

# **Biophysical Impact Assessment Framework**

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**and**

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THE CITY OF  
**CALGARY**  
PARKS

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## INTRODUCTION

The requirement for Biophysical Impact Assessments (BIA) has been in place since early 1990's as a requirement of the Calgary Municipal Development Plan. The BIA was incorporated into the City of Calgary Council approved Open Space Plan in 2002.

The purpose of BIA Framework is to provide a consistent process of review and approval of BIA reports ensuring equitability and transparency throughout City of Calgary Parks planning regions and other regulatory procedures. In addition, the framework is established as a straightforward decision-making process to assist project proponents and environmental consultants to determine the appropriate level of BIA required with triggers mechanisms for assessing the appropriate level of BIA's required.

### **DEFINITION: Biophysical Impact Assessment (BIA) Framework**

BIA Framework is a set of tools available for proponents and Corporate Project Managers to outline potential project impacts and appropriate mitigating measures for:

- Any approval of outline plans for land containing or abutting identified Environmentally Significant Areas (ESA);
- Any channelization, utility crossing, within a natural environment park (NEP).

## Components of the BIA Framework

There are three levels of environmental review in the BIA Framework:

- Level 1: Initial Project Review: Preliminary Natural Site Assessment (PNSA)
- Level 2: Environmental Screening
- Level 3: Scoped Biophysical Impact Assessment

The level of review required is dependent on the type of project and nature of existing environment.

### BIA Requirements Criteria

Projects that have the potential to incur in negative impacts to identified Environmentally Significant Areas (ESA), Natural Environment Parks (NEP), and natural areas that qualify as Environmental Reserve (ER) will require at the very minimum a PNSA.

The level of assessment required is based on the following criteria:

- Any approval of outline plans for land containing or abutting identified Environmentally Significant Areas (ESA) will require a Level 3 BIA
- Any channelization, utility crossing, within a natural environment park (NEP) will require a Level 3 Scoped BIA.

- Size and the regional context of the project. Larger project that has the potential for impacts of a regional scale will require a PNSA.
- Distance of the project to the ESA, NEP, and ER with a maximum distance of 50m. Projects within 50m of the ESA, NEP, and ER will require a PNSA

**Table 1. Project examples requiring the different levels of review**

| <b>Level of Environmental Review</b>           | <b>Type of Project</b>   | <b>Nature of Existing Environment</b>  | <b>Examples</b>  |
|--|--|--|--|
| <b>No Environmental Review Required</b>        | Minor maintenance or upgrading projects which imply <b>no change</b> in existing use               | In previously disturbed areas. Project is not foreseen to have significant environmental effects                             | Minor amenity replacements; repairs to granular trails                           |
| <b>Initial Project Review Required - PNSA</b>  | Minor maintenance, upgrading or construction projects which imply <b>no change</b> in existing use | In potentially sensitive areas (e.g., vegetative cover, wildlife corridor). Potential impacts are small and easily mitigated | Regional pathway upgrade in a NEP, MCI Project, RCS,                             |
| <b>Environmental Screening Report Required</b> | Maintenance or construction which may imply a change in existing use                               | In potentially sensitive areas. Environmental effects and mitigation measures may be unknown                                 | ASP, ARP & Outline Plans, Natural Environment Park Management Plan               |
| <b>Biophysical Impact Assessment Required</b>  | Large-scale capital works, excavation, new construction that implies a change in existing use      | In potentially sensitive areas. Environmental effects and mitigation measures may be unknowns                                | Large Capital Projects, Outline Plans, Federal and Provincially funded Projects, |

**Table 2 Criteria for not requiring the Preliminary Natural Site Assessment and further BIA reports**

|   |
|---|
| A Preliminary Natural Site Assessment and subsequent BIA reports are <b>NOT</b> required if:                        |
| 1. Environmentally Significant Area is nowhere near the project site – 50m - 500m                                   |
| 2. Waterbody is not present on the project site   |
| 3. Wetlands are not present on the project site   |
| 4. Presence of contaminated sites is unlikely   |
| 5. Presence of the rare species/species-at-risk is unlikely (previous confirmation or demonstrated lack of habitat) |
| 6. Lack of habitats – areas with no habitat value   |
| 7. The project is within the urban centre   |

**Biophysical Impact Assessment Framework Objectives**

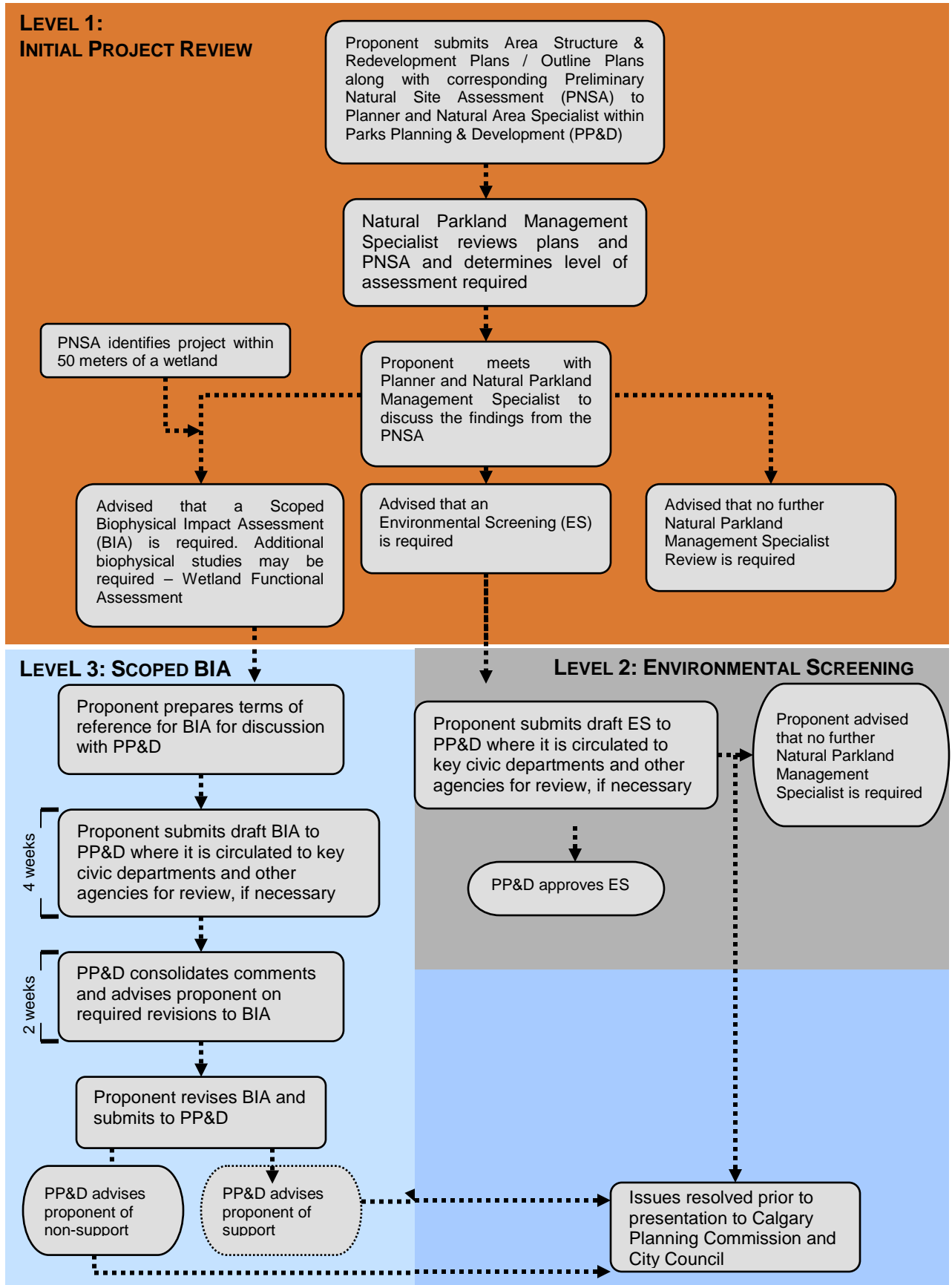
The objectives of the BIA Framework are to ensure adequate protection of environmentally significant areas and natural areas with ecologically diverse components and prevent and/or minimize environmental impacts. The implementation of BIA Framework will:

- Establish requirements and expectations of developers (project proponents) and communicate them to all stakeholders.
- Provide clear and consistent guidelines for identifying, evaluating, predicting and mitigating potential environmental impacts associated with development on/or adjacent to an Environmental Reserve (ER) / ESA. (Provide the process flow charts, tools (assessment tables) and work instructions to all stakeholders and educate them).
- Ensure projects receive equitable and appropriate level of review.
- Ensure compatibility of proposed BIA with federal and provincial environmental impact assessment regulation.
- Establish regulatory philosophies for the BIA framework, as follows:
  - apply a risk-based approach to tailor the requirements to the risk posed to ecologically diverse and environmentally significant areas by the project
  - consider the life cycle of a project (from design to completion)
  - apply a goal-oriented approach rather than prescriptive
  - consider integrated decision-making (involve City of Calgary Parks, in the initial step of process)

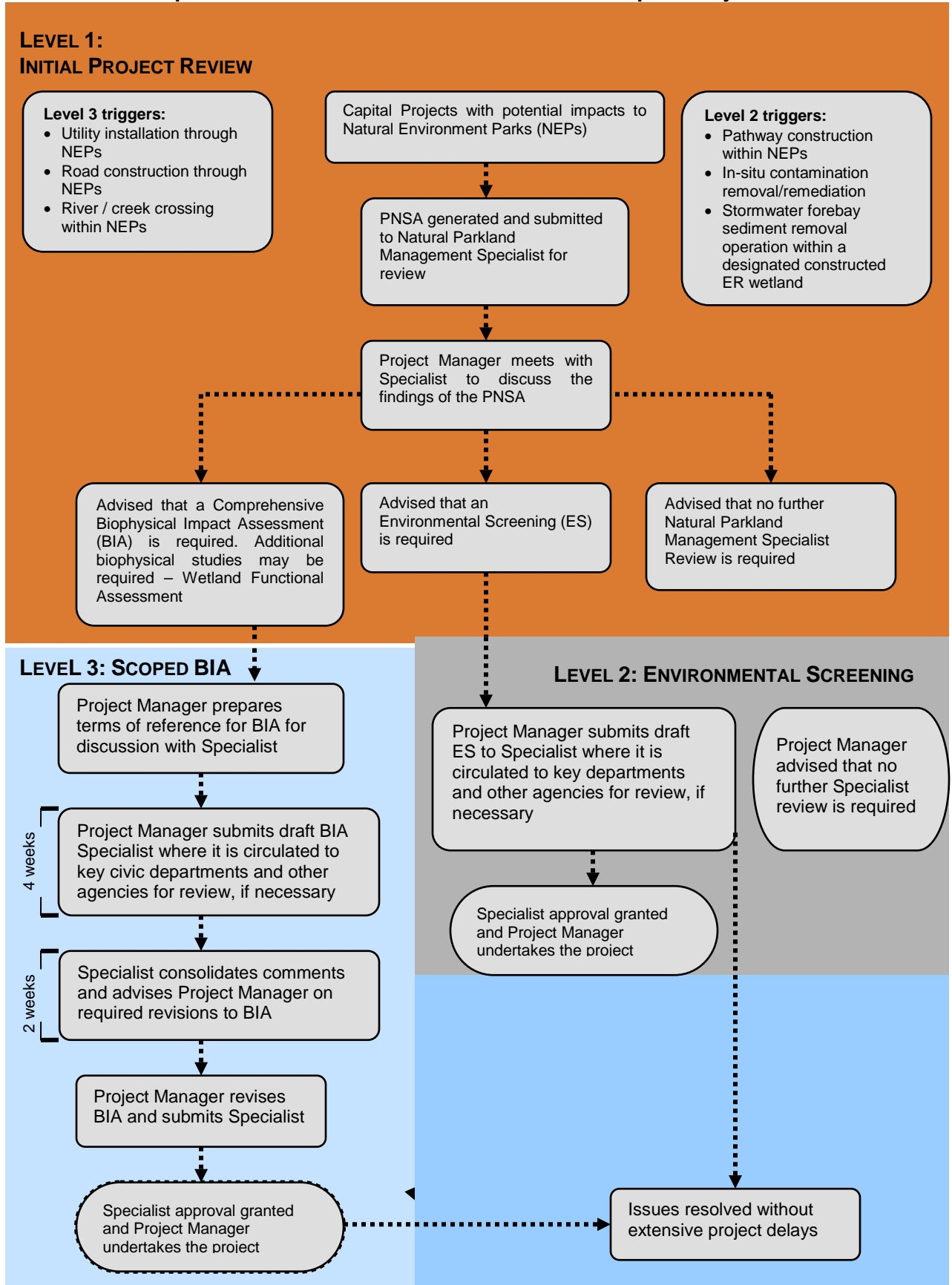
- establish criteria to determine whether an Environmental Screening (ES) is required, or a more detailed, high quality BIA that ensure adequate protection of ecologically diverse and environmentally significant areas and minimization or avoidance of adverse environmental effects
- ensure City Council and Calgary Planning Commission has adequate information to make an informed decision
- ensure clear, transparent, predictable, efficient processes
- Establish review timelines for transparency/accountability (15 days for ES approvals, 30 days for BIAs).
- Establish a seasonal requirement of when ES and BIA are to be conducted inclusively capturing the seasonal dependant flora and fauna.

# BIA Framework Process

**Flowchart 1. Proposed Environmental Review Process for ASPs and Outline Plans**



## Flowchart 2. Proposed Environmental Review Process for Capital Projects



## **Roles & Responsibilities**

The various levels of BIAs require the expertise of qualified Environmental Consultant Biologist to capture the biophysical elements and outline the potential impacts and the mitigation strategies to offset the project impacts.

Internal Capital and Operational Projects will rely on Project Planners, Managers and Environmental Specialist knowledge of the projects and potential impacts to the ESA, NEP and ER to ensure that one of the BIA level is prepared. Qualified Environmental Consultant or Biologist should be enlisted to undertake the assessment employing their knowledge and expertise in biophysical inventory and delineating potential project impacts.

Qualified Environmental Consultant and Biologist must be able to:

- Identify biophysical elements within the project areas with accuracy and consistency to the Urban Parks Master Plan Habitat Classification System and Mapping protocol.
- Identify the potential project impacts and mitigation measures to prevent or minimize project impacts.
- Undertake the required BIA assessments within Appropriate Assessment Periods (refer to the Appropriate Assessment Periods section).
- Submit BIAs to City of Calgary Parks for review and approval.
- Revise changes to the BIA reports as required based on the comments and response relayed by the approving authority.
- Submit reports in hard copy as well as electronic version (i.e. MS Word or Adobe PDF).
- Implement the mitigation measures throughout the duration of project.

## **Appropriate Assessment Periods**

All biophysical assessments are to be conducted during the growing season from May to September to ensure that the data acquired are representative of the biophysical feature and capture adequate information on the seasonally-dependant species such as the rare species and/or species at risk within the project area. The Preliminary Natural Site Assessment can be prepared outside the growing season with synthesis of existing background information on the particular project site and a desk-top research. Further environmental assessment such as the Environmental Screening and Scoped BIA will require in-depth biophysical inventories and assessments conducted during the appropriate season to ensure that the required information and data are captured accurately.



## **Implementation**

BIA reports are based on project-specific conditions and interactions with the existing natural elements within the project site. This Framework will provide guidance for the preparation of the appropriate levels of assessment required.

A significant portion of the assessment will rely on desk-top research for site-specific and pertinent information available from previous studies or the various databases managed by Alberta Sustainable Resource Development, Alberta Environment. The result of the initial exercise will require confirmation and ground-truthing.

## **Description of the BIA levels of report**

### **Level 1: Initial Review – Preliminary Natural Site Assessment (PNSA)**

The initial project review provides an overview of the proposed project and the existing environment to determine the level and extent of any further requirements for environmental review. The checklist is divided into two distinctive categories – *Project Description and Baseline Information* and *Potential Environmental Effects*. Project Description and Baseline Information is used to collect relevant information on the existing environmental elements found within the project site and provide direction for further environmental assessments and reports required. Potential Environmental Effects category is used to document the potential project effects of the biophysical elements – if there are any project interaction; brief description of the interactions; level of interaction; the type of interaction and brief description of potential adverse environmental effect.

The project proponent conducts a PNSA and completes an impact checklist (Table 3). Air photos, concept drawings, and site checks will be required. The Natural Area Specialist reviews the PNSA report and advises the proponent on the level of environmental review required: no further study required (with or without conditions); environmental screening (Level 2); or biophysical impact assessment (Level 3).

The PNSA can be used by project managers and project proponents as a preliminary decision-making tool to assist in determining the need to prepare BIAs. A series of “decision-tree” flowcharts have been produced for the PNSA to guide project proponents in a more streamlined decision-making whether the need for further environmental assessment is required. These flowcharts namely, Environmentally Significant Area (ESA), Waterbody, Wetland, Known Contaminated Site and Species at Risk are to be referenced when answering the specific environmental element categories.

## **Level 2: Environmental Screening (ES)**

The ES report provides a screening level of study describing the project impacts, including project alternatives, in a manner that ensures mitigation of known or suspected impacts to the environment. The need for the ES report will be determined through the PNSA reporting process. The ES report will:

- outline the rationale for the project;
- explore the alternatives that have been investigated;
- describe the existing environment including the biophysical and socio-economic elements; and
- describe both short- and long-term environmental effects and mitigation measures.

The Approving Authority reviews the report and provides approval with or without conditions depending on report quality, acceptance of the recommended mitigation measures.

### **Level 3: Scoped Biophysical Impact Assessment (Scoped BIA)**

The Scoped BIA provides a detailed study and review of a project including project alternatives, and recommended mitigation measures. It predicts, interprets and evaluates impacts and identifies mitigation measures to avoid, minimize or compensate for these impacts. A BIA report must:

- describe the proposed activity and provide rationale, including alternatives considered;
- describe the existing environment;
- predict and analyze the possible effects of the activity on the environment;
- recommend mitigation measures that would avoid, minimize or compensate for the environmental impacts of the activity; and
- describe how mitigation measures will be monitored over time to ensure effectiveness.

It is important for the BIA to provide a clear assessment methodology that will lead to specific recommendations. Tools should be employed that will provide demonstrable rationale for recommending specific mitigation measures. Examples include but not limited to matrix evaluation, checklist evaluation, ecological land classification and valued ecosystem components.

Draft reports are submitted to the Natural Area Specialist for review, technical circulation (if required) and approval. All Scoped BIAs are project specific and will vary in the issues and project needs to be addressed. The following composite sample (Box 2) provides a suggested template detailing the required information to support the rationale for project impacts and recommended mitigation measures. Contents are generally similar to those included in an environmental screening report, except that the Scoped BIA will provide more detailed information and requiring an environmental protection plan.

The Approving Authority reviews the report and provides approval with or without conditions depending on report quality, acceptance of the recommended mitigation measures.

## Procedures

This Framework will assist Project Proponents in preparing the appropriate level of BIA for projects that have identified potential impacts to existing ESA's and NEP's through understanding of project impacts and constraints. The Framework will also provide a high-level decision making models to guide project proponents to determine the requirement for further levels of BIA assessments.

The following sections describe the procedures:

- to prepare the Level 1 PNSA worksheet;
- to assess requirements for further levels of BIA;
- to prepare a Level 2 Environmental Screening report; and
- to prepare a Level 3 Scoped BIA

## Level 1 PNSA

**Table 1 Project Description and Baseline**

### Project Scope

| Project Description and Baseline Information |   |  |              |
|--|---|--|--------------|
| Project Scope                                | Project Name  |  | Project Size |
|  | Project Description                                       |  |              |
|  | Location (legal, street address). Provide map, air photos |  |              |
|  | Project Purpose   |  |              |

- Provide the name of the project along with a brief description, purpose and size of the project.

The project name should be unique that should include:

- type of project;
- 'rationale for the project;
- brief description of the regional context;
- legal ; and

## Project Administration

|                        |                            |  |                           |                   |
|------------------------|----------------------------|--|---------------------------|-------------------|
| Project Administration | Proposed Construction Date |  | Estimated Completion Date |                   |
|                        |                            |  | PNSA Date                 | PNSA Performed By |
|                        | <b>Internal Projects</b>   |  |                           |                   |
|                        | Project Manager/Engineer   |  |                           |                   |
|                        | Division/Business Unit     |  |                           |                   |
|                        | Estimated project \$       |  | Project Funded By         |                   |

- Provide the proposed project construction date and the estimated project completion date.
- Provide the date when the PNSA is performed and the information of who performed the PNSA.

**For Internal Projects**, provide the name of the project manager and the Business Unit/Department sponsoring the project.  
Provide the estimated project value and funding information.

## Project Biophysical Information

|                                 |   |   |
|---------------------------------|---|---|
| Project Biophysical Information | Description of Biophysical Elements   |   |
|                                 | Location Of Project in proximity to (in metres):  | (Refer to ESA chart)                          |
|                                 | <ul style="list-style-type: none"> <li>• Environmentally Significant Area           <ul style="list-style-type: none"> <li>○ Patch of native vegetation</li> <li>○ Waterbody</li> <li>○ Wetland</li> <li>○ Spatially continuous wildlife corridor</li> <li>○ Unique landscape feature</li> </ul> </li> <li>▪ Known contaminated site</li> </ul> | (Refer to Waterbody chart)                    |
|                                 |   | (Refer to Wetland chart)                      |
|                                 |   |   |
|                                 |   | (Refer to Contaminated Site chart)            |
|                                 | Presence of listed species at risk or species of special status (plant and/or wildlife) or habitat located within the project area (ANHIC/EC).  | (Refer to Rare Species/Species At Risk chart) |

- Provide the description of the biophysical elements found within the project site.
- Provide the distances of the project to the list of indicator categories.
- Provide any information of potential presence of rare species.

The description of the biophysical elements should provide sufficient baseline information for environmental setting/context as well as to evaluate the need for further levels of BIA assessments. The information should include at a minimum the following:

- Physical landscape assessment – topography, soil and geology;
- Hydrology – presence of wetlands and waterbodies such as drainage corridors, streams, creeks, and rivers;
- Habitat types;
- Landscape Ecology assessment – wildlife corridors, habitat connections, and unique features;
- ANHIC, FWMIS, database research results on the potential presence of listed species at risk, species of special status or rare communities.

The distance to the biophysical indicator categories listed should be given in meters. The measurement should be taken from the actual project activity location to the edge of the biophysical element. The distance threshold of 50 meters is employed for decision-making purposes in deciding for further levels of BIA assessments.

**Table 2 Potential Biophysical Impacts**

| Potential Biophysical Impacts                              |                            |   |                                      |                          |                          |
|--|----------------------------|---|--------------------------------------|--------------------------|--------------------------|
| Environmental Elements                                     | Project Interaction? Y/N/U | Description of Interaction (How, When, Where) | Significance Rating High / Med / Low | Type of Potential Impact | Potential Adverse Impact |
| Topography   |                            |   |                                      |                          |                          |
| Hydrogeology   |                            |   |                                      |                          |                          |
| Aquatic Resources  |                            |   |                                      |                          |                          |
| Geology / Geomorphology                                    |                            |   |                                      |                          |                          |
| Soils and terrain  |                            |   |                                      |                          |                          |
| Vegetation   |                            |   |                                      |                          |                          |
| Wildlife and wildlife habitat                              |                            |   |                                      |                          |                          |
| Fish and fish habitat                                      |                            |   |                                      |                          |                          |
| Species of Special Status (provincial, territorial, local) |                            |   |                                      |                          |                          |
| Species at Risk (federal - SARA)                           |                            |   |                                      |                          |                          |
| Historical & Archaeological                                |                            |   |                                      |                          |                          |
| Land and resource use                                      |                            |   |                                      |                          |                          |

- Provide the information of the potential impacts on the biophysical elements within the project area.

The purpose of the assessment is to ensure that decision-makers consider environmental impacts before deciding whether to proceed with new projects. Impact assessment is to draw conclusions, on balance, as to the likely impacts of the project in the context of existing conditions and the measures that are available to mitigate its likely impacts.

**Project Interaction:** Determine if there are any interactions or potential impacts to the listed environmental elements within the project area. Projects within 50 m of ESA, spatially continuous wildlife corridor, unique landscape or in a known contaminated site are considered to generate project interactions with the environmental elements.

**Description of Interaction - How, When, Where:** Provide a brief description of how, when and where the project will generate the project interactions.

**Significance Rating – High, Medium, Low:**

**High:** Project interactions with a high significance rating are considered to result in severe alteration to the environmental elements such as re-contour of an escarpment, or open cut operation for deep utility installation through a ravine or wetland, or loss of critical habitat for species at risk wildlife.

**Medium:** Project interactions with a medium significance rating are considered to result in moderate impacts to the environmental elements such as removal of a small portion of vegetation within a large ESA designated land.

**Low:** Project interactions with a low significance rating are considered to result in minimal or negligible impacts to the environmental elements such as Regional Pathway construction within Municipal Reserve lands 50 m away from an ESA land

**Type of Potential Impact:** Description of the impacts proposed for the project such as soil loss, vegetation loss, wetland loss, etc.

**Potential Adverse Impact:** Provide a Yes/No to indicate the residual nature of the impact those that potentially result in permanent alteration to the environmental elements.

**Table 3 Further Biophysical Impact Assessment Requirements Matrix**

| No further Biophysical impact Assessments Required | Yes/No                  | Level 2 Required (Environmental Screening) | Yes/No | Level 3 Required (Scope BIA) | Yes/No |
|--|-------------------------|--|--------|------------------------------|--------|
| Wetland Functional Assessment Required             | Yes<br>Level 3 Required |  |        |                              | No     |

- Provide Yes/No answers for each category

**No further Environmental Review Required:** The PNSA prepared for the project concluded that there are no potential impacts affecting all environmental elements within the ESA, spatially continuous wildlife corridor, and unique landscape or the land is considered to be greenfields, therefore not requiring further environmental assessments.



**Table 3. Preliminary Natural Site Assessment**

| Project Description and Baseline Information |  |   |                                  |
|--|--|---|----------------------------------|
| <b>Project Scope</b>                         | Project Name   |   | Project Size                     |
|  | Project Description  |   |                                  |
|  | Location (legal, street address). Provide map, air photos  |   |                                  |
|  | Project Purpose  |   |                                  |
| <b>Project Administration</b>                | Proposed Construction Date   |   | Estimated Completion Date        |
|  |  |   | PNSA Date      PNSA Performed By |
|  | <b>Internal Projects</b>   |   |                                  |
|  | Project Manager/Engineer   |   |                                  |
|  | Division/Business Unit   |   |                                  |
|  | Estimated project  |   | Project Funded By                |
| <b>Project Biophysical Information</b>       | Description of Biophysical Elements  |   |                                  |
|  | Location Of Project in proximity to (in metres):   | (Refer to ESA chart)                          |                                  |
|  | <ul style="list-style-type: none"> <li>• Environmentally Significant Area                             <ul style="list-style-type: none"> <li>○ Patch of native vegetation</li> <li>○ Streams</li> <li>○ Wetland</li> </ul> </li> </ul> | (Refer to Waterbody chart)                    |                                  |
|  | <ul style="list-style-type: none"> <li>▪ Spatially continuous wildlife corridor</li> </ul>   | (Refer to Wetland chart)                      |                                  |
|  | <ul style="list-style-type: none"> <li>▪ Unique landscape feature</li> </ul>   |   |                                  |
|  | <ul style="list-style-type: none"> <li>▪ Known contaminated site</li> </ul>  | (Refer to Contaminated Site chart)            |                                  |
|  | Presence of listed species at risk or species of special status (plant and/or wildlife) or habitat located within the project area (ANHIC/EC).   | (Refer to Rare Species/Species At Risk chart) |                                  |
| <b>Regulatory Information</b>                | Has the proponent consulted with relevant municipal, provincial and federal departments/agencies? Are there issues of concern? (explain)   | (If Yes, Scoped BIA required)                 |                                  |

| Potential Biophysical Impacts                              |                            |   |                                      |                          |  |
|--|----------------------------|---|--------------------------------------|--------------------------|--|
| Environmental Element                                      | Project Interaction? Y/N/U | Description of Interaction (How, When, Where) | Significance Rating High / Med / Low | Type of Potential Effect | Potential Adverse Environmental Effect |
| Topography   |                            |   |                                      |                          |  |
| Hydrogeology   |                            |   |                                      |                          |  |
| Aquatic Resources  |                            |   |                                      |                          |  |
| Geology / Geomorphology                                    |                            |   |                                      |                          |  |
| Soils and terrain  |                            |   |                                      |                          |  |
| Vegetation   |                            |   |                                      |                          |  |
| Wildlife and wildlife habitat                              |                            |   |                                      |                          |  |
| Fish and fish habitat                                      |                            |   |                                      |                          |  |
| Species of Special Status (provincial, territorial, local) |                            |   |                                      |                          |  |
| Species at Risk (federal - SARA)                           |                            |   |                                      |                          |  |
| Historical & Archaeological                                |                            |   |                                      |                          |  |
| Land and resource use                                      |                            |   |                                      |                          |  |

### Further Biophysical Impact Assessment Requirements Matrix

| No further Biophysical impact Assessments Required | Yes/No                  | Level 2 Required (Environmental Screening) | Yes/No | Level 3 Required (Scope BIA) | Yes/No |
|--|-------------------------|--|--------|------------------------------|--------|
| Wetland Functional Assessment Required             | Yes<br>Level 3 Required |  |        |                              | No     |

## Phase 2: Environmental Screening

### EXECUTIVE SUMMARY

#### 1. INTRODUCTION

- Project Overview
- Regulatory Information Requirements
- Environmental Assessment Scope
- Related Documents and Plans

#### 2. PROJECT DESCRIPTION

- Project Need
- Project Setting / Site Description (location, surrounding land use, etc.)
- Scope of Work (design considerations, extent of alteration/construction, duration or work)
- Alternatives (concept/design alternatives and location)
  - Review of Project Alternatives
  - Impact Assessment of Project Alternatives
  - Evaluation of the Recommended Alternative with the Least Environmental Impacts

#### 4. EXISTING ENVIRONMENT

- General Description
- Biophysical Inventory: vegetation; wildlife and wildlife habitat; aquatic resources; fish and fish habitat; geology/geomorphology; soils and terrain; hydrogeology
- Heritage resources; land use; traditional land and resource use; visual resources

#### 5. IMPACT ASSESSMENT METHODS

- Approach to the Assessment
- Scoping the Assessment
- Spatial and Temporal Extents
- Assessment of Effects
- Determining Significance of Effects

#### 6. MITIGATION MEASURES

- Accepted methods – Avoidance and/or Best Management Practices
- Recommended Mitigation Measures

#### 8. ENVIRONMENTAL MONITORING AND FOLLOW-UP

- Environmental Monitoring (monitoring during construction, routine operations monitoring)
- Follow-up Programs – preparation of Restoration Plans

#### 9. ENVIRONMENTAL PROTECTION PLAN

- ECO Plan may be required if ESA is impacted by the project

#### 10. CONCLUSION AND RECOMMENDATIONS

- Summary of Significant Environmental Impacts, Recommended Project Alternatives and Recommended Mitigation Measures
- Summary of Outstanding Issues and Concerns

#### APPENDECIS

- Preliminary Natural Site Assessment
- Technical Data (i.e., fish, vegetation sampling data)
- Restoration Plan
- Erosion and Sediment Control Plan
- Photographs, Maps, Illustrations
- Historical Resources Impact Assessment

## Phase 3: Scoped Biophysical Impact Assessment

### EXECUTIVE SUMMARY

#### 1. INTRODUCTION

- Project Overview
- Environmental and Land Use Overview
- Regulatory Information Requirements
- Environmental Assessment Scope
- Related Documents and Plans

#### 2. PROJECT DESCRIPTION

- Project Need
- Project Setting / Site Description (location, surrounding land use, etc.)
- Scope of Work (design considerations, extent of alteration/construction, duration or work)
- Environmental Constraints
- Alternatives (concept/design alternatives and location)

#### 3. REGULATORY APPROVALS

- Federal and Provincial Regulatory Approvals

#### 4. EXISTING ENVIRONMENT

- General Description
- Biophysical Inventory: vegetation; wildlife and wildlife habitat; aquatic resources; fish and fish habitat; geology/geomorphology; soils and terrain; hydrogeology
- Heritage resources; land use; traditional land and resource use; visual resources

#### 5. CONSTRUCTION AND ENGINEERING

- General Description (including methods of construction, duration)
- Options Alternatives (concept/design alternatives and location)
  - Review Project Alternatives
  - Impact Assessment of Project Alternatives
  - Evaluation of the Recommended Alternatives with the Least Environmental Impacts
- Proposed Construction Components and Techniques (including site preparation, access, lighting)
- Proposed Scheduling (including timing, phasing)

#### 6. ASSESSMENT METHODS

- Approach to the Assessment
- Scoping the Assessment
- Spatial and Temporal Extents
- Assessment of Effects
- Determining Significance of Effects
- Cumulative Effects in relation to the lands within the Regional Context Study area
- Follow-up and Monitoring
- Environmental Protection Plan Development

#### 7. MITIGATION MEASURES

- Accepted methods – Avoidance, Minimization, Compensation and/or Best Management Practices
- Recommended Mitigation Measures – Based on site-specific requirements
  - Wetlands – No Net Loss of Wetland Function
  - Conservation Design
  - Slope Adaptive Designs
- Monitoring of Mitigation Measures

#### 8. ENVIRONMENTAL MONITORING AND FOLLOW UP

- Environmental Monitoring (monitoring during construction, routine operations monitoring)
- Follow-up Programs

#### 9. ENVIRONMENTAL PROTECTION PLAN AND ECO PLAN

- Summary of the plan to demonstrate the minimization of project impacts
- Tree Protection Plan for Natural Environment Parks and ESAs
- ECO Plan may be required the project is within 50 m of and within the ESA

#### 10. CONCLUSION AND RECOMMENDATIONS

- Summary of Significant Environmental Effects and Recommended Mitigation Measures
- Summary of Outstanding Issues and Concerns

#### APPENDIX

- Technical Data (i.e., flora and fauna sampling data)
- Wetland Delineation and Classification Report
- Restoration Plan
- Photographs, Maps, Illustrations
- Historical Resources Impact Assessment

## **GLOSSARY OF TERMS**

### **Aquatic Resources**

The aquatic resources component of the overview consisted of conducting a desktop study as well as a field survey to identify waterbodies and potential aquatic resources concerns. The resources are divided in two parts: 1. Surface Hydrology 2. Fish and fish habitat.

**Cumulative Effects Assessment:** A description of potential positive and negative environmental, social, economic and cultural impacts of the proposed activity, including cumulative, regional, temporal and spatial considerations. The elements of the cumulative effect assessments include:

- Issues and Valued Ecosystem Components (VECs) identification, spatial and temporal scales as well as past, existing and proposed projects.
- Impact characterization.
- Significance evaluation and determination

**Calgary Wetland Conservation Plan:** A set of policies to ensure that there is No Net Loss of Calgary Wetlands. Refer for Calgary Wetland Conservation Plan for policies.

**Environmentally Significant Area (ESA):** A natural area site that has been inventoried prior to potential development and which, because of its features or characteristics, is significant from an environmental perspective to Calgary, and has the potential to remain viable in an urban environment. A site is listed as an Environmentally Significant Area on the basis of meeting one or all of the criteria as listed:

1. Quality of Biotic Community: Biotic communities of high quality with minimal disturbance and/or diversity for a specific habitat type.
2. Ecological Function: The area is important for the healthy maintenance of a natural system beyond its boundaries by maintaining biodiversity and/or acting as staging area or corridor for wildlife within the system.
3. Distinctive and/or Unusual Land Form: The area possesses a distinctive and/or unique land form (geologic and geographic).
4. Uniqueness: The habitat or ecosystem component has limited representation within the municipality; and/or the area provides representative habitat for wildlife of recognized importance.

**Geology/ Geomorphology:** A description of surficial and, if possible, sub-surficial geological features at the site and its immediate environment; identified glacial land forms and stability issues should be included in the preliminary site report.

**Historical land and resource use:** Existing historical, interpretive, or recreational features; includes the potential for developing recreational, interpretive, or educational facilities at the site when completed.

**Hydrology:** Listing of all standing water features, water courses, or other natural hydrological sources, surficial drainage patterns, depth to water table, and other features.

**Natural Parkland Management Specialist:** City of Calgary Parks staff who provide technical expertise and support to Parks Planners in the context of Corporate Planning Approval Group. Responsible for the review and approval of BIA reports, restoration plan and wetland functional assessments submitted by project proponents ensuring that the proposed development is compliant with the requirements, guidelines and policies put in place by City of Calgary Approving Authority.

## **Rare species/Species at Risk Legislation and Regulations**

### **Canada Wildlife Act**

The act is administered by the Federal Minister of the Environment. It establishes statutes responsible for wildlife within Canada, all Provinces, and the Territories. The Act defines the powers, duties and functions of the Minister respect to all wildlife that is wild by nature and the habitat of any such animal, plant, or organism, including any waters on or flowing through the lands. The Act governs the management and protection of endangered wildlife and habitat. The Act stipulates that the Minister may take actions such measures as deemed necessary for the protection of any species of wildlife in danger of extinction, including the acquisition of lands for the purposes of research, conservation, and interpretation. Any wildlife or habitat categorized as endangered within the development area would be subject to the Canada Wildlife Act.

### **Species At Risk Act**

The act is administered by the Federal Minister of the Environment, the Minister of Fisheries and Oceans, and the Minister of Canadian Heritage. It was enacted to prevent the extirpation or extinction of species that are of special concern, endangered, or threatened. The Act legislate protection of these species and any existing critical habitats through agreements and permits, enforcement measures, and public registry. Stewardship action plans and recovery strategies are also outlined within the Act.

**Rare species/Species at Risk Strategy:** Mitigative measures for rare species/Species AtRisk communities within the project area. The measures may include but not limited to the following activities:

- Avoidance and realignment of pathways and structures
- Collection of seeds and/or cuttings, where appropriate, for future propagation and as a seed source
- Transplanting and augmenting existing populations within the City of Calgary where protection is guaranteed
- Collection and retention of viable specimens for future remediation projects

**Topography:** a physical description of existing land form, slope, aspect, and position within the landscape; in most cases this may require presentation of a survey.

**Waterbody:**

Environmental Protection and Enhancement Act defines a waterbody/watercourse as

- (i) the bed and shore of a river, stream, lake, creek, lagoon, swamp, marsh or other natural body of water, or
- (ii) a canal, ditch, reservoir or other artificial surface feature made by humans, whether it contains or conveys water continuously or intermittently.

**Wetland Functional Assessment:** A component of the BIA requirement as part of any wetland mitigation where residual impacts requiring compensation. The assessment will be used as a means of evaluating the roles and benefits of the wetland on the basis of its ecological, hydrological and socio-economic functions. These functions will then provide a basis for determining appropriate mitigation.

**Water Act**

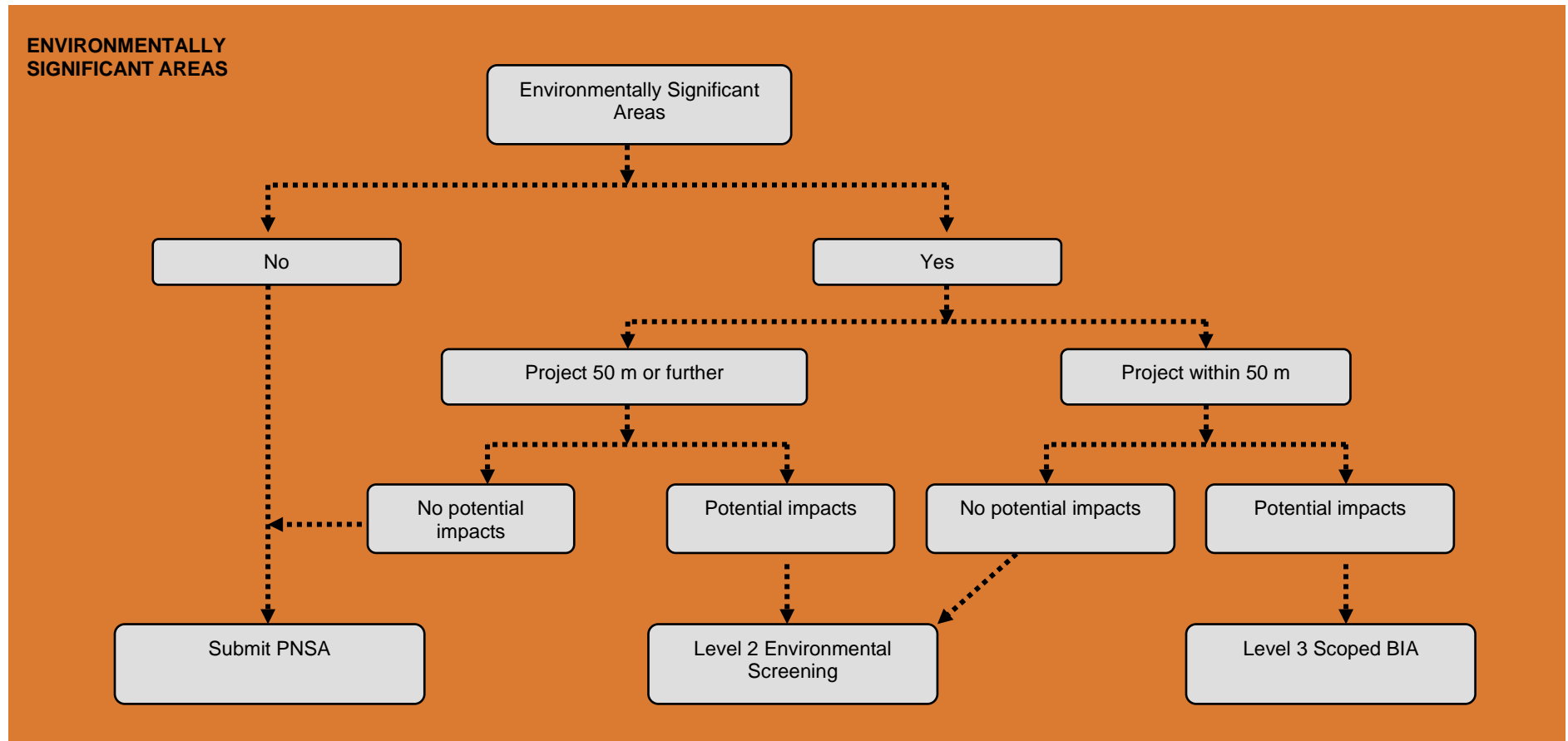
The water Act, as administered by the Government of Alberta, identifies all water bodies within the Province of Alberta as Crown Property and defines regulations pertaining to rights, restrictions, and resource managements in relation to all water resources within provincial boundaries. The Act also addresses the disposition, diversion, or alteration of any waterbody within Alberta, which may or may not impact water flows, wetlands, and stream diversions which influence or interfere with water quantity and quality within the Province of Alberta require statutory authorization

## **APPENDIX 1**

### **Decision-making flowcharts for further environmental assessments**



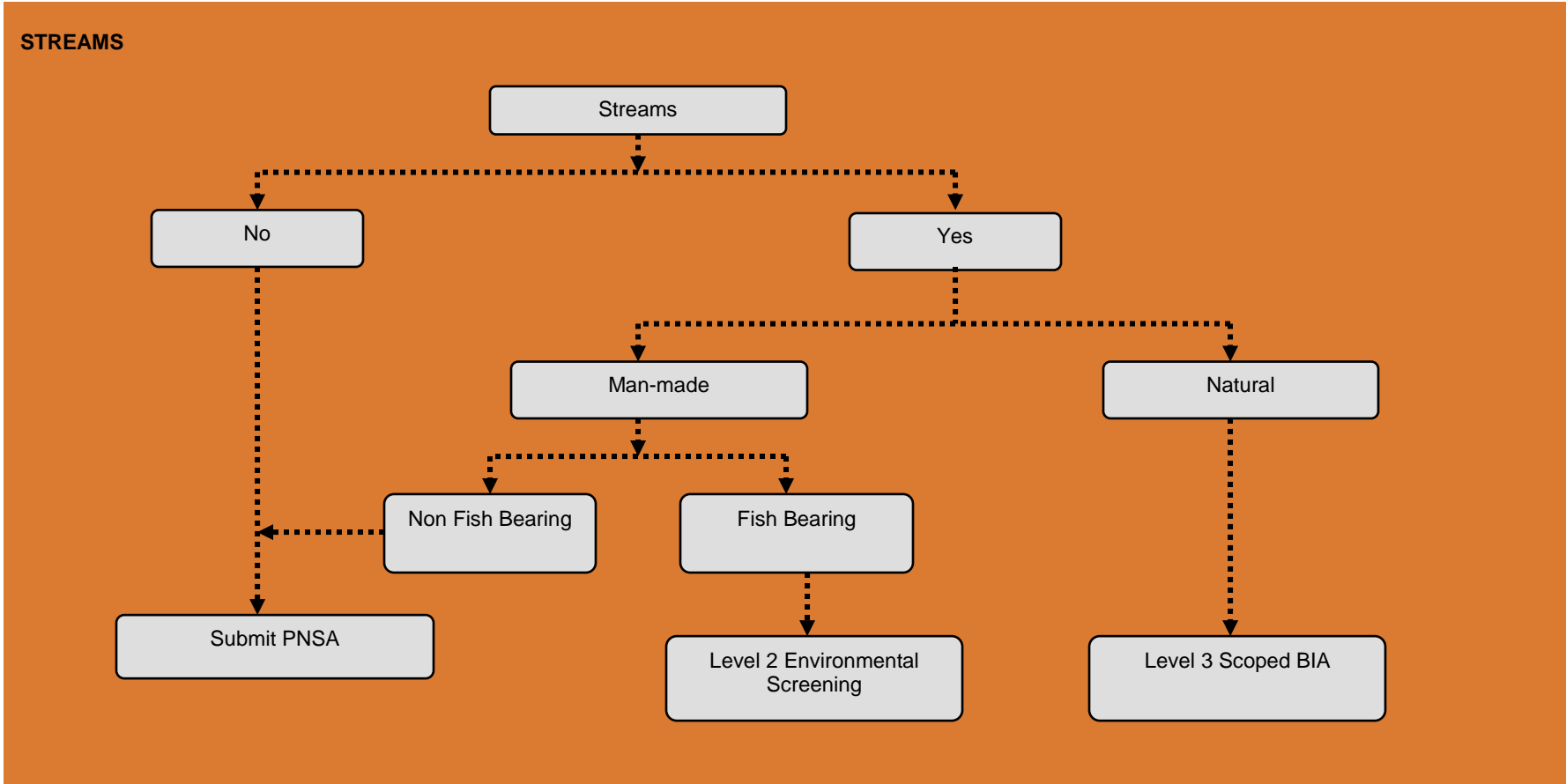
## Decision-making Flowcharts for Further Biophysical Impact Assessment Requirements



**Flowchart 1** Decision-making tool to arrive at the required environmental assessment when considering ESAs

**DEFINITION: Environmentally Significant Areas**

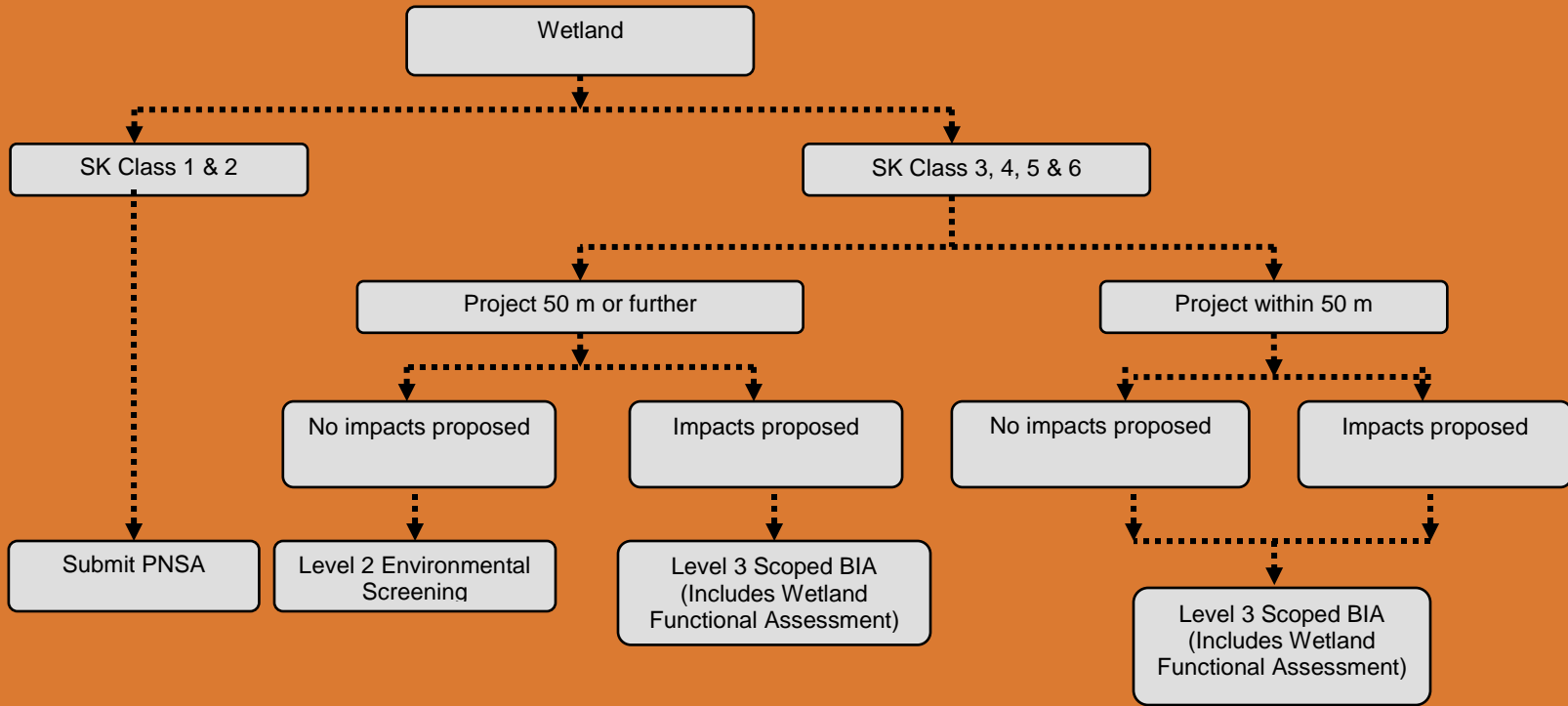
A natural area site that has been inventoried prior to potential development on the basis of meeting one or all of the criteria as listed: Quality of Biotic Community, Ecological Function, Distinctive and/or Unusual Land Form and Uniqueness. Because of its features or characteristics, these sites are considered as significant from an environmental perspective to Calgary, and have the potential to remain viable in an urban environment. They may include patches of native vegetation, streams, wetlands, spatially continuous wildlife corridors, and unique landscapes.



**Flowchart 2** Decision-making tool to arrive at the required environmental assessment when considering Streams

**DEFINITION: Streams**  
 Alberta Environmental Protection and Enhancement Act defines a waterbody/watercourse as  
 (i) the bed and shore of a river, stream, lake, creek, lagoon, swamp, marsh or other natural body of water, or  
 (ii) a canal, ditch, reservoir or other artificial surface feature made by humans, whether it contains or conveys water continuously or intermittently;

**WETLAND**



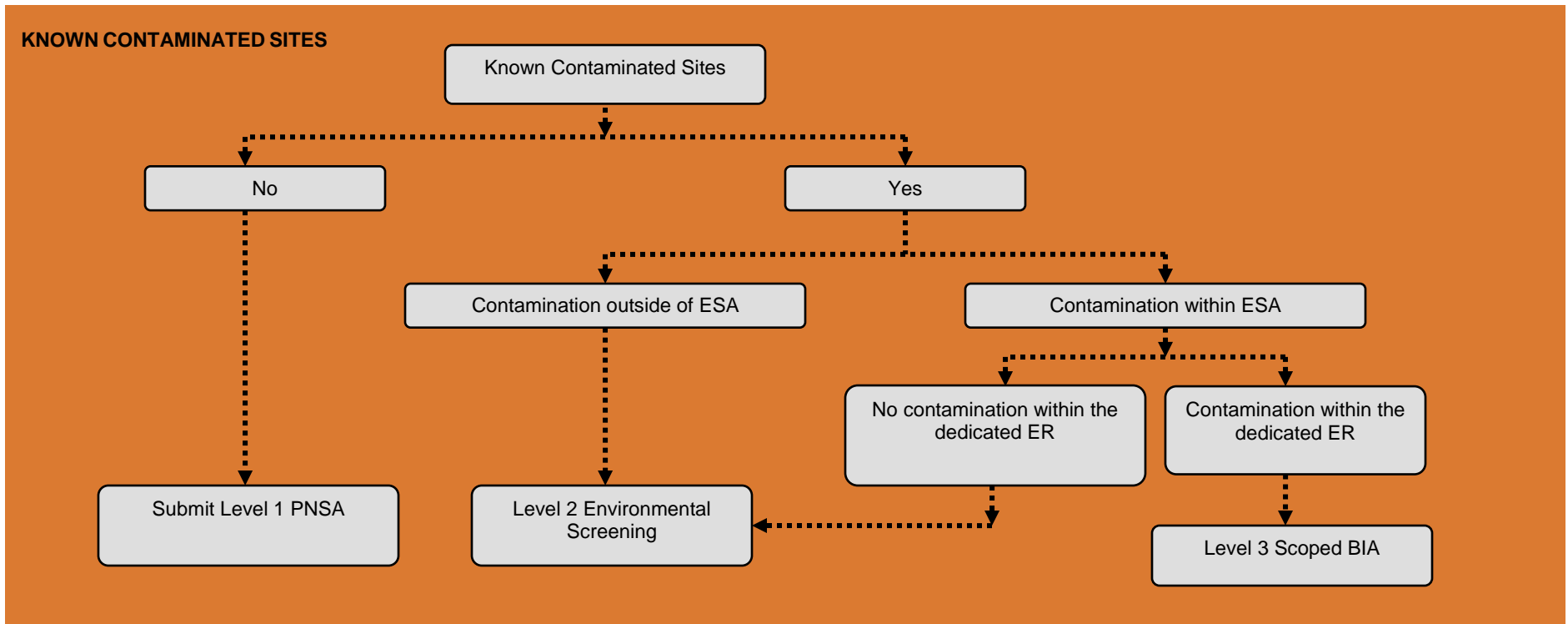
**Flowchart 3** Decision-making tool to arrive at the required environmental assessment when considering Wetlands

**DEFINITION: Wetlands**

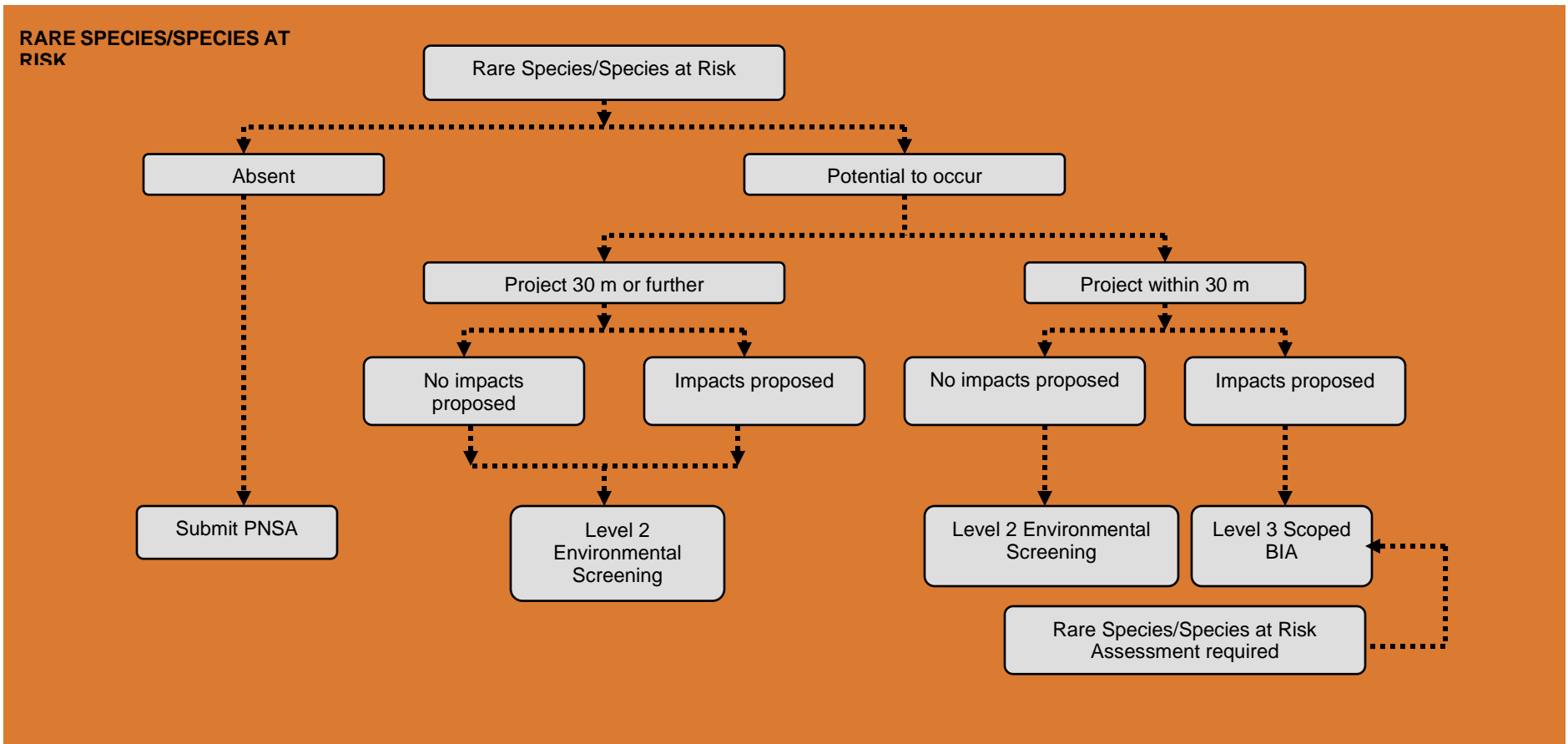
Wetlands in the City of Calgary are waterbodies that are naturally occurring or disturbed located within the Foothills Fescue and Foothills Parkland Natural Regions. They are saturated with water for a period of time promoting wetland or aquatic processes indicated by poorly drained soils, hydrophytic vegetation and a diversity of biological activity which are adapted to wet environments.

**DEFINITION: Wetland Functional Assessment**

It is a component of the Scoped BIA that will be required to characterize wetland loss and presence of residual impacts as part of mitigation requiring compensation. The assessment will be used as a means of evaluating the roles and benefits of the wetland on the basis of its ecological, hydrological and socio-economic functions. These functions will then provide a basis for determining appropriate mitigation.



**Flowchart 4** Decision-making tool to arrive at the required environmental assessment when considering Known Contaminated Sites



**Flowchart 5** Decision-making tool to arrive at the required environmental assessment when considering Rare Species / Species at Risk

**DEFINITION: Wildlife Act Species at Risk**

**Endangered Species** A species that is facing imminent extirpation or extinction if limiting factors are not reversed.

**Threatened Species** A species likely to become endangered if limiting factors are not reversed.

**Species of Special Concern** A species with characteristics that make it particularly sensitive to human activities or natural events.

## **APPENDIX 2**

### **Wetland Functional Assessment**

# Wetland Functional Assessment

## 1. Introduction

Calgary Wetland Conservation Plan was approved by Council on May 14, 2004 with the intention of conserving and protecting Calgary wetlands while maintaining their benefits, use and enjoyment of present and future Calgarians. The Plan provides direction for “No Net Loss” of wetland function within development sites and policies to ensure the conservation of environmentally significant wetlands as Environmental Reserve.

A Wetland Functional Assessment will be required as a part of a BIA report to address wetland mitigation where there are impacts requiring compensation. The assessment will be used as a means of evaluating the roles and benefits of the wetland on the basis of its ecological, hydrological and socio-economic functions. These functions will then provide a basis for determining appropriate mitigation.

## 2. Function

“Function” in this context refers to properties and processes (physical, chemical and biological) that occur within a wetland. Processes can include water storage, creation of biomass, nutrient uptake, and the provision of wildlife habitat.

Wetland function can be broadly grouped into the following categories:

- a. Biological** (e.g., habitat supply, species diversity);
- b. Hydrological** (e.g., surface water storage, groundwater recharge, water quality improvement);
- c. Socio-economic** (e.g., bird watching, hunting, fishing, aesthetic value);

Not all wetlands will perform all of these functions, nor will all wetlands perform all functions equally well. Many factors influence a wetland’s performance, including:

- a.** long-term and short-term climatic conditions;
- b.** water quality and quantity;
- c.** position in the landscape/watershed;
- d.** surrounding land use;
- e.** human disturbances to the wetland or adjacent upland; and
- f.** species diversity/presence of non-native species.

As a general rule, environmentally significant wetlands are assumed to possess a higher degree of function than those of less significance.

## 3. Assessment Methods

There are several accepted methodologies for assessing wetland function, including the Ontario Wetland Evaluation System<sup>1</sup> and the Canadian Wetland Evaluation Guide.<sup>2</sup> Developing a single, comprehensive method for assessing the functions of a wetland is

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<sup>1</sup> Ontario Ministry of Natural Resources, 1993.

<sup>2</sup> North American Wetland Conservation Council. Bond *et al.* 1992

no trivial task. There is an inherent degree of uncertainty and risk in wetland mitigation. The science of understanding, describing and, ultimately replacing wetland ecosystems is not yet well developed. It can be very time consuming to fully understand all the functions of a wetland ecosystem. That having been said, decisions must be made based upon the best science available.

Furthermore, a wetland assessment method must not only provide for a means of understanding the value of a given wetland relative to others, but it must also be used to provide guidance in evaluating the effectiveness of proposed mitigation measures.

#### **4. Utility in Mitigation**

An understanding of wetland function and values will form the basis of any mitigation negotiations.

It was originally proposed that wetland loss be compensated for on a fixed ratio basis. For example, for every square metre of wetland lost, three to four square metres of restored, enhanced or created wetlands would be required as compensation. Many jurisdictions consider a compensation ratio to be an acceptable proxy for the loss of wetland function. The rationale for this was based upon the following:

- Wetland ecosystems are extremely complex and cannot be fully understood or described using current science; and
- Our ability to fully replace wetland function is limited.

As a rule, environmentally significant wetlands do provide a greater degree of wetland function, however, not all wetlands function at equivalent levels. In some cases, an environmentally significant wetland may be less functional in certain respects than a non-significant wetland. Furthermore, it is generally well accepted that some wetland functions can be more easily replaced than others.

There was a strong concern that mitigation decisions should be considered on a case-by-case basis using a Functionality Assessment. The functional values of a particular wetland should be evaluated and any subsequent mitigation work be approached with the goal of ensuring No Net Loss of those functions.

#### **5. Terms of Reference**

The Wetland Functional Assessment will be developed as follows:

##### **Evaluation System**

The wetland evaluation system will be developed based upon the following broad categories of wetland function:

1. Biological function (e.g. species diversity, breeding habitat, habitat use, species at risk);
2. Hydrological (e.g. flood attenuation, water quality treatment, groundwater discharge);
3. Socio-economic (aesthetic value, recreational potential, educational/scientific value).



A list of functional, measurable attributes will be determined for each of the above categories based upon existing literature and consultation with appropriate specialists in each field. An aggregate ranking system will be developed that weighs all these factors to determine the overall functionality of the wetland.

### **Mitigation Process**

All development applications with a potential to affect a Calgary Wetland must be evaluated under the Mitigation Process. Avoidance and minimization of impact must always be considered first.

A Wetland Functional Assessment must be conducted by a Qualified Wetland Specialist. The need for an assessment and the scope of the study must be determined in consultation with the City of Calgary Parks.

A Wetland Functional Assessment will be required for all wetlands requiring mitigation. Where impacts to a wetland are considered unavoidable, minimization of impacts will be determined based upon the described functions and values of the wetland. The purpose of the mitigation process will be to ensure the retention and continuation of the functions of that system – not to determine a dollar value for the wetland functions.

### **Wetland Planning Tool**

The Wetland Planning Tool is being developed by The City of Calgary – Parks, Planning & Development (Parks) in concert with the City of Calgary Wetland Conservation Plan (Conservation Plan). The overall wetland objective for Parks in the Conservation Plan is *no net loss of function*. To strive for this objective, Parks has placed a priority on protecting all Class III to VI wetlands, using the Stewart and Kantrud (1971) classification system, where feasible, and is currently working towards an overall plan that identifies specific Class III to VI wetlands that must be avoided or, if there is an impact, how the impact can be minimized. Currently, the major wetland functions that Parks is most interested in and that are highlighted in the Conservation Plan are: life support, hydrology, water quality, and socio-economic.

In support of this objective, the Wetland Planning Tool will work towards defining a threshold of wetland functions against which any impacts on wetland functions are assessed and identified so impacts can be mitigated, restored, and/or compensated to achieve *no net loss of function*.

The Wetland Planning Tool will furnish the City, proponents and their consultants with a responsible, transparent process for decision-making on wetland protection and wetland compensation that can be consistently applied. Its immediate utility will provide proponents and their consultants a measure of the level of effort required to address wetland assessments, scoring, and compensation.

### **The Wetland Functions Scoring Form in the Wetland Planning Tool Process**

The Wetland Functions Scoring Form (Scoring Form) is one step in the Wetland Planning Tool process leading towards agreements for appropriate wetland protection or compensation. The Scoring Form recognizes functions based on the presence or absence of wetland attributes. The rationale is that cost to compensate will be positively correlated

with increasing quality of function, which is captured during a Biophysical Impact Assessment (BIA). The scoring considers presence or absence in relation to expected Attributes of all wetland classifications.

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