



CEMA – THE RECLAMATION WORKING GROUP (RWG)

REQUEST FOR PROPOSAL

CRITERIA AND INDICATORS FRAMEWORK: BIODIVERSITY INDICATOR DEVELOPMENT

May 4th, 2015

Re. C&I Framework: Biodiversity Indicator Development

The Cumulative Environmental Management Association (CEMA) has a mandate to develop recommendations to government to address the cumulative effects within in the Regional Municipality of Wood Buffalo (RMWB).

You are invited to submit a statement of qualification, experience, approach, methods and fee schedule for a project to CEMA's Integrated Task Group who work under the direction of the Reclamation Working Group. The ITG will evaluate the Proposals received for the work described in this Request for Proposal before selecting an organisation to complete the work.

All Proposal responses must be received electronically or by mail, by **12:00PM (Noon) MST, June 2, 2015**. Any Proposal delivered to the Designated Contact after the required time and date specified for delivery shall be considered late and non-responsive. Any late Proposals will not be considered. All Proposals shall be delivered to the following contact:

CONTACT

Any questions concerning this Request for Proposal ("RFP") and all written submissions required under this RFP must be directed to:

Program Administrator:

Kim Dacyk
RWG Program Administrator
CEMA
Suite 214, Morrison Building
9914 Morrison Street
Fort McMurray, AB T9H 4A4
Tel: 780-881-4943
Fax: 780-714-3081
Email: kim.dacyk@cemaonline.ca
(the "Designated Contact").

Scientific Authority (for technical questions):

Mike Poscente
RWG Technical Program Manager (TPM)
CEMA
Office: 780-570-5818
Email: mike@cppenv.ca

Sincerely,

Stephen Tuttle and Taras Pojasok
Co-Chairs, Reclamation Working Group (RWG)

Enclosure



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INTRODUCTION

CEMA is a multi-stakeholder society that is a key advisor to the provincial and federal governments committed to respectful, inclusive dialogue to make recommendations to manage the cumulative environmental effects of regional development on air, land, water and biodiversity. CEMA is governed by approximately 50 members, representing all levels of government, industry, regulatory bodies, environmental groups and Aboriginal groups.

BACKGROUND

In 2012, the Reclamation Working Group (RWG) started the development of the Criteria and Indicators Framework for Oil Sands Mine Reclamation Certification (Poscente and Charette, 2012) with the purpose of developing a framework using criteria and indicators to support reclamation certification decisions on oil sands mines in Alberta. The overarching goal for oil sands mine reclamation certification is that the reclaimed soils and landforms are capable of supporting a diverse self-sustaining, locally common boreal forest landscape, regardless of the end land use. The goal has three objectives:

1. Reclaimed landscapes are established that support natural ecosystem functions;
2. Natural ecosystem functions are established on the reclaimed landscape; and
3. Reclaimed landscapes support an equivalent land capability appropriate to the approved end land uses.

The criteria and indicators framework was designed to be compatible with the current Alberta regulatory system. The framework is closely associated with other programs within CEMA including: the effectiveness monitoring program (active); the biodiversity monitoring project (in development); wildlife habitat modeling (in development); and the state and transition model (in development). These other projects will inform and generate indicators for inclusion into the framework over time. The criteria and indicator framework is supposed to provide a comprehensive, consistent, and transparent process to assess performance towards achievement of reclamation goal and objectives. The framework is not intended to be a “checklist”, where if one or more indicators are not achieved, the reclamation has failed. The design of the framework is to allow adaptive management with the use of professional judgement in response to unplanned events during the period of time that reclamation occurs. Development of the criteria and indicator framework within CEMA supports a multi-stakeholder approach and plans to undergo periodic updates to reflect new reclamation knowledge, techniques, and technologies.

The criteria and indicator framework is intended to establish the reclamation objectives and criteria upon which to determine the readiness of a parcel of land for reclamation certification. The framework includes indicators¹ that will be measured to determine if a criterion² has been fulfilled. The framework was released by the Government of Alberta for information and encouraged further development and testing by the RWG prior to decisions for implementation. The purpose of this RFP is to further the development of biodiversity indicator 23 (detailed in Appendix II) in order to further develop the framework. This indicator was recommended to the RWG, and accepted by the RWG, subject to further development prior to their inclusion into the framework. The scope of work for development of this indicator is only for vegetation. Wildlife and other biodiversity indicators are being developed separately.

Table 1 depicts the common oil sands mine reclamation goal, objectives and criteria under which indicators will be developed. Biodiversity indicators will primarily align to Objective 3, criterion 3.1. Table 2 lists the considerations for indicator screening and selection by the RWG. The purpose of indicators is to evaluate the achievement of the

¹ An attribute which can be measured or described and used to evaluate if a criterion has been met

² Characterized by one or more related indicators which are used to determine success or to assess change over time



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associated criterion in Table 1. Therefore, to be considered complete an indicator must have a measure³, measurement method and a set threshold⁴ value.

Table 1. Depicts the Goal and its objectives and criteria in the criteria and indicator framework

GOAL: The reclaimed soils and landforms are capable of supporting a diverse, self-sustaining, locally common boreal forest landscape, regardless of the end land use.	
Objective 1:	Reclaimed landscapes are established that support natural ecosystem functions.
Criteria	<ul style="list-style-type: none"> 1.1 The landforms are integrated within and across lease boundaries. 1.2 The landforms have a natural appearance. 1.3 The landscape and its landforms incorporate watershed features such as surface drainage, lakes and wetlands. 1.4 The landforms have geotechnical stability. 1.5 Reclamation materials are placed appropriate to the landform. 1.6 Terrestrial and aquatic vegetation common to the boreal forest is established.
Objective 2:	Natural ecosystem functions are established on the reclaimed landscape.
Criteria	<ul style="list-style-type: none"> 2.1 The reclaimed landforms have the required water quality. 2.2 The reclaimed landforms have the required water quantity. 2.3 Nutrient cycling is established on the reclaimed landscape. 2.4 Ecosystem productivity is established on the reclaimed landscape. 2.5 Reclaimed ecosystems display characteristics of resilience to natural disturbances.
Objective 3:	Reclaimed landscapes support an equivalent land capability appropriate to the approved end land uses.
Criteria	<ul style="list-style-type: none"> 3.1 The reclaimed landscape provides for biodiversity. 3.2 The reclaimed landscape provides commercial forests. 3.3 The reclaimed landscape provides for fish and wildlife habitat. 3.4 The reclaimed landscape provides opportunities for traditional uses. 3.5 The reclaimed landscape provides opportunities for recreational uses.

³ A qualitative or quantitative aspect of an indicator; a variable which can be measured (quantified) or described (qualitatively) and demonstrates either a trend in an indicator or whether or not a specific threshold was met

⁴ The quantitative point which triggers an action or effect



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Table 2. The considerations used to screen and select indicators

Category	RWG Screening Considerations for Indicator Selection	Yes	No
Effectiveness	Is the indicator useful/definitive, when used in the prescribed circumstances, in distinguishing that the criterion was met?		
	Does it draw a distinct line between what is acceptable and what is not acceptable?		
Soundness	Is the indicator based on scientific research or widely held or accepted principles?		
	Is the indicator measurable?		
	Is the measurement of the indicator replicable?		
	Does an acceptable common measurement method exist?		
	Is the indicator responsive (high signal to noise ratio)?		
Practicality	Is measurement of the indicator technically feasible?		
	Can the indicator be applied now using existing technology and methods?		
	Is the effort and cost to measure the indicator reasonable in relation to its value?		
	Is the indicator aligned to an EPEA approval condition?		

OBJECTIVES

1. Advance the development of recommended biodiversity indicator 23 – Species and community diversity (Appendix II), which is classed as “acceptable but needs further development”. The scope of work under this RFP is limited to assessing vegetation establishment on reclaimed land for diversity, richness, evenness and abundance.

SCOPE

The scope of work for this project, aligned to the Criteria and Indicators Framework, is summarized below:

1. Attend project initiation meeting with the ITG to review the scope of work, timelines and administrative requirements.
2. Conduct review and/or analysis of existing literature and data respectively, for the mineable oil sands sub-region for use in further development of the recommended indicator.
 - a. See the References section of this RFP for datasets available online from the CEMA library.
3. Further develop biodiversity indicator 23- Species and community diversity (Appendix II), which was previously recommended for the criteria and indicator framework and classed as “acceptable but needs further development”.
 - a. Indicator development is only for vegetation, other biodiversity measures are out of scope (e.g. wildlife, soil biota etc.).
 - b. Fully developed indicators must have a measure, measurement method and threshold.
 - c. The scale of the indicator application must be identified, e.g. polygon, landform or mine footprint scales.
 - d. If the indicator cannot be fully developed, the consultant is to identify the information gaps required to be filled.
 - e. Use available data sources, NO new data collection or new research initiatives.
 - f. The indicator must directly align to criterion 3.1 - The reclaimed landscape provides for biodiversity, as stated in the criteria and indicator framework, and may indirectly align to other criteria.
 - g. Development of additional indicators beyond the one recommended is out of scope.



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DELIVERABLES

1. Development of biodiversity indicator 23 - Species and community diversity for inclusion into the C&I Framework, with defined measures, measurement methods, and thresholds as defined in the C&I Framework. Recommended indicators will be submitted in the same format as in Appendix III.
2. A final report outlining the purpose, process, method and outcomes of the project; including if necessary any gaps preventing further development of the indicator.
3. Summary notes for each work session held with the ITG.

PROPOSED TIMELINE

Timelines in Table 3 are meant as general guidelines and will need to be confirmed through discussions between the ITG and the successful consultant. In their RFP, consultants are encouraged to recommend timelines that they believe are realistic, according to their approach.

Table 3 Task Timelines

Task	Description	Delivery Date
1	Attend project initiation meeting with the ITG to review the scope of work, timelines and administrative requirements. <i>Note: June 15, 2015 is a scheduled ITG meeting (teleconference).</i>	June 15, 2015
2	Conduct a review of existing available data for the mineable oil sands sub-region for use of the data to further develop the indicator.	June 30, 2015
3	Further develop biodiversity indicator #23 (Appendix II) which was previously recommended for the criteria and indicator framework and classed as "acceptable but need further development.	Aug. 31, 2015
4	Conduct one or more work sessions with the ITG for developing indicators. <i>Note: ITG has a scheduled meeting on September 24, 2015 (Fort McMurray) and October 15, 2015 (Calgary)</i>	Work sessions completed on or before Oct. 15, 2015 Summary notes submitted 10 days after each session
5	Prepare, submit and present a final draft report to the ITG and RWG for review and input. <i>Note: November 18, 2015 is a scheduled ITG meeting (conference call).</i>	Submit final draft by Nov. 10, 2015 Present to ITG and RWG on Nov. 18, 2015
6	Prepare and submit a final report to the ITG and RWG for review, feedback and approval. <i>Note: The RWG has a scheduled meeting on December 9, 2015 (conference call) at which the report will be reviewed for approval.</i>	Submit final report by Dec. 1, 2015
7	Prepare and submit the final deliverables after RWG approval of the report.	Dec. 18, 2015



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MEETINGS

The consultant may be requested to either attend in person or participate via conference call at meetings on May 27, 2015 (Edmonton), October 15, 2015 (Calgary), and/or November 18, 2015 (conference call) to provide updates or conduct work sessions. The meetings will either be held by conference call or in the locations as indicated above. Attendance will be determined on an as needed basis.

REFERENCES

Alberta Environment and Sustainable Resource Development. 2013. [Criteria and Indicators Framework for Oil Sands Mine Reclamation Certification](#). Prepared by Mike Poscente and Theo Charette of CharettePellPoscente Environmental Corp. for the Reclamation Working Group of the Cumulative Environmental Management Association, Fort McMurray, AB. September 18, 2012

Jan J.H. Ciborowski, Misun Kang, Alice Grgicak-Mannion, Dustin Raab, Suzanna E. Bayley, A. Lee Foote, 2013. [Synthesis: Applying the Reference Condition Approach for Monitoring Reclamation Areas in the Athabasca Oil Sands Region](#). Cumulative Environmental Management Association. Fort McMurray, Alberta

Geographic Dynamics Corp. 2003. [Natural ecosite and plant resource summary for the Athabasca Oil Sands Region. \(includes dataset\)](#). Prepared for the Cumulative Environmental Management Association, Reclamation Working Group, Soil/Vegetation Subgroup (SVSG), Fort McMurray, Alberta by Geographic Dynamics Corp., Edmonton, Alberta.

Derek Ebner, 2010. [Wildlife Movement and Habitat Connectivity Monitoring Guidelines for the RMWB-Task 1: Literature Review](#). Cumulative Environmental Management Association. Fort McMurray, Alberta

Virgil C Hawkes, Krysia N Tuttle, Bryce McKinnon, Nathan Hentze, 2010. [Early Successional Wildlife Monitoring Program on Reclaimed Plots in the Oil Sands Region: 2011-2012 Comprehensive Final Report](#). Cumulative Environmental Management Association. Fort McMurray, Alberta

John L Kansas, Douglas M Collister, 2002. [Regional Habitat Evaluation and Mapping for Key Wildlife Species in the Athabasca Oil Sands Region - Priority Area 1. \(Includes dataset\)](#). Cumulative Environmental Management Association. Fort McMurray, Alberta

[CEMA Landscape and Habitat Reclamation Summary, Wildlife Habitat Reclamation Table](#). AXYS Environmental Consulting Ltd. 2010. Cumulative Environmental Management Association. Fort McMurray, Alberta.

PROJECT BUDGET

A proposed budget is not being provided at this time to allow for creative proposal development.

Please include appropriate fee schedule including:

1. A brief outline of the approach and fee schedule for conducting the work described herein.
2. An outline of estimated total contract costs and any assumptions/caveats based on the work outlined in the "Project Tasks", broken down by numbered task. This should include the following:
 - a) Who is on the project team and their roles with their rates for the project
 - b) Who from the project team will be working on each task with an estimated number of hours per task at their given rate?
 - c) CEMA will not pay for secretarial/admin AND a mark up on professional fees. Should a markup be selected, it cannot exceed 5%.



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- d) Disbursements/expenses assumed for each task with an estimate for these disbursements/expenses. Please note that expenses/disbursements will be reimbursed at cost. No mark up/surcharge will be paid on these items.
- e) Totals net of GST for each task.
- f) A final total net of GST.
- g) A list of any assumptions/caveats on the budget/fee schedule.
- h) Identification of any value adds beyond the proposed scope of work

PROPOSAL EVALUATION

Proposals will be evaluated based on the criteria and weighting in Table 4. A score from 0 to 10 will be applied to each of the four criteria, multiplied by the weighting to arrive at a final overall score for the proposal.

Table 4 Proposal evaluation criteria and weighting

CRITERIA	WEIGHT	Consultant 1	Consultant 2
PROJECT TEAM EXPERIENCE	30%		
Description: Depth of resources and ability to provide a quality product. Appropriate staff assigned to tasks. Experience within or familiarity with region identified. Demonstrated capabilities/experience for tasks identified i.e. resumes included. Work quality – reputation. Relationship with local stakeholders.		Score out of 10	Score out of 10
BUDGET	25%		
Description: Proposal structured as requested i.e. tasks and hours of staff identified. Includes proportion of cost allocated to senior vs. junior staff. Does the proposal illustrate the adequacy of the firm's system for quality and cost controls? Appropriate allocation between project management, field work and office work. Illustration of cost saving opportunities / control/manage within the allotted budget.		Score out of 10	Score out of 10
CONTENT OF PROPOSAL	30%		
Description: Understanding of work involved; expectations. Approach / method outlined and addressed clearly, with sufficient detail. Addresses RFP. Creative solutions or identification of issues with methodology presented. Proposal clear, concise, logical well written and presented in a professional manner. Does the proposal identify any problems in the methodology that may need to be addressed? Study design quality, tailored to achieve the project objectives, logical and complete.		Score out of 10	Score out of 10
SCHEDULE/TIMING	15%		
Description: Allowed for appropriate/realistic time for each task according to methods/approach outlined. Indicated time saving opportunities where applicable. Any problems/delays accounted for. Does the proposal indicate that the achievement of objectives will be met according to an acceptable schedule?		Score out of 10	Score out of 10
TOTAL SCORE (OUT OF 10)	100%		



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INVOICING

The successful consultant will be expected to provide monthly invoices and progress reports to the Working Group Program Administrator for review. Invoicing will commence one month after initiation of the contract, and will be submitted by mail monthly, at the end of each month, for work conducted during the previous month, except where no work has been conducted in that previous month. All invoices with fees and expenses incurred on this project will be billed directly by mail to the Working Group Program Administrator only for review and sign off. Electronic versions of invoices may be submitted in advance of the hardcopy by mail, if desired, for quicker processing (this will not be considered a substitution for mailed hardcopies of the invoices with receipts). These invoices may be submitted with the contractor's monthly update and progress report to the Working Group.

All invoices shall include the following:

1. Specify the date on which the invoice was submitted to CEMA.
2. Specify the month in which the work being billed for was conducted.
3. Specify the CEMA contract number as provided to you by the Working Group Program Administrator.
4. Specify the consultants invoice number.
5. Provide a brief description of all tasks conducted.
 - a) Provide a clear outline and breakdown of fees in net of GST including:
 - b) Technical, professional and administrative hours allocated to the project
 - c) Which task(s) these hours were billed against
 - d) Rate at which these hours are charged.
 - e) Who on the consulting team worked on each task?
 - f) A clear outline and breakdown of expenses in net of GST including: Travel costs (Flights, taxis, hotels, meals, mileage, parking) with copies of detailed receipts for all amounts charged.
 - g) Contract costs (for any and all work subcontracted out to other organizations) with copies of all invoices of contracts billed for all amounts charged.
 - h) Other miscellaneous expenses (Hall bookings, catering, equipment rentals, printing charges, etc.) with copies of detailed receipts for all amounts charged.
6. A subtotal of all fees and expenses net of GST.
7. Specify the amount, as a separate item, that relates to any federal Goods and Services Tax that may apply to the Services provided (GST will be charged at cost of the amount incurred for disbursements and 5% on labour).
8. Specify the Goods and Services Tax registration number of the Contractor.
9. Specify a final invoice total.
10. Specify the date when payment is due, no less than 30 days from date of invoice.

SCOPE CHANGES

Any additional funds required once the Contract is issued shall be discussed with the Program Administrator. A formal Scope Change with a new fee schedule must be completed before additional fees can be expensed against the Contract.

PUBLISHING

CEMA produced reports will be made publicly available. Traditional knowledge or other content sensitive material will be removed from the reports before posting to our public website.

REPORTING REQUIREMENTS

During contract term:

- A brief status report, in letter format, is to be provided to the Program Administrator on a monthly basis following the contract start date.
- An electronic copy of the draft report to be emailed to the Program Administrator.



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Upon contract completion:

- Two hard copies of the report (one bound, one unbound).
- Two CDs, each containing a PDF and MS Word format copy of the document. Both CDs should include all maps and data files
- All spatial data products to be in ArcInfo Export or compatible format (see Appendix I).

Please note: The PDF files must be unprotected and unsecured.

PROPOSAL CONTENTS/CONDITIONS

Since the services requested may require differing capabilities as well as experience, your bid package may involve a cooperative effort by more than one company. If the bid involves more than one company, bidders must submit an integrated proposal that clearly defines roles, responsibilities, and accountabilities of each company.

The proposal must contain the following:

1. A brief outline of the methods and processes for conducting the work described herein including any assumptions or caveats to the proposed work.
2. The credentials of the proposed project team and their academic and professional qualifications, relevant experience and their specific roles and time commitment to the study. Please include all contact information for the proposed project team and project lead.
3. A brief description of any similar projects undertaken, in particular those undertaken in north-eastern Alberta. Please include the date the project was undertaken and the key individuals involved in its completion.
4. An outline of estimated total contract costs and fee schedule by task with consultants expected to work on each task, hours and rates to be applied and any assumptions/caveats based on the work outlined in the scope. Include considerations for in-person meetings, travel expenses, and revisions to the draft report should be outlined in the proposal. Note that review costs will be covered by CEMA directly.
5. If your organisation cannot meet the proposed timeline a revised schedule should be provided.
6. **Please indicate funding requirements on calendar year basis.** For example, if work is to extend over the end of a calendar year then the fee must indicate how much (dollar figure) of the total contract will be needed/spent in each year. E.g. A \$100,000 contract starting in February 2011 and extending to February of 2012. In this example the contract must indicate the projected dollar expenditure for the 2011 and the 2012 calendar years separately, the sum of those amounts totaling, but not exceeding, \$100,000.

Governing Conditions

1. The proposal must be no more than 10 pages in length excluding resume(s) and other attachments.
2. This request for proposal does not constitute an obligation on the part of CEMA to accept this proposal.
3. CEMA will not pay any compensation for the preparation of the proposal.
4. Please review the CEMA Contract Template, (located at www.cemaonline.ca under RFP's) prior to submitting your proposal. The terms of this contract are strictly adhered to.
5. CEMA will review the proposal(s) and reserves the right, at its sole and absolute discretion, to refuse any and all proposals.
6. Given the participation of the Government of Alberta (GoA) in the CEMA, all companies and consultants need to be aware of the *Freedom of Information and the Protection of Privacy Act* (FOIPPA) passed by the GoA.
 - a) All information and documents submitted to CEMA and in the custody of Alberta Environment and Sustainable Resource Development (AESRD) are subject to the provisions of the FOIPPA and may, therefore, be subject to disclosure to any person requesting such information pursuant to FOIPPA.
 - b) The FOIPPA grants a right of access to records in AESRD custody or control, and prohibits these departments from disclosing information where disclosure would be harmful to your business interests as defined in section 15 of FOIPPA, or would be an unreasonable invasion of your personal privacy as defined in section 16 of FOIPPA.



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- c) AESRD routinely discloses information and records in its custody and under its control pursuant to FOIPPA. Should your proposal contain any information such as trade secrets, processes or techniques, commercial or financial, the release of which would harm your business interest, please identify such information. This is so that you may be contacted should a request be made to access the information. Please note that AESRD and CEMA cannot guarantee that any information submitted will remain confidential.
 - d) Further information about FOIPPA, should be sought from the FOIP office at 780-427-4429.
7. Personal information requested above is included as part of the RFP package to enable CEMA to evaluate the proposal. All individuals whose personal information is contained in your proposal must be advised of the possibility of disclosure and the purpose of the request for this information.
8. Indemnities and Insurance:

The Contractor shall be responsible for and indemnify and save CEMA harmless from all claims, losses and damages, including all costs on a solicitor/client basis, which relate to or arise out of negligent acts, errors and omissions of the Contractor or its agents in providing the Services.

The Contractor represents and warrants that the Services provided and the Contract Property do not and will not infringe upon or violate a patent, copyright, license or other property or proprietary right held, or misappropriate a trade secret or other property right claimed by any third party. The Contractor shall indemnify and hold CEMA harmless from all claims, losses and damages, including costs on a solicitor/client basis, which relate to the Contract Property infringing on any patent, copyright, license or other property right or proprietary right of any third party.

The Contractor shall indemnify CEMA for any claims made against CEMA, or loss, damages or costs suffered by CEMA, its agents and employees, resulting from the use or disposition of the Contract Property by the Contractor.

- a) The Contractor shall provide, maintain, and pay for Commercial General Liability Insurance, identifying CEMA as an additional insured, and Professional Liability Insurance, with limits, per occurrence, of not less than the amount of \$2,000,000.00.
- b) Both the Commercial General Liability Insurance and the Professional Liability Insurance specified in clause a) shall be in force from the date of commencement of the Services until the date that the Services provided under the Contract are complete to the satisfaction of CEMA, unless otherwise provided for in the signed Contract, Schedule "B", Part "C".
- c) Notwithstanding any other provision of this Agreement, the aggregate liability of the Contractor, for the Services provided pursuant to this Agreement, shall not exceed the amount of \$2,000,000.00
- d) Prior to the commencement of any provision of Services pursuant to the Contract, the Contractor shall promptly provide CEMA with confirmation of coverage. If required by CEMA, the Contractor shall provide CEMA with a certified copy of the certificate of insurance, executed by an authorized representative of the Contractor's insurer, together with copies of any and all amending endorsements, which certificate shall provide at least 14 days notice to be given to CEMA prior to the cancellation or modification of any insurance referred to therein.



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APPENDIX I

CONTRACT PROPERTY – DATA SETS

1. All mapping is to be performed on the Provincial Base Features GIS data layers. If data is provided to the Contractor by CEMA or one of its member associates, the Contractor will not use this data for any purpose other than this contract.
2. Data sets should be submitted in formats that will best ensure their future usability. Types of data sets that do not fall under the specifications below should be submitted in formats with this goal in mind, and should be reviewed by the Program Administrator.
3. The Contractor is required to submit the master copy of the contracted data to the CEMA Program Administrator after the project has been completed.
4. Spatial vector data layers are to be provided in Shape (.shp) or ESRI Geodatabase (.gdb) files.. Spatial raster data layers are to be provided in Geotiff format.
5. Spatial data are to be submitted using the NAD 83 datum and UTM Zone 12N projection. All information is to be tagged with metadata using the template provided by CEMA. Simple tabular data is to be submitted in Open Document Formats (ODF) wherever possible (i.e. Not .xls or .xlsx) .
6. Relational databases must include a data model diagram with the submission. SQL scripts to recreate the database structure and load the data must be included.

The metadata template and instructions can be found at <http://library.cemaonline.ca/dms-resources/dms-template> The completed template must be completed and reviewed by the Program Administrator in order for the contract to be considered closed.



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Appendix II

INDICATOR 23: SPECIES AND COMMUNITY DIVERSITY

Group Name ¹	Biodiversity Task Group (BTG)	Submitted by ²	<i>Names removed</i>	Date ³	October 21, 2011
Objective ⁴	Objective 1 – Reclaimed landscapes are established that support natural ecosystem functions. Objective 2 – Natural ecosystem functions are established on the reclaimed landscape. Objective 3 – Reclaimed landscapes support an equivalent land capability appropriate to the approved end land uses.	Criterion ⁵	1.3 – The landscape and its landforms incorporate watershed features such as surface drainage, lakes and wetlands. 1.5 – Terrestrial and aquatic vegetation common to the boreal forest is established. 2.2 The reclaimed landforms have the necessary water quantity. 2.3 Nutrient cycling is established on the reclaimed landscape. 2.4 Ecosystem productivity is established on the reclaimed landscape. 2.5 – Reclaimed ecosystems display characteristics of resilience to natural disturbance and climatic variability. 3.1 – The reclaimed landscape provides for biodiversity.		
Describe the indicator being recommended. ⁶					
Species and community diversity is representative of the target.					
Provide a brief statement on the value of the indicator. ⁷					
BTG adopted a hierarchical framework to evaluate biodiversity to address the spatial scale of measurement (see BTG mandate letter). The hierarchy includes the following levels: species, community, habitat, landscape and regional. The BTG is defining guidance for implementing the reference condition approach to monitor biodiversity within the hierarchical framework (CEMA Contract 2010-0025). Species and community is representative of the target addresses species and community level biodiversity and components of the approval conditions identified below.					
Is the indicator presently in use within approved guideline documents or Mine Reclamation Plans? ⁸				Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
If yes, state the document and page number: ⁹					
Guidelines for Reclamation to Forest Vegetation in the Athabasca Oil Sands Region (AENV 2010) – see Section 5 From Total-EP approval: Mine Reclamation Plan Life of Mine Closure Plan Soil Placement Plan Revegetation Plan Forest Resource Plan Wetland Reclamation Plan Wetland Soil Salvage and Placement Plan Wetland Revegetation Plan Tailings Research and Development Report Wetland Research Plan Wetland Monitoring Program Plan for Reclamation Biodiversity					
List references related to the recommended indicator (research paper, journal article etc.): ¹⁰					



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See References in Guidelines for Reclamation to Forest Vegetation in the Athabasca Oil Sands Region (AENV 2010)		
Alberta Biodiversity Monitoring Institute (ABMI). 2009. ABMI's Habitat Pyramid: Definitions and Element Lists (2003), Version 2009-04-20. Alberta Biodiversity Monitoring Institute, Alberta, Canada. Report available at: abmi.ca [Date Cited].		
Ciborowski, J.J.H.; M. Kang; D. Raab; S.E. Bayley; and A.L. Foote. 2011. Synthesis: Applying the Reference Condition Approach for Monitoring Reclamation Areas in the Athabasca Oil Sands Region Final Report Draft 1.0 April 8, 2011. Prepared for the Cumulative Environmental Management Association, Fort McMurray, AB. CEMA Contract 2010-0025.		
Kirk, D.A.; J. Schieck; and B. Eaton. 2009. Biodiversity review for the Guidelines to Reclamation to Forest Vegetation in the Alberta Oil Sands. Prepared for the Biodiversity and Wildlife Task Group of the Reclamation Working Group of the Cumulative Environmental Management Association. Final Version December 22, 2009. (CEMA Contract 2008-0031).		
Does the indicator need to be measured in every polygon? ¹¹	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
Briefly explain: ¹²		
The survey intensity level of each polygon will differ depending on the measure and the scale the measure represents (i.e., species, community).		
Is the indicator fully developed? (has a defined Measure, Method and Threshold) ¹³	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
Briefly describe the existing or proposed measure, method and threshold for the indicator: ¹⁴		
Measure:	See Terrestrial Sub-group indicator recommendations for Plant Community Composition-Weeds; Plant Community Composition – Characteristic Species; and Plant Community Composition - diversity, richness, evenness, abundance.	
	See Wildlife Task Group indicator recommendations of Populations and Ecological Role.	
	Further measures to be developed.	
Method:	To be developed.	
Threshold:	To be determined.	
If the indicator is not fully developed, describe the effort and estimated direct cost required to fully develop the indicator: ¹⁵		
<p>The BTG is developing guidance for implementing the reference condition approach as the experimental design model to monitor biodiversity in the reclaimed areas. The measures for species and community diversity representative of the target will be determined through the work of this project. Some proposed measures for this measure are:</p> <ul style="list-style-type: none"> • Topographic features (diversity) • Species diversity (composition for vegetation and for other organisms) • Structural diversity (includes vegetation structure and other features, like CWD) • Potential for diversity due to use of surface soils containing propagules, or proximity to a natural propagule source (important if expecting natural regeneration) <p>The Reclamation Classification System Task Group is developing a classification system for the reclaimed areas to describe homogeneous reclamation units that are defined by hydrology, position on the landscape and biological response. The classification system will support closure planning and assist in mapping the reclamation areas which will facilitate evaluation of community diversity on the reclaimed landscape.</p>		
Is the indicator aligned to an EPEA approval condition? ¹⁶	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
If yes, what is the condition number and corresponding EPEA approval? ¹⁷		
From Total-EP approval:		
6.2.2	The approval holder shall revegetate disturbed land to target the establishment of self-sustaining, locally common boreal forest ecosystems, integrated with the surrounding area, unless otherwise authorized in writing by the Director.	



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- 6.2.8 The Mine Reclamation Plan referred to in subsection 6.2.6 shall address, at a minimum, the following:
- (g) vegetation, with consideration of the target ecosite phases and forest productivity, including reference to spatial and temporal vegetation sourcing;
 - (h) forest resources considering progressive establishment of upland vegetation communities and timber productivity consistent with pre-disturbance upland communities and consistent with the Revegetation Plan referred to in subsection 6.3.25;
- 6.2.12 The Life of Mine Closure Plan referred to in subsection 6.2.10 shall address, at a minimum, the following:
- (f) vegetation, with consideration of the target ecosite phases and forest productivity, including reference to spatial and temporal vegetation sourcing;
 - (g) forest resources considering progressive establishment of upland vegetation communities and timber productivity consistent with pre-disturbance upland communities and consistent with the Revegetation Plan referred to in subsection 6.3.25;
- 6.3.19 The Soil Placement Plan referred to in subsection 6.3.16 shall describe how salvaged materials will be used to achieve the reclamation objectives, and shall address at a minimum, the following, unless otherwise authorized in writing by the Director:
- (a) the target ecosites, including spatial extent and location, as identified in the mine reclamation plan;
- 6.3.20 The approval holder shall consider the following in developing the Soil Placement Plan referred to in subsection 6.3.16:
- (g) matching pre-disturbance ecosite to targeted ecosite of reclaimed areas for the two categories of upland surface soil;
- 6.3.26 The Revegetation Plan referred to in subsection 6.3.25 shall comply with the Guidelines for Reclamation to Forest Vegetation in the Athabasca Oil Sands Region, 2009, as amended, and shall at a minimum:
- (b) incorporate vegetation and vegetation communities that establish habitat for wildlife, including birds;
- 6.3.30 The Forest Resource Plans referred to in subsection 6.3.29 shall include the following, unless otherwise authorized in writing by the Director:
- (b) a description of how the pre-disturbance forest characteristics (including equivalent areas and types of ecosystems, forest stand structure, and forest growth and yield) will be reflected in the reclamation areas;
- 6.3.35 The Wetland Reclamation Plan referred to in subsection 6.3.34 shall comply with Guideline for Wetland Establishment on Reclaimed Oil Sands Leases, 2007, as amended, and shall include at a minimum, all of the following:
- (c) identification of the location, wetland type, target ecosite, and amount of wetlands to be created on the reclaimed landscape;
 - (d) identification of the location, wetland type, target ecosite, and amount of wetlands that will remain undisturbed by mine development;
 - (e) identification of opportunities to maximize wetland reclamation across the reclaimed landscape over the life of the mine;
 - (f) a Wetland Soil Salvage and Placement Plan that describes how salvaged materials will be used to achieve the reclamation objectives for wetland ecosystems outlined in the Life of Mine Closure Plan referred to in subsection 6.2.10, in a format consistent with subsections 3.6.29 and 6.3.19;
 - (h) a Wetland Revegetation Plan that shall include at a minimum, the following:
 - (i) the target ecosite, as identified in the Mine Reclamation Plan referred to in subsection 6.2.6;
 - (iii) incorporation of vegetation and vegetation communities that can provide habitat for wildlife, including birds;
- 6.4.10 The Tailings Research and Development Report referred to in subsection 6.4.8 shall address, at a minimum, all of the following:
- (a) for terrestrial ecosystem research:
 - (vii) identification of local native vegetation species suitable for re- establishment on terrestrial lands affected by tailings waters;
 - (b) for wetland ecosystem research:
 - (vi) wetland revegetation including:
 - (1) identification of local native wetland vegetation species suitable to inhabit the tailings wetlands;



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| 6.4.18 | The Wetland Research Plan referred to in subsection 6.4.17 shall consider the objectives of the Wetland Reclamation Plan referred to in subsection 6.3.34 and shall include, at a minimum, the following: |
| d) | expected criteria and performance measures for reclaimed wetlands including measures of wetland sustainability (including water quality and quantity), ecological function, traditional use, and biodiversity; |
| (i) | assessment of ecological function of wetland types and potential to maintain and enhance biodiversity; |
| 6.4.20 | The Wetland Monitoring Program referred to in subsection 6.4.20 shall include: |
| (a) | a plan to monitor natural undisturbed wetlands for natural variability to serve as reference conditions for comparing against potentially impacted or reclaimed wetlands; |
| 6.4.24 | The approval holder shall re-establish wildlife and fish habitat levels, at a minimum, similar to that which existed prior to disturbance, in proportions appropriate relative to the approved Life of Mine Closure Plan. |



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APPENDIX III

Group Name ¹		Submitted by ²		Date ³	
Objective ⁴		Criterion ⁵			
Describe the indicator being recommended. ⁶					
Provide a brief statement on the value of the indicator. ⁷					
Is the indicator presently in use within approved guideline documents or Mine Reclamation Plans? ⁸				Yes <input type="checkbox"/>	No <input type="checkbox"/>
If yes, state the document and page number: ⁹					
List references related to the recommended indicator (research paper, journal article etc.): ¹⁰					
Does the indicator need to be measured in every polygon? ¹¹				Yes <input type="checkbox"/>	No <input type="checkbox"/>
Briefly explain: ¹²					
Is the indicator fully developed? (has a defined Measure, Method and Threshold) ¹³				Yes <input type="checkbox"/>	No <input type="checkbox"/>
Briefly describe the existing or proposed measure, method and threshold for the indicator: ¹⁴					
Measure:					
Method:					
Threshold:					
If the indicator is not fully developed, describe the effort and estimated direct cost required to fully develop the indicator: ¹⁵					
Is the indicator aligned to an EPEA approval condition? ¹⁶				Yes <input type="checkbox"/>	No <input type="checkbox"/>
If yes, what is the condition number and corresponding EPEA approval? ¹⁷					