tr>
<tr>
<td>Pre-Development Cross Section Drawing must show the pit and adjacent areas in profile, as though a section has been cut away. These drawings show the surface landscape, as well as the thickness of the topsoil, overburden, surface material being extracted, water table and bedrock if applicable. Topography maps, air photos or a topographical survey can provide the surface elevation information which can be transposed on to the cross sections. (see appendix 3j and 3k).</td>
</tr>
<tr>
<td>Post-Development Cross-Section Drawing: Cross-sectional drawings show the reclaimed pit and adjacent areas in profile, as though a section has been cut away. These drawings show the surface landscape, surface slope, as well as the thickness of the topsoil, overburden, surface material being extracted, water table and bedrock, if applicable. The depth is to be shown on the cross-sectional drawings, and is required where the water table will be within three feet (one metre) of the reclaimed pit surface. Reclamation grade: the depth of layers that are removed and replaced should be used to determine the surface elevation of the reclaimed pit (see appendix 3j and 3k).</td>
</tr>
</tbody>
</table>

Records

- Exploration Data: Test hole locations surface elevations, test hole coordinates and soil logs, sieve analysis, lab reports (See Appendix 3L and 3M).
- Other Records: LSAS records, land use zoning records, water well records, etc.
- Site Photos: Photos of Test holes, test pits and important environmental and land use features.
2.5 Other SML Requirements

2.5.1 Legal Responsibilities for Lease Boundaries

A legal survey must be carried out and monumented by an Alberta land surveyor for all SMLs and be submitted to ASRD after the CRBP acceptance letter has been issued. The physical lease boundaries must be exactly as they are described in the lease.

Once the lease has been approved, the operator should ensure that the boundaries are well marked on the ground and that control points are established (permanent reference markers) to measure all development parameters (area cleared of vegetation, topsoil stripping area, overburden stripping, pit size, reclaimed area). This ensures that the occupied lands are consistent with the legal description of the lease, as specified in "Appendix A" of the lease agreement. It also ensures the operation is as described and will not encroach on other interests.

Figure 4. Provides the requirements for a SML Survey Plan. All disposition survey plans submitted to the department must meet this standard or the SML will not be approved.

2.5.2 Land Disposition-Holder Permission

Applicants must notify and provide written consent from certain disposition-holders that may be affected by the lease before an approval is granted, specifically Forestry Management Agreements-holders (FMAs), Commercial Timber Permit-Holders (CTPs) and Grazing Lease-Holders (GRL).

Applicants must also notify and obtain consent from other registered disposition-holders that may be affected such as LOC-holders, oil and gas operations, etc. Permission is also needed for any access roads on private land and other infrastructure that forms part of the pit.

As part of the notification process, it is important to discuss current and final land use (following reclamation) with the affected disposition-holders to ensure they concur with the plans. Only upon issuance of a reclamation certificate by ASRD, or a transfer of the application to another operator, can any surface lease agreement with the disposition-holder be surrendered.

The applicant must retain any written authorizations or records of consultation and must be prepared to produce them to ASRD at any time.

Reference should be made to Section 5.0 to identify land uses that may be affected by the development.

2.5.3 Other Regulatory Requirements

An approval obtained under the Public Lands Act does not guarantee the right to operate on an SML as other legislation may apply to the development including but not limited to:

- the Provincial Water Act;
- the Provincial Forest Act;
- the Federal Fisheries Act;
- the Species at Risk Act (SARA);
- the Migratory Birds Convention Act;
An application submitted to ASRD could be referred to any one of these government agencies should they have jurisdiction over the project and/or if it is deemed that they have a vested interest in the project. It is up to the application holder to determine and obtain the necessary approvals and abide by all applicable Codes of Practice.

A summary of government statutes and policies (directives) that may apply to the development and operation of an aggregate deposit is provided in Appendix 4B.

Note: ASRD generally does not require proof that other related regulatory approvals have been obtained before issuing a license or lease. However, once pit operations start, the application holder maybe required to show a copy of all required approvals upon request by ASRD. Some regulatory approvals can take up to a year to process.

2.5.4 Security

The SML cannot be authorized until security for the pit, in an amount and form acceptable to the ASRD, has been provided to the ASRD. Security is typically calculated at $1000.00/acre based on the proposed disturbance area of the SML (typically clearing and ground disturbance). If the applicant intends to develop the SML sequentially, (in other words entire lease is not cleared at once), the security will be based on the area outlined in Phase 1 of the development plan, still at a rate of $1000/acre. For example, a 20-acre SML with a 10-acre phase 1 development area will require a $10,000 security deposit.

2.5.5 Royalties and Fees

Information on royalties and fees may be found in the pocket at the back of the Guideline and ASRD website.

2.5.6 Access Requirements

All leases must have legal access before the lease will be authorized. The intended road access must be described in the CRBP and noted on the plans.

Access from Private Land

If the site is accessible only by crossing private land, an agreement must be obtained from the landowner.

Existing Access on Public Land

Often, the access road required to reach the intended location already exists, and the applicant may be required to obtain permission or a formal approval from the owner to use it, even if this means using only a small portion of the road. If access is by way of a road that is legally held by another party, then a road-use agreement with the holder of that authority may be required. Access from a secondary road or highway may require an Access Development Permit from Transportation or the local road authority.

New Access on Public Land

If a new road must be constructed, or if no other authority administers an existing road, an application must be made for a Licence of Occupation (LOC), which will be approved with
the SML. To ensure that this occurs, LOC applications should be forwarded along with the SML application to the ASRD Disposition Services Branch. LOCs are separate applications and may be completed electronically http://www.srd.gov.ab.ca/lands/onlineservices/ea.aspx

Note: ASRD does not become involved in road use agreement negotiations between applicants and road right-of-way owners. If an agreement cannot be reached between the two parties, an appeal may be made to the ASRD Lands Division to resolve the situation. Appeals must be made in writing and be addressed to the Director. All commercial users of Licences of Occupation are expected to pay a fair rate for maintenance and usage.

2.6 SML Submission and Approval Process

The approval process that is undertaken once an SML application and CRBP report are submitted to ASRD is shown in Figure 7.0 and summarized below:

2.6.1 SME and SML Applications

SML applications must be filed through ASRD’s Electronic Disposition System (EDS) at http://srd.alberta.ca/lands/formspublications/usingpublicland/default.aspx#EDS EDS is an online service that allows clients to submit specified applications/amendments and documents for surface dispositions to SRD electronically. Applications that are accepted by EDS for uploading to Land Standing Automated System (LSAS) will be assigned an activity number by EDS and emailed back to the client along with a copy of the application.

All other applications including SMEs must be filed manually. An SME application form is provided on the web at http://www.srd.gov.ab.ca/lands/formspublications/usingpublicland/default.aspx. Eventually all ASRD-related applications will be online. Please check the website to get updated information.

Required plan requirements to be included with the applications can be found at http://www.srd.gov.ab.ca/lands/formspublications/usingpublicland/default.aspx#pr

2.6.2 CRBP Submission

• Nine copies of the CRBP must be submitted and approved before any removal of surface materials may begin. The submission must also include one electronic copy of any accompanying reports (i.e., CRBP) recorded on a CD in PDF format. The submission must be sent to: Alberta Sustainable Resource Development 3rd Floor, 9915-108 Street, Petroleum Plaza South Tower, Edmonton, AB T5K 2G8 This office will then send it to the appropriate region for processing.

• ASRD will advise the applicant of any deficiencies in writing, and may not move forward with the SML application until the required CRBP information is provided. The applicant is responsible for obtaining the required information and submitting a revised application to the appropriate ASRD office.
Note: ASRD does not normally issue approvals with conditions, as such, any omission of data or incorrect data will result in the application being rejected and all accompanying reports being returned.

• If a corrected CRBP is not received within the 60-day period, the application will be cancelled. If all required pages are submitted, the CRBP will be referred to the appropriate ASRD field office for review.

• ASRD will also forward the CRBP to other government agencies who may have an interest in the project. Based on input from other agencies, the land manager will ultimately decide if the proposed development is congruent with regional land management objectives.

• Once the CRBP is deemed complete, ASRD will review the applicant’s security and/or applicable timber charges (see Section 2.5.4). ASRD may request further information from the applicant or, if the security is not acceptable, ASRD may request additional security as well as any outstanding consents that are required (FMA, CTP, grazing lease).

• No activities may be carried out at the pit until ASRD has provided a copy of the approval to the applicant making them the disposition-holder. The disposition-holder then becomes responsible for the proper implementation of approval and all prescribed conditions. The disposition-holder may allow other people to use the pit but the disposition-holder is responsible for ensuring compliance with the approval by all users of the pit.

• A copy of the lease document and CRBP must be kept at the pit, and all persons carrying out activities at the pit be made aware of the CRBP content and applicable regulatory requirements (e.g. Fisheries Act, Water Act). Any significant changes to the scope of the design plans may require a reassessment to predict the potential impacts associated with those changes.

• The application-holder should appoint a person who will be completely familiar with the pits operations and the requirements of the approval in the field. Ideally this is the person identified in the application as the primary contact. This person should, in turn, ensure that all persons carrying out activities at the pit are aware of the regulatory requirements and the company’s environmental operating guidelines.

Note: In reviewing all applications, public projects take priority. Therefore, if a government department has already determined a specific need exists in a particular area, through a Consultative or Protective Notation identifying the area of interest, that need will be filled first. Second, ASRD requires information, reports and monies to be sent to the department within a specified time, along with a justification for the use of all surface materials on that land. Based on the applicant's test results, the area of land requested may be reduced based on the amount of material found in combination with the projected needs.
Figure 7.0  Flowchart of SML Application Review Process

Application made for SML:
> Application received at the Land Management Branch (LMB)

Land Management Branch (LMB):
> LMB Reviews application information, test data, legal access
> Technical Services Section ensures plan standards are met
> LMB reviews program to determine who the lead agency will be and what agencies have a registered interest in the area
> If the information is inadequate, a letter is sent to the applicant that the application will be canceled in 30 days if the information is not received
> If the information is suitable, a letter of acknowledgement is sent to applicant

LMB refers application to Lead agency and any registered interest holders:
> Application is referred to the ASRD field office and registered referral agencies

Field review of lease area application:
> Referral agencies review application and forward comments to the local ASRD
> The local ASRD office reviews concerns of referral agencies, co-ordinate them with their own and forward package to LMB
> If the lead agency feels additional information is required, LMB will forward a letter to the applicant requesting additional information

LMB issues Approval in principal forwarded to the applicant:
> If extraction is deemed an acceptable land use, LMB will advise the applicant that ASRD has no objections to their lease application and will request the applicant to provide a CRBP within six months
> If the lead agency deems the activity is not an acceptable land use, LMB will cancel the application and place a restrictive PNT on the area

CRBP is forwarded to the lead agency & registered referral agencies for review:
> The CRBP is referred to the lead agency, registered interest holders
> The lead agency will compile field comments and forward them to LMB
> LMB will either forward the comments to the applicant or request more information
> LMB will have a final review of the lease and CRBP conditions before signing off the application.
> Once it is determined that the lease and CRBP can be approved, LMB will request the applicant to provide the survey and consents

Letter of approval issued covering both the lease and the CRBP:
> Approval issued once the consents and survey received
2.7 Post Approval Requirements

2.7.1 Change in Status and Failure to Comply
Disposition-holders must notify ASRD if any of the following changes occur.

2.7.1.1 Changes to Corporate Status
Disposition-holders must notify ASRD if there are any actions related to bankruptcy, creditor protection, appointment of a receiver or receiver-manager, or seizure of assets. Disposition-holders should also notify ASRD if there are any changes to the corporate status of the application-holder or changes in the contact information for individuals designated by the application-holder as the primary contact for the pit.

2.7.1.2 Plan Amendments
Leases can be amended to add new areas or delete areas that are no longer required.

If an area of the lease is mined out, or if it is decided that a portion of the lease is no longer required, the disposition-holder may choose to amend the lease area to delete that area of the lease. The main benefit to deleting an area out of the SML, is that the disposition-holder is no longer required to pay rental on the area removed and will be refunded that portion of the security deposit held for the area removed.

When a disposition-holder is deleting land from the lease area, they will be required to provide the following items:

- a reclamation certificate for land being deleted;
- an amendment application for to delete lands along with the related fees;
- a survey plan showing the new lease area; and
- an amended conservation and reclamation business plan.

If an area is being added to the lease area, the disposition-holder will be required to provide the following items:

- test data for the area being added;
- an amendment application for the added land along with related fees;
- a statutory declaration regarding no other gravel extraction lands are held within a six-mile radius and are not more than 80 acres;
- a survey plan showing the new lease boundary; and
- an amended conservation and reclamation business plan.

An amendment form is available on the Electronic Disposition System (EDS) [http://srd.alberta.ca/lands/formspublications/usingpublicland/default.aspx#EDS](http://srd.alberta.ca/lands/formspublications/usingpublicland/default.aspx#EDS)

2.7.1.3 Renewal of Lease
Most lease approvals are issued for a period of 10 years. ASRD will review its records to determine if the lease is in good standing and to see if any additional items are required to make the lease current with department standards. ASRD will contact the holder six months prior to the expiry of the term to determine if the holder wishes to retain the lease.
or not, and to advise what requirements must be met to retain the lease. SRD Edmonton will do the notification.

In order to be deemed as being in good standing and current with departmental standards a lease must posses the following:

- current required payments to the department;
- a CRBP that meets present requirements;
- a lease operated in accordance with the existing conservation and reclamation business plan and lease approval conditions; and
- a lease that has been surveyed by an ALS surveyor.

Although the Department will generally renew all leases in good standing, it does reserve the right to cancel leases where land-use priorities in the area have changed, making an extraction operation no longer a suitable activity.

### 2.7.1.4 Assignments

An assignment allows a disposition-holder the ability to transfer surface materials lease (SML) to another party (i.e. person or company). The assignment should be completed on the LD02 (Assignment of Disposition – General) form available on the website. The following are the general requirements necessary to register an assignment of a Surface Materials Lease.

1. Lease must not be expired.
2. The assignment document must:
   - be original;
   - be unconditional;
   - show the consideration;
   - be executed (seal or affidavit);
   - if there is more than one assignee, joint tenants or tenants in common (with the percentage for each holder) must be indicated;
   - contain the assignee address and phone number; and
   - if the assignee is a corporation it must be registered with the Corporate Registry, Alberta Government Services)
3. Assignment Fee (see back pocket) must be included.
4. There must be written verification from the taxing authority that all taxes with respect to the site are current.
5. The balance in the lease account must be current.
6. If the current security deposit is cash, the assignor may choose to provide confirmation that the existing security deposit may be transferred to the assignee. If this not desirable, or if the security deposit is a form other than cash, the assignee must replace the security deposit in a form acceptable to the department.
7. The Assignor must provide the current lease document and approved operating plan or conservation and reclamation business plan. If one cannot be supplied to the department, one may be purchased from the department at cost. If a copy of the plan
for the lease is required, please contact IHS AccuMap in Edmonton, Alberta at (780) 413-3380.

8. Access to the lease must be indicated and included in the assignment if applicable.

9. A surface materials return (Form LM 17A) from the date of the last return to the date of the assignment must be submitted and royalties paid on any material moved in that period.

10. Any encumbrances registered against the lease must be discharged prior to the disposition being assigned.

An assignment is not considered registered until the department provides written confirmation of the registration.

2.7.1.5 Failure to Comply and Develop

The lease is subject to cancellation if an operator fails to comply with the annual requirements, the lease conditions, or any request of the Minister. Reclamation is still required and a reclamation certificate must be issued before the security deposit can be released. Once reclamation is complete and provided, the disposition holder is not indebted to the Crown and the security deposit is released.

Possible reasons for cancellation include:

- failure to comply with the conditions of the lease;
- expired or non-renewed lease;
- SML developed beyond the specified vertical and horizontal limits;
- failure to develop an area within the time specified on the lease or not using the area as specified on the lease;
- failure to submit returns and operating reports;
- non-compliance for environmental reasons; and
- failure to submit money owing.

Developing the SML beyond the specified limits or failure to develop an area within the time specified on the lease or not using the area as specified on the lease (activities outside of intended use) may result in cancellation of the lease and forfeit of any security deposit held by ASRD. Reclamation is still required if the area has been disturbed and a reclamation certificate must be issued, whether the site has been disturbed.

Operations terminated for environmental reasons must be identified and the reasons justified by written confirmation from departmental staff. These justifications must include an outline of the environmental problem and evidence that the operator was given an opportunity to mitigate the problem.

Reclamation must still be completed, and a reclamation certificate must be obtained. The security deposit is released once the reclamation certificate is issued. A form is mailed to the applicant to complete before an inspection is made for issuance of a reclamation certificate. Once the entire pit has received a reclamation certificate, the lease-holder may apply to have the lease terminated.
2.8 Monitoring and Reporting Requirements

ASRD requires various types of reporting that the application holder must comply with. Other reporting requirements, such as environmental reporting, are not mandatory but are strongly encouraged.

2.8.1 Non-Compliance Reports

Contraventions to the conditions of the lease or the specifications outlined in the CRBP must be immediately reported to the nearest local ASRD office. http://www.srd.gov.ab.ca/fieldoffices/default.aspx

The reporting provides an opportunity for the application-holder to indicate what happened and why, and what will be done in the future to prevent similar problems in the future. Failure to report a contravention is a violation of the Act.

2.8.2 Annual Reports

Annual returns are required to report volumes removed through an SML. When reporting the volume removed in the past year (anniversary date), the operator must provide a breakdown with the following details:

- dates on which the material was removed;
- contractor's invoice or truckers' ticket numbers;
- specific types of material removed (for example, the type of surface material);
- volume of extracted material in cubic yards or cubic metres;
- name of the purchaser/contractor;
- how the material was used (e.g., concrete, construction, fill); and
- was the material used by public works (provide confirmation letter).

For SML-approvals, royalty payment based on the removed volume must accompany the return. In addition, an operator is to submit an annual operating report to accompany the annual return. Figure 8.0 highlights the main information that is typically required in an AOR report. An Annual Operating Report (AOR) form is available on-line at http://www.srd.gov.ab.ca/lands/formspublications/usingpublicland/default.aspx

A site plan showing the development status of the operation should accompany the Annual Report. If no activity has taken place as planned or approved, a letter stating the reason for inactivity is required along with the accompanying annual return.

The operator is reminded that if the submitted annual operating report does not reflect the development status or volumes reported by the returns, a contour survey may be requested by ASRD. The applicant must report all deviations to the CRBP including reasons for the deviation.
### Figure 8.0 Annual Operating Reporting Requirements for an SML

<table>
<thead>
<tr>
<th>Part A</th>
<th>Total area of lease that has been cleared of vegetation ( ) ha</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total area where the top soil has been stripped off ( ) ha</td>
</tr>
<tr>
<td></td>
<td>Total area where the overburden has been stripped off ( ) ha</td>
</tr>
<tr>
<td></td>
<td>Total area where extraction has been completed ( ) ha</td>
</tr>
<tr>
<td></td>
<td>Total area where extraction is partially completed ( ) ha</td>
</tr>
<tr>
<td></td>
<td>Total area under reclamation (top soil replaced) ( ) ha</td>
</tr>
</tbody>
</table>

**Part B**

Provide a sketch on a scale drawing (preferably using the same scale as the original development plan) showing the outline of the above noted areas plus the location and type of stockpiles and also updated drawings of your original cross section locations showing excavation depths and activities.

**Part C:**

<table>
<thead>
<tr>
<th></th>
<th>Volume of stockpile of surface materials processed ( ) Yds³</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Volume of stockpile of reject material ( ) Yds³</td>
</tr>
<tr>
<td></td>
<td>Volume of reject material used for reclamation ( ) Yds³</td>
</tr>
<tr>
<td></td>
<td>Volume of top soil stockpiles ( ) Yds³</td>
</tr>
<tr>
<td></td>
<td>Volume of top soil used for reclamation ( ) Yds³</td>
</tr>
<tr>
<td></td>
<td>Volume of overburden stockpiles ( ) Yds³</td>
</tr>
<tr>
<td></td>
<td>Volume of overburden used for reclamation ( ) Yds³</td>
</tr>
</tbody>
</table>

**Conversion factors:**

- 1 cubic meter = 1.308 cubic yards
- 1 cubic yard = .764 cubic meters
- 1.2477 tones of gravel = 1 cubic yard
- 1.0435779 tones of sand = 1 cubic yard

- Based on additional clearing, additional security and/or timber charges may be required.
2.8.3 Environmental Reports

To ensure implementation and compliance with the conditions of the Lease and the specifications in the CRBP, the disposition-holder is encouraged to provide the following supplementary information with all annual operating reports:

- records of communication with government agency staff and site personnel about environmental policies and requirements;
- records of inspection of all activities to ensure compliance with terms and conditions of approvals and permits including the CRBP;
- documentation of site activities by field notes and photographs;
- visual monitoring of water quality and erosion within the project area, to make sure standards are not compromised;
- records for all activities related to environmental protection will be retained in a project file on-site. Such records will include permits/licences/approvals, SML/SME applications, test results, manifests, environmental incident and spill reports, notification forms, inspection records, material safety data sheets (MSDS), all alterations and upgrading of environmental protection controls, environmental assessments, reports, plans and specifications; and
- reports on any environmental incidents and follow up with an investigation and a plan for corrective action.

2.8.4 ASRD Site Inspections

Leases are inspected periodically by ASRD officers to ensure that operations are progressing according to the approved plans. Listed below are certain aspects of a surface material operation that may cause problems if not properly addressed by an operator.

Trespass

Any activity the operator conducts outside his lease boundary may be an act of trespass that may result in a penalty. In addition, if the surface material removed by the operator belongs to someone else, civil action for loss or damage is also possible.

Non-Compliance of Operating Conditions

Any operation conducted outside the approved operating area, or any operating condition not complied with, is subject to penalty.

Environmental Damage

During a site inspection, departmental officers check environmental conditions. If existing or potential damage is noted, the operations may be altered or suspended.

2.9 Site Closure and Reclamation Certification

2.9.1 Reclamation Certificate

Under the Public Lands Act, the liability of an SML is effective until the disposition holder has obtained a reclamation certificate from ASRD. The disposition holder must apply to ASRD for the reclamation certificate and provide the required information stated in the
application along with the application fee. The application should be submitted within five (5) years of the reclamation work being completed. The application must verify that the conditions of the CRBP, specifically the reclamation plan have been met, including but not limited to the following guidelines:

- all improvements have been removed;
- brush disposal is complete; and
- backsloping and recontouring is complete and revegetation is complete and successful.

ASRD will subsequently inspect the lease to ensure that it has been adequately reclaimed and the site warrants a reclamation certificate.

It is important to note that the operator must complete the reclamation work, and then apply for a reclamation certificate. Rental and taxes must be paid until the date this certificate is issued. The disposition is cancelled effective the date of the reclamation certificate. The security deposit is then refunded if the operator is not indebted to the Crown.

Details on the reclamation certificate process are described in EPEA and the Conservation and Reclamation Regulation. [http://www.environment.alberta.ca/3.html](http://www.environment.alberta.ca/3.html) Leaseholders should review the information requirements in the application listed in the Conservation and Reclamation Regulation and then contact the local ASRD office if there are any questions.

Guidelines for preparing a reclamation plan are provided in Section 9.0 and sample plans are provided in Appendix 3. The information required in the application must include a drawing showing the site in both plan-view and cross-section. The plans must also show surface landscape features of the reclaimed pit area. This is a conceptual drawing of the pit area after it is reclaimed. The original land surface can be added to show clearly the difference between original and reclaimed ground levels.

A reclamation certificate request form is available on the web at [http://www.srd.gov.ab.ca/lands/formspublications/managingpublicland/default.aspx](http://www.srd.gov.ab.ca/lands/formspublications/managingpublicland/default.aspx)

### 2.9.2 Liability

The leaseholder continues to remain liable for conservation and reclamation issues at the site until a reclamation certificate is issued. As well, under the *Environmental Protection and Enhancement Act* and the Conservation and Reclamation Regulation, the leaseholder remains liable for reclamation issues that arise on the site for five years after certification. These reclamation issues can only be ones that were not apparent at the time the certificate was issued. Also, the leaseholder remains liable forever for contamination issues resulting from their activities at the pit after the reclamation certificate is issued.
3.0 Other Dispositions
This section provides guidance on obtaining approvals for public pit licences (PPL) and surface material licences (SMC) which are generally associated with extracting smaller volumes of aggregate over a short timeframe.

3.1 Public pit Licences (PPL)
Public pit licences, or PPLs, are issued for extraction from government-held extraction sites. These sites are typically held by ASRD or Alberta Transportation, under disposition reservations (DRS) in situations where there is:

- a limited source of material (i.e. only one viable source for all users in an area);
- a limited demand (i.e. there is a need for a public source to accommodate small volume demands) either because there is a lack of sources, or environmental impact control is being implemented as a land-management strategy.

A pit manager will be selected through a request for proposal (RFP) process. The successful proponent (company or individual) will be responsible for operating the pit and making aggregate available to applicable operators. Operators can access their surface material needs, and providing it meets the allowable volume requirements, can obtain instant approval by obtaining a PPL from ASRD.

Following are some conditions and requirements for PPLs.

- PPLs are issued to individuals or companies for up to one year. Once a PPL has been issued, the operator has until the expiry date, usually one year from the effective date of licence, to remove the material applied for.

- The volume to be removed is specified in the licence and all fees are paid in advance (see back pocket of report). The maximum volume of material that can be extracted is different for each pit. Amounts larger than the licence’s maximum limit can be approved by the issuing office with a written request validating the need (specify material-use and project location). This written request is sent to the Land Management Branch in Edmonton along with a copy of the licence, by the issuing office.

- A licence can be issued immediately at any ASRD field office or through the Edmonton office (there is no referral period). A surcharge is collected to cover the cost of reclamation.

- Within non-onsite management pits, the operator is responsible to operate in the area dictated by the holder of the public pit. The clearing of vegetation, stripping of topsoil and overburden is to be carried out by the operator as directed by the holder of the public pit. The extraction operation must be co-ordinated with any other operator who may be working the pit at the same time.

- All extraction faces created by the operator are to be re-sloped as specified by ASRD staff.

All registered PPLs are shown on the LSAS. A copy of the PPL application along with information about the pit requirements can be obtained at any ASRD office.
3.2 Surface Material Licences (SMC)

Surface material licences or SMCs are designed for quick approval of small volume requirements in areas where the surface material source will likely not have an ongoing demand. The maximum allowable disturbance area is five acres. Following are the main requirements for SMCs.

- SMCs are issued for up to one year to individuals or companies and permit the removal of a specific volume of surface material from a specified area.

- The SMC application must be supported by an SMC Operations and Aggregate Field Report, Sketch (Figure 4.0), Statutory Declaration, test data if available and required fees.

- The submission is reviewed by the ASRD land managers and any other concerned agencies. The volume of aggregate to be removed and the allowable disturbance area (no greater than five (5) acres) is specific in the licence and all fees are paid in advance.

- Approval of the application will identify the restrictions that may be imposed on such an operation.

- Once approval has been issued, the licencee is responsible for accurately establishing and marking the boundaries.

- Obtaining a reclamation certificate is the responsibility of the licencee.

- The Security Deposit is refunded upon the issuance of a reclamation certificate.

An application for an SMC is available online at [http://www.srd.gov.ab.ca/lands/formspublications/usingpublicland/default.aspx](http://www.srd.gov.ab.ca/lands/formspublications/usingpublicland/default.aspx)

3.3 Surface Material Extraction Government Reservations

Government agencies have public land interests held throughout the province under Consultative Notations (CNT), Disposition Reservations (DRS), Holding Reservations (HRS), and Protective Notations (PNT).

**Consultative Notation (CNT)**

This entry does not impose any land use restrictions but indicates that an agency has declared an interest in the land and wishes to be consulted prior to any commitment or disposition being issued on the land. In some cases, government held CNT pits can be made available for public use and maybe open to surface material exploration, licence or lease applications. The applicable government agencies review all such applications and can reject or restrict any proposal where their projected needs require the resources.

**Disposition Reservation (DRS)**

This is a reservation held by an agency for a specific purpose and is equivalent to a disposition for immediate use of the land. Some reservations have been flagged by various government agencies to provide resources for ongoing and future public projects. For example, Alberta Transportation often maintains pits strictly for its use in constructing and maintaining the public highway system. DRS Reservations for aggregate may be made available to the public as source options for government highway and infrastructure projects.
**Holding Reservation (HRS)**
This entry indicates an agency has determined a specific future land use based on an approved development plan or policy decision by senior management. All other user interests **must** be resolved prior to approving HRS. A HRS precludes the entry of any other type of reservation or notation on the land.

A HRS is usually followed by an Order in Council or Ministerial Order for the transfer of the administration and control of the land or a DRS when the intended future use is to be implemented.

**Protective Notation (PNT)**
PNTs are the most restrictive to development. This entry imposes a restriction on land use usually due to specific natural features of the land. Natural features include any naturally occurring characteristics related to land-form, soil type or vegetative characteristics. A PNT consequently may imply either an indefinite land use restriction (generally based upon land-form or soil characteristics), or a restriction which may be subject to change over time (due to changing vegetative characteristics).

This notation restricts lands from sale and may also restrict agricultural or other surface dispositions. More than one agency may register a protective notation; however, the most restrictive notation will determine the permitted land use.

**Note:** Legislation allows Transportation to enter any public land held under a surface material lease to obtain material for a public project. In such cases, compensation is generally considered for the leaseholder. Situations such as this are not common.

**3.4 Surface Material Extraction Temporary Field Authority**
Clay material being used in association with a licence of occupation, mineral surface lease, pipeline agreement or borrow pit approval, a temporary field authorization is required.
4.0 Surface Material Exploration

This section provides guidance on conducting a surface material exploration program to delineate the aggregate reserve and other important subsurface parameters. The information is mandatory for all SMLs and provides the justification for leasing the land for extraction purposes. It also provides important information needed for soil salvage and reclamation planning which must be addressed in the CRBP.

It is recommended that a qualified specialist\(^3\) be retained to conduct the surface materials exploration work. This person should use the appropriate techniques and equipment discussed in this Section to undertake the work.

It should be noted that the applicant does not have the rights to other minerals found in the area. If there is doubt as to the origin of the deposit, a geologist can be employed to establish the depositional history, or a Metallic and Industrial Minerals agreement can be obtained from Alberta Energy to reduce the risk of potential conflict with an “industrial mineral” rights holder.

![Surface material exploration program](image)

A surface material exploration program involves delineating the aggregate reserve.

4.1 SME Information Requirements

The surface material investigation should investigate and document more than the deposit that is to be mined. Required information includes:

- a drawing showing test hole locations and GPS coordinates, including elevations;
- test hole logs complete from surface to below the mineable deposit;
- descriptions of overburden layers, any partings or reject seams, and the below-deposit materials;
- descriptions of bedrock if encountered;

\(^3\) ASRD will determine the definition of a qualified individual. A member of a professional association with the designation of P.Eng., P.Ag., RPF, or RPFT is initially considered to be a qualified individual under this provision.

Guidelines For Acquiring Surface Material Dispositions on Public Land
Alberta Sustainable Resources Development – 2007 Edition

Page 34
• groundwater conditions (if encountered) including depth below surface, elevation, and if possible, gradient; and

• chemistry of the groundwater if required under the *Water Act* (if the pit will be de-watered or the water will be used) or optionally if the closure landscape will have a pond or wetland

Once exploration data is submitted and approved by ASRD, the applicant cannot extend the excavation limits as specified in the SML. Applicants are encouraged to delineate the entire horizontal and vertical extent of the resource within the proposed SML in order to maximize its extraction. Inadequate testing may result in partial allocation or rejection of the surface material disposition.

**Note:** Not all SME applications will be approved and approval of the SME does not guarantee that an SML will be issued.

### 4.2 Subsurface Investigation Methodology

#### 4.2.1 Site Reconnaissance

The area should initially be assessed in a reconnaissance manner to determine the presence of potential commercial surface materials. Once a potential surface material deposit is located, a more intensive evaluation can be done to properly delineate the reserve.

Site reconnaissance information sources may include:

- justifiable geological interpretation of geological data from adjoining or nearby extraction operations, adjacent pits or other features that expose or give clues;

- surficial geology maps available through the Alberta Geological Survey at [http://www.ags.gov.ab.ca/activities/surficial_mapping/surficial_mapping.html](http://www.ags.gov.ab.ca/activities/surficial_mapping/surficial_mapping.html) or by contacting them at 780-422-3767;

- review of topographic maps and air photos to identify geomorphologic features, surface water features and vegetation (See Appendix 2);

- review of water wells and drill reports (showing drill logs) on and near the property (obtained from Alberta Environment’s Groundwater Information System; [http://www.environment.alberta.ca/1295.html](http://www.environment.alberta.ca/1295.html) and

- site inspection to ground-truth on-site and off-site conditions.

#### 4.2.2 Establish Exploration Grid

Based on the site reconnaissance findings, choose the minimum number of assessment points that your site will require to conduct the subsurface investigation. The sampling scheme must adequately characterize the variability of site conditions.
A density of approximately one point per hectare is considered a minimum. Sites with very complex or variable topography, drainage, or unusual features often require more than the minimum number of assessment points. Slightly fewer holes are acceptable for larger sites if the assessor is confident that the site is defined as having uniform soils.

The assessment points should be spread out as evenly as possible across the site. A grid pattern may be used, but the grid should be adjusted so that assessment points include the following:

- crest, middle, and lower slope positions;
- depressions and poorly drained areas;
- disturbed areas; and
- any other anomalous features.

The location of exploration holes or survey lines are to be numbered and shown on a suitable drawing as described in Section 4.5.

### 4.2.3 Test Holes and Test Pitting

The subsurface assessment can be undertaken by auger drilling, backhoe digging or both across the area described in the grid. When the deposit is at a greater depth than the limit of the backhoe, an auger can be used to determine the lowest extraction limit. Using the exploration grid as a guide, the most appropriate method to conduct the subsurface investigation can be determined.

When the area is heavily treed, the method of clearing for subsurface inventory is to be discussed with the land manager. Existing land disturbances such as seismic lines and utility corridors should be used, wherever possible, to minimize adverse environmental impacts to soil vegetation and wildlife habitat.

**Note:** Approval from ASRD (in the form of an SME) is required when exploration activities will create a surface disturbance. Normally, this occurs when motorized equipment is used to dig or drill exploration holes. The clearing of vegetation to open access routes or to create exploration lines is also defined as a surface disturbance. Requirements for obtaining an SME are provided in Section 2.3.

### 4.2.4 Use of Non Intrusive Methods

An electromagnetic (EM) or ground penetrating radar (GPR) survey can be used to provide a preliminary assessment of the resource. It can also help to identify test hole and test pit drill targets. The use of EM and GPR can also result in less reliance on intrusive methods therefore minimizing ground disturbances. Please note, a non-intrusive method alone is not adequate testing information for submission of an SML.

### 4.2.5 Laboratory Analysis

The suitability of the material types for different uses (i.e., concrete, asphalt, gravel) may be determined by sending a sample to a laboratory. An understanding of the physical characteristics from the analysis will assist in planning the blending of materials from different areas to produce useable products and help optimize the potential of the resource.
Test pitting to evaluate subsurface conditions.

A drill auger can be used to determine the lowest extraction limit.

Ground penetrating radar (GPR) can be used to identify test hole/drill targets.
4.3 Evaluation of Subsurface Conditions

Of all the steps involved in making a pit operational, documenting and interpreting the exploration data is the most important. This information will provide an inventory of the surface material that is available to be removed and most importantly whether an extraction operation is feasible at the selected location.

This information is to be given to ASRD along with the SML application after the exploration work has been completed and will be treated as confidential.

The following shows how information should be documented.

4.3.1 Describe Overburden and Aggregate

Any exploration holes that are drilled or dug and are being used to apply for an SML must be described in terms of the materials that are found. Provide information on thickness of topsoil, subsoil, overburden, material / aggregate and below-aggregate. Note the depth of bedrock if encountered. Any geophysical survey that is carried out is to be described along with the results and the interpretation of the results.

Volumes of different materials to be extracted can then be estimated and operations planned most efficiently. This information is needed for planning pit sequence and storage needs. It is also needed for preparing the security estimate and planning reclamation.

Note: Some areas and material types are known to have a high ratio of reject to product. It is important that during the initial planning process, the moving, storage, and final placement of reject material be considered. In some cases, this reject material may become a product depending on future product specification, distance to market and local supply and demand. Excessive volumes of reject may become a storage and management problem, and create a substantial reclamation liability for which the application-holder must provide security.

Note: Overburden materials and below-gravel materials may become near-surface root zone soil layers in the reclaimed landscape, and may require sampling to determine soil quality. Soil types should be described and mapped by a soil-testing program (See Section 6.2.4).

4.3.2 Groundwater Conditions

The depth to groundwater encountered in the test holes must be reported. If material is to be mined below the water table, water may have to be discharged out of the operating area. In addition during reclamation, proper drainage of the pit area will have to be considered. Groundwater depth will also help to determine if surface water features will be created as a result of site development.

Groundwater information will also help to determine if water management requirements will trigger an approval under the Water Act (See Section 8.6.3).

Note: Applicants are encouraged to install piezometers at strategic locations within the proposed SML to evaluate groundwater depth, gradient and chemistry overtime. This information will help to determine if the completed pit will contain temporary or permanent surface water features. Groundwater monitoring throughout the life of the pit will also help to determine pre- and post-groundwater quality conditions, should there be concerns regarding groundwater contamination from the site operations or off-site land uses (i.e. oil and gas operations).
ASRD has the capacity to forfeit the SML approval if water quality is threatened or water is exposed and the end-land use changes.

4.3.3 Logging Test Hole Data
The lithology of the geology test holes should be logged from surface to below the aggregate deposit and any groundwater occurrence must be described. The logs should include the following information as a minimum:

- date the investigation was conducted;
- name of the tester;
- test method;
- topsoil depth;
- subsoil depth;
- overburden depth;
- thickness of surface material deposit to limits;
- water table depth if encountered;
- bedrock depth if encountered;
- laboratory-analyzed material results and exploration data;
- GPS coordinates and elevation relative to a fixed benchmark; and
- photograph of the test hole location.

An example of a test pit and drill hole log are provided in Appendix 3L and 3M respectively.

4.4 Post Exploration Reclamation
The Environmental Protection and Enhancement Act/Public Lands Act specifies an operator has a duty to conserve and reclaim disturbed land. The operator is obligated to:

- use avoidance clearing where timber densities permit (timber salvage is expected to occur unless waived by ASRD);
- strip and salvage the topsoil;
- backfill all excavated test holes;
- compact the replaced material;
- cap the disturbed area with the topsoil; and
- prevent spread of forest fires through the following measures:
  - Where lines are to be cut through forested areas, the brush must be separated. This means that every long brush pile (called "windrows") can be only 60 metres in length, and must be followed by an eight-metre clear area.
  - All leaning trees (called "leaners") along a cutline, plus the parts of broken trees that stick out of windrows should be bucked up, limbed and flattened to the ground. Flames can travel up these trees into the standing timber and help spread a fire.
- A Field Officer may require the applicant to roll back the brush on exploration trails on some sites. This helps to spread native seeds, slow water run-off and hold down the topsoil.
• All exploration lines must be revegetated and appropriate erosion control methods implemented before the reclamation obligations are completed. Re-establishment of native species is required on native grasslands and natural forest sites.

• Mulchers should be used to replace fibre and organic matter and natural seeds into the soil.

Any other special reclamation requirements will be outlined in writing by a departmental officer.

The operator must reclaim all test pits and test holes that are not included in the SML.

4.5 Documenting Findings

The location of all proposed exploration points must be included in a sketch that is submitted with the SME application (See example drawing in Appendix 3D).

The results of the exploration program including logs as stated in Section 4.3.3 any all associated lab reports and sieve analysis (optional), must be included with the SML application.

The CRBP report must include a written interpretation of the exploration program. The written interpretation must include the following information:

• an exploration drawing showing test hole locations and GPS coordinates, including elevations (See example drawing in Appendix 3E);
• test hole logs complete from surface to below the mineable deposit;
• field notes and photographs with data for each assessment point;
• descriptions of overburden layers, any partings or reject seams, and the below-deposit materials and availability and quality of overburden for use as a reclamation root zone soil material;
• descriptions of bedrock if encountered;
• groundwater conditions (if encountered) including depth below surface, elevation and, if possible, gradient;
• chemistry of the groundwater if required under the Water Act (if the pit will be de-watered or the water will be used) or optionally if the closure landscape will have a pond or wetland;
• stripping recommendations, to optimize conservation of topsoil (first lift) and upper root zone subsoil (second lift) quality; and
• additional environmental or soil handling concerns, such as potential soil stripping problems, sensitive areas, rare vegetation, existing disturbances.

5.0 Land Use Investigation

This section provides guidance on acquiring information about land use dispositions, municipal zoning restrictions and/or other land-use activities (i.e. First Nations) that may be affected by the project. Guidance is also provided on the stakeholder consultation process that is expected by ASRD. Land-use information is mandatory for all SML and CRBP submissions.

This information can be obtained from several sources, most importantly from the government Land Status Automated System (LSAS) and municipal land-use maps. Other means include ground reconnaissance and direct consultation with the affected parties.

It is up to the application holder to identify other land users that may be impacted by the lease.

5.1 Land Dispositions

Before filing the application, the applicant must obtain a land standing report (LSAS) and check the land standings to ensure that possible land use conflicts are dealt with and the necessary consents are obtained. Having knowledge of other disposition holders in the area also helps to identify common corridors that may be used to avoid unnecessary disturbances. Using common corridors is an important land management concept. It is expected that existing clearings will be used/paralleled whenever possible. If a proponent chooses not to parallel existing clearings, justification must be provided to the respective land manager.

The LSAS helps the applicant identify who needs to be contacted, including trappers, holders of timber dispositions, agricultural dispositions, industrial holdings and/or dispositions, Indian Reserves, Métis Settlements, Forestry Management Agreements (FMAs) and other areas of special concern. In addition, LSAS can be used to identify any reservations placed on lands such
as disposition reservations (DRS), protective notations (PNT), consultative notations (CNT),
other land dispositions and native land claim areas.

Written consent must be provided if specific dispositions are impacted including grazing leases
GRL), forestry management agreements (FMAs) and commercial timber permits (CTPs). Where
other registered land uses exist, applicants are encouraged to contact the reservation/disposition-
holder to identify potential concerns.

5.2 Land Use and Land Management Plans

Municipal land-use and land-use zoning plans should be consulted to identify potential
restrictions to development including conflicts with existing and proposed municipal land uses.
For example, some municipalities restrict aggregate operations in certain areas such as
floodplains and environmentally sensitive areas. Many municipalities have their land-use bylaws
posted on the web under the municipalities’ name.

The applicant is also encouraged to consult provincial Integrated Resource Management Plans
(IRMPs). These plans describe regional land-use planning polices and initiatives geared towards
industrial development. The applicant should ensure that their land development projects
conform to these planning polices where possible. The IRMPs are available at the Queens
Printer.

5.3 FMA Holders

For industrial activities planned within forest management agreement areas (FMAs), contact the
FMA-holder in the early planning stages to identify potential issues (e.g., reforested cut-over), as
well as to maximize opportunities for joint use of existing or planned access roads and corridors.
Timber salvage is a basic operating requirement for all industrial and commercial uses of public
lands. The final authority on salvage is ASRD. As such, the local ASRD office should be
consulted to determine timber salvage requirements.

In general, the applicant is responsible for providing information on timber disposition holders
(i.e., FMA, CTL, DTL, CTP, etc.) and an estimate of merchantable timber present on lands
covered by the application. The estimate should indicate the approximate volume in cubic
metres, or the number of tree length loads, by species, on the required lands.

The specifications for merchantable timber can vary with the different forest management units
(FMU) and FMAs. From the LSAS report, determine the applicable FMA, coniferous timber
licence (CTL), coniferous timber permit (CTP), deciduous timber allotment (DTA), deciduous
timber licence (DTL), deciduous timber permit (DTP) or local timber permit (LTP). Contact the
applicable timber authority-holder to determine the specifications for their timber authority. For
lands not included in any of these timber authorities, contact the ASRD-area office to determine
the applicable utilization standards.

Provide the utilization standards for the applicable coniferous and deciduous species. All timber
salvage must be carried out in accordance with the Timber Management Regulations and, as
applicable, the Alberta Timber Harvest Planning and Operating Ground Rules and Forest
Management Agreement Timber Planning and Operating Ground Rules, and any additional
conditions that the Minister may prescribe.
In areas covered by timber dispositions, details on salvaging, decking requirements, notification when the timber is decked and timelines for removal/hauling are to be worked out among the applicant and the timber disposition holder/salvage operator/purchaser.

FMA holders affected by the lease must be contacted to identify potential land use conflicts. Timber salvage is a basic operating requirement for all industrial and commercial uses of public lands.

If the applicant has determined merchantable timber is present in sufficient quantity to warrant salvage, and a salvage operator/purchaser has been found at the time of application, please provide the name of the purchaser. Indicate the time frame within which the wood will be hauled from the decked location to the end destination of a wood manufacturing plant, or to a central decking site along an all-weather road. This could either be a specific date or a general statement (i.e. prior to spring break-up, the following winter, during the summer, etc.).

The final salvage arrangements are to be completed and submitted to the land manager for approval before any lands are cleared. This information shall be provided by submitting either a CRBP with all the information requested in the timber salvage section, a timber salvage plan, or a copy of the salvage agreement. The information submitted must specify who is removing/purchasing the salvage, and the time frame within which the salvage will be removed/hauled from the site.

Where salvage operations are conducted under frozen ground conditions or winter access, the operator is responsible for moving the salvage to a site with all-weather access to ensure the wood can be removed.

5.4 Permanent Research Sample Plots

Permanent research sample plots or PSPs are government tree-growth monitoring sites that are protected so that they can be monitored.

PSPs are indicated on LSAS and held by ASRD. If the land standing indicates a PSP, the applicant is responsible for determining its location in relation to the lands being applied for. In the field, the outside perimeter of the sample plots may be recognized by blue paint marks on the trees and/or customized “Permanent Sample Plot/Research Area” flagging tape.
Specifically, the applicant must indicate if a PSP boundary is located within 100 metres of any lands in the application. If yes, specific information must be included on how far the proposed activity is from the PSP boundary. The legal land location, down to the legal subdivision, and the GPS coordinates in degrees/minutes/seconds are to be provided.

Any activity located within 100 metres of a PSP is prohibited. No activity is allowed that may cause any disturbance to trees within the boundary of these plots, including cutting by hand for surveying purposes. This includes additional clearings for borrow pits, remote sumps, campsites, etc. All construction personnel must be made aware of the restrictions applicable to PSPs.

**Note:** The forest industry also has PSP and research plots within their areas. If these plots are registered on LSAS, they will show up as Industrial Sample Plot (ISP) reservations. Not all forest industry plots are registered on LSAS, and the specific forestry company will need to identify these plots as part of the consent procedure.

*Permanent Research Sample Plots (PSPs) are government tree growth monitoring sites that must be protected.*
5.5 First Nations

The Government of Alberta's *First Nations Consultation Policy on Land Management and Resource Development* was approved on May 16, 2005. This policy requires project proponents to consult First Nations who may be affected by surface material extraction activities on public land. Rights and traditional uses includes burial grounds, gathering sites, historic or ceremonial locations, and existing constitutionally protected rights to hunt, trap and fish and does not refer to proprietary interests in the land. ASRD requirements relative to this policy are as follows:

- After reviewing the SML application, ASRD will advise the applicant if consultation is required including which First Nations must be consulted. ASRD will be responsible for consultation whenever a tender or “Bonus Bid” system is used prior to tender.

- Where ASRD has deemed consultation is required, the project proponent should submit a consultation plan to the local ASRD field officer for review prior to consultation being initiated. The plan should include forwarding a copy of the SML sketch to all interested Nations and following this up with a telephone interview or meeting.

- The project proponent must discuss the specifics of the proposed operation with potentially affected First Nations, prior to submission of their CRBP. This would include specific phases of the operation and timelines to complete each phase of the operations. ASRD staff will review the adequacy of consultation.

- The applicant must maintain records of all consultations including concerns and proposed resolution measures. This information must be available to ASRD.

- Surface material exploration (SME) programs will not require First Nations consultations, however, in some instances where there is a potential to adversely impact First Nations Rights and Traditional Uses of crown lands, ASRD may notify potentially affected First Nations prior to approving an SME application.

The following key elements should be used by applicants as a basis for consultation:

- Notification to band council or a designate of potentially adversely impacted First Nations;
- Provision of plain language information describing the scope and location of the project, and clearly identifying potential short and long term adverse impacts;
- Meetings to discuss ideas, comments and concerns of the potentially adversely impacted First Nations;
- Strategies to avoid or mitigate potential adverse impacts on First Nations Rights and Traditional Uses; and
- Where an agreement has not been reached with respect to avoidance or mitigation of potentially adverse impacts, written reasons are to be provided to ASRD.
Consultation with First Nations who may be affected by the project may be required.

Information related to First Nations consultation can be found at:

5.6 Protected Areas

The land standing must be reviewed to determine if the lands under application are protected by notations (e.g., Protective Reservation, Natural Area, Ecological Reserve, etc.). When a proposed activity falls within a protected area, the activity will need to be relocated to avoid that area in nearly all cases.

Any environmentally sensitive areas in the vicinity within 100 meters of the proposed activity, will generally require special measures ranging from complete avoidance to buffers and setbacks. For example, permafrost, native prairie, wetlands, etc. are very sensitive and require special protection measures. Permafrost is most prevalent in the Northwest Boreal Region, and the ASRD offices in that region have maps of the known permafrost locations.
Information on what might constitute a sensitive area can be found in Section 6.0 of the Guideline and in “R&R/03-2, Siting an Upstream Oil and Gas Site in an Environmentally Sensitive Area on Private Land” [http://environment.gov.ab.ca/info/library/5940.pdf](http://environment.gov.ab.ca/info/library/5940.pdf).

Guidelines for minimizing disturbances in sensitive areas can be found in the following documents:

- *Principles for Minimizing Surface Disturbance in Native Prairie and Parkland Areas* (EUB IL 2002-1) is available from [http://www.eub.gov.ab.ca/bbs/ils/ils/pdf/il2002-01.pdf](http://www.eub.gov.ab.ca/bbs/ils/ils/pdf/il2002-01.pdf) and also contains a link to *Petroleum Industry Activity in Native Prairie and Parkland Areas*:


### 5.7 Impacts to Other Land Uses

Mapping and ground evidence may help evaluate other land uses that may be impacted by the project. Considerations include:

- proximity to the nearest residence and or community;
- evidence of camping, use by livestock, off-highway vehicle tracks;
- identification of all human-made alterations documenting the reclamation liability and/or any previous surface material resource depletion;
- potential pit areas that may be too close to pipelines, roads, rivers, embankments, recreation areas, etc. for which it may be necessary to leave a buffer of trees or undisturbed land.

Local residents may be able to provide important historical information associated with the site that can alter the operating requirements of the proposed resource extraction (i.e. burial of human remains or garbage, access uses).

### 5.8 Documenting Findings

A copy of the LSAS report showing all registered land use dispositions in the area of the lease along with all required written consents must be provided with the SME and SML application and the CRBP. The information must also be shown on the required drawings (See sample drawings in Appendix 3D and 3E).

A description of the existing land uses, the potential land use conflicts, and proposed actions should be summarized in the CRBP report. Table 2.0 shows a recommended format to present this information.
<table>
<thead>
<tr>
<th>Directive</th>
<th>Rationale</th>
<th>Recommended Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alberta Transportation</td>
<td>Road use agreement likely required to use DRS 830029</td>
<td>Consult Transportation.</td>
</tr>
<tr>
<td>Land Use Bylaws</td>
<td>Zoned Rural (RD) under the Land-use Bylaw. Aggregate operations are an allowable land use</td>
<td>See development permit below.</td>
</tr>
<tr>
<td>Development Permit</td>
<td>As required by Land-use Planning Bylaw.</td>
<td>The Regional Municipality of Lakeland County will be consulted regarding development permits, road access agreements and the related permits and bylaws</td>
</tr>
<tr>
<td>Building Permits</td>
<td>No permanent, buildings, structures or utilities.</td>
<td>None Required.</td>
</tr>
<tr>
<td>Lakeland IRA</td>
<td>Located in Caribou Zone.</td>
<td>Will be subject to wildlife planning objectives. Consult ASRD.</td>
</tr>
<tr>
<td>First Nations</td>
<td>The subject site is located in the Traditional Use areas of Fort McMurray No. 468 First Nation; Chipewyan Prairie First Nation; and status and non-status First Nations members and Métis.</td>
<td>All affected First Nations were consulted in accordance with the consultation plan submitted to ASRD on June 24, 2007. None of the First Nations contacted had concerns regarding the proposed development. Copies of the consultation plan and records of correspondence are provided in Appendix 1 of the CRBP.</td>
</tr>
<tr>
<td>Proximity Agreements</td>
<td>No known access, excavations or encroachments across pipeline or utility corridor.</td>
<td>First Call will be contacted to identify underground utilities.</td>
</tr>
<tr>
<td>Forest Management Agreement (FMA)</td>
<td>SML is within ALPACs FMA</td>
<td>Forest Management Agreement Alberta Pacific Forest Products (FMA 9100029) will be consulted to acquire a wood purchasing contract agreement and to obtain permission to enter the land and salvage the timber. Authorization for Harvest: The proponent will ensure that authorization has been granted by ASRD through the disposition process by letter of authority or by Temporary Field Authorization (TFA) prior to commencement of the salvage operation. The area forest officer must be contacted prior to entry.</td>
</tr>
<tr>
<td>Trapper Notification</td>
<td>SML encompasses a TPA Trap line license.</td>
<td>A trapping line registered to (trapper’s name) exists in the SML. In accordance with ASRD Condition 116, the proponent would be required to notify the trappers within 10 days of project development.</td>
</tr>
</tbody>
</table>
6.0 Biophysical Investigation

This section provides guidance on acquiring information about environmental resources in the project area and identifying negative changes that may occur to them from the proposed site activities. This information is mandatory for all CRBP reports.

Environmental resources that may be impacted include:

- fish and wildlife habitat;
- vegetation and soils;
- groundwater and surface water features;
- people - human health and socio-economic conditions;
- resources for traditional purposes by aboriginal persons; and
- historical, archaeological, paleontological features.

In most cases, environmental constraints can be addressed through the application of mitigation measures. Mitigation measures refer to a design, management or operational procedure to reduce, minimize or avoid an adverse environmental affect.

6.1 Assessment Methodology

Information about environmental resources should initially be obtained through existing sources such as government websites, resource mapping (topographical maps and air photos) and consultation with the regional ASRD wildlife biologist.

This should be followed by a site inspection to validate this information and delineate site-specific conditions. For example, it may be difficult to locate a small creek or historical site from an air photo or topographical map that may exist within the lease.

The site inspection assessment should be carried out during the summer and after the site has been clearly flagged, but before any disturbance, including brush or forest clearing, takes place.

Potential adverse effects to the environmental resources from the project must be documented along with techniques that will be employed to mitigate them. Reporting of this information is discussed in Section 6.8.
6.2 Soil Landform and Vegetation (SLVA)

A soil landform and vegetation (SLVA) assessment is one of the most important components of the biophysical assessment because it establishes the pre-disturbance land capability of the site. The pre-disturbance data form the baseline for comparison to post-reclamation conditions which becomes the basis for developing soil salvage and land reclamation plans.

The applicant is encouraged to retain a qualified specialist (such as a professional agrologist) to conduct the SLVA assessment. The specialist should:

- use an Ecosystem-based approach on rangeland and forestland management;
- use an appropriate inspection density (Alberta Soils Advisory Committee, 1993);
- conduct the inventory at the proper time (i.e., avoid frozen, snow covered, dark or wet conditions). The assessment should be carried out after the site has been clearly flagged in the field, but before any disturbance including brush or forest clearing takes place. In some cases it may be beneficial to carry out the assessment during the exploration phase when drilling testing equipment is available (i.e., back hoe drill rig);
- use appropriate inspection techniques and equipment; and
- obtain correct soil information using appropriate techniques and systems (Expert Committee on Soil Survey, 1982; Agriculture and Agri-Food Canada, 1998; C&R/IL/92-2 for winter surveys)

6.2.1 Ecosystem Approach

An ecosystem inventory of the pre-disturbance landscape and ecological features based on the provincial system is recommended to identify targets for closure landscape design.

ASRD uses this system for rangeland and forestland management whereby reclamation goals for native grasslands and native forests require a return of ecosystem structure and function. This is because ecosystem function, productivity, management and reclamation opportunities differ greatly depending on where you are in the province. For example, the dry mixed grass prairie at Medicine Hat will have different characteristics than the parkland at Edmonton and the foothills forests at Hinton.

The Natural Regions and Subregions Map of Alberta (Figure 9) provides a framework for ecological land classification at the provincial level. Within each natural subregion there are sites with dry, moist and wet conditions and different soils and vegetation assemblages (ecosites). Measures of ecosystem structure and function can be used as standards to determine whether the reclamation meets the requirements.
Figure 9.0 Natural Subregions of Alberta Map
General information on landscape classification and ecology may be obtained from the following sources:


- The Alberta Vegetation Inventory (AVI) program has classified and mapped the forested part of Alberta (the Green Area). Information is available that interpret merchantable and non-merchantable timber volumes and other data for stand types. The Grassland Vegetation Inventory (GVI) provides mapping of Ecological Range Sites (a combination of range site and soils).


**6.2.2 Terrain and Land-use Mapping**

The first step in the SLVA assessment process is to describe and map the terrain features on and near the lease. The mapping should be presented on an air photo base at a scale of 1:10,000 (or at more detail if required) and described and documented with photographs. The list of features should include the following:

- topography - steepness, direction, and length of slopes, and contours if possible;
- land surface expression;
- existing pits, severely eroded areas, slumping or failing slopes, subsided fills;
- drainage sub-basins and direction of water flow across the site;
- water bodies and water courses, wetlands, springs and seeps, water wells, dugouts, dams, beaver ponds, animal licks;
- current land-use of the site and adjacent activities which may impact the site (wellsites, pipelines, power lines, residences, historic sites);
- presence of piles or exposures of rocks and gravel, debris or junk piles; and
- existing features such as buildings, roads, trails, fences and corrals.

The intent is to identify any terrain features that may be impacted by the proposed project (i.e. encroachments into watercourses, slope stability issues). It is also important to indicate if the project will have a detrimental effect on the aesthetics of the surrounding landscape when viewed from specific vantage points such as recreational areas and highways. Mitigation measures and landscape design modeling may be required.
Information related to terrain features can be obtained from air photos, topographical maps and government resource documents related to environmental landscapes. Information sources include:

- the National Topographic System maps of 1:50,000 scale provides elevation information that can be used for site topography [http://maps.nrcan.gc.ca/topo_e.php](http://maps.nrcan.gc.ca/topo_e.php);
- the upland, flood plain and waterbody areas can be approximated from air photography, available from ASRD at [http://www.srd.gov.ab.ca/lands/geographicinformation/airphoto/default.aspx](http://www.srd.gov.ab.ca/lands/geographicinformation/airphoto/default.aspx);
- information on land capability can be obtained from the Canada Land Inventory at [http://geogratis.cgdi.gc.ca/CLI/frames.html](http://geogratis.cgdi.gc.ca/CLI/frames.html); and
- information on eco-regions can be obtained from the Natural Regions and Subregions of Alberta Report at [http://tpc.alberta.ca/parks/heritageinfocentre/naturalregions/default.aspx](http://tpc.alberta.ca/parks/heritageinfocentre/naturalregions/default.aspx).

### 6.2.3 Soil and Vegetation Sampling and Mapping

The next step in the SLVA process is to obtain information on soil and vegetation using an ecosite approach.

The ecosites should be pre-mapped by air photo interpretation and a sampling plan should be designed to adequately describe the soil and vegetation components of all ecosites. Sample sites should be chosen in locations that are representative of the ecosite.

The sampling grid should be spaced at 50 to 100 metres, depending on size and complexity of the landscape. Observations of ecosite boundaries and special features (rare plants, wildlife signs, etc.) are made continually along the transects, and information points are located by GPS.

The number of sample plots / points varies with the landscape. A minimum of five plots per ecosite type is normal. Coverage for soil quality control is typically one to two test holes per hectare on smaller projects (5 to 10 hectares) and one per five to 10 hectares for large (130 hectares) projects. Numbers should be based on soil variability.

#### 6.2.3.1 Soil Information

The soil types, locations and depths on the proposed pit should be identified through a soil-testing program. The depths of soil horizons determine salvage depths. The volumes of topsoil and subsoil determine the best methods of soil handling and replacement. The soil type and topography helps determine post-reclamation goals.

Topsoil “depth variability checks” (several auger cores in a 3m circle) are done at locations where soil may be unusually thick or thin, to add confidence to the estimates of soil salvage volumes. A description of the patterns and variability of the soil landscape can be more useful test pit logs.

Soil descriptions and classification should follow *The System of Soil Classification for Canada, Third Edition* (Agriculture and Agri-Food Canada), 1998. Soils should be correlated to the soil series established in each Soil Correlation Area (see the Soil Names
A hand auger is an important tool to assess near surface soil conditions.

There are several key bits of soil information required for planning soil conservation, reclamation, and for comparison to the closure landscape. Soil data must satisfy the following information interpretations:

- soil characteristics required to replace ecosystem structure and function in the reclaimed landscape;
- baseline soil quality parameters that will be used to determine reclamation success or failure (topsoil quality and quantity, subsoil restrictions, stoniness and gravel content);
- topsoil seedbank availability and salvage recommendations;
- topsoil quality and thickness by ecosite described by soil variability;
- topsoil salvage depths and volumes by ecosite;
- subsoil quality and thickness by ecosite described by soil variability;
- subsoil salvage thickness and volumes by ecosite;
- overburden quality for use in reclamation and volumes available;
- reject material quality for use in reclamation and volumes available; and
- sub-gravel material suitability as a deep or shallow root zone layer in the reclaimed soil landscape.

6.2.3.2 Vegetation Information

Vegetation should be assessed by describing the plant community at each ecosite (list the main species by layer, i.e. tree, shrub, herb) and correlating to the list of communities for the natural subregion. Information sources are listed at:

Provide information on the landscape that the project will be traversing/impacting (i.e., native grassland, cropland, shrubby wetland, etc.) This information indicates the productivity of the underlying soils, and, therefore, provides important baseline information for reclamation expectations. The intent is to identify vegetation resources (i.e., rare
plants, riparian vegetation, old growth timber, etc.) that may be impacted by the proposed project.

Additional vegetation information is required for revegetation planning if the site was a native vegetation site. Vegetation data must satisfy the following information interpretations:

- sites with native plant communities are to be returned to native communities after closure;
- identify target ecosites for the closure landscape; and
- list key species to establish in target ecosites as part of the revegetation plan

Plant communities within the lease boundaries can be mapped through field evaluation along with the aid of air photography, Alberta Vegetation Inventory [http://www.srd.gov.ab.ca/lands/geographicinformation/resourcedataproductcatalogue/avi.aspx](http://www.srd.gov.ab.ca/lands/geographicinformation/resourcedataproductcatalogue/avi.aspx)


Approximate areas of each mapped unit should be provided in the appropriate category.

Guides to identifying the common plant communities and ecosites in each subregion have been published by ASRD at: [http://srd.alberta.ca/lands/managingpublicland/rangemanagement/classificationecology.aspx](http://srd.alberta.ca/lands/managingpublicland/rangemanagement/classificationecology.aspx) and by Natural Resources Canada at: [http://www.nrcan.gc.ca/com/index-eng.php](http://www.nrcan.gc.ca/com/index-eng.php)


Vegetation should be assessed by describing the plant community at each ecosite.
6.2.3.3 Rare Plants

A rare species is any native species that, because of its biological characteristics or its occurrence at the edge of its range, or for some other reason, exists in low numbers or in very restricted areas.

Rare plant species or rare plant communities for Alberta are listed on the current Alberta Natural Heritage Information Centre (ANHIC) tracking list (ANHIC, 2000; Allen, 2001) and may include those listed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) www.cosewic.gc.ca.

Nationally registered rare plants governed by the Species at Risk Act (Environment Canada) can be found at http://www.speciesatrisk.gc.ca/search/default_e.cfm for listed species.

As a minimum, ANHIC should be contacted to determine if any rare species have been located in the project area. If the proposed pit is on the list or if it is situated in a natural landscape, such as a river valley or other unusual landscape, a rare species site survey may have to be conducted. Guidelines on how to conduct a rare plant survey are located on the Alberta Native Plant website www.anpc.ab.ca.

6.2.3.4 Problem Vegetation/Weeds/Invasive Plants

Describe any areas of problem vegetation on or near the site that could possibly affect the development and reclamation process, and determine if there is a risk of weeds spreading to the site if it is developed, and if so, how it might be prevented or managed.

Problem vegetation areas commonly consist of weed infestations—noxious weeds in particular. The Weed Designation Regulation of the Weed Control Act lists the weeds that can be problematic and may require control. Such requirements are listed at Alberta Agriculture and Food at: http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/acts6156

As part of the weed survey, a “weed documentation form” should be completed. Weed documentation forms are available online at http://environment.gov.ab.ca/info/library/5929.pdf

6.3 Geology and Hydrogeology

The intent is to identify any subsurface features of importance, in particular soil and groundwater that may be impacted by the proposed project. Adverse impacts can result from the release of hazardous materials (fuel, grease, oil); and from ground disturbances that may impact slope stability. Much of this information can be obtained from the Surface Material Exploration Assessment (Section 5.0).
6.4 Wildlife

The initial point of contact to obtain information on wildlife should be the Regional Wildlife and Fisheries Biologists, Fish and Wildlife Division (FWD). Staff contacts are listed on the ASRD website. Additional information may be obtained from air photos, topographic maps, land management referral maps, and by conducting a ground reconnaissance.

From these sources, briefly describe whether the site has any evidence of wildlife use or any significant habitat features paying careful attention to critical wildlife habitat for ungulates, species at risk and migratory birds. Document features such as:

- ungulate winter ranges;
- mountain sheep and mountain goat ranges - tracks, droppings, nests, browsed trees/shrubs, mineral licks;
- high vegetation diversity, high browse availability, wildlife trees (large live trees and snags with cavities);
- travel corridors;
- waterfowl nesting, molting or staging areas;
- colonial nesting areas;
- aquatic and riparian habitats (marshes and ponds);
- presence of species at risk;
- other unique fauna or their habitats; and
- snake and hibernacula.

*Indicate any evidence of wildlife use in and near the lease area.*
6.4.1 Critical Wildlife Habitat

Critical wildlife habitat such as Caribou Protection Zones, ungulate winter range, trumpeter swan habitat, and special access areas can be found on Land Management Referral Mapping (LMRM) prepared by ASRD and available at [http://www.maptown.com/](http://www.maptown.com/). An example of an LMRM map is provided in Appendix 3C.

Before any surface dispositions will be approved, including (SMEs, SMLs and CRBPs) companies proposing activities in designated caribou areas must complete a Caribou Protection Plan (CPP). These plans are used to evaluate the amount, duration and location of work taking place in any one caribou range. In order to do this effectively, CPPs must be received early enough (Oct. 15th of each year) in the process to allow a review before surface disposition applications are submitted. This will ensure there is sufficient time for essential discussions/planning to take place.

Some wildlife species and habitat are considered to be sensitive and will need to be considered in the approval and design of pit development. For example, the maximum sightline distances of 200 metres restriction (maximum of 4 hectares open at any one time) will affect the development sequencing of an operation. Stockpiling or crushing on lease may be restricted due to wildlife concerns.

If applicable, CPPs must be included in the CRBP report. Templates of the caribou plans for the various caribou ranges/permafrost areas are available on the web at: [http://www.srd.gov.ab.ca/lands/formspublications/managingpublicland/default.aspx](http://www.srd.gov.ab.ca/lands/formspublications/managingpublicland/default.aspx)

Industrial land use guidelines that are available to assist applicants with preparing CPP reports include:

- **Strategic Plan and Industrial Guidelines for Boreal Caribou Ranges in Northern Alberta, September 2001**
- **Land Use Guidelines For Key Ungulate Areas**
- **1996-97 Operating Guidelines for Industrial Activity in Caribou Ranges in West-Central Alberta (ASRD)**
  [http://inform.energy.gov.ab.ca/il/Documents/Published/IL-2003-23.pdf](http://inform.energy.gov.ab.ca/il/Documents/Published/IL-2003-23.pdf)
ASRD - Fish and Wildlife Division (FW) has developed a series of guidelines (including mitigation techniques such as using buffers and timing restrictions) for some land uses in key wildlife areas. These guidelines are available at: http://www.srd.gov.ab.ca/fishwildlife/guidelinesresearch/default.aspx Additional information may be obtained from FW referral maps and guidelines for the applicable ASRD region.

Timing restrictions may be used to mitigate some potentially harmful effects of industrial development on wildlife. If timing constraints apply, the applicant must include the date on which the constraint takes effect and the date on which it ends for each year.

6.4.2 Species at Risk (Animals)

If the proposed pit is situated in a natural landscape, such as a river valley or other unusual landscape, a species-at-risk survey should be conducted. Potential impacts to species at risk can occur from ground disturbances, removal of vegetation, and noise among other activities.

Indicate the presence of any species at risk or their habitats. Species at risk include:

- species listed as endangered or threatened under the Alberta Wildlife Act;
- species designated as special concern in Alberta;
- species listed as endangered, threatened or special concern in Alberta by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC); and
- species with a general status in Alberta of at risk and may be at risk.


6.4.3 Migratory Birds

The Migratory Birds Convention Act [1994, c.22] (MBCA) http://laws.justice.gc.ca/en/M-7.01/ is federal legislation based on an international treaty signed by Canada and the United States of America that aims to protect migratory birds from indiscriminate harvesting and destruction on federal and provincial lands. Under the MBCA, efforts will be made to provide for and protect habitat necessary for the conservation of migratory birds, and to conserve habitats that are essential to migratory bird populations, such as nesting and wintering grounds, and migratory corridors. Under Section 6(a) of the general prohibitions of the Migratory Birds Regulations C.R.C., c. 1035, it is an offence to “disturb, destroy or take a nest, egg, or nest shelter” of a migratory bird. Additionally, Section 35(1) stipulates that “no
person shall deposit or permit to be deposited oil, oil wastes or any other substance harmful
to migratory birds in any waters or any area frequented by migratory birds”.

The *Migratory Birds Convention Act* would apply to nesting birds in the project area
including uplands, wetlands and riparian areas. As such, the project may be restricted to
timing windows during the nesting period. Depending on the area and bird species affected,
this period may extend from April 1 to June 30th. Tree clearing should not be done during the
nesting period.

Special requirements for operating in the Hay–Zama Lake complex in northwest Alberta, an
important migratory bird habitat area, are described in the EUB Interim Directive ID 96-01
http://www.eub.gov.ab.ca/BBS/requirements/ils/ids/id96-01.htm

![Nesting birds](image)

*Nesting birds should be identified and protected in accordance with the Migratory Birds Convention Act.*

### 6.5 Fish and Aquatic Resources

If a surface water feature is located on or near the project area, information will be required on its
importance relative to fish habitat.

The initial point of contact should be the Regional Wildlife and Fisheries Biologists, Fish and
Wildlife Division (FWD) and the local Department of Fisheries and Oceans Habitat Biologist.
Contacts are listed on the websites at [http://www.dfo-mpo.gc.ca/regions/central/habitat/os-
eo/prov-terr/ab/os-eo18_e.htm](http://www.dfo-mpo.gc.ca/regions/central/habitat/os-eo/prov-terr/ab/os-eo18_e.htm)

Additional information may be obtained from air photos, topographic maps, and land
management referral maps and by conducting a ground reconnaissance. Information on fish
species, water quality and drainage and lake basin characteristics for certain Alberta lakes, (not
all lakes are listed) Alberta lakes can be obtained from the Atlas of Alberta Lakes
[http://sunsite.ualberta.ca/Projects/Alberta-Lakes/](http://sunsite.ualberta.ca/Projects/Alberta-Lakes/)
Timing restrictions on in-stream activities (watercourses and waterbodies) may be required to protect fish and fish habitat. Information on stream classifications and timing restrictions can be found in Appendix 4C, and in the Codes of Practice under the Water Act website at [http://environment.alberta.ca/3.html](http://environment.alberta.ca/3.html)

![Image of a river with trees on either side]  
*Information is required on fish habitat in the lease area.*

**Note:** Operations that may cause harmful alteration, disruption or destruction of fish habitat (HADD) will require authorization under the Federal Fisheries Act. Operators should consult Fisheries and Oceans to ensure that the proposed operations comply with the requirements of the Fisheries Act. The 1998 publication entitled Decision Framework for the Determination and Authorization of Harmful Alteration, Disruption or Destruction of Fish Habitat by Fisheries and Oceans Canada, outlines the process to determine if an approval is required.

### 6.6 Historical Resources

Information related to the historical significance of the lease area may be obtained from the Listing of Significant Historical Sites and Areas [http://culture.alberta.ca/heritage/resourcemanagement/archaeologyhistory/resourcesimpactassessments.aspx](http://culture.alberta.ca/heritage/resourcemanagement/archaeologyhistory/resourcesimpactassessments.aspx) and by documenting any physical evidence of artifacts or indications of historical resources observed in the field (teepee rings, arrowheads, etc.)

Lands that are on the listing and/or lands where potential artifacts have been observed will require clearance under the Historical Resources Act. An application for Historical Resources Act Clearance must be submitted to the Heritage Resource Management Branch, Cultural Facilities and Historical Resources Division, Alberta Culture and Community Spirit [http://culture.alberta.ca/heritage/resourcemanagement/archaeologyhistory/resourcesimpactassessments.aspx](http://culture.alberta.ca/heritage/resourcemanagement/archaeologyhistory/resourcesimpactassessments.aspx)
Land parcels that are on the listing have been assigned a historical resource value (HRV), ranging from one through five. Development may not be granted or may be restricted to portions of those lands that have been assigned an HRV of one, two or three. Lands that have been assigned an HRV of one, two or three will typically have reservations/notations attached on the LSAS.

Activities that are targeted for lands that have been assigned an HRV of four or five will likely require a Historical Resources Impact Assessment. Although reservations/notations may be placed on HRV-four lands, it is not the intention of the Cultural Facilities and Historical Resources Division to place reservations/notations on all lands of “High” potential (i.e., HRV-five lands). The Historical Resources Impact Assessment must be included and a copy of the assessment approval is to be included with the CRBP.

**Document the HRV value in the CRBP**

For further information regarding the *Listing of Significant Historical Sites and Areas*, the *Application for Historical Resources Act Clearance*, and *Historical Resources Impact* refer to [http://culture.alberta.ca/heritage/resourcemanagement/archaeologyhistory/resourcesimpactassessments.aspx](http://culture.alberta.ca/heritage/resourcemanagement/archaeologyhistory/resourcesimpactassessments.aspx)

6.7 Noise and Air Quality

Noise contributors related to pit operations include heavy trucks, vehicles, machinery (crushers, screeners, backhoes, etc.), conveyer systems, open pumping systems for water activities, and generators. If proper sound control features are incorporated into the facility design, increases in sound levels can be kept to acceptable minimums.

The main concern associated with air quality is the potential to increase air pollutant emissions in vulnerable parts of the airshed; in particular, emissions from diesel equipment and fine dust particulate from material handling and crushing operations. Emissions should be minimized through appropriate dust control measures (such as using water trucks), controlling of leaks and spills and effective maintenance of equipment.

Application holders should provide information related to noise and air quality, particularly in areas where the site is located in close proximity to important receptors such as nesting areas, key ungulate range and private residences. This information should include:

*Indicate if there is any physical evidence or records of artifacts or historical resources in the lease area.*
• a description of the general noise and air quality climate in the area;
• a description of the existing noise and air emission sources;
• the principal noise and air emission sources from the project;
• the principal receptors that will be affected by noise and air emissions (wildlife, people);
• the expected changes in the noise climate and airshed from the project; and
• potential mitigation measures.

6.8 Documenting Findings

The results of the biophysical investigation must be documented in the CRBP report. The information should include a description of:

• the biophysical resources and land uses in the project area;
• adverse environmental effects that could result from the lease; and
• the proposed mitigation measures (the potential environmental effects of the project and the proposed mitigation measures should be summarized in a table similar to Table 3.0).

The information obtained from the biophysical investigation should also be documented on the biophysical/land-use plan supported by site photographs to illustrate any anomalous features such as wetlands, creeks, historical sites. The plan should encompass all lands within approximately 600 feet (200 metres) of the lease area. The map should be presented on an air photo base at approximately 1:10,000 scale and should show the following features:

• a legend including a soils legend and key information;
• ecosite types, sample plot locations, locations of soil samples;
• vegetation communities (native, non-native and non-vegetated areas forest or pasture, rare plants, rare plant communities, weedy areas);
• important wildlife habitat (e.g., caribou range, bear dens, large stick nests, burrowing owl holes);
• surface water and drainage features and direction of flow (rivers, streams, ponds, lakes sloughs, ditches, dugouts);
• topographic features and eroded areas (eskers, sink holes, gullies); and
• land uses (roads, trails, seismic lines).

An example of a biophysical/land-use plan is provided in Appendix 3B.
<table>
<thead>
<tr>
<th>POTENTIAL ADVERSE EFFECT</th>
<th>PROPOSED MITIGATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>There may be a small amount of disturbed fish habitat in the immediate area of the</td>
<td>• A 100 metre buffer will be maintained and appropriate mitigation taken to protect fish habitat.</td>
</tr>
<tr>
<td>proposed road crossing over an unnamed creek</td>
<td>• DFO will, however, be consulted regarding the status of the creek. If required, the water crossing will be designed to be consistent with DFO Guidelines.</td>
</tr>
<tr>
<td>The site is in key ungulate range, therefore, there are potential adverse effects to</td>
<td>• A key ungulate protection plan has been included in the CRBP.</td>
</tr>
<tr>
<td>moose through loss of habitat and noise.</td>
<td>• Construction will take place outside of the seasons where there are normally wildlife activities.</td>
</tr>
<tr>
<td></td>
<td>• ASRD will be informed of the project location and timing.</td>
</tr>
<tr>
<td></td>
<td>• The reclamation plan incorporates wildlife habitat features including a buffer area.</td>
</tr>
<tr>
<td>There may be potential impacts to groundwater from the use of hazardous materials</td>
<td>• Strict measures will be enforced to contain and manage hazardous substances including secondary containment, spill response kits and related training</td>
</tr>
<tr>
<td>specifically fuelling operations</td>
<td></td>
</tr>
<tr>
<td>There may be potential adverse environmental effects from the project on surface water</td>
<td>• Buffer areas will be imposed and erosion control measures employed.</td>
</tr>
<tr>
<td>include the off-site migration of silt-laden water into the creek</td>
<td>• Strict measures will be enforced to contain and manage hazardous substances.</td>
</tr>
<tr>
<td></td>
<td>• Adherence to general timing restrictions for wildlife will help to ensure that changes to the noise climate will have a temporary and insignificant effect.</td>
</tr>
<tr>
<td></td>
<td>• Wildlife timing restrictions will be imposed in accordance with the Migratory Birds Convention Act and the ASRD.</td>
</tr>
<tr>
<td>There will be increased noise and traffic that could disturb nesting birds and wildlife.</td>
<td>• These impacts will be mitigated through erosion control measures and Timber Salvage Planning.</td>
</tr>
<tr>
<td>Potential adverse impacts related to vegetation include erosion and land instability from</td>
<td>• The disturbance will be mitigated by soil reclamation. The primary goals of soil reclamation are watershed protection, and replacement of land capability for forestry and wildlife. Reclamation can be successful if soil materials are salvaged before gravel extraction; and the disturbed areas are graded and soil profiles and soil landscapes are reconstructed. When soil reclamation is done properly the short-term impacts are reversible and the long-term effects are minimal.</td>
</tr>
<tr>
<td>exposed soils</td>
<td></td>
</tr>
<tr>
<td>Potential adverse environmental effects of gravel extraction activities include the</td>
<td>• A letter of clearance has been obtained from Alberta Culture and Community Spirit.</td>
</tr>
<tr>
<td>complete disturbance of soils for a short term.</td>
<td>• First Nations have been consulted in accordance with a plan submitted to the local ASRD officer. No issues arose as a result of this process. A copy of the correspondence is included as Appendix 1 of the CRBP.</td>
</tr>
<tr>
<td>The project area is located in the Athabasca River Valley which is considered to have</td>
<td></td>
</tr>
<tr>
<td>high historical/cultural significance. Athabasca Chipewyan First Nation, the Fort Mackay</td>
<td></td>
</tr>
<tr>
<td>First Nation and the Fort Mackay Métis may have an interest in the project.</td>
<td></td>
</tr>
</tbody>
</table>
7.0 Development Planning

At this point in the planning process the lease has been issued and the surface material resource exploration and land-use and biophysical investigations have been completed (Sections 4, 5 and 6). The next step is to describe the sequential plans for site development.

The site development plan provides a description of the proposed construction footprint including all the surface area that will be disturbed by the development. This includes roads, stockpile sites, pit development, and site-clearing within the lease area.

The objective of the development plan should be to maximize the recovery of the aggregate and minimize the footprint of the land base. Development planning should indicate or demonstrate maximum utilization while considering minimum footprint. The disturbance area will help ASRD to justify the size of the disturbance relative to the size of the aggregate reserve and, as well, calculate the security deposit required.

The development of the site should be done with consideration to the reclamation and end-land use of the site, or final reclamation and end-land goals will not be achieved. Reference should be made to Section 9.0.

Application-holders are encouraged to discuss the proposed contents of their plans with the local ASRD office to determine if specific plans need greater emphasis due to local environmental, economic and land-use issues (i.e. buffers around sensitive areas, dust control).

The objective of the development plan should be to maximize the recovery of the aggregate, minimize the footprint of the land base and provide the framework to meet reclamation and end-land use goals.
7.1 Site Feasibility Analysis

The first step in the development planning process should be to conduct a site feasibility analysis. Upon examining a site, an operator may learn that certain characteristics will present economic and environmental constraints to operating a pit and decide not to develop or to develop with certain design parameters (buffers, avoidance of certain areas etc.). The following are some examples:

- The distance surface material is hauled to customers can have a significant effect on the economics of an extraction operation. It is wise to establish the location of prospective customers before making an application for a specific site.
- If the gravel is to be washed, screened, crushed or stockpiled, the costs will increase with each of these steps.
- Some areas and material types are known to have a high ratio of rejected material. It is important that during the initial planning process, the moving, storage, and final placement of reject material be considered. In some cases, this reject material may become a product depending on future product specification, distance to market and local supply and demand. Excessive volumes of reject may become a storage and management problem and create a substantial reclamation liability for which the application holder must provide security.
- If there are plans to remove gravel from below the water table, the operator may have to consider pumping the water out of the operating area. This activity may trigger the Water Act where provisions may be required for water management. This may result in additional development costs.
- When viewing the site, an operator should note any potential pit areas that may be considered to be too close to pipelines, roads, rivers, embankments, recreation areas, etc. for which it may be necessary to leave a buffer of trees or undisturbed land. Changes to the pit size and configuration may make development uneconomical.
- Wildlife species and habitat considered to be sensitive will need to be considered in the approval and design of pit development, especially if the lease is located in a Caribou Protection Area. For example, the maximum sight line distances of 200 m restriction (maximum of 4 ha open at any one time) will affect the development sequencing of an operation. Furthermore, timing and access conditions maybe applied.

7.2 Pit Size and Configuration

Once the decision is made that a pit is feasible, consideration should be given to determining how it will be designed relative to any development constraints.

7.2.1 Topsoil, Subsoil, Overburden and Aggregate

The main design criteria will be the characteristic of subsurface conditions, namely the aggregate reserve. Provide information on thickness of topsoil, subsoil, overburden and aggregate that was obtained from the Surface Material Exploration and Soil Assessment. of different materials to be extracted can then be estimated and operations planned most efficiently. This information will also assist with planning pit sequence and storage needs. It will also help prepare the security estimate and set reclamation goals.
7.2.2 Vertical and Horizontal Extent of Excavation

Pit size includes the total area where aggregate will be removed and any areas where soil will be salvaged and stockpiled. The development plan should identify the largest maximum pit size that is likely to occur at the location to reduce the need for amendments to the plan. Pit size should be determined through a survey.

As sand and gravel pit depths are variable, the development plan should indicate the anticipated maximum depth (from the original surface to the deepest extraction depth) for the pit. A proper review of the subsurface information provides an inventory of the aggregate to be removed.

The depth of the pit relative to the remaining land surface may influence choice of end-land use. Shallow pits less than three metres deep can provide suitable sites for almost any land use, with the exception of fish habitat. Moderately deep pits with depths of three to seven metres can provide opportunities for wildlife habitat, fish habitat and recreation. Pits more than seven metres in depth are likely to be suitable only for wildlife or fish habitat, unless substantial recontouring is included as part of the pit development plan.

7.2.3 Undisturbed Buffer Zones and Setbacks

Buffer zones of undisturbed vegetation of varying widths may be needed around pit operations to protect environmental resources and other land uses. These buffers should be identified on a plan, and surveyed clearly and permanently marked in the field prior to any activity on the site commencing.

The buffer zone widths are generally based on site specific conditions and will need to be determined by consulting the local ASRD officer. General information to help establish buffer zones is provided below.

Undisturbed Buffer Zones Adjacent to Rivers and Water Bodies

Vegetated buffers adjacent to rivers and waterbodies are important for:

- maintaining stability of slopes, thereby reducing bank erosion, the potential for lateral shifting and stream degradation;
- helping protect land from flooding and potential loss of land due to erosion and instability;
- aiding in preventing the loss of product and soil material that maybe suitable for reclamation (e.g., as a result of flood events);
- reducing potential of erosion and siltation into the water body thereby reducing the loss of potential fish habitat;
- intercepting runoff and acting as a filter for sediment and pollutants, thereby reducing the amount introduced to the water body; and
- protection fish habitat, furbearing animals and aquatic birds where a site is located adjacent to a surface water feature such as a lake, creek, river, wetland, bog or fen.

Buffer areas near surface water features may be as narrow as 30 metres and as wide as 200 metres. The width of the undisturbed buffer zone generally depends on the importance of the water body and the characteristic of the floodplain. For example, a river with a wide floodplain will require a wider buffer than a small creek with a narrow floodplain. Similarly,
a fish-bearing lake will likely require a wider buffer than a small wetland in order to protect the Fisheries’ Sensitive Zone (See graphic below).

Ideally, the buffer should be measured from the top of the active bank of the river or water body to the boundary of the SML. In the case of waterbody buffers, consultation with the local ASRD officer is critical.

![Fisheries Sensitive Zone Diagram]

**Buffers for Wildlife**

In areas travelled by wildlife, a buffer will allow animals to continue moving from one area to another without being exposed. In addition, without a buffer, large areas used by wildlife are easily visible from the work area, making it hazardous for wildlife, especially during hunting season. This buffer area may range from 30 to 200 metres depending on the type of wildlife and wildlife habitat.

**Buffers around Unstable Areas**

A geotechnical assessment or evaluation may be necessary in areas where stability is a concern. Slumping, particularly along valley breaks, can be evidence of stability problems. This may be an important consideration for the safety of operations in some areas. Undisturbed buffer zones from the top of valley breaks or similar features will need to be determined based on the stability of soil and geological materials.
Buffer Zones for Noise, Aesthetics and Safety

In areas where there is human activity such as roads and communities, a buffer of undisturbed vegetation can help to reduce noise created by gravel operations, conceal an unsightly operation, and provide a security screen. A minimum 30-metre buffer is generally recommended between the excavation and all secondary and primary road allowances and a 100-metre buffer from all public facilities.

Buffer Zones Around Hazardous Material Depots, Garbage, Camps and Fueling Areas

Describe and note the location of facilities that may be a threat to wildlife or contribute to soil or groundwater contamination. These facilities should be located at least 100 m from any watercourse or waterbody as a minimum.

Extraction Setbacks

Extraction setbacks from all boundaries and undisturbed buffer zones should be included to ensure that adequate material is available to meet the sloping requirements. A three-metre undisturbed buffer zone from all property lines to the edge of the disturbance is recommended as a minimum. Once the extraction setback is calculated, it has to be added to the undisturbed buffer zone adjacent to the property line to determine the excavation limit.

For example:

- The extraction setback should be equal to the average depth of the pit multiplied by 1.5 for property boundaries where a 3:1 slope is to be established (see Figure 3.0). This allows for maximum resource development while maintaining a stable slope that can be revegetated with relative ease.

- For a pit with an average depth of four metres, the extraction setback would be four metres x 1.5 = six metres.

- The distance from the actual property boundary to where the mining must stop would be three metres (recommended undisturbed buffer adjacent to the property line) plus six metres (extraction setback) = nine metres.

- During reclamation, the material left in this extraction setback is used to establish a 3:1 slope starting from the edge of the three metre undisturbed buffer and running to the pit floor.

For situations where flatter slopes are required adjacent to undisturbed buffer zones, the extraction setback distance has to be increased or other suitable material has to be available to construct the required slopes. Normally, slopes associated with property boundaries and undisturbed buffer zones are not required to be compatible with adjoining land uses or CLI classes. Stability and revegetation are the main concerns in these areas of the pit.

Excavation of aggregate within the calculated extraction setback can be undertaken if there is sufficient overburden material available in the pit to create the required slope and the excavation would not result in stability problems at the pit face. Operations should be conducted in a manner that allows for rapid overburden placement to reduce the potential for collapse of the pit face.
Undisturbed buffer zones and extractions setbacks are not required at property lines if the excavation will continue across the property line. Application holders should make every effort to maximize the extraction of aggregate resources by working with landowners, municipalities (for road allowances) and adjacent pit operators.

7.2.4 Sensitive Areas

There are a number of landscapes and site types that are highly sensitive and need to be given special attention during the planning, operating and reclamation phases of a project. Mitigative action aimed at protecting and conserving these resources should be addressed.

Some particularly sensitive landscapes and features should be avoided. These include lands adjacent to and within: water-bodies; wetlands; coulees; river valleys; and dry lakebeds. Lands that have rare landforms, rare plants or plant communities, and listed endangered wildlife species, and important wildlife areas are also sensitive to development. Where avoidance is not practical, alternative construction techniques and equipment and appropriate timing windows should be considered.

Pit location and operations should also be designed to avoid disturbing valley and coulee edges and water bodies. Disturbance in this context includes excavation of valley and coulee walls (daylighting) and disposal of soil or geological material into valleys and coulees.

7.2.5 Wildlife Considerations

Regional and local differences exist in the types, distribution and abundance of wildlife. It is important to know what wildlife exists in the pit development area and how the species are likely to respond to conditions in the reclaimed area.

In addition to wildlife buffers described in Section 7.2.3 there maybe need to apply timing restrictions. Adjusting timing of construction or reclamation activities to less sensitive periods during the year is common practice to avoid breeding or spawning times for wildlife and to minimize disturbance to native vegetation and habitat. It is important to consult with local wildlife biologists to determine the best times to construct without undue disturbance to wildlife populations. Construction during breeding times is usually restricted.

7.2.6 Urban and Rural Residential Areas

Urban and rural residents have a number of concerns related to the development of pits near their homes, including environmental issues such as groundwater protection, dust, and final reclamation plans, and non-environmental issues such as truck traffic and hours of operation. Application-holders should engage local residents early in the planning process to describe the operating plans and environmental protection measures that will be employed, including the final reclamation goals for the pit. This communication should be continued throughout the development and reclamation of the pit.
7.2.7 End Land Uses

Reclaimed pits in close proximity to cities and towns are often developed for intensive uses (i.e., residential or commercial light industrial developments, parks, golf courses, or sports complexes) but zoning changes may be required. On the periphery of urban centers, less intensive uses such as country residential, wildlife habitat, fish habitat and nature-oriented recreation are possibilities. Sites in rural areas may be better suited for grazing, wildlife habitat and/or fish habitat.

7.3 Utility Right-of-Ways

If electrical service is required for the disposition, or a power line right-of-way required along this disposition to service another related facility, make this clear. If a power line right-of-way is required, this need should be considered during the early planning stages to reduce the risk of igniting wildfires and/or loss of service to facilities. When locating power lines in a common corridor, it is expected the power line will be located in a position where it is the least likely to be affected by falling trees. Power lines constructed on a single-use right-of-way must have sufficient clearance between the power line and standing trees to prevent falling trees from striking the power line.

Where a road, pipeline and power line right-of-way are required, it is recommended the power line be located between the road and pipeline. This greatly reduces clearing requirements and keeps the power line safe from falling trees.

Note: Different interests within the area may require protective measures or agreements to establish acceptable operating parameters. This information helps to indicate the types of agreements that may be required prior to any development. Encroachment agreements can be obtained from pipeline or power companies to enter into their right-of-ways and extract material. The Pipeline Regulations stipulate the requirements of ground disturbance operations adjacent to pipeline rights of way. In some cases it may be economical to relocate a power line or pipeline. To achieve conflict free operations to remove material up to a lease boundary common to another extraction operation, it is advisable to enter into an agreement with the adjoining operator, outlining how the extraction will take place. Any buffer requirements stipulated in the Conditions - “Schedule A’ of the lease document are to be reflected here.

7.4 Access Right-Of-Ways

Provide detailed information as to access requirements for construction, development, operation and maintenance purposes. Identify whether existing access is being used or new access is required.

Often, the access road required to reach the intended location already exists, and the applicant may be required to obtain approval to use it, even if this means using only a small portion of the road. Section 2.5.6 should be consulted regarding access approvals.

Before an access route is approved, the applicant may be requested to present the advantages and disadvantages of any alternate proposals, the rationale for selecting a particular route, and the trade-offs made. In this case the applicant should indicate the type of access road based on the following guidelines:
• undeveloped (no grade): 10 m right-of-way or less, usually temporary;
• frozen ground: 10 m right-of-way or less, usually temporary;
• summer (dry): low-grade, no gravel, 15-20 m right-of-way, usually only accessible in dry conditions; and
• all weather (permanent): all season, grade development, graveled, usually 15-20 m right-of-way.

For winter access, it is recommended that existing seismic lines and/or LOCs be used for initial access for exploration. Any widening of these lines for or during winter operations should be minimized. The applicant must provide a description of the access development planned for the disposition. In some cases, the plan may be to go in on a winter access with minimal development of a narrow right-of-way of 8-10 m.

Once the exploration work is completed, the applicant generally plans to move to a wider right-of-way (e.g., 20 m) for development of a high-grade road.

**Note:** If the entire right-of-way width is cleared initially, and then not required for development, it will be treated as an unauthorized use of public land and the appropriate enforcement action will be taken.

Provide detailed information regarding access requirements. Use existing access where possible.

### 7.4.1 Watercrossings

All watercourse crossings and methods must be identified. The bed and shore of most watercourses and waterbodies are owned by the provincial government. Activity at or near watercourses is one of the most critical factors reviewed on public land surface disposition applications. In such cases, the surface and sub-surface drainage patterns are to be maintained.

Watercourse crossing structures already in place along existing roads should be used as much as possible to avoid the need to construct new crossings for equipment/vehicles. If watercourses are present on the right-of-way, but construction equipment and vehicles will be using existing crossings on roads currently under disposition, state this in the CRBP.
Disturbances are to be kept to a minimum and special measures must be taken to minimize siltation and ensure bare soil is revegetated. This may include the use of erosion blankets, silt fences, etc., especially near fish-bearing waters.

Special measures may have to be taken to allow fish passage and minimize siltation at watercrossings.


- most ice bridges and snowfills (see schedule #2 of the Water (Ministerial) Regulation for a list of watercourses that require an approval under the *Water Act* for an ice bridge or snowfill);
- one-span bridge crossing;
- logfills where no flow is present (frozen to the bottom); and
- culverts where the flow is equal to or less than what can be accommodated by a 1.5 m culvert.

For watercourse crossings that are regulated by the *Water Act*, Code of Practice for Watercourse Crossings (e.g., any crossing with culvert[s] larger than 1.5 m in diameter, or any bridge[s] over one span), the notice under the *Water Act*, Code of Practice for Watercourse Crossings must be submitted with this application. A copy of the notice is available at [http://environment.alberta.ca/3.html](http://environment.alberta.ca/3.html)

Watercourses over a navigable waterway will require approvals under the Federal *Navigable Waters Protection Act* ([NWPA](http://www.tc.gc.ca/marinesafety/oep/nwpp/faqs.htm))

More details regarding watercourse crossings can be found in Appendix 4C or at [http://environment.alberta.ca/3.html](http://environment.alberta.ca/3.html)
7.5 Site Improvements

Describe and show the location of all proposed site improvements that are required for site operations including stockpiles, crushing plants, washing areas, water management projects, ditching, camps, weigh scales, fencing, fuel compounds etc. See Section 8.0.

7.6 Pit Development and Sequencing

Where not already indicated, describe the intended sequencing and methods of site development and aggregate extraction.

7.6.1 Construction Start Date and Ground Conditions

Indicate when the initial clearing and site preparation are expected to commence. This is to advise ASRD as to the time of year (frozen or unfrozen ground conditions) in which the activities will take place. Dispositions approved for frozen ground conditions (i.e. snow fills and winter access), but where construction does not occur until non-frozen conditions exist, will require a revised CRBP to reflect the prevailing construction conditions and approval.

7.6.2 Extraction Sequencing and Soil Handling

Indicate the number of phases that is expected over the life of the operation. The phases are to match the division of the lease into operational areas which indicate their order of development (to be shown on the site plan), the proposed yearly volumes and the life expectancy of the deposit.

Operations should be planned to efficiently extract the resource and progressively reclaim the pit. Progressively developing and reclaiming the pit should minimize double handling of topsoil, subsoil, overburden, and/or aggregate. Extracting and processing materials only when they are required can also reduce materials handling.

Once a development stage is completed, overburden and subsoil can be directly placed into depleted pit areas to achieve the contour grade for reclamation. Salvage and direct placement of topsoil promotes better plant cover and serves as a source for native seeds and plants. Pit development and reclamation becomes a sequential process, minimizing the reclamation liability.

7.6.3 Timber Management and Woody Debris Disposal

Provide information and describe methods of woody debris disposal (e.g., burning, mulching, rollback for erosion/access control and fire control measures, crushing, etc.). Indicate whether total or partial disposal will be undertaken.

“Schedule A” of the lease document will stipulate the conditions of timber salvage and disposal of woody debris. The area cleared covered by salvageable timber is reported here along with the area of unsalvageable vegetation cleared.

Note: A fire permit may be required during fire season

Section 150 of the Timber Management Regulations of the Forest Act states “an industrial operator shall, within 60 days of clearing land, remove the decked timber and put it to some beneficial use or dispose of it by sale or gift.” However, a condition of the lease may require
the applicant to salvage the timber. There are many salvage contractors in Alberta, as well as many potential users for the wood. Considering the wood can be used for posts, poles, lumber, pulp, firewood and other purposes, the operator should determine whether any parties are interested in the timber rather than destroying it, even though ASRD may not require timber salvaging. By doing this, the operator can gain additional revenue and also make it easier to carry out gravel extraction operations.

By contacting the nearest departmental office, the applicant may learn the names of local timber-salvage contractors. Salvaged timber can be stored for only a short time. After 60 days, the operator may lose ownership of the timber, and ASRD may award it to someone else. Timber will generally lose its principal value after two years. The operator should make certain that any unsold timber is sorted and placed where it need not be moved for up to two years.

Describe methods of woody debris disposal.

7.7 Inactive Pit Planning

The life expectancy of many sand and gravel operations is long-term, but activity may shut down for a period of time once a contract is fulfilled or aggregate is depleted from a portion of the pit. A plan must be developed for the pit, or portions of the pit, that will be inactive for more than two years. The plan must include the techniques for soil conservation and reclamation techniques that will be used to:

- ensure that the site is safe (i.e. slopes, water bodies, equipment and structures);
- ensure that soil reclamation materials will continue to be conserved (i.e. protected from erosion and loss); and
- control weeds.

The plan should indicate what monitoring program would be carried out to ensure that the plan is effective.

7.8 Documenting Findings

A description of the proposed site development must be included in the CRBP report along with the following drawings. The drawings should be at an appropriate scale and size to clearly show the required information.
Site Sketch Plan
This drawing should show the lease boundaries (scaled and matching the dimensions of the approved boundaries); township grid (section lines, road allowances); location of exploration holes and pits; location of existing pit(s); and access roads and adjoining or adjacent interests (within 100 m of lease boundaries) such as highways, power lines and pipeline rights of way or other extraction sites. Refer to Appendix 3E for sample drawings.

Existing Pit Conditions and Proposed Sequence of Activity
The drawings should show the planned sequence of excavation and reclamation for the life of the pit. This is best shown in a time sequence series of drawings. Each drawing should show major activities such as:

- new salvage areas;
- new excavations;
- new stockpile areas;
- new pit water discharge locations;
- new water diversion infrastructure;
- new groundwater discharge and recharge areas;
- existing and new infrastructure and recent reclamation areas;
- location of any improvements (human made structures such as gates, fencing, etc.);
- location of existing and future topsoil and overburden stockpiles (next phase), and existing surface material resource stockpiles;
- total area that requires reclamation security (includes all disturbances - existing and next development phase);
- general location of all processing facilities such as crusher, washing sites and ponds, asphalt plant;
- location of cross-sectional lines, e.g., A-A¹, B-B¹;
- development sequence of the operation of the lease including; area that will be cleared of vegetation; area that will be cleared of vegetation for the next development phase; area that will be stripped of topsoil; area that will be cleared of topsoil for the next development phase; area that will be stripped of overburden and area that will be cleared of overburden for the next development phase;
- location of any concentration of reject materials that may have been buried, e.g., large boulders;
- anticipated development phase areas numbered to follow sequencing;
- estimated volume of gravel in each development area (show on site plan);
- proposed land use after the site is reclaimed and reasons for this choice; and
- reclamation sequence and anticipated timing (in reference to development phases).

Refer to Appendix 3G and 3H for sample drawings.
Cross-section Drawings of Existing Pit Site Conditions
Cross-sectional drawings show the pit and adjacent areas in profile, as though a section has been cut away. These drawings show the surface landscape, as well as the thickness of the topsoil, overburden, surface material being extracted, water table and bedrock if applicable.

Cross-sections must show the existing conditions and those expected after the site is reclaimed from and beyond the lease boundaries to include any topographic features (slopes, watercourses, etc.) or adjacent interests (roads, other pit developments, etc.). Each pair of cross-sections should be at right angles to each other or be located in a manner that shows a reasonable representation of the pit and the adjacent land.

For larger pits, additional cross-sections are usually required to represent the variations that are usually encountered. Refer to Appendix 3J and 3K for sample drawings.

8.0 Operations Planning
This section provides guidance on planning and documenting the aggregate processing operations that will take place on the site. The information should include details on the: location, operation and timing of these activities; any plans to change their location as the pit is developed through time; and a description of any special mitigative measures that will be employed to prevent potential adverse environmental effects.

The CRBP must identify all activities associated with aggregate processing.

8.1 Salt Mixing, Asphalt Mixing and Truck Box Spraying Sites
Asphalt plants, cold mix sites, salt mix sites, truck box spraying sites and bulk fuel storage sites must be located in areas of the pit where topsoil and subsoil have been salvaged. It is recommended that the overburden not be removed from these sites. If overburden material is not present it is recommended these sites be engineered with a proper liner.

By placing these operations in areas where clay overburden is still present or on sites that have been properly engineered, the potential for contaminants to infiltrate through the soil or gravel
into the groundwater system is reduced. It also ensures that the material suitable for use as reclamation material is not lost due to contamination.

All bulk fuel storage sites must also be constructed and operated in compliance with the most recent version of the Guidelines for Secondary Containment for Above Ground Storage Tanks http://environment.gov.ab.ca/info/library/5714.pdf

8.2 Aggregate Washing

Typical washing operations include screens to remove large size materials and hydro-separators to wash away silt, clay, soil, organic and other very fine particles from the aggregate. Further screening can be done to separate gravel, coarse sand and fine sand depending on grade of product desired. This system requires settling ponds and a pit water collection system.

Settling ponds for washing operations should be located on a stable, impermeable foundation with containment features or dykes as needed. It is highly recommended that the clarified water from settling ponds be re-used at the wash plant.

Sludge from the bottom of the settling ponds is typically fine sediment particles such as silt. This material should be considered for use in reclamation. It could be used for establishing grades, slopes or contours, and could also be used as subsoil if suitable. If the material is not suitable for reclamation, it should be placed at the bottom of the pit. This material should not be left in stockpiles where it could be subject to wind or water erosion.

In addition to special permits from ASRD, Water Management Division and Land and Forest Services, the operator will have to indicate the intended water source, the location of a settling pond for used water, and a plan for releasing used water. See Section 8.6.1 – Release of Pit Water.

8.3 Equipment

The type of equipment used for pit operation depends on size of the proposed operation, the need for extraction and processing, and the local availability of equipment. Every effort should be made to:

- use equipment that is suited to the size of the job;
- use equipment that has the least possible impact on the land;
- select equipment to perform the work with consideration to productivity, safety, and cost effectiveness; and
- have contingency plans when different equipment is required due to changes in site conditions (i.e. low ground pressure equipment if the area is or becomes too soft to salvage surface soils).

8.4 Crushing and Weighing Sites

Operations that involve crushing and weighing create special problems that must be addressed. An efficient traffic pattern should be planned to and from the crushing and weighing equipment so workers do not obstruct or delay each other. It is easier to develop this on paper than to move equipment on the ground or amend a development plan.
Royalty fees must be paid to ASRD. Measures to keep track of accurate volumes that are removed from the lease site are the responsibility of the operator. For leases where large volumes are being removed from the site, scales are recommended.

Crushers and weigh scales will require the operator to consider the intended location of the following:

- area for stripping and other overburden piles;
- area for pit run piles;
- crushed aggregate piles;
- rejected material pile;
- blending material;
- leftover stockpiles;
- mixing plant site;
- mobile pads; and
- buffer zones between property lines and/or drainage courses.

8.5 Incidental Activities

The applicant must identify and outline on a plan, any additional clearings required for temporary use (e.g., borrow pits, campsites, salvage decking sites, etc.). For incidental activities, as indicated above, when applied for with the disposition and included in the plan, no additional approval is required. If the incidental activity is not approved under the disposition, a separate authority is required.

Listed below are some general guidelines that apply when choosing locations for additional clearings.

8.5.1 Improvements

Fencing, gating, placement of storage tanks or construction on lease of any type requires approval. Improvements such as these can be identified in the application stage to be included in the approval. If the improvement is required after the approval has been issued, the field
officer can add the requirement through written consent. Permanent buildings and structures will need a separate authority.

**8.5.2 Water Use**

Identify the source/site of all water withdrawals. If this information is not known at the time of application, it must be provided to the ASRD prior to use. If applicable, indicate the name, location and type of water source subdivision, and the GPS coordinates in degrees/minutes/seconds. (i.e., beaver dam, creek, etc.). The disposition holder is expected to take all necessary precautions to prevent deleterious materials from leaving the site.

**Note:** In the Green Area, temporary water withdrawal and use of up to 5,000 m³ may occur without a *Water Act* licence. For the White Area, temporary water withdrawal requires a *Water Act* licence for all sources except withdrawal from borrow pits under the terms specified in the *Water Act*, Appendix B, Schedule 3, of Regulation 205/98.

**8.5.3 Camps**

If a camp site is required in conjunction with the operation of a surface materials lease or license, it cannot be approved as part of the surface materials disposition. Authorization to establish a camp site on public land will require a separate authorization.

To establish a camp site on public land, the applicant must apply for either a miscellaneous lease (MLL) or a miscellaneous Permit (MLP). An MLP is issued for short term operations for a period up to one year, while an MLL is issued for a longer period of time. The length of time you wish to operate the campsite should dictate if an MLP or an MLL is more appropriate. Copies of the MLP or MLL application form can be obtained at: http://www.srd.gov.ab.ca/lands/formspublications/usingpublicland/pdf/LS1_application.pdf

If the disposition-holder wishes to apply for an MLL or an MLP within the SML area, they must first delete the area from the SML.

**8.5.4 Hazardous Materials**

Describe any hazardous materials and wastes that will be used or generated at the site including salt for mixing with the sand for winter road de-icing, oil for asphalt production gas and diesel for fuelling and petroleum products and paints. Equipment storage needs must also be identified in the plan.

Describe the manner they will be stored to control contamination. At minimum, fuelling facilities and hazardous material depots must have secondary containment and be located at least 100 m from any watercourse or waterbody. The burial of asphalt reject material must be done in a manner that is acceptable to the regional field officer.
8.5.5 Waste and Sewage

Describe the method of collecting, storing and disposing of human waste. Portable toilets with holding tanks should be provided for sewage. Domestic garbage should be contained in wildlife-proof containers. Show the locations of these facilities on a plan.

8.6 Surface and Groundwater Water Management

Water management is a propriety issue in the development and operation of the aggregate facility. Many surface materials have been carried and deposited by water, therefore, many deposits are often found close to rivers and lakes.

The mining development must be isolated from watercourses by an appropriate buffer (See Section 7.2.3). Underground springs and above-ground runoff from rain or snow also may affect extraction operations. If the operator suspects that water will affect the operation in any way, methods for controlling it should be included in the operations plan. All ditching, berms, settlement ponds, buffers, and other control methods are to be shown on the plan.

Experience at other gravel extraction operations indicates that the collection of runoff and removal of excessive suspended solids (silt) from extraction water are the main treatment requirements to meet water quality objectives. Control of water is required from initial site disturbance through full completion of reclamation.

8.6.1 Wet Pit Excavation

Pit dewatering typically takes place in operations where the excavation is at or below the water table. Site drainage is maintained by directing pit water (surface runoff and groundwater seepage) to the low point in the extraction area, a sump, a settling pond or offsite to an adjacent waterbody.

Settling ponds should be established in the excavation area to provide containment and settling time for any suspended solids within pit water. They should be constructed so they
are of an adequate size to handle the volume of water coming into the excavation. It is recommended they be located away from pit activities and riverbanks. Keeping the ponds located away from riverbanks helps ensure riverbank stability.

Sumps are typically constructed for new pits when offsite discharge is not an option and there are no excavations to contain pit water. To provide a reasonable rate of recharge back to the groundwater aquifer, sumps are usually constructed by removing topsoil, subsoil and overburden material from above the gravel in a future mining area. Pit water that is diverted into the sump, quickly infiltrates back into the gravel associated with the aquifer.

Bailing may take place in a wet pit where excavation of aggregate is at or below the water table instead of pit dewatering. In this situation a dragline, clamshell, large hoe or other similar equipment is used to extract the aggregate. Due to high total suspended solids, the water contained within the stockpiles from bailing operations should be directed or allowed to run back into the pit from which it was taken; otherwise, it must be managed to meet the requirements for release of pit water (See Section 8.6.2).

Settling ponds should be established in the excavation area to provide containment and settling time for any suspended solids within pit water.

8.6.2 Release of Pit Water

Pit water handling plans may include moving water within the pit (e.g., from excavation to excavation) or discharging off-site via a pipe or a natural drainage. Where the water is retained on-site, the CRBP should include a description of the water movement plans. Where the water is to be discharged off-site, the CRBP must provide the following information:

- the conditions that would require release of pit water to the environment, the techniques to release the water and the location of discharge points;
- type of pit water to be discharged (pit dewatering, pit washing, pit runoff, other);
- volumes to be discharged;
- discharge rates;
- timing of discharge;
the monitoring program (to ensure there are no adverse effects of the discharge on the receiving environment); and
contingency plans in case an adverse effect is discovered or the discharge cannot occur.

Note: The release of pit water outside of the lease area requires a Temporary Field Authority (TFA) from the local ASRD office.

Pit water should be released into a vegetated area within the lease. The release of pit water outside of the lease will require a Temporary Field Authority (TFA) and may be subject to the conditions of the Fisheries Act and Water Act.

8.6.3 Water Act and Fisheries Act Approval

Pit operators have the potential to affect surface water and groundwater on the site and off the site. The impacts of these activities off the site may affect adjacent landowners and water users. Pits may require an authorization under the Water Act or may be required to follow a Code of Practice when:

- water is used or diverted (e.g., gravel washing, pit dewatering, diversion of watercourses or surface water);
- the pit is within the floodplain of a watercourse or water body;
- structures, such as roads, bridges, culverts, outfalls and erosion protection, are being constructed on watercourses or water bodies;
- water bodies, such as wetlands (permanent or temporary) are or may be affected by pit operations;
- drainage courses will be modified, controlled or diverted; and
- surface water bodies are planned as an end land use.

Exemptions

Pit registration holders should be aware that their activities may be exempt from requiring a Water Act authorization if the proposed activity or diversion falls into one of the exemption categories in the Water (Ministerial) Regulation. For example, the following is exempted under Schedule 3 of the Water (Ministerial) Regulation.
(f) A diversion of water for the purpose of dewatering a sand and gravel site or construction site if

   (i) The water diverted as a result of dewatering is  
      • moved into and retained in an on-site pit, without using the water, or  
      • diverted back into a water body without using the water, if the water is equal to or of the same quality as the water that was originally diverted

   (ii) The dewatering site, the water body and the on-site pit referred to in sub clause (i) are hydraulically connected

   (iii) There is no adverse effect on the aquatic environment or on a household user, licensee or traditional agriculture user

Sample Water Act application forms can be found on Alberta Environment website at http://www.environment.alberta.ca/1580.html Applicants can contact the local Alberta Environment office for further information on Water Act approvals.

Aquifers and Groundwater
Under the Water Act, aquifers are considered water bodies and an authorization may be required for any activities that may affect the aquifer, such as the hydraulic characterization and water availability of the aquifer. As such, lease holders must take extra precautions where the operations may impact an aquifer. Obtaining background groundwater data is important for the planning, operating, and reclamation phases of the pits. Following are the steps to take.

- Determine if the pit operation is on a known aquifer. Information may be available from local municipalities, Alberta Environment, Prairie Farm Rehabilitation Administration offices or local community organizations such as the Grimshaw Gravels Aquifer Advisory Committee. Digital information may be available from the Prairie Farm Rehabilitation Administration for aquifers south of Edmonton, and from the Groundwater Information Centre.

- Obtain groundwater quality and quantity information prior to operating a pit on an aquifer, and retain the information on file. If authorization under the Water Act is required, a field verified survey of groundwater users might be required. The survey should include the location and ownership of all wells, springs or dugouts within a specific radius (usually one mile) of the proposed operations. The survey includes water quality, well depth, depth to water, completion details (e.g., screened, open or slotted interval) and pump intake depth for each well. A map should be created to show the locations of the wells identified in the survey. This information is useful in protecting both the registration-holder and the adjacent users if conflicts arise over water contamination or water use. The information may also require periodic updating.

- Ensure that above-ground fuel storage tanks, asphalt plants and salt mixing sites are appropriately located and operated in a manner that ensures any releases are contained and remediated.

- Ensure that local runoff does not contribute pesticides or other contaminants to groundwater supplies through appropriate drainage measures.

More information on aquifers is available through Alberta Environment’s Ground Water Information System http://environment.alberta.ca/1295.html
Fisheries Act Approval
Operations that may cause harmful alteration, disruption or destruction of fish habitat will require authorization under the Federal Fisheries Act. Operators should consult Fisheries and Oceans to ensure that the proposed operations comply with the requirements of the Fisheries Act. The 1998 publication entitled Decision Framework for the Determination and Authorization of Harmful Alteration, Disruption or Destruction of Fish Habitat by Fisheries and Oceans Canada http://www.dfo-mpo.gc.ca/oceans-habitat/inforcentre/publications_e.asp outlines the process to determine if an approval is required.

8.7 Erosion and Sediment Control
Erosion control during the operation and reclamation phases of pits is one of the most important, yet problematic issues that requires serious thought during the development and planning stages. This is because construction and operation activities at a pit exposes land to erosion forces that can lead to adverse environmental impacts such as siltation of water bodies and loss of topsoil.

Describe in the CRBP the measures that will be employed to control erosion and sediment loading in runoff water and nearby watercourses during construction, operation and reclamation. Suggested controls are provided below:

Temporary Controls
Erosion control measures will be implemented before construction commences to minimize the amount of sediment entering surrounding watercourses.

- In the event of erosion due to natural causes or emergencies, a suitable stockpile of silt fencing will be kept on site.
- Equipment will not be permitted to work within the riparian perimeter of a watercourse.
- Topsoil and organic materials disturbed during preparation of the work area will be salvaged as much as possible and used during revegetation and site enhancement.
- Whenever possible topsoil, subsoil and overburden will be separated. Topsoil can be used for mine remediation purposes and subsoil and overburden will be stockpiled in a manner which prevents erosion into local waterbodies.
- The width of the right of way required for access to the site and the area of the work zone will be kept to a minimum. The access and work zone will be clearly delineated. Disturbance to vegetation outside the delineated area will be avoided.
- Terrestrial and runoff sediments from the work site will be controlled with filter/silt fences and will be placed and maintained in a manner that effectively contains any disturbed or exposed soil.
- Topsoil removed from the construction site will be stockpiled away from watercourses and provisions will be made to contain runoff (e.g., silt fences).
- Stockpiles will be seeded to grass cover to prevent erosion, discourage weed growth and maintain the nutrients in the soil.
- Instream work on culvert expansions will be conducted during the time of the year when flows are lowest. Instream construction for culvert expansions will be conducted in the dry using appropriate isolation structures such as sheet pilings and gravel berms. Flumes or pumps will be used to keep the downstream flow of water constant during instream work.
• Work near watercourses will be discontinued in the event of storms or other weather that increase the potential for erosion/runoff.

Permanent Controls
Long term erosion and sediment control measures will be implemented to maintain slope stability and to control the off-site migration of sediments.

• Vegetation buffers will be incorporated into the pit design to prevent encroaching into wetland and riparian areas. All efforts will be made to protect as much riparian and upland vegetation by marking and adhering to the buffer areas.

• Access roads will be located on an existing disturbance on relatively level land to minimize the amount of cuts and fills. Where required, temporary culverts will be installed to maintain natural surface water drainage pathways. No drainage from the excavation or road will be directed directly into a watercourse.

• Reclamation and stabilization of the pit will be initiated as soon as practically possible. Initial stabilization might have to be undertaken using straw mats, intercepting fences, and other protection structures until permanent vegetation has become established. If fewer than four weeks of the growing season remain, seeding/revegetation will take place at the beginning of the next growing season.

• Slopes, soils and stockpiles prone to erosion will be stabilized as soon as possible by use of erosion mats.

• Slash piles and woody debris will be placed where local drainages will not be obstructed. Slash piles can either be burned, buried, windrowed, crushed, shredded or stockpiled for use in slope contouring following mining activities.

• Outflows from dewatering activities will be directed towards a vegetated area or settling pond to minimize the introduction of sediment into local water features.

• All mining-related structures and materials will be removed from the site upon completion of the works; and the design of the decommissioning and remediation plan will be implemented to ensure the mining areas are stabilized.

Erosion control techniques also require continual updating as new problems are encountered.
The Operations Plan must incorporate all necessary techniques to prevent erosion.

8.8 Dust Control

Dust is defined as a “substance” under the *Environmental Protection and Enhancement Act* and must be controlled so it does not cause an adverse effect. Dust becomes more of a concern as pit development encroaches on urban and residential areas. Depending on the proximity to populated areas, there may be a need to use ambient monitoring equipment to monitor exposure levels.

Contributing factors include excavation of topsoil and other soil resources (e.g., subsoil, overburden), excavation of aggregate, processing of gravel (e.g., crushing, screening, loading, and/or hauling), truck traffic to and from the site causing road dust, movement of heavy equipment on site, and exposed stockpiles.

There are different impacts depending on the size and type of material (clay, for example, is quite fine and contains silicates which may pose more of a health concern than coarser materials such as sand). Impacts from excess dust could include respiratory problems, safety concerns associated with driving, and cleanliness of personal property both indoor and outdoor. Strategies to address fine particulate matter in Alberta are the subject of the Clean Air Strategic Alliance (CASA) *Particulate Matter and Ozone Management Framework for Alberta*.

It is important to adapt equipment and site operating practices to decrease the amount of dust within a pit. Mitigative efforts could include the following:

- enclosing crushers to minimize dust levels;
- using fine spray or a misting system on crushing machinery;
- placing a screening system around the crushing equipment and/or on the upwind side of the operation;
- placing crushers in the excavated area (best to set up equipment in a low area of the pit to decrease exposure; this also has the benefit of reducing noise);
- paving roads that have intensive or regular use;
- watering down traffic lanes during dry periods to prevent loss of fines due to vehicle movement;
- considering material handling practices and shape of stockpiles (i.e. placement of gently contoured topsoil stockpiles on adjacent agricultural land so they can continue to be
farmed during mining operations, allow access on top of stockpile for weed spraying and make them cigar-shaped, facing the prevailing wind);  
- considering wind direction (i.e. move stockpile material from the downwind side and do not have a rough exposed face when working);  
- considering the size and type of equipment for the job;  
- developing and implementing contingency plans (i.e. if there are heavy winds and insufficient control measures in place, shut down operations until the dust level subsides); and  
- considering using dust (particulate matter) monitoring equipment to provide factual information in case of disputes.

Application-holders should consult the Framework documentation on the CASA web site at [http://www.casahome.org/](http://www.casahome.org/). Click on CASA Library, then on particulate matter and ozone project team under CASA group. As well, application-holders should consult the Canadian Council of Ministers of the Environment website to learn more about the Canada-wide Standard on particulate matter at [http://www.ccme.ca/ourwork/air.html?category_id=99](http://www.ccme.ca/ourwork/air.html?category_id=99)

### 8.9 Weed Control

Weeds can invade new land exposures. The operations plan should include methods for controlling and eliminating weeds associated with operating and reclaiming the pit. Methods to prevent the introduction of weeds to a site and facilitate weed control during construction, operation and reclamation of a pit could include the following:

- preventing initial weed establishment;
- minimizing seed spread by pressure cleaning construction and reclamation equipment before it is brought onto a site;
- developing an active weed control program during operation of the pit;
- keeping soil stockpiles as close to the original location as possible;
- seeding stockpiles to grasses or legumes to reduce weed growth (e.g., use species that provide erosion control and are competitive with weeds);
- monitoring land for new weed outbreaks and spot spraying, mowing or hand pulling weeds to save money in the long run (mowing is preferred to spraying for weed control on prairie sites);
- mowing to control weeds prior to flowering so weed seeds are not spread;
- mowing areas seeded to native species high enough (15 centimetres above surface grade) to avoid damaging established native seedlings;
- using herbicides appropriately during pit operation (determine if herbicide use is allowed in the area and, if so, read mixing and application instructions carefully);
- not importing topsoil with weeds;
- using soil from the immediate area where required (talk to the landowner); and
- requesting a Certificate of Seed Analysis for each seed lot to determine weeds or “undesirable species” in the seed mix and checking with regulatory personnel to determine if any species of concern are present.
8.10 Noise

Describe potential noise sources and the methods to reduce the amount of noise emissions. Such measures may include the following:

- suppression by enclosure of pumps or other systems;
- enclosure of crushers (e.g., use of a blanket system around the outside of a plant to absorb sound);
- general restriction on operations (e.g., reduce or restrict the use of engine retarder brakes and reduce the amount of heavy gearing);
- selection of equipment that has taken noise reduction into account;
- consideration of equipment location (e.g., crusher set up in low areas, use of stockpiles as sound barriers, and operational design of pit);
- in instances where pit operations are close to residential areas, the use of sound monitoring equipment is encouraged to provide factual information in case of disputes.

8.11 Safety and Security

The applicant must comply with all required Occupational Health and Safety requirements and their own comprehensive health, safety and environmental policy operators are urged to contact the Provincial department responsible for the Occupational Health and Safety Act for further information and advice on safety issues.

8.12 Unexpected Occurrences

The CRBP should include measures to address the following unexpected situations:

- spill response plans for hazardous material releases;
• contingency plan to address the release of silt-laden water into a watercourses or erosion or slope failure;
• plan to pause activities in the immediate area if archaeological artifacts are discovered during construction, and contact the appropriate provincial government office to determine whether additional remaining artifacts will be recovered, and in what manner.

8.13 Shutting Down Operations

In the event of wet or partially frozen conditions, construction and equipment travel should be suspended until conditions improve in order to minimize terrain disturbance and soil structure damage. Indicators of wet conditions may include rutting, wheel-slip, build-up of mud on tires and cleats, formation of puddles, and tracking of mud on the site as vehicles leave the working area. Topsoil handling should also be suspended during excessive wind conditions to prevent soil erosion. A clear shut down protocol should form part of the application holder’s internal operations manual.

The application-holder should immediately suspend the salvage or replacement of any topsoil or subsoil when:
• wet or frozen field conditions would result in the degradation or loss of topsoil or subsoil;
• wind velocity creates the potential for loss of topsoil or subsoil; and
• any other field condition or construction method could result in the degradation or loss of topsoil or subsoil.

The application holder should only restart the salvage or replacement of topsoil or subsoil when the conditions specified above no longer exist.

8.14 Site Management

The applicant is responsible for the proper implementation of the lease or license approval and all prescribed conditions in the approval and CRBP. In this regard, the applicant should describe the measures that will be put in place to ensure compliance with the lease and CRBP. The following management measures are recommended.

• The application-holder should appoint one person who will be completely familiar with the pit’s operations and the requirements of the approval in the field. Ideally this is the person identified in the application as the primary contact. This person should, in turn, ensure that all persons carrying out activities at the pit are aware of the regulatory requirements and the company’s environmental operating guidelines.
• The applicant must provide the necessary equipment and training to undertake the work. Site personnel should be advised of the mitigation measures by the project superintendent and through appropriate awareness training.
• Records should be maintained of all activities to ensure compliance with terms and conditions of approvals and permits, and that sensitive environmental features are protected. Documentation should include field notes and photographs.
• Water quality and erosion should be visually monitored within the project area to make sure standards are not compromised.
• On-site records for all activities related to environmental protection should be retained in a project file. Such records will include permits/licences/approvals, SML/SME applications, test results, manifests, environmental incident and spill reports, notification forms, inspection records, Material Safety Data Sheets (MSDS), all alterations and upgrading of environmental protection controls, environmental assessments, reports, plans and specifications.

• Include reports on any environmental incidents and follow up with an investigation and a plan for corrective action.

8.15 Documenting Findings

A written description of the proposed site operations should be included in the CRBP report along with a corresponding drawing showing the respective locations within the lease or license area. Combining the information into a single development plan as discussed in Section 7.8 is considered acceptable.

9.0 Reclamation Planning

This section provides guidance on preparing a reclamation and end-use plan to establish the post-disturbance ecosystem functions and land-use of the site. The reclamation and end use plan should provide the following information:

• description of the reclamation objectives;
• description of proposed end-land uses;
• the sequencing and method to be used to achieve progressive reclamation; and
• illustration of the reclaimed site upon exhaustion of the surface material resource.

The end land use for the pit area will usually dictate the final pit design and sloping requirements.

9.1 Proposed Land Uses

Native grasslands and forests provide a wide variety of goods and services for Albertans and Canadians. The conservation and restoration of the ecosystem functions that will support these goods and services is the primary goal of reclamation practices. Where forests presently exist the post-reclamation land use is to be forestry. Where native grasslands presently exist the post-reclamation land use is to be native grassland grazing.
The preferred reclamation method can be described as “assisted natural regeneration”. A change in closure-land use can be applied for if, for example, a water body or wetland is to be developed in a landscape that was entirely grassland. A change in land-use approval is required.

The end-land use for the pit should be decided in consultation with ASRD. The decision is based on an assessment of the type of operation, its location and surrounding uses. The end land use for the pit area will usually dictate the final pit design and sloping requirements.

### 9.1.1 Native Grasslands

Reclamation goals for native grasslands require a return of ecosystem structure and function. An ecosystem-based inventory of the pre-disturbance landscape is needed to identify targets for closure landscape design. Measures of ecosystem structure and function will be used as standards to determine whether reclamation meets requirements. See Section 6.2.

### 9.1.2 Forested Land

Forested land encompasses any treed land, whether or not the forest is exploited for commercial ventures. Forests provide a variety of goods and services for Albertans and Canadians. The conservation and restoration of the ecosystem functions that will support these goods and services is the primary goal of reclamation practices (source: ASRD, March 2007 – Guide to Reclamation Criteria for Wellsites [http://environment.gov.ab.ca/info/library/7749.pdf](http://environment.gov.ab.ca/info/library/7749.pdf)). Measures of ecosystem structure and function will be used as standards to determine whether reclamation meets requirements.

### 9.1.3 Wildlife Habitat

Reclaiming a pit for wildlife habitat usually involves creating a diverse environment that meets the needs of many species. Rolling, hummocky terrain with random patterns and irregular slopes, edges and contours are more suitable. Habitat should be blended in with surrounding areas. If applicable, care should be taken to maintain or create wildlife corridors so that animals can move safely through the reclaimed area. Revegetation plans should consider the types of wildlife native to the area and their needs (i.e. food, cover, escape terrain and water). Planting a diverse native vegetative cover that matches the surrounding landscape is the best approach.

Shallow slopes can be constructed where wildlife movement is a concern.
9.1.4 Surface Water Body

This part of the reclamation plan should indicate the intended use of any surface water bodies that will be retained or occur as a result of the development (e.g., fisheries, wildlife, recreation, stock watering, etc.). The reclamation plan must provide the following information:

- design;
- intended use;
- elevation of the water when the surface water body is filled to its design capacity (the full supply level); and
- slope of the land one metre above and one metre below the full supply level.

Surface water bodies must only be constructed in areas where there is sufficient natural recharge water (groundwater or surface runoff) available to maintain the design volume of water in the surface water body. If a surface water body does not fill to its designed full supply level a reclamation certificate will not be issued and the application holder may be required to reclaim the water body to an alternate land use.

Site drainage features that channel surface runoff into the surface water body should be constructed during the resloping, contouring and grading phase of reclamation. These features need to be developed, planned for and included in the Development and Operations Plan and the Water Act application. Depending on the intended use, landforms such as irregular pond bottoms, islands, contoured banks and mounds, and irregular shorelines should be considered.

Note: If a water body is being designed for fish habitat, a qualified aquatic environmental specialist should be consulted.

9.2 End Pit Design

It is important that the end pit design show the location of all proposed buffers and setbacks. Buffers and setbacks are areas of undisturbed vegetation that are left in place to protect an important environmental resource or land use activity. See Section 7.2.3.

9.3 Soil Salvage and Use

Conservation of topsoil and subsoil is required to restore ecological structure. The Soil Conservation Act requires that topsoil be conserved. The reclamation plan must outline how these materials are salvaged, handled, stored and used for reclamation.

There are several key bits of soil information required for planning soil conservation and reclamation, and for comparison to the closure landscape. Soil data must satisfy the following information interpretations:

- soil characteristics required to replace ecosystem structure and function in the reclaimed landscape;
- baseline soil quality parameters that will be used to determine reclamation success or failure (topsoil quality and quantity, subsoil restrictions, stoniness and gravel content);
- topsoil seedbank availability and salvage recommendations;
topsoil quality and thickness by ecosite (description of soil variability);
- topsoil salvage depths and volumes by ecosite;
- subsoil quality and thickness by ecosite (description of soil variability);
- subsoil salvage thickness and volumes by ecosite;
- overburden quality for use in reclamation and volumes available;
- reject material quality for use in reclamation and volumes available; and
- sub-gravel material suitability as a deep or shallow root zone layer in the reclaimed soil landscape.

Ideally the topsoil seedbank should be salvaged and directly placed to maximize plant germination.

### 9.3.1 Topsoil Seedbank Salvage

The sod layer on the surface of native grassland soils is a valuable source of native seed, rhizomes and bulbs that should be salvaged and used to “seed” reclaimed areas. Topsoil seedbank salvage and placement is the most cost-effective and rapid method to re-establish the native plant community. The donor site should match the recipient site for moisture regime. Ideally the topsoil seedbank should be salvaged and direct-placed to maximize plant germination and establishment. Some of the seeds will survive storage in a stockpile but limiting stockpile time is desirable.

The forest floor materials, made up of the moss layer and the duff or leaf litter (the LFH), hold the topsoil seed bank on forest soils. This layer should be salvaged and used to “seed” reclaimed soils in the same way as described for grassland soils.

### 9.3.2 Topsoil Salvage

If A horizon (s) are less than 15 cm, then a minimum of 15 cm of material will be salvaged unless part of the material is unsuitable (e.g. Bnt, bedrock, gravel). In forested areas salvage the duff (LHF) and up to 15 cm of material.

A topsoil depth survey should be carried out and a topsoil depth and distribution map should be prepared to guide the salvage operations in the field.
Topsoil must be salvaged from all areas of the pit that will be disturbed by pit operations. The only exception is that topsoil does not have to be salvaged from areas where topsoil stockpiles will be located.

Topsoil should be salvaged at least five metres ahead of all pit faces to ensure that topsoil does not slough into the pit. The salvage distance should be greater if the pit face is unstable or is rapidly advancing. The distance may be shortened near undisturbed buffer zones to maximize aggregate salvage but extra care should be taken to ensure no loss of topsoil.

Topsoil salvage should be carried out when the ground is not frozen. It is very difficult to salvage topsoil separately from the underlying subsoil or overburden when the near-surface soils are frozen.

9.3.3 Subsoil Salvage
Subsoil is the soil material found beneath the topsoil but above overburden or bedrock (usually the B horizon). It must be salvaged from excavation areas after the topsoil has been removed.

Subsoil should be salvaged at least three metres ahead of the pit face to reduce loss into the pit. Subsoil is replaced in the pit after operations have been completed. If overburden or other materials are not available, subsoil may be used for site contour development.

9.3.4 Overburden Removal
Overburden is the lower subsoil / geological sediments that lie between the soil and the aggregate. Overburden should be removed and retained for site contour development during reclamation. Excavation and direct placement will usually reduce handling costs.

9.3.5 Stockpiles
Reclamation materials need to be stockpiled when a pit is first opened up and may have to be stockpiled when direct placement is not possible. Approximate areas required for long-term topsoil, subsoil and overburden stockpiles can be determined based on the estimates of initial stripping volumes.

Materials from the initial site preparation are often stockpiled for the duration of the operation and then used in reclaiming the last operating area on the property. To minimize erosion potential and cut down on weed growth, these stockpiles should be seeded with appropriate vegetation (often annual crops such as oats, barley or rye). There is also the option to gently contour topsoil stockpiles so they can be integrated with the adjacent farming operations; however care must be taken over time to ensure that the material is recorded and understood to be a stockpile rather than “adjacent land”.

In addition, the following points should also be taken into consideration when determining stockpile location and design to improve chances of conservation and reclamation success and reduce cost of reclamation security.

- Thin, vegetated topsoil stockpiles (one to two metres in depth) tend to maintain topsoil quality better than thick piles.
- Topsoil, subsoil and overburden stockpiles should be contoured to allow for vegetation and stabilization as well as easier weed control.
• If possible, topsoil, subsoil and overburden stockpiles should not be located over
  merchantable aggregate.
• The stripped surface of the stockpile site should be smoothed and properly sloped to
  make a firm, well-drained base.
• Drainage around stockpiles should be provided to prevent collection and blockage of
  surface run-off.
• Stockpiles should be located in a secure area away from travel areas and day-to-day
  operations.
• Stockpiles should not be constructed near road allowances, lease boundaries or utility
  rights of way where slumping could cause personal injury or property damage.
• Stockpiles should be placed where they are easily accessible for loading material into
  trucks.
• Stockpiles should be located so that they do not have to be rehandled (e.g., locate
  storage sites in areas that will not be disturbed by the mining operation) and do not
  interfere with future pit expansion.
• Stockpiles should be oriented so they do not create safety hazards for traffic, such as
  blind corners or dangerous access.
• Stockpiles of reject and waste materials from asphalt and concrete or cement
  production should be located so that they do not come in contact with surface water or
  groundwater.
• Use of silt fences, tackifiers, mulches, tarps, or erosion control products may help
  prevent erosion and prevent sediment (as a result of water erosion) from leaving the
  site.

9.3.6 Soil Replacement Depths
Topsoil and subsoil replacement depths must be described in the CRBP. These depths may be
different for various land uses. If there is more than one land use, the CRBP should identify
the average replacement depths for each use.

When replacing topsoil on forest sites it is not necessary or desirable to make the topsoil
absolutely smooth and uniform. This usually results in compaction and poor soil structure
due to back-blading with a dozer. It is much better to leave a rough surface, with variable soil
thickness, and numerous micro-sites with some stumps and roots to encourage a diverse plant
community development. The rough surface traps snow and improves soil moisture, and traps
blowing seeds. It is common silvicultural practice to mound or “scarify” a site prior to
planting to trees, and to plant on the edge of the mounds.

On native grassland sites it is desirable to have a rough surface with numerous micro-
topography sites. The topsoil should not be back-bladed and harrowed to produce a smooth,
packed surface. Lumps of sod and some rocks are desirable features. Roughness reduces
wind erosion and improves soil moisture.
9.3.7 Use of Alternative Reclamation Materials

Alternative reclamation materials include compost, manure, sewage sludge, and other soil amendment materials. These materials may be acceptable and beneficial in some situations. A land manager should be consulted prior to use.

9.4 Soil Replacement

The application-holder should focus on progressive reclamation throughout the life of the pit to reduce stockpile volumes and the amount of active area within the pit. The goal for soil replacement should be replacement of salvaged soil material so that soil depth and quality are equivalent to the original or representative of the adjacent undisturbed land. Where end land use changes, soil depth and quality may vary from the original condition.

9.4.1 Sequence

Replace salvaged reject material, overburden, subsoil and topsoil in the proper sequence as follows:

- During replacement, poor quality materials should be directly placed into the pit.
  - Poor-quality overburden (saline, very stony), reject material and fine sediments should be replaced first and covered by at least 1.2 metres of better quality material so the rooting zone is not impacted.
  - Coarse materials should be buried at the bottom of the pit or used for slope reconstruction.
  - Placing reject and other poor-quality reclamation materials in their desired final destination avoids costly rehandling.
- Overburden can be spread evenly across the site or placed where it is needed for site grading and re-contouring.
  - It is recommended that overburden be directly replaced into depleted portions of the pit. The placement of this material should be done so that it supports the final land use for the site.
• Salvaged subsoil should be replaced evenly over the overburden or reject material and can be used for minor re-contouring. In natural environments (i.e., forests or native range), leaving a rough surface will facilitate the development of diverse vegetation by creating micro-sites for seed germination and establishment.

• Topsoil replacement should occur after contouring is complete and subsidence is no longer a concern. In natural environments, such as forests, it is preferable to have uneven thickness of topsoil to increase diversity on the site.

The application holder should minimize machine traffic on the topsoil and not work it when it is wet. Replaced topsoil should be protected from water and wind erosion by leaving some surface roughness and establishing appropriate erosion control measures.

9.4.2 Decompaction

The following should be given consideration to reduce compaction on reclaimed sites to ensure an adequate rooting zone:

• reducing the amount of equipment traffic on levelled areas and operating only during dry conditions;
• replacing overburden in thick (one metre) lifts to help to reduce compaction on a site;
• decompacting the replaced and contoured overburden before replacing topsoil and subsoil;
• tilling subsoil if necessary with appropriate equipment to break larger soil clods, prior to topsoil replacement.

If compaction does occur, ripping can help improve soil conditions by breaking up the surface of the overburden, increasing infiltration of surface water, and creating a better root zone.

Subsoilers can be used to relieve compaction in the subsoil after topsoil has been replaced, without mixing soil layers. Subsoiling can be beneficial if completed under the right conditions and followed by proper management. Factors to consider include soil texture, soil moisture, equipment type, equipment speed, and subsequent vegetation management. Wet

Topsoil replacement should occur after contouring is complete.
soil, for example, may not fracture as expected and could likely re-compact. Operating equipment too fast or too slow may cause the same result depending on the soil and moisture conditions. Experienced personnel should monitor and supervise the work and make adjustments as deemed necessary.

9.5 Drainage

Drainage control is important in both the operation and reclamation phases to minimize erosion, soil loss and sedimentation resulting from overland and channel flow through reclaimed areas, to control flooding or ponding, and to minimize obstacles to farming equipment. It is very important during both the operating and reclamation phases that the pit operations do not divert block or impound the natural surface or subsurface drainage.

The CRBP should document methods to re-establish and control drainage (e.g., interceptor drainage and grassed waterways to slow water velocity). Temporary diversion of drainage away from newly topsoiled and seeded areas to prevent erosion should also be considered. The plan should also describe methods to ensure that surface runoff from the pit during the operation phase does not flow onto adjacent properties. Directing runoff and groundwater seepages to sumps or low points in the pit to allow for later disposal or seepage is one method that can be used.

9.6 Revegetation

Native grasslands and natural forest sites are to be returned to native species sites as quickly as possible. The old practice of seeding a site with an aggressive agronomic grass to obtain a dense cover (the old 80 per cent rule) is no longer acceptable. A thick grass cover provides erosion control but it prevents invasion and growth of native species.
The old practice of seeding a site with an aggressive agronomic grass to obtain a dense cover (the old 80% rule) is no longer acceptable.

Following are some of the “assisted natural regeneration” techniques being used.

- Salvage the topsoil seedbank and use it to “seed” the reclaimed soil. Direct-place the salvaged sod or forest duff material for best results. This method is cost-effective and has been successful in many regions.
- Salvage clumps of soil and vegetation and plant them as island transplants.
- Seed a cover crop of barley or oats or winter wheat to provide quick erosion control cover, and mow it before it sets seed.
- Seed a native grass seed mix. The seed should be harvested from the local region.
- Seed native cultivars. Check with the ASRD Land Manager / Range Specialist.
- Develop layers of vegetation on forested sites (a herbaceous layer, a shrub layer and a tree layer) to restore natural site structure.
- Weed control and erosion control must be effective. Monitor the site regularly and respond quickly if action is required.
- New techniques are being developed. Contact the ASRD Land Manager / Range Specialist.

It is extremely important to use weed-free materials. It is not sufficient to purchase “certified seed”. Seed analysis should be conducted on all seed by a recognized laboratory. A Certificate of Seed Analysis should be obtained for each seed lot (prior to mixing) and examined to determine if there are any problem weeds in the seed. Agricultural fieldmen can be contacted about specific weed concerns in local municipalities.

The Native Plant Revegetation Guidelines for Alberta (NPWG, 2001) [http://www.srd.gov.ab.ca/lands/managingpublicland/landinformation/nativeplantrevegetationguidelines/default.aspx] can be consulted during the planning phase if revegetation plans require use of native species. Species lists for various areas and site types in Alberta can be found in A Guide to Using Native Plants on Disturbed Land (can be purchased by: calling 1-800-292-5697 or (780) 427-0391; completing order form at [http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/ipc6852?opendocument];
9.7 Weed Control

9.7.1 Definitions

In Alberta, a weed is defined as a plant that is listed in the Weed Control Act’s Weed Regulation [http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/acts6156](http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/acts6156) This legislation defines three classes of weeds:

- **Restricted weeds** (7 species) are defined as those plants that must be eliminated.
- **Noxious Weeds** (23 species) must be controlled if a weed notice is issued.
- **Nuisance weeds** (37 species) are those whose spread or scattering must be controlled.

Problem plants are not defined by the Act, but are interpreted to be those that tend to disrupt or invade natural ecosystems. Problem plants can include introduced forages like crested wheatgrass, smooth brome or timothy. Whether a plant becomes a problem depends on the plant’s habits, climate and soils in an area, and land management practices.

9.7.2 Regulatory Framework

The Weed Control Act is the primary provincial legislation that deals with weeds. The Act provides for the appointment of weed inspectors and the issuance of notices to the occupant (which includes the operator) or landowner to address weed problems. The Act also allows local authorities to enact by-laws that designate particular weed species to a higher class (i.e. nuisance to restricted).

The Weed Designation Regulation lists the restricted, noxious, and nuisance weeds in Alberta.

The Public Lands Act provides the legislative authority to enter public land. With this authority, the disposition-holder also has a legal responsibility to control weeds.

9.7.3 Responsibilities of Operators

- Section 31 of the Weed Control Act states that the occupant or owner of the land must destroy all restricted weeds, control noxious weeds and prevent the spread or scattering of nuisance weeds.

- Sections 34 and 35 of the Weed Control Act state, “no person shall deposit or permit to be deposited weed seeds or material containing weed seeds in a place where they might grow or spread” and “no person shall move a machine or vehicle if the movement is likely to cause the spread of a restricted, noxious or nuisance weed”.

- Section 63 of the Public Lands Act states that a holder of a disposition shall use only first class seed that is free and clear of all noxious weeds and restricted weeds within the meaning of the Weed Control Act, and shall cut, keep down and destroy all noxious weeds and restricted weeds to which the Weed Control Act applies.

- Operators or leaseholders are the “occupants” as defined in the Weed Control Act and, therefore, are liable.

9.7.4 Guidelines for Operators

- The application-holder is the “occupant” as defined in the Alberta Weed Control Act and is responsible for the spread of any weed seeds.
• One of the best ways to limit the establishment of weeds and problem plants is to prevent unnecessary soil disturbances whenever possible. Minimum disturbance planning is considered to be one of the most practical ways to accomplish this.

• Operators should communicate with landowners/occupants and weed inspectors for the area. Weed history of sites and surrounding areas should be determined. Any weeds or problem species of concern must be identified.

• Prior to construction, conduct a weed survey to document what weeds were present and include photographs of the site.

• Determine if the local authority (e.g., municipality) has changed the class designation of a specific weed species.

• As a preliminary step, consider the type and magnitude of the expected disturbance as well as the timing of the activity. Check with the local municipality, agricultural fieldman, Farmer’s Advocate, Alberta Environment inspector, or district agrologist to discuss known weed infestations so the municipality can act to minimize weed spread.

• Identify current land use and any special requirements for specific crops (e.g., certified, organic). Sometimes the use of herbicides is not allowed.

• Conduct an onsite and adjacent area inspection with the landowner/occupant (using qualified personnel) for all listed weeds prior to commencing an activity and audit. This is important documentation if conflicts arise and an important step in identifying weed sources. Updates during the life of operations can save money.

• Discuss weeds concerns and control program with the landowner/occupant. Maintain communications with landowner/occupant during facility operation.

9.7.5 Weed Control Measures
The CRBP should include methods for controlling and eliminating weeds associated with operating and reclaiming the pit. Methods to prevent the introduction of weeds to a site and facilitate weed control during construction, operation and reclamation of a pit could include the following:

• preventing initial weed establishment;

• pressure-cleaning construction and reclamation equipment before it is brought onto a site to minimize seed spread;

• developing an active weed control program during operation of the pit;

• keeping soil stockpiles as close to the original location as possible;

• seeding stockpiles to grasses or legumes to reduce weed growth (i.e. use species that provide erosion control and are competitive with weeds);

• monitoring land for new weed outbreaks and spot spraying, mowing or hand pulling weeds to save money in the long run (mowing is preferred to spraying for weed control on prairie sites);

• mowing to control weeds prior to flowering so weed seeds are not spread;

• mowing areas seeded to native species high enough (15 centimetres above surface grade) to avoid damaging established native seedlings;
• appropriately using herbicides during pit operation (determine if herbicide use is allowed in the area and if so, read mixing and application instructions carefully);
• not importing topsoil with weeds;
• using soil from the immediate area where required (talk to the landowner); and
• requesting a Certificate of Seed Analysis for each seed lot to determine weeds or “undesirable species” in the seed mix and checking with regulatory personnel to determine if any species of concern are present.

9.8 Documenting Findings
A description of the intended reclamation program along with the following drawings must be included in the CRBP. The drawings should be at an appropriate scale and be an appropriate size to clearly show the required information.

Cross-Section Drawing of Site Conditions after Reclamation
Refer to Appendix 3J and 3K for sample drawings. At least one cross-section should go through the deepest part of any surface water body in the reclaimed landscape.

Reclamation Closure Drawing
Refer to Appendix 3I for sample drawings. This is a conceptual drawing of the pit area after it is reclaimed showing the surface landscape features of the reclaimed pit area. The original land surface can be added to show clearly the difference between original and reclaimed ground levels.

The drawing should show:

• new infrastructure and recent reclamation areas;
• area that will be cleared of vegetation and area that has been stripped of topsoil;
• location of any improvements (human made structures such as gates, fencing, etc.);
• location of cross-sectional lines, e.g., A-A¹, B-B¹;
• location of any concentration of reject materials that may have been buried (e.g., large boulders);
• reclamation sequence and anticipated timing (in reference to development phases);
• bank location of any created waterbodies (separate plan if necessary);
• direction of drainage on the reclaimed land;
• replaced topsoil layer and the replaced overburden layer;
• revegetation and land use;
• reclaimed slope angles;
• surface water drainage direction if not obvious;
• undisturbed buffer zones;
• water table levels (where appropriate); and
• title block and legend.
### Glossary of Terms

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to 100 Year Floodplain</td>
<td>See Floodplain</td>
</tr>
<tr>
<td>Active Channel</td>
<td>Those parts of the bed and banks of a water body that are without terrestrial vegetation.(^4)</td>
</tr>
<tr>
<td>A Horizon</td>
<td>A mineral horizon formed at or near the surface in the zone of removal of materials in solution and suspension, or maximum in situ accumulation of organic carbon, or both.</td>
</tr>
<tr>
<td>Ae</td>
<td>An ashy, grey-coloured A horizon formed at the surface in the zone of removal of clay by leaching, as defined by CSSC.</td>
</tr>
<tr>
<td>Ah</td>
<td>An A horizon in which organic mater has accumulated as a result of biological activity, as defined by CSSC.</td>
</tr>
<tr>
<td>Ahe</td>
<td>An A horizon which has some organic matter accumulation, as well as some leaching of clay, iron or aluminums, as defined by CSSC.</td>
</tr>
<tr>
<td>Ap</td>
<td>An A horizon markedly disturbed by cultivation, as defined by CSSC.</td>
</tr>
<tr>
<td>Aggregate</td>
<td>A composition of different surface materials.</td>
</tr>
<tr>
<td>Ancient Channel</td>
<td>A waterway, no longer contains moving surface water, where surface materials have accumulated due to a former water flow.</td>
</tr>
<tr>
<td>Associated Disposition</td>
<td>An existing activity on which fill material is imported from an adjoining or adjacent area.</td>
</tr>
</tbody>
</table>
| B Horizon                   | A mineral horizon characterized by one or more of the following:  
|                             | 1. An enrichment in silica clay, iron, aluminum, or humus.  
|                             | 2. A prismatic or columnar structure that exhibits pronounced coatings or stainings associated with significant amounts of exchangeable sodium.  
|                             | 3. An alteration by hydrolysis, reduction or oxidation to give a change in color or structure from the horizons above or below, or both.\(^5\) |
| Bank (legal)                | “When surveying a natural body that is a body of water, the surveyor shall determine the position of the line where the bed and shore of the body of water cease and the line shall be referred to the bank of the body of water.” |
| Bar                         | A mass of sand, gravel, or alluvium deposited by the flowing water on the bed of a waterbody. |
| Bed                         | “The land covered so long by water as to wrest it from vegetation or as to mark a distinct character on the vegetation where it extends into the water or on the soil itself.”\(^6\) |

\(^4\) Code of Practice for Watercourse Crossings – Alberta Environment - 2000  
\(^5\) The Pedosphere and it’s Dynamics: A Systems Approach to Soils Science – Noorallah Juma  
\(^6\) The Surveys Act (S.A. 1987 c. S-29.1)
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Borrow Excavation</td>
<td>An excavation outside of a public road right-of-way made solely for the purposes of removing, opening up or proving borrow material for the construction of the sub-base of the roadway or its associated infrastructure.</td>
</tr>
<tr>
<td>Borrow Pit</td>
<td>A surface disturbance created from the removal of clay or silt for the purposes of fill material in infrastructure construction associated with public land disposition approvals. Two descriptive types of pits are dugouts and landscape pits.</td>
</tr>
<tr>
<td>C Horizon</td>
<td>A mineral subsoil comparatively unaffected by the pedogenic processes operative in the A and B horizons except for the process of gleying or the accumulation of calcium carbonates or other salts, as defined by CSSC.</td>
</tr>
<tr>
<td>Capability (land)</td>
<td>The nature and degree of limitations imposed by the physical characteristics of a land unit for a certain use.</td>
</tr>
<tr>
<td>Clay</td>
<td>A near surface deposit of sedimentary material with a composition of the material consisting of 50 percent or more of particles of a size of 2 micrometers or smaller having a depositional history that is not associated with the bedrock formation. (See Figure 1).</td>
</tr>
<tr>
<td>Code of Practice for Pits</td>
<td>The Code does not apply to any operation given approval under the.</td>
</tr>
<tr>
<td>Code of Practice for Watercourse Crossings</td>
<td>May apply to any activity that affect the bed and shore of a watercourse.</td>
</tr>
<tr>
<td>Colluvial</td>
<td>A deposit of angular rock fragments mixed in with sand and gravel.</td>
</tr>
<tr>
<td>Conservation</td>
<td>The planning, management and implementation of an activity with the objective of protecting the essential physical, chemical and biological characteristics of the environment against degradation.</td>
</tr>
<tr>
<td>Conservation &amp; Reclamation Inspector</td>
<td>An Alberta Sustainable Resource Development (ASRD) employee who monitors and enforces compliance of “designated activities on public land under the Public Lands Act.</td>
</tr>
<tr>
<td>Consolidated Bedrock</td>
<td>Any solid rock exposed at the surface of the earth or overlain by unconsolidated material.</td>
</tr>
<tr>
<td>Control Points</td>
<td>Permanent reference markers that are used to measure all development parameters (area cleared of vegetation, topsoil stripping area, overburden stripping, pit size, reclaimed area).</td>
</tr>
</tbody>
</table>
Crevasse Filling: A linear ridge of sand and gravel that had accumulated in a crevasse of a glacier.\(^7\)

**Disturbance** Includes the stripping of public land of any of the following: vegetation, topsoil, subsoil or surface materials. The amount of security deposit required for a lease or licence is based on the total area of disturbance.

**Drumlín** A streamlined hill or ridge of glacial drift with long axis paralleling direction of flow of former glacier.

**Dugout** A borrow pit that creates a surficial depression.

**Electromagnetic Survey** A geophysical method of detecting subsurface composition relative to ground conductivity.

**Eolian** Applied to surface material deposited and arranged by the wind.

**Esker** A linear to sinuous mound of sand and gravel material deposited by watercourses within decaying glaciers.

**Exploration** The subsurface evaluation of an area by mechanical equipment (creating a surface disturbance) to find and delineate a surface material deposit.

**Field Officer** An ASRD employee who makes land use decisions based on provincial/regional management objectives and input from other resource managers; monitors and enforces compliance of activities on public land under the *Public Lands Act*.

**Fill** Clay or silt extracted from public land to be used for road or mineral surface lease construction.

**First Lift** The top layer of undisturbed soil materials salvaged and separated during excavation to be re-spread as topsoil.

**Fish** Fish used for domestic, sport and commercial purposes, and fish of special concern, including but not limited to rare, endangered, threatened or vulnerable species.\(^8\)

**Fish Habitat** All that portion of an ecosystem that provides for the sustenance of the fish populations. See Productive Capacity and harmful alteration, disruption or destruction of fish habitat (**HADD**).

**Floodplain** That portion of a river valley, adjacent to the river channel, which is built of sediments during the present regimen of the river and which is covered with water when the river overflows its banks at flood stages at least once every one hundred years.

---

\(^7\) Dictionary of Geological Terms – American Geological Institute - 1962  
\(^8\) Code of Practice for Watercourse Crossings – Alberta Environment - 2000
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forest Officer</td>
<td>An ASRD land manager.</td>
</tr>
<tr>
<td>Geophysical Testing</td>
<td>Using geophysical equipment (e.g. electromagnetic survey) to assess the subsurface structure.</td>
</tr>
<tr>
<td>Gravel</td>
<td>A near surface deposit of sedimentary material with a composition of the material consisting of 50 percent or more of particles of a size of size 5 millimetres or larger having a depositional history that is not associated with the bedrock formation. (See Figure 1).</td>
</tr>
<tr>
<td>Green Area</td>
<td>Public Lands General Land Classification. Forest lands not available for agricultural development other than grazing.</td>
</tr>
<tr>
<td>Ground Water</td>
<td>That part of the subsurface water which is in the zone of saturation.</td>
</tr>
<tr>
<td>HADD</td>
<td>Harmful Alteration, Disruption or Destruction of fish habitat.</td>
</tr>
<tr>
<td></td>
<td>Harmful Alteration: any change to fish habitat that indefinitely reduces its capacity to support one or more life processes but does not eliminate the habitat. Disruption: a change to fish habitat that reduces its capacity to support one or more processes for a limited period. Destruction: any permanent change to fish habitat that completely eliminates its capacity to support one or more life processes.</td>
</tr>
<tr>
<td>Horizon (soil)</td>
<td>A layer of mineral or organic soil which differs from adjacent horizons in properties such as colour, structure, texture, and consistence, and in chemical, biological, and mineralogical composition.</td>
</tr>
<tr>
<td>Inchannel</td>
<td>See active channel</td>
</tr>
<tr>
<td>Industrial Minerals</td>
<td>All minerals not classified as metallic minerals, energy minerals, fossils, gemstones or surface materials.</td>
</tr>
<tr>
<td>Instream</td>
<td>See active channel</td>
</tr>
<tr>
<td>Inspector</td>
<td>An ASRD employee who has the authority to issue reclamation certificates under the <em>Environmental Protection and Enhancement Act</em>.</td>
</tr>
<tr>
<td>Island</td>
<td>A tract of land, bounded around its perimeter by a legal bank as defined under Section 17 of the Surveys Act (see Bank).</td>
</tr>
<tr>
<td>Kame</td>
<td>A conical hill or short irregular ridge of gravel or sand deposited in contact with glacier ice.</td>
</tr>
<tr>
<td>Lake Deposit</td>
<td>Surface materials that have formed through natural erosion and have accumulated in a basin that has been or is filled with water.</td>
</tr>
<tr>
<td>Landscape Pit</td>
<td>A borrow pit that reduces or reshapes a topographical high feature.</td>
</tr>
</tbody>
</table>

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**Land Manager**
See field officer.

**Legal Bank**
See Bank

**Lower Subsoil**
See C horizon

**Manufacturing Clay**
Has the same characteristics as “clay” however the material is processed by hand or machinery to form a saleable product (e.g. bricks, pottery).

**Marl**
A near surface deposit of sedimentary material with a composition of clay to silt grains of which 50 percent or more are calcium carbonate having a depositional history that is not associated with the bedrock formation.

**Operator**
The holder of the approval who is responsible to comply with the approval conditions.

**Operating Area**
All the area that has been cleared/disturbed along with the area that will be disturbed in the next lease anniversary year. The security deposit amount is based on this area.

**Organic Matter**
The decomposition residues of biological materials derived from plant and animal materials deposited on the surface of the soils; also roots and micro-organisms that decay within the soil.

**Outwash**
Rock material deposited by melt-water streams beyond active glacier ice.

**Ped**
Soil particles held together in a single cluster, such as in a clod or a crumb.

**Preglacial**
An accumulation of sand and gravel prior to the Larimide glacial advance which in the east half of the Province characterized by the lack any Canadian Shield material transported by the ice advance.

**Productive Capacity**
The natural capacity of habitats that comprise the aquatic environment to produce healthy fish that are safe for human consumption, or to support or produce the naturally occurring diversity of aquatic organisms upon which fish depend.\(^{10}\)

**Profile (soil)**
A vertical section of the soil through all its horizons and extending into the C horizon.

**Progressive Reclamation**
Landscaping to final grade and replacing the soil are completed in the areas where the surface material resource has been depleted as the extraction operation continues in other areas.

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\(^{10}\) Code of Practice for Watercourse Crossings- Alberta Environment-2000
Public Land Specialist  An ASRD land manager.

Reclamation  The reconstruction of slopes and landforms, replacement of overburden, reject material and topsoil and establishment of vegetation on a disturbed site. Reclamation must return equivalent land capability, or meet an approved alternate capability (e.g., upland to waterbody).

Reject Material  Any material that is a by-product of processing the surface material.

Remote Sensing  The science (and to some extent, art) of acquiring information about the Earth's surface without actually being in contact with it. This is done by sensing and recording reflected or emitted energy and processing, analyzing, and applying that information (e.g. air photography, satellite imagery).

Resource Manager  A government employee that is specialized in the evaluation and management of a particular natural resource (e.g. wildlife, vegetation, fish, water, land, historical, surface materials).

Residuum  An unconsolidated material that has formed from the decomposition of the bedrock without being transported from its origin.

River Terrace  An ancient flood plain within a river valley that is at a higher elevation than the 1 to 100 year flood plain.

Root Zone  That part of the soil which is occupied by plant roots. See B horizon.

Sand  A near surface deposit of sedimentary material with a composition of the material consisting of 50 percent or more of particles ranging in size from 0.08 millimetres to 5 millimetres having a depositional history that is not associated with the bedrock formation. (See Figure 1).

Sand Dune  A mound, ridge, or hill of loose sand heaped up by the wind.\textsuperscript{11}

Second Lift  The second layer of undisturbed soil material, underlying the first lift, which is salvaged and separated during excavation to be replaced as upper subsoil.

Security Deposit  The financial security held by ASRD to ensure the reclamation of any surface disturbances related to specified activities.

Silt  A near surface deposit of sedimentary material with a composition of the material consisting of 50 percent or more of particles ranging in size from 0.002 millimetres to 0.08 millimetres having a depositional history that is not associated with the bedrock formation. (See Figure 1).

Soil  The upper most mineral/organic material, valued as a growing medium. This includes topsoil and subsoil that is to be salvaged.

\textsuperscript{11} Dictionary of Geological Terms – American Geological Institute –1962
Solonetzic
An order of soils with darkly stained brownish or blackish Solonetzic B (Bn, Bnt) horizon and a saline C horizon, as defined by CSSC. A Solonetzic blowout is an area where the solonetzic subsoil has been exposed to the surface because the topsoil has been removed by wind erosion.

Subsoil
Any material underlying the topsoil that has been penetrated by plant roots. Usually includes the “B” horizon.

Surface Materials
For the purpose of this manual includes marl, clay, silt, sand, gravel having a depositional history that is not associated with the bedrock formation.

Figure 1: Size Classification of Surface Materials

<table>
<thead>
<tr>
<th>Gravel</th>
<th>Sand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bould</td>
<td>COB</td>
</tr>
<tr>
<td>Peb</td>
<td>F</td>
</tr>
<tr>
<td>Coa</td>
<td>Me</td>
</tr>
<tr>
<td>Grain</td>
<td>F</td>
</tr>
<tr>
<td>300mm</td>
<td>S</td>
</tr>
<tr>
<td>75mm</td>
<td>CL</td>
</tr>
<tr>
<td>20mm</td>
<td>400μm</td>
</tr>
<tr>
<td>5mm</td>
<td>80μm</td>
</tr>
</tbody>
</table>

Surface Water
All water associated with the surface of the land.

Texture
Soil composition based on grain sizes. See Figure 10 (p. 60).

Testing
Using mechanical equipment to determine the quantity and quality of a surface material deposit.

Tilth
The physical condition or properties of the soil seed bed, that affects seed germination, seedling emergence, and plant growth.

Topsoil
All “A” horizon (Ah, Ahe, Ae, Ap) material within the surface profile including any overlying organic horizons (O, L, F, H).

Unconsolidated Bedrock
Bedrock that has been weathered into material that can be dug up or removed without requiring common bedrock quarrying methods.

Upland
Any tract of land of higher in elevation than the 1 to 100 year flood plain.

Upper Subsoil
See B horizon.

Water Body
A body of surface water with defined bed and banks, whether or not water is continuously present. Refers to a stream, creek, river, lake or pond of water.
**Watercourse**

A linear surface feature with defined bed and banks formed from continual to intermittent water flows. Refers to a stream, creek or river.

**White Area** Public Lands General Land Classification. Privately owned lands. Available public lands in this area, which are suitable for the proposed use and are not required for conservation, recreational, wildlife habitat, forestry and other purposes, may be applied for pursuant to the Public Lands Act and associated regulations.

**Abbreviations**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASRD</td>
<td>Alberta Sustainable Resource Development</td>
</tr>
<tr>
<td>INFTR</td>
<td>Alberta Infrastructure and Transportation</td>
</tr>
<tr>
<td>CRBP</td>
<td>Conservation and reclamation Business Plan</td>
</tr>
<tr>
<td>CNT</td>
<td>Consultative Notation</td>
</tr>
<tr>
<td>EPEA</td>
<td>Environmental Protection and Enhancement Act</td>
</tr>
<tr>
<td>LSAS</td>
<td>Land Status Automated System</td>
</tr>
<tr>
<td>P. Ag.</td>
<td>Professional Agrologist</td>
</tr>
<tr>
<td>P. Biol.</td>
<td>Professional Biologist</td>
</tr>
<tr>
<td>P. Eng.</td>
<td>Professional Engineer</td>
</tr>
<tr>
<td>P. Geoph.</td>
<td>Professional Geophysicist</td>
</tr>
<tr>
<td>PLA</td>
<td>Public Lands Act</td>
</tr>
<tr>
<td>PPL</td>
<td>Public Pit Licence</td>
</tr>
<tr>
<td>PNT</td>
<td>Protective Notation</td>
</tr>
<tr>
<td>SMC</td>
<td>Surface Material Licence</td>
</tr>
<tr>
<td>SML</td>
<td>Surface Material Lease</td>
</tr>
</tbody>
</table>
# Resources for Surface Material Applications

<table>
<thead>
<tr>
<th>Resource</th>
<th>Purpose</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Applications, Forms and Publications</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Alberta Sustainable Resource Development</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plan Requirements</td>
<td>Includes information and sample drawings for plan requirements and submitting applications online</td>
<td><a href="http://www.srd.gov.ab.ca/lands/formspublications/usingpublicland/default.aspx">http://www.srd.gov.ab.ca/lands/formspublications/usingpublicland/default.aspx</a></td>
</tr>
<tr>
<td>SME Application Form</td>
<td>Required to explore for surface materials on public land</td>
<td><a href="http://www.srd.gov.ab.ca/lands/formspublications/usingpublicland/default.aspx">http://www.srd.gov.ab.ca/lands/formspublications/usingpublicland/default.aspx</a></td>
</tr>
<tr>
<td>SML Application Form</td>
<td>Required to operate a surface material operation on public land for long term tenure</td>
<td><a href="http://www.srd.gov.ab.ca/lands/formspublications/usingpublicland/default.aspx">http://www.srd.gov.ab.ca/lands/formspublications/usingpublicland/default.aspx</a></td>
</tr>
<tr>
<td>Application for Surface Disposition Amendment Form</td>
<td>Required for a change of route or change of location for an existing surface disposition</td>
<td><a href="http://www.srd.gov.ab.ca/lands/formspublications/usingpublicland/default.aspx">http://www.srd.gov.ab.ca/lands/formspublications/usingpublicland/default.aspx</a></td>
</tr>
<tr>
<td><strong>Letter of Clearance</strong></td>
<td></td>
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<tr>
<td>------------------------</td>
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<td></td>
</tr>
<tr>
<td><strong>Application for Shore Line/Water body modification under the Public Lands Act and Water Act</strong></td>
<td>Required under the <em>Water Act</em> when any modifications to a shore line or water body are needed</td>
<td></td>
</tr>
<tr>
<td><strong>Statutory Declaration for Assignments (Companies)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Statutory Declaration for Assignments (Individuals)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Statutory Declaration for Surface Material Dispositions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Surface Material Conservation and Reclamation Annual Report</strong></td>
<td>Required for submitting annual conservation and reclamation activities on an SML</td>
<td></td>
</tr>
<tr>
<td><strong>Test Hole Data Form</strong></td>
<td>Instructions for completing test hole data form</td>
<td></td>
</tr>
<tr>
<td><strong>Surface Material Operation Annual Report</strong></td>
<td>Required for annual surface materials return for SMC, PPL and SML</td>
<td></td>
</tr>
<tr>
<td><strong>Request for Reclamation Certificate</strong></td>
<td>Reclamation certificate is required to effectively surrender a lease on public land</td>
<td></td>
</tr>
<tr>
<td><strong>Other:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Water Act Approval Form</strong></td>
<td>Must be submitted with plan if any water is to be used or diverted</td>
<td></td>
</tr>
</tbody>
</table>

### Resources For Surface Material Exploration

<table>
<thead>
<tr>
<th><strong>Alberta Environment’s Water Data Management Group</strong></th>
<th>Provides information on the general status of Alberta’s surface and groundwater</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Alberta Environment’s Groundwater Information System</strong></td>
<td>Show the location and driller’s reports of Alberta Water wells that have been drilled (subject to a 400 m error)</td>
</tr>
</tbody>
</table>
### Surficial Geology Maps

Provides information for the exploration of surface materials


Alberta Geological Survey Publications
4th Floor, Twin Atria
4999 – 98th Ave. Edmonton, AB T6B 2X3

### Resources For Land Use Investigations

#### Land Dispositions:

| Land Status Automated System (LSAS) | Provides information on all land interests on public land within a requested area | Crown Land Data Support
Ph. (780)422-5727
Fax. (780) 422-9522 |
|------------------------------------|--------------------------------------------------------------------------------|------------------|

#### First Nations:

|-----------------------------|---------------------------------------------------------------------|---------------------------------|

<table>
<thead>
<tr>
<th>First Nations Contact Information</th>
<th>Contact information for issues regarding consultations</th>
<th><a href="http://www.aboriginal.alberta.ca/576.cfm">http://www.aboriginal.alberta.ca/576.cfm</a></th>
</tr>
</thead>
</table>

#### Protected Areas:

<table>
<thead>
<tr>
<th>R&amp;R/03-2 Siting an Upstream Oil and Gas Site in an Environmentally Sensitive Area on Private Land</th>
<th>Identifies areas that are environmentally sensitive and aids in developing mitigation measures for a site in an environmentally sensitive area</th>
<th><a href="http://environment.gov.ab.ca/info/library/5940.pdf">http://environment.gov.ab.ca/info/library/5940.pdf</a></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Principals for minimizing Surface Disturbances in Native Prairie and Parkland Areas</th>
<th>Outlines guiding principals for minimizing disturbance in native prairie and parkland areas</th>
<th><a href="http://www.ercb.ca/portal/server.pt/gateway/PTARGS_0_0_323_253_0_43/http%3B/ercbContent/publishedcontent/publish/ercb_home/industry_zone/rules_regulations_requirements/information_letters_interim_directives/information_letters/il2002_01.aspx">http://www.ercb.ca/portal/server.pt/gateway/PTARGS_0_0_323_253_0_43/http%3B/ercbContent/publishedcontent/publish/ercb_home/industry_zone/rules_regulations_requirements/information_letters_interim_directives/information_letters/il2002_01.aspx</a></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Petroleum Industry Activity in Native Prairie and Parkland Areas: Guidelines for Minimizing Surface Disturbances</th>
<th>Outlines how oil and natural gas exploration, development, production, and pipeline activities should be conducted in areas of native prairie and parkland in Alberta.</th>
<th><a href="http://www.ercb.ca/docs/Documents/reports/NativePrairieGuidelines.pdf">http://www.ercb.ca/docs/Documents/reports/NativePrairieGuidelines.pdf</a></th>
</tr>
</thead>
</table>
### Resources For Biophysical Investigations

#### Landscape Classification and Ecology:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Alberta Soil Information Viewer</strong></td>
<td>Framework for classifying and naming soils in Alberta</td>
<td><a href="http://www.agric.gov.ab.ca/app21/infopage?cat1=Soil%2FWater%2FAir">http://www.agric.gov.ab.ca/app21/infopage?cat1=Soil%2FWater%2FAir</a></td>
</tr>
<tr>
<td><strong>Canadian System of Soil Classification</strong></td>
<td>Information on the classification and characteristics of Canadian soils</td>
<td><a href="http://sis.agr.gc.ca/cansis/references/1998sc_a.html">http://sis.agr.gc.ca/cansis/references/1998sc_a.html</a></td>
</tr>
<tr>
<td><strong>Alberta Soil Survey Reports</strong></td>
<td>Soil survey reports for various areas in Alberta</td>
<td><a href="http://www.agric.gov.ab.ca/app21/infopage?cat1=Soil%2FWater%2FAir&amp;cat2=Soil+Management">http://www.agric.gov.ab.ca/app21/infopage?cat1=Soil%2FWater%2FAir&amp;cat2=Soil+Management</a></td>
</tr>
</tbody>
</table>

#### Terrain and Land Use Mapping:

<table>
<thead>
<tr>
<th><strong>Topographic Information</strong></th>
<th>Provide information to establish elevation control for developing cross section profiles</th>
<th>Commercial Mapping Outlets National Topographic System of Canada: <a href="http://maps.nrcan.gc.ca/topo_e.php">http://maps.nrcan.gc.ca/topo_e.php</a></th>
</tr>
</thead>
</table>
| **Aerial Photographs**      | To determine biophysical and predisturbance conditions of the site              | http://www.srd.gov.ab.ca/lands/geographicinformation/airphoto/default.aspx  
Air Photo Services  
9920-108 St. Main Floor  
Edmonton, AB T5K 2M4  
OR Commercial Mapping Outlets |
| **Canada Land Inventory**   | Describes land capability for agriculture, forestry, land use, recreation, ungulates and waterfowl (Note: Not all of Canada has been described) Maps are available for viewing. | http://geogratis.cgdi.gc.ca/CLI/frames.html |

#### Soils Information:

<table>
<thead>
<tr>
<th><strong>Canadian System of Soil Classification</strong></th>
<th>Information on the classification and characteristics of Canadian soils</th>
<th><a href="http://sis.agr.gc.ca/cansis/references/1998sc_a.html">http://sis.agr.gc.ca/cansis/references/1998sc_a.html</a></th>
</tr>
</thead>
</table>
### Vegetation Information:

| Natural Regions and Subregions of Alberta | Provides detailed climatic, vegetation, soils and physiographic descriptions for 6 natural regions and 21 natural subregions in Alberta | [http://www.tpr.alberta.ca/parks/landreferencemanual/naturalareas.aspx](http://www.tpr.alberta.ca/parks/landreferencemanual/naturalareas.aspx) |
| Alberta Vegetation Index | Photo-based digital inventory developed to identify the type, extent and conditions of vegetation, where it exists and what changes are occurring | Can be purchased from: [http://www.srd.gov.ab.ca/lands/geographicinformation/resourcedataproductcatalogue/avi.aspx](http://www.srd.gov.ab.ca/lands/geographicinformation/resourcedataproductcatalogue/avi.aspx) |
| Forest Cover Maps | Provide an aid for vegetative cover information and determining the location of a site (Phase III and Alberta Vegetation Inventory) | [http://www.srd.gov.ab.ca/lands/geographicinformation/resourcedataproductcatalogue/phase3forestinventory.aspx](http://www.srd.gov.ab.ca/lands/geographicinformation/resourcedataproductcatalogue/phase3forestinventory.aspx) 
Air Photo Services  
9920-108 St. Main Floor  
Edmonton, AB T5K 2M4 |

### Rare Plants:

| Alberta Natural Heritage Information Centre | Provides accurate and accessible biodiversity information necessary for making informed decisions concerning conservation, natural resource management, and development planning | [http://www.tpr.alberta.ca/parks/heritageinfocentre/default.aspx](http://www.tpr.alberta.ca/parks/heritageinfocentre/default.aspx) |
| Committee on Endangered Wildlife in Canada | Information on which species in Canada are in danger of disappearing | [http://www.cosewic.gc.ca/index.htm](http://www.cosewic.gc.ca/index.htm)  
| Alberta Native Plant Council | Provides information on conducting a rare plant survey, invasive weeds, native plant sources list | [http://www.anpc.ab.ca/content/index.php](http://www.anpc.ab.ca/content/index.php) |

### Problem Vegetation/Weeds/Invasive Plants on or Near Site:

| Weed Control Act | Provides legal authority to deal with weeds which affect agriculture production  
Defines three classes of weeds (Restricted, Noxious and Nuisance) | [http://www.agric.gov.ab.ca/app21/infopage?cat1=Diseases%2FInsects%2F+Pests](http://www.agric.gov.ab.ca/app21/infopage?cat1=Diseases%2FInsects%2F+Pests)  

### Critical Wildlife Habitat:

Can also be obtained from specific ASRD offices. |
| **EUB IL 94-22. Operating Guidelines for Operating Activity in Caribou Range – North West Alberta** | Guidelines for protection of caribou in North west Alberta | [http://www.ercb.ca/portal/server.pt/gateway/PTARGS_0_0_0_0_0_43/http%3B/ercbContent/publishedcontent/publish/ercb_home/industry_zone/rules_regulations_requirements/information_letters_interim_directives/informational_letters/](http://www.ercb.ca/portal/server.pt/gateway/PTARGS_0_0_0_0_0_43/http%3B/ercbContent/publishedcontent/publish/ercb_home/industry_zone/rules_regulations_requirements/information_letters_interim_directives/informational_letters/) |
| **Public Lands Operational Handbook** | Applies to all industrial and commercial activity on public lands Assists in planning and conducting operations Includes objectives, standards and guidelines | [http://www.srd.gov.ab.ca/lands/formspublications/managingpublicland/default.aspx](http://www.srd.gov.ab.ca/lands/formspublications/managingpublicland/default.aspx) |
| **Index of Alberta Wildlife and Fisheries Referral Maps** | Types of maps available and where to get them | [http://www.srd.gov.ab.ca/lands/formspublications/managingpublicland/default.aspx](http://www.srd.gov.ab.ca/lands/formspublications/managingpublicland/default.aspx) |

**Species At Risk (Animals):**

| **Species at Risk In Alberta** | Information on species at risk in Alberta and species recovery plans | [http://www.srd.gov.ab.ca/fishwildlife/speciesat risk/default.aspx](http://www.srd.gov.ab.ca/fishwildlife/speciesat risk/default.aspx) |
| **Species Listed as Endangered or Threatened in Alberta** | List of Species Currently Listed under the Wildlife Act and New Species Assessed by Alberta's Endangered Species Conservation Committee | [http://www.srd.gov.ab.ca/fishwildlife/escc/currentlylisted.aspx](http://www.srd.gov.ab.ca/fishwildlife/escc/currentlylisted.aspx) |
| **Species at Risk Act** | Environment Canada’s list of species that are at risk, can search by species or region | List By Region: [http://www.speciesatrisk.gc.ca/map/default_e.cfm](http://www.speciesatrisk.gc.ca/map/default_e.cfm) List by Species: [http://www.speciesatrisk.gc.ca/search/default_e.cfm](http://www.speciesatrisk.gc.ca/search/default_e.cfm) |
### Migratory Birds:

**Migratory Birds Convention Act**  
Applies to any nesting birds occurring in a site, including uplands, wetlands and riparian areas (could restrict activity periods)  
http://laws.justice.gc.ca/en/M-7.01

**Hay Zama Lake Complex – Special Requirements**  
Specific guidelines for operators proposing oil and gas development within the Hay-Zama Lake Complex  
http://www.eub.ca/portal/server.pt/gateway/PTARGS_0_0_270_233_0_43/http%3B/extContent/publishedcontent/publish/eub_home/industr y_zone/rules_regulations_requirements/information_letters_interim_directives/interim directives/id96_01.aspx

### Fish and Aquatic Resources:

**DFO Office List in Alberta**  
Obtain government referral maps and fish habitat assessment reports or general information on fish and aquatic resources  
http://www.dfo-mpo.gc.ca/regions/central/habitat/os-eo/prov-terriab/os-eo18_e.htm

**Codes of Practice under Water Act**  
To help in the interpretation of the Water Act  
http://www.environment.alberta.ca/1398.html

**Atlas of Alberta Lakes**  
Provides drainage and lake basin characteristics, water quality and biological characteristics for some lakes in Alberta  
http://sunsite.ualberta.ca/Projects/Alberta-Lakes/

### Historical Resources:

**Listing of Significant Historical Sites and Areas**  
List of sites in Alberta that have been given a Historical Resource Value, listed by legal land description  
http://culture.alberta.ca/heritage/resourcemanagement/landuseplanning/default.aspx

**Protection and Stewardship Section Heritage Resource Management Branch**  
Contacts for information or applications related to the Historical Act  
http://www.qp.gov.ab.ca/Documents/acts/H09_CFМ

**Historical Resources Management**  
Provides information concerning sites with a HRV, sites requiring Historical Resource Act clearance or a Historical Resource Impact Assessment and the Historical Resource Act  
http://culture.alberta.ca/heritage/resourcemanagement/default.aspx

**Instructions for using the Listing of Significant Resources**  
Describes the conditions that warrant a HRIA or require HAC and what to do if your site has an HRV  
http://culture.alberta.ca/heritage/resourcemanagement/landuseplanning/default.aspx
### Resources for Development and Operation Plans

<table>
<thead>
<tr>
<th><strong>Notice Under Water Act</strong></th>
<th><a href="http://www.environment.alberta.ca/1398.html">http://www.environment.alberta.ca/1398.html</a></th>
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<tr>
<td><strong>Clean Air Strategic Alliance</strong></td>
<td>A multi-stakeholder partnership, composed of representatives selected by industry, government and non-government organizations, which recommends strategies to assess and improve air quality in Alberta <a href="http://www.casahome.org/">http://www.casahome.org/</a></td>
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<tr>
<td><strong>Canada Wide Standard on Particulate Matter</strong></td>
<td>Developed on a national level to reduce overall PM <a href="http://www.ccme.ca/ourwork/air.html?category_id=99">http://www.ccme.ca/ourwork/air.html?category_id=99</a></td>
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### Resources For Reclamation Plans

<table>
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<tr>
<th><strong>Code of Practice for Pits</strong></th>
<th>Provides requirements for pits on Private land <a href="http://www.qp.gov.ab.ca/documents/Codes/PITS.cfm">http://www.qp.gov.ab.ca/documents/Codes/PITS.cfm</a></th>
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</thead>
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<tr>
<td><strong>Guide to Reclamation Criteria for Wellsites</strong></td>
<td>Provides guidance on reclamation certification criteria (Forested Lands in the Green Area) for oil and gas wellsites and access roads, and associated facilities such as borrow pits, campsites, and off-site (remote) sumps <a href="http://environment.gov.ab.ca/info/library/7749.pdf">http://environment.gov.ab.ca/info/library/7749.pdf</a></td>
</tr>
<tr>
<td><strong>A Guide to Using Native Plants on Disturbed Land</strong></td>
<td>Provides information and lists the native plants suited to the various natural regions and site types across Alberta. Provides information about the ecology, reproduction, habitat and availability of 130 native grasses, 260 wildflowers, 80 shrubs and 13 tree species. Can be bought by calling 1-800-292-5697 or (780) 427 – 0391</td>
</tr>
<tr>
<td><strong>General Resources</strong></td>
<td></td>
</tr>
<tr>
<td>-----------------------</td>
<td></td>
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| **Alberta Sand and Gravel Association** | ASGA represents the interests of Alberta sand and gravel operators on key industry related issues and proposed regulatory changes | [http://www.asga.ab.ca/aboutus.htm](http://www.asga.ab.ca/aboutus.htm)  
Head Office in Edmonton – (780) 435-2844 |
| **Local ASRD Offices** | Provide further information on this guideline and related resources  Report contraventions of the lease/CRBP to an ASRD Field Office | [http://srd.alberta.ca/informationcentre/offices.aspx](http://srd.alberta.ca/informationcentre/offices.aspx)  
Call 310-0000 and ask for ASRD office |
| **Integrated Resource Plans** | Describes land use designation on a regional basis | [srd.infocent@gov.ab.ca](mailto:srd.infocent@gov.ab.ca)  
Alberta Sustainable Resources Information Centre, Main Floor, 9920 – 108 St. Edmonton, AB T5K 2M6 |
| **Integrated Resource Plans** | Describes land use designation on a regional basis | [srd.infocent@gov.ab.ca](mailto:srd.infocent@gov.ab.ca)  
Alberta Sustainable Resources Information Centre, Main Floor, 9920 – 108 St. Edmonton, AB T5K 2M6 |
| **Public Lands Act** | Provides legislative authority to enter public lands | [http://www.qp.gov.ab.ca/Documents/acts/P40.cfm](http://www.qp.gov.ab.ca/Documents/acts/P40.cfm) |
Figure 1
Sample Topo Map and Location Plan

LEGEND:

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<tbody>
<tr>
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Figure Name:
SNL 009999
Sweetheart Lake Aggregate Deposit

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<td>Drawing No.</td>
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<td>August 29, 2007</td>
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Figure 2

Sample Biophysical/Land Use Plan

Guidelines For Acquiring Surface Material Dispositions on Public Land
Alberta Sustainable Resources Development – 2007 Edition  
Page 122
Figure 3
Sample
Land Management Referral Map (ASRD)
Appendix 3D

Figure 4
Sample Plan Showing Location of Surface Materials Exploration in SE 2, Part of SW 2, and Part of NE 2

Proposed SME Area = 115 hectares
(284.17 acres)
Appendix 3I

Figure 8
Sample Reclamation/Closure Plan

LEGEND:
- SML Property Boundary
- Excavation Boundary
- Reserve Area
- Wetland
- Surface Drainage

Project Name:
SML - 099999
Sweetheart Lake Aggregate Deposit

Client:
9999999 Alberta Ltd.

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### Appendix 3L

#### Sample

**Test Hole Log**

SW 02-99-9, W6M

SME 000001

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<th>GPS Location (NAD 83)</th>
<th>Depth of Hole (m)</th>
<th>Material Type</th>
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<td></td>
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<td>1.8-3.6</td>
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Alberta Aggregate (Sand and Gravel)  
Allocation Policy for Commercial Use  
On Public Land

Purpose

To allocate aggregate (sand and gravel) for commercial use on public land in a fair, comprehensive and timely manner that optimizes benefits for Albertans.

Procedure

Aggregate will be allocated according to the following criteria as provided in this document entitled: Alberta Aggregate (Sand and Gravel) Allocation Policy for Commercial Use on Public Land.

Allocation Procedure and Criteria

1. **Public interest**: Aggregate required for public purposes will be reserved for use by the Ministry of Infrastructure and Transportation. Infrastructure and Transportation will acquire an appropriate reservation for aggregate deposits, to register its interests in the Crown land records. Municipalities may also identify sources of aggregate for public works purposes. They may apply for and may be issued appropriate aggregate dispositions. Municipalities desiring to develop aggregate operations for commercial purposes will be required to follow the process outlined in this policy.

2. **Aggregate deposits that are in peril**: This applies to aggregate deposits of any size that are located in areas where there is pending or approved development activity, such as from mining operations. Sustainable Resource Development may issue surface material leases of any size, to any party, in order to liquidate the deposit and make the most beneficial use of the resource.

3. **Previously identified aggregate resources**: Where the volume of aggregate is already known or estimated, Sustainable Resource Development will allocate it:
   - by tender,
   - by request for proposal, or
   - by any other approved means deemed necessary to ensure that the aggregate is used in an optimal manner and that the use is in the public interest.

Sites tendered will have the same development requirements as sites over 80 acres.

4. **Public pit**: A specific site may be operated as a public pit where Sustainable Resource Development determines that it is in the public, industry, and/or community interest (e.g., a
highly competitive market area with confirmed scarcity of resource). A pit manager will be selected through a Request for Proposal (RFP) process. The successful proponent (company or individual) will be responsible for operating the pit and making aggregate available to all operators. An example is the Susan Lake public pit near Fort McMurray.

5. **Surface material lease allocation for sites up to 80 acres:**

   a) Exploration - surface material exploration: Applications are processed on a one-time, first-come-first-serve basis. Surface material exploration approvals are issued for up to 180 days with no extensions. During this time period, proponents are expected to determine resource volumes. Proponents interested in proceeding with their applications will file an application for a surface material lease within 10 days of expiry of the surface material exploration approval. Sustainable Resource Development will not accept any additional surface material exploration applications during this time.

   The maximum size of a surface material exploration approval giving exclusive rights is 320 acres. A non-transferable security deposit of $1,500 is required for each 80 acres, or portion thereof, applied for under a surface material exploration application. The surface material exploration holder must provide adequate mapping and test data that illustrates test hole locations, horizon profile, and any other data (e.g., photos) that depict the volume and degree of the gravel deposit. Test data, methods, and volumes must be verified by a qualified individual.\(^{12}\)

   b) Once a notice of approval of the surface material lease application has been given, the applicant will be required to complete a conservation and reclamation plan for the site within six months. The proposed plan will be prepared in accordance with *A Guide to Surface Material Resource Extraction on Public Land*. When approved, the plan will contain information on how the volume of aggregate removed from the site will be measured and how reclamation will progress during the term of the proposed disposition and appropriate level of security. Approval of the plan will include a surface material lease that will be issued for up to 10 years. Lessees must commence operations on the site within the first four years or the time specified in the plan if this time is less than four years. Failure to meet performance requirements will result in cancellation of the lease. Operations will include reporting of volumes removed from the site on a yearly basis and payment of applicable royalties.

   c) Sustainable Resource Development will periodically conduct quality assurance reviews during the term of the lease. Proponents will be required to undertake a pre-determined amount of development work in accordance with the approved plan. Progressive reclamation will also be required. Renewal will be based on the performance of the lessee.

---

\(^{1}\) The Alberta Sand and Gravel Association (ASGA) will determine the definition of a qualified individual, in accordance with procedures approved by Sustainable Resource Development. A member of a professional association with the designation of P.Eng., P.Ag., RPF, or RPFT is initially considered to be a qualified individual under this provision. Appropriate qualifications and training requirements will be developed by the ASGA and approved by Sustainable Resource Development.
Applicants will be required to provide a signed declaration indicating all of their public land aggregate interests within a six-mile radius of the application area. They can also indicate why any sites included in the radius should be considered outside of a specific market area. An example is where a river traverses an area and hauling is in a different direction. Where the combined total area of an existing lease any additional aggregate activity held by the proponent is over 80 acres, it will be assessed under the same criteria as sites over 80 acres.

6. Surface material lease allocation for sites over 80 acres: Bonus Bid

a) Applications may be submitted for individual sites greater than 80 acres in size in what is known as a bonus bid. Applications must include an exploration plan.

b) Prior to advertising the land for bonus bid, Sustainable Resource Development may first consider public needs and general aggregate availability in the vicinity.

c) Advertising for bonus bid: Sustainable Resource Development will advertise the application by placing a notice on its web site. Sustainable Resource Development will also provide a notice of the advertisement to the Alberta Sand and Gravel Association, Alberta Road Builders and Heavy Construction Association, and the Members of the Legislative Assembly for the area:

- The notice will specify the bonus bid date.
- The bonus bid date will be about 240 days from the advertisement date, in order to allow interested parties adequate time for exploration.

d) Site exploration: parties interested in making a bonus bid may determine the quantity of aggregate on the site by carrying out exploration. More than one exploration program may occur on the land area at the same time:

- Exploration plans must be submitted to Sustainable Resource Development for approval prior to commencing exploration.
- Sustainable Resource Development will charge a minimum exploration security deposit of $7,000 for up to 320 acres, or $1,500 per 80 acres or portion thereof, for sites over 320 acres.
- The original applicant will be given approval to proceed with exploration when the department has placed the advertisement and received the appropriate security deposit.

e) Bonus Bid:

- In order to provide time for the exploration to be undertaken, the closing date for receipt of bonus bids specified in the advertisement will be around 240 days from the advertisement date.
- Those interested in submitting bids must do so before the specified deadline.
- The requirements specified in the bonus bid advertisement package must be met.

f) Conservation and Reclamation Business Plan: Following the close of the bonus bid, the results will be announced and the successful party will be notified. Once a notice of approval has been given, the successful party will have up to six months to prepare a conservation and reclamation business plan:
• This plan will provide specific details including timelines for carrying out operations on the proposed lease and procedures for verifying volumes removed (e.g., a scale operation). It will also address how reclamation will progress during the term of the proposed disposition and appropriate security.

• The successful bidder will be required to provide adequate mapping and test data, obtained from detailed exploration through the exploration process, obtained prior to the bonus bid, that illustrates test hole locations, horizon profile, and any other data (e.g., photos) that depicts the volume and degree of the gravel deposit. Test data, methods, and volumes will be verified by a qualified individual\textsuperscript{13}.

• Failure to meet the requirements, particularly in providing the detailed test data, will result in forfeiture of the bonus bid and cancellation of the application.

g) Plan Approval: Approval of the plan will include a Surface Material Lease that will be issued for up to 10 years.

• Lessees must commence operations on the site within the first three years or the time specified in the plan, if this time is less than three years.

• Failure to meet performance requirements will result in cancellation of the lease.

• Operations will include reporting of volumes removed from the site on a yearly basis and payment of applicable royalties.

h) Sustainable Resource Development will periodically conduct quality assurance reviews during the term of the lease. Proponents will be required to undertake a pre-determined amount of development work in accordance with the approved plan. Progressive reclamation will also be required. Renewal will be based on the performance of the lessee.

7. Renewal of Leases: Renewals will be considered based on the performance of the lessee during the term of the lease. Routine assessment of compliance with the conservation and reclamation plans will be conducted to ensure that satisfactory reclamation progress continues and any reclamation liability remains with the aggregate operator.

8. Transition: Applications for sites over 80 acres made prior to July 8, 2005 will have a period of six months to complete the requirements and plans. These applications will be processed in accordance with the requirements for sites less than 80 acres, regardless of their size. After the six-month period, any outstanding applications must either be cancelled or put up for bonus bid. Applications received subsequent to July 8, 2005 that are over 80 acres in a market area will be subject to the new requirements for sites over 80 acres including the bonus bid provision.

Pertinent Legislation

Public Lands Act, Dispositions and Fees Regulation (AR 54/2000).

\textsuperscript{13} The Alberta Sand and Gravel Association (ASGA) will determine the definition of a qualified individual, in accordance with procedures approved by Sustainable Resource Development. A member of a professional association with the designation of P.Eng., P.Ag., RPF, or RPFT is initially considered to be a qualified individual under this provision. Appropriate qualifications and training requirements will be developed by the ASGA and approved by Sustainable Resource Development.
Appendix 5
Example Table of Content

Example Table of Content

Conservation and Reclamation Business Plan Proposed XX Aggregate Deposit
Near XX Alberta
January 2007

Prepared for:
Table of Contents

1.0 Introduction.......................................................................................................................1
   1.1 Background...................................................................................................................1
   1.2 Terms Of Reference and Scope of Work.................................................................1
   1.3 CRP Limitations.........................................................................................................2

2.0 Project Overview.................................................................................................................4
   2.1 Project Location and Layout.......................................................................................4
   2.2 Project Proponent and Need.......................................................................................4
   2.3 Aggregate Quality and Quantity.................................................................................5
   2.4 Site Operations and Facilities......................................................................................6
      2.4.1 Extraction and Aggregate Processing..............................................................6
      2.4.2 Buildings Structures and Improvements.........................................................6
      2.4.3 Site Services and Waste Management ...........................................................6
      2.4.4 Fuelling and Hazardous Material Management..............................................6
   2.5 Site Access and Traffic..............................................................................................7
   2.6 Groundwater and Surface Water Management..........................................................7
   2.7 Hours of Operation and Project Sequencing..............................................................7
   2.8 Site Management........................................................................................................8

3.0 Regulatory And Policy Review........................................................................................9
   3.1 Federal Legislation......................................................................................................9
      3.1.1 Fisheries Act.....................................................................................................9
      3.1.2 Navigable Waters Protection Act..................................................................10
      3.1.3 Migratory Bird Convention Act (MBCA).....................................................11
      3.1.4 Species at Risk Act (SARA)........................................................................11
   3.2 Provincial Jurisdiction and Policies..........................................................................12
      3.2.1 Environmental Protection and Enhancement Act..........................................12
      3.2.2 Public Lands Act............................................................................................12
      3.2.3 Water Act.......................................................................................................13
      3.2.4 Wildlife Act and Wildlife Guidelines...........................................................14
      3.2.5 Forest Act.......................................................................................................16
      3.2.6 Historical Resource Act.................................................................................16
      3.2.7 Species at Risk Program.................................................................................17
      3.2.8 First Nations Consultation.............................................................................17
      3.2.9 Integrated Resource Management Plans........................................................18
   3.3 Municipal Bylaws.....................................................................................................19
   3.4 Other Policies and Agreements.................................................................................19
   3.5 Summary of Applicable Government Statutes and Planning Policies .................20
4.0 Environmental Effects Assessment .................................................................23

4.1 Land Topography and Use................................................................................23
4.1.1 Land Use Zoning and Management............................................................24
4.1.2 Hunting and Trapping..................................................................................24
4.1.3 Agriculture Land Use...................................................................................25
4.1.4 Oil, Gas and Utility Activities.................................................................25
4.1.5 Waterwells and Water Licensees.................................................................25
4.1.6 Forestry .......................................................................................................25
4.1.7 First Nations and Traditional Use...............................................................25

4.2 Surface Drainage...............................................................................................25
4.3 Vegetation and Forestry Resources.................................................................26
4.3.1 Vegetation and Rare Plant Species..............................................................26
4.3.2 Forestry ......................................................................................................26

4.4 Soils and Overburden.......................................................................................28
4.5 Geology ............................................................................................................28
4.6 Groundwater......................................................................................................29
4.7 Wildlife..............................................................................................................29
4.8 Fish and Aquatic Resources...........................................................................29
4.9 Historical Resources and First Nations.........................................................30
4.10 Noise and Air Quality ....................................................................................30

5.0 Environmental Management Plan....................................................................31

5.1 Regulatory Approvals and Consultation...........................................................31
5.2 Pre-Development Environmental Awareness..................................................31
5.3 Erosion and Sediment Control.........................................................................32
5.3.1 Temporary Controls....................................................................................32
5.3.2 Permanent Controls....................................................................................33
5.4 Vegetation and Timber Salvage .......................................................................33
5.4.1 Resources Overview...................................................................................34
5.4.2 Approvals & Referral Requirements............................................................34
5.4.3 Salvage Operation and Log Quality............................................................35
5.4.4 Salvage Wood Specifications....................................................................35
5.4.5 Salvage Wood Purchaser & Haul Information...........................................38
5.5 Topsoil, Subsoil and Overburden Stripping.......................................................38
5.6 Fish Habitat........................................................................................................39
5.7 Groundwater.....................................................................................................39
5.8 Wildlife...............................................................................................................39
5.9 Historical Resources and First Nations............................................................40
5.10 Fuel and Hazardous Materials Management..................................................40
5.10.1 General Use.............................................................................................40
5.10.2 Hazardous Material Usage Near Water Features.......................................40
5.11 Noise and Air Quality ....................................................................................41
5.12 Fire and Weed Control....................................................................................41
5.13 Safety and Security.........................................................................................42
6.0 Reclamation Plan

6.1 Reclamation Plan Design
   6.1.1 Reclamation Objectives
   6.1.2 Land Reclamation Options
   6.1.3 Development and Reclamation Schedule

6.2 Soil Handling and Grading Plan
   6.2.1 Topsoil Salvage
   6.2.2 Overburden and Reject Salvage and Utilization
   6.2.3 Grading
   6.2.4 Preparation of Compacted Soil Areas
   6.2.5 Topsoil Replacement

6.3 Revegetation Plan
   6.3.1 Seeding With the Topsoil Seedbank
   6.3.2 Tree Planting

6.4 Ponds, Wetlands And Surface Drainage

6.5 Weed Management (During Operations And After Closure)
   6.5.1 Weed Prevention
   6.5.2 Weed Monitoring
   6.5.3 Weed Control

7.0 Site Management Plan

7.1 Annual Operating Report
7.2 Environmental Monitoring

Closure

References

Appendix 1: General Figures
Figure 1. General Location Plan and Topo Map
Figure 2. SML Site Area Plan
Figure 3. Biophysical Land Use Plan
Figure 4. ASRD Land Management Referral Mapping

Appendix 2: Site Photos
   • Site Photos

Appendix 3: Development and Reclamation Plans
Figure 5. Boundary Plan
Figure 6. Site Facility Development Plan
Figure 7. Development Plan
Figure 8. Phase Development Plan
Figure 9. Reclamation Closure Plan
Figure 10. Pre-Development Cross Section A and B
Figure 11. Pre-Development Cross Section C
Appendix 4: Exploration Data

Figure 14. Test Pit Location Plan
Testhole Data Logs

Appendix 5: Miscellaneous Records

ASRD – Land Status Report
Abadata Database Search
SML Application
SME Application
Draft Surface Material Lease Level 2 Procedure Document and Checklist, November, 2002

Company Environmental Policy
Alberta Environment Groundwater Well Search