



Conservation of  
Natural Sites in  
Edmonton's  
Table Lands CITY POLICY C - 467

**NATURAL SITE  
ASSESSMENT  
GUIDELINES**



# EXECUTIVE SUMMARY

## Introduction

On July 25, 1995, Edmonton City Council approved the Conservation of *Natural Sites in Edmonton's Table Lands* policy, fulfilling direction from Objective 6.D of the General Municipal Plan, Bylaw 9076. The policy's focus is on encouraging the voluntary conservation of natural sites (environmentally sensitive areas or significant natural areas) identified on Edmonton's table lands (suburban and agricultural lands, annexed to the City in 1982 – see map 1).

The natural sites were identified in the *Inventory of Environmentally Sensitive and Significant Natural Areas, City of Edmonton (1993)* due to their ecological sensitivity or significance to Edmonton. The sites range in size from 2 to 50 ha. and contain features such as old growth forest (trees 100 to 130 years old), young woodlots (trees 20 years old), native prairie, rare plants and birds, sand dunes, and, lakes.

While the policy was being drafted, concerns were raised about the cursory nature of the Inventory, survival of natural sites in an urban setting (sustainability) and the resources required to ensure the survival of natural sites. In order to provide information to Council on these issues and the ultimate fate of natural sites, the policy requires development proponents to provide information (Appendix A) for “development proposals and strategies on Edmonton's table lands and any new development proposals and strategies or any major amendments to approve development proposals and strategies on substantially undeveloped lands within the City of Edmonton”.

This document outlines the information required by the policy (natural site assessments) and the expectations of the Planning and Development Department as to how it is provided by development proponents. There is a 3 stage process for natural site assessments. This 3 stage process provides a flexible approach for identifying and mitigating impacts on natural sites before irrevocable decisions are made.

An assessment will contain a completed table with key word and data requirement comments accompanied by documentation of the assessment process. Documentation will maintain the assessments integrity and accountability and may be referenced by planners, decision makers and evaluators in the future.

**A Stage One – Preliminary Natural Sites Assessment** is a two step process. It is done by an environmental evaluator who uses a site check, background research and his/her knowledge of ecological attributes and the development proposal to complete the assessment.

### 1. Step One will:

- identify important environmental elements on a site and determine the site's natural sustainability, in its own right.

- result in one of two outcomes:
  - Step Two required
  - No further study required

**2. Step two will:**

- evaluate the *highly* important environmental elements identified in Step One and assess the potential effects of the proposed development on the sustainability of the site.
- result in one of two outcomes:
  - Stage Two – Detailed Natural Site Assessment required
  - Process terminates (with or without conditions)

**A Stage Two – Detailed Natural Site Assessment** investigates the unknown and significant environmental issues arising from Preliminary Assessment. It is done by an environmentally evaluator who does site specific studies to gather the information necessary to quantify potential effects and site sensitivity.

**Stage Two** will have one of two outcomes:

1. Stage Three – Economic Assessment required
2. Process terminates (with or without conditions)

**A Stage Three – Economic Assessment** is a benefit cost analysis for which the proponent and the Planning and Development Department agree to a Terms of Reference.

The information provided in the natural area assessment will be included in the Planning and Development Department's report to Council on the proposed development.

## STAGE ONE – PRELIMINARY NATURAL SITE ASSESSMENT

This two step process screens natural sites(s) to identify important environmental issues and to eliminate non-issues.

1. Step One identifies important environmental elements on a site and determines the site's natural sustainability, in its own right.
2. Step Two assesses the potential effects of the proposed development on the *highly* important environmental elements on a site and on the sustainability of the site.

### Stage One, Step One

#### Requirements

In Step One, the environmental evaluator will conduct a site reconnaissance to gain a first hand impression of the physical and ecological attributes of the site. The reconnaissance will be preceded by a desk top review of the information provided in *the Inventory of Environmentally Sensitive and Significant Natural Areas, City of Edmonton (1993)*, topographic maps, thematic maps and air photos. Additional data sources, including government agencies (such as Alberta Environmental Protection) and interest groups such as the Alberta Fish and Game Association, Ducks Unlimited or the Edmonton Natural History Club should be accessed.

- Where a new site has been identified (no relevant information available from the Inventory), the original identification criteria for a new site can be utilized (Appendix B).
- Where a site has changed or been altered since the 1993 *Inventory*, the site should be re-evaluated using the original inventory as a benchmark for method and data requirements.
- Where a site is non-existent, a brief history of the site and the factors leading to its demise will be provided.

#### Importance Rating

In Step One, the relative importance of each of the environmental elements in Table 1 is assessed. Elements are assessed based on the environmental evaluator's knowledge and expertise. A high or low value will be assigned to each environmental element. Guidelines for Importance Ratings are provided in the environmental element descriptions in Appendix C.

Where appropriate, specific comments about each environmental element, the key words or phrases that highlight the principle factors or assumptions which were used and notes indicating additional data requirements will be provided. Documentation should be attached to Table 1.

A low importance rating would be ascribed to an element which does not affect the environmental, social or economic viability of the site. An example would be an area which has no surface water. As a result the elements Fisheries and Surface Water Quality would be rated as low importance. Elements given a low importance rating would no longer be considered in Step Two.

A high importance rating would be ascribed to an element when:

- The element is rare, endangered or unique (e.g. rare fauna)
- The element's status directly affects the environmental viability of the site (e.g. the site is large sized and has high biodiversity);
- The environmental element is present, valuable, sustainable in its own right, and likely to be affected by development (e.g. groundwater quality is rated high when the site is in a hydrologic recharge area); or
- existing information is insufficient to confidently rate the element's importance.

### **Natural Sustainability**

Determination of a site's natural sustainability is based on cumulative assessment of all attributes and the evaluator's best judgement (see Appendix D). A high rating for a site's natural sustainability would be made for those sites that achieve high importance ratings for the key indicators of sustainability: large enough size; high biodiversity; presence of rare and endangered species; presence of established ecological linkages; and size of buffer zone surrounding the site that could ensure its ability to withstand adjacent development.

This rating is provided as part of Table1. Any conditions related to a site(s) sustainability should be outlined at the point.

### **Decision Point**

Conclusion of Stage One, Step One:

1. Where environmental elements are rated *highly* or the site is judged to be sustainable in its own right, process will continue to Step Two;
2. Process will terminate where the site is non-existent, no environmental elements are rated highly or the site is not self-sustaining.

### **Product**

A finished Stage One, Step One analysis will provide:

- a documented overview of the natural sites(s) within or adjacent to the proposed development;
- a high or low rating for each environmental element, with appropriate comments and documentation;
- an assessment of the site(s) natural sustainability in its own right with an outline of the conditions necessary for the site's sustainability; and,
- direction to continue to Stage One, Step Two or to terminate the assessment.

## **Stage One, Step Two**

### **Evaluating Potential Effects**

Potential effects of development are described *only* for those environmental elements which were given a *high* importance rating in Stage One, Step One. This eliminates the inclusion of trivial or irrelevant environmental elements from the evaluation process.

Potential effects would be described as: positive, neutral, negative, or unknown. The environmental evaluator will mark the effect with an “x” on Table 1. For example, a positive effect would be where a proposed development included plans to enhance bird habitat for upland waterfowl. A negative effect would be extensive construction of buildings and infrastructure which reduced a site’s size and ecological sustainability.

Based on his knowledge of the site’s bio-physical characteristics, the layout of the proposed development, the construction phases, the operational phases (ie. Population densities, sewage emissions) and other impacts, the environmental evaluator will determine the potential effects on the *highly* rated environmental elements.

Where appropriate, specific comments about each potential effect, the key words or phrases that highlight the principal factors or assumptions and notes indicating additional data requirements will be provided. Documentation for Step Two will also be attached to Table 1.

The resultant scores are not intended to be used as guidelines during the assessment process and do not indicate the actual significance of the impact of a particular development upon each environmental element. A high number of unknown and negative effects will draw attention to important environmental concerns.

### **Natural Sustainability**

The environmental evaluator will assess the effects of the development on the site’s natural sustainability based on the information provided in Step Two.

### **Analysis**

Together, the Importance Rating (Step One) and Potential Effects (Step Two) score provide the basis for determining if there are significant environmental issues associated with the site and the proposed development. It will also determine if the site is sustainable in its own right and if there are significant unknowns about the environmental issues. The scores are meant as part of an evaluation framework which will flag or signal potential problems related to development of a natural site.

It is recommended that if there are any Unknown or Negative potential effects, which have been rated as *highly* important, that a Stage Two –Detailed Natural Site Evaluation be conducted on those areas. Conversely, if there are no Unknown or Negative Potential Effects (which have been rated as *highly* important), the evaluation process can be terminated.

It should be noted, however, that totals are not meant as absolutes in making decisions on a site's importance or its sensitivity to development. For example, one negative impact to one element like rare fauna would be significant and trigger a Stage Two – Detailed Natural Sites Assessment. Ultimately, the decision to proceed to Stage Two is based on the evaluator's experience and expertise. Proper documentation of the decision making process is critical to ensure accountability.

A significant number of unknown plus negative effects would indicate that not enough is known about potential effects to validate a decision about development at this time, or that there are a large number of negative impacts to important environmental elements.

### **Decision Point**

Conclusion of Stage One, Step Two:

1. Where unknown or negative potential effects will affect *highly* important environmental elements or significant environmental issues were identified, process will continue to Stage Two – Detailed Natural Site Assessment.
2. Process will terminate where all significant environmental issues are resolved, the site is ecologically sustainable within the proposed development and where no unknown or negative effects to important elements were identified.

### **Product**

A finished Stage One, Step Two analysis will provide:

- an overview of the proposed development and an indication of its impacts upon the natural site;
- a potential effect rating for each *high* importance environmental element, with appropriate comments and documentation;
- an assessment of the site(s) sustainability within the proposed development with an outline of the conditions necessary for the site's continued sustainability; and,
- direction to continue to Stage Two or to terminate the assessment.
- a Terms of Reference for Stage Two, if necessary

**TABLE 1 Preliminary Natural Site Assessment**

Site or Study Area: \_\_\_\_\_

Proposed Development: \_\_\_\_\_

<b>STAGE 1: Preliminary Natural Site Assessment</b>							
<b>Environmental Element</b>	<b>Step 1 – Importance Rating</b>		<b>Step 2 – Potential Effects (x)</b>				
	<b>Importance Rating High/Low</b>	<b>Comments</b>	<b>Positive</b>	<b>Neutral</b>	<b>Negative</b>	<b>Unknown</b>	<b>Comments</b>
1. Flora (unique or Rare)							
2. Fauna (unique or Rare)							
3. Geology/Physiography							
4. Archeology							
5. Site Size (ecological sustainability)							
6. Ecological Linkages (sites, structures & processes)							
7. High Biological Diversity							
8. Significant Wildlife Population							
9. Vegetation							
10. Bird Habitat (diversity and life stage)							
11. Fisheries (habitat & Spawning rearing sites)							
12. Surface Water Quality (protection & improvement)							
13. Groundwater Quality (protection)							
14. Topography and Soil (erosion, compaction, mass wasting)							
15. Part of Larger Program							
16. Urban Flood Protection							
17. Public Health and Safety							
Other:							
Other:							
Site Sustainable in Own Right	Yes/No	Summary Comments Regarding Sustainability:	No:	No:	No:	No:	Summary Comments Regarding Potential Effects:

Step 2 Required	Yes/No	➔	Step 2 Required	Yes/No	➔
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## STAGE TWO – DETAILED NATURAL SITE ASSESSMENT

Environmental elements with a *high* importance rating for which either an unknown or negative impact has been identified in Stage One (as a result of the proposed development) will be considered in the Stage Two assessment. The environmental elements are described in Appendix C.

Site specific studies will be conducted for these environmental elements. This data will allow the environmental evaluator to determine the sensitivity of the site to development and the significance of the impacts upon the site.

### REQUIREMENTS

The Terms of Reference for the Stage Two study will stipulate the data requirements. Data requirements (see Appendix E) for Stage Two studies are not preset and will vary according to the environmental elements identified the type of proposed development and the site.

The Terms of Reference (TOR) can be drafted by the environmental evaluator who completed the Stage One study. Or, the environmental consulting firms who submit proposals to conduct the Stage Two studies can be responsible for drafting the TOR. In this case, the Stage One environmental evaluator should be involved in the review of proposals to ensure environmental issues are properly addressed in the Stage Two assessment. The TOR must also ensure that all critical information requirements pertaining to key elements, identified as having a *high* probability of impact under the Stage One process, are appropriately covered. If this is not done, it will limit the ability of the Stage Two evaluator to make an informed decision regarding the development's potential impacts and the effectiveness of any proposed mitigation to limit or reduce identified impacts to acceptable levels.

The Stage Two assessment will present two levels of data:

1. existing data for environmental elements rated in the Stage One process as having low importance or that were projected not to have the potential for impact from the development; and,
2. new or additional studies/data collected for *high* importance environmental elements where no information was available in Stage One or where negative or unknown impacts were predicted in Stage One.

### Parameters

The new or additional studies would be used to describe and quantify potential impacts according to the following parameters:

**Geographical Extent** – of a potential effect refers to the area which may be affected and includes the site (effects within the boundaries of the site), local (effects to the area immediately adjacent and surrounding the site), regional (the Edmonton region), and extra-regional (the province, nation, and international effects such as may be the case for migratory birds).

**Magnitude** – of a potential effect refers to the proportion of the environmental element which may be affected and is expressed in terms of low (less than 1%), medium (1% - 10%), and high (greater than 10%).

**Duration** – of a potential effect refers to the period of time during which the element is changed or affected by the proposed development and the time it takes for the element to be restored or to recover its predevelopment state. It is subdivided into short term (less than 1 year), medium term (1- 10 years) and long term (more than 10 years).

**Probability** – of a potential effect refers to the likelihood or chance that the effect will occur. It is expressed as low (0 – 20%), medium (20% - 70%), or high (70% - 100%) probability. These general categories are appropriate where the probability can not be mathematically derived. In some cases, such as the potential for groundwater contamination, modeling may be employed to mathematically predict probability. In such a case more specific subdivisions may be devised.

**Significance** – of a potential effect is rated based on the scientific information and interpretations of the Stage Two studies. Significance is subdivided into low, medium, and high significance. The significance rating is, in part, the product of the preceding parameters used to describe the effects. Each parameter should be used to provide the justification for the significance rating. As well, the significance rating should consider the following factors, some of which are similar to elements listed in the matrix:

- The perceived sensitivity and sustainability of the site's ecosystem;
- Effects which may cause changes that will exceed recognized standards for that resource (e.g. water quality); and
- Effects which may cause changes that pose public health and safety concerns.

When it is not possible to rate the significance of potential impacts because of an incomplete data base, further studies or monitoring programs may be recommended.

Where possible, each parameter should be applied to each environmental element relative to the site and to the type of development.

The categories within each analysis parameter are recommended, but are not fixed. The categories are based on methodology developed by W. Duval and P. Vonk in "*A semi-qualitative Procedure for the Preparation of Initial Environmental Evaluations and Assessments of Potential Impact Significance*" (Seakem Group Ltd., 1991). The environmental specialists conducting the Stage Two environmental assessment may change the ranges for each category within each of the analysis parameters. For example, duration may be redefined as short term is less than 2 years; medium term is 2 – 5 years, and long term is greater than 5 years. However, it is critical that the rationale for changing or redefining the categories is properly documented as part of the assessment report in order for the process to maintain its integrity and accountability.

## **Comments**

Where appropriate, specific comments about each environmental element should be provided. The comments column in the Stage Two matrix may be used by the environmental specialists in the early phase of the Stage Two study to emphasize the most salient or obvious issues related to each element.

Upon its completion, the Stage Two report will contain discussions with descriptions of the anticipated effects related to the proposed development. The report will not, however, determine or recommend if a development is in the public interest, is viable, appropriate, or if it should be approved. In order to make such decisions, other interests and factors which are not associated with the physical environment must also be evaluated.

Typically environmental assessments are accompanied by a benefit-cost analysis. The benefit-cost analysis is a tool to assess the socio-economic factors which need to be considered by decision makers. The benefit cost analysis may parallel the environmental assessment or may be staged to follow the environmental assessment. Within the present framework, the Benefit-Cost analysis is contemplated as Stage Three. This allows decision makers at the conclusion of Stage Two to decide if the predicted impacts are significant enough to warrant a recommendation on the status of the development without first conducting a Stage Three benefit-cost analysis.

## **Decision Point**

Conclusion of Stage Two

1. Where negative potential effects cannot be mitigated or there are great costs associated with attempting to maintain a site's long term sustainability, the process will continue to Stage Three – Economic Assessment
2. Process will terminate where all significant environmental issues are resolved, the site is ecologically sustainable within the proposed development and where negative effects have been mitigated.

## **Product**

A finished Stage Two analysis will provide (accompanied by appropriate comments and documentation):

- an introduction to the analysis;
- a project description;
- a baseline description of the highly important environmental elements identified in Stage One;
- an identification of potential effects on each environmental element described in the baseline section;
- an assessment of effects on each environmental element described in the baseline section;
- an outline of mitigation measures (measures designed to prevent or minimize potential effects) for each environmental element described in the baseline section;
- a discussion of residual impacts (effects which remain after mitigation);
- a preliminary assessment of management issues;
- an assessment of the site's ability to remain self sustaining in the future;
- direction to continue to Stage Three or to terminate the assessment.

**TABLE 2 – Stage 2: Detailed Natural Site Assessment**

Site or Study Area: \_\_\_\_\_

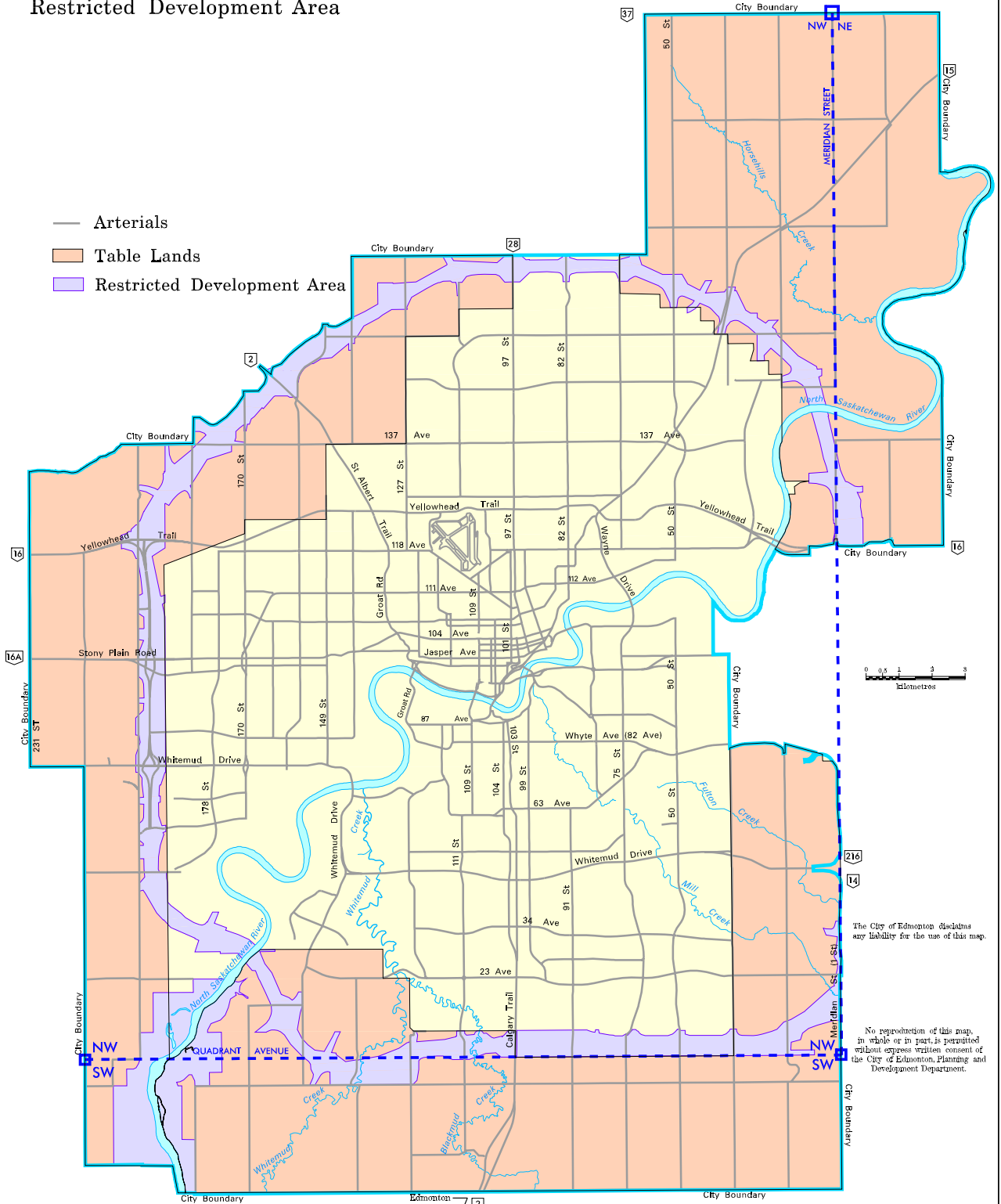
Proposed Development: \_\_\_\_\_

<b>STAGE 2: Detailed Natural Site Assessment</b>							
<b>Environmental Element</b>	<b>Evaluate the Significance of Environmental Effects</b>						<b>Status of Mitigation Planning or Need</b>
	<b>Geographic S, A, R, X</b>	<b>Magnitude L, M, H</b>	<b>Duration S, M, L</b>	<b>Probability L, M, H</b>	<b>Significance L, M, H</b>	<b>Comments</b>	
1. Flora (unique or Rare)							
2. Fauna (unique or Rare)							
3. Geology/Physiography							
4. Archeology							
5. Site Size (ecological sustainability)							
6. Ecological Linkages (sites, structures & processes)							
7. High Biological Diversity							
8. Significant Wildlife Population							
9. Vegetation							
10. Bird Habitat (diversity and life stage)							
11. Fisheries (habitat & Spawning rearing sites)							
12. Surface Water Quality (protection & improvement)							
13. Groundwater Quality (protection)							
14. Topography and Soil (erosion, compaction, mass wasting)							
15. Part of Larger Program							
16. Urban Flood Protection							
17. Public Health and Safety							
Other:							
Other:							
	S-site A-local area R-regional X-extra-regional	L-low M-Medium H - high	S – short M – medium L - long	L – low M – medium H - high	L – low M – medium H - high		

# City of Edmonton

## Table Lands & Restricted Development Area

- Arterials
- Table Lands
- Restricted Development Area



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Map compiled by: The Geographic Group  
Planning and Policy Services Branch

**APPENDIX A**

**INFORMATION REQUIRMENTS**

*Information Requirements – information provided by the proponent in conjunction with development proposals and strategies. This may include an identification and description of affected natural sites; a description of the proposed development and associated facilities and services that may affect the natural sites; a description of the potential impacts of the proposed development on the affected natural sites; and an indication of interest in voluntary conservation.*

<b>1.0 Plans (Areas Structure Plan (ASP), Neighbourhood Area Structure Plan (NASP), Neighbourhood Structure Plan (NSP), Servicing Concept Design Brief (SCDB) Approved Subsequent to Policy)</b>	
<b>1.1 NEW ASP, SCDB</b>	Proponent to comply with information requirements
<b>1.2 Residential</b>	
b) <u>New NSP, NASP</u>	Proponent to comply with information requirements
i) Redistricting	No information requirements
ii) Subdivision	No information requirements
iii) Development Permit	No information requirements
<b>1.3 Industrial</b>	
a) <u>Redistricting</u>	No information requirements
b) <u>Subdivision</u>	No information requirements
c) <u>Development Permit</u>	No information requirements
<b>2.0 Plans (ASP, NASP, NSP, SCDB) Approved Prior to Policy</b>	
<b>2.1 Residential</b>	
a) <u>Major Amendment to ASP, SCDB</u>	Proponent to comply with information requirements
b) <u>New NSP, NASP After Policy</u>	Proponent to comply with information requirements
i) Redistricting	No information requirements
ii) Subdivision	No information requirements
iii) Development Permit	No information requirements
c) <u>NSP, NASP Approved Prior to Policy</u>	
i) Redistricting	No information requirements, Conservation Coordinator and project planner to initiate discussion with proponent on site and voluntary conservation, if warranted.

**INFORMATION REQUIREMENTS**

<b>2.0 Plans (ASP, NASP, NSP, SCDB) Approved Prior to Policy (cont'd)</b>	
ii) Subdivision	No information requirements
iii) Development Permit	No information requirements
d) <u>Major amendment to existing NSP, NASP</u>	Proponent to comply with information requirements
e) <u>No NSP in place</u>	
i) Redistricting	No information requirements. Conservation Coordinator and project planner to initiate discussion with proponent on site and voluntary conservation, if warranted
ii) Subdivision	No information requirements. Conservation Coordinator and project planner to initiate discussion with proponent on site and voluntary conservation issues, if warranted
iii) Development Permit	No information requirements. Conservation Coordinator and project planner to initiate discussion with proponent on site and voluntary conservation, if warranted
<b>2.2 Industrial</b>	
a) <u>Major amendment to ASP, SCDB, or Outline Plan</u>	Proponent to comply with information requirements
b) Redistricting	No information requirements. Conservation Coordinator and project planner to initiate discussion with proponent on site and voluntary conservation issues, if warranted
c) Subdivision	No information requirements
d) Development Permit	No information requirements
<b>3.0 NO APPROVED OR STATUTORY PLAN IN PLACE</b>	
a) Redistricting	No information requirements. Conservation Coordinator and project planner to initiate discussion with proponent on site and voluntary conservation, if warranted
b) Subdivision	No information requirements. Conservation Coordinator and project planner to initiate discussion with proponent on site and voluntary conservation, if warranted
c) Development Permit	No information requirements. Conservation Coordinator and project planner to initiate discussion with proponent on site and voluntary conservation, if warranted

excerpt from Conservation of Natural Sites in Edmonton's Table Lands, City Policy C-467

**Detailed Decision Structure for the Identification of Natural Areas, Significant Natural Areas and Environmentally Sensitive Areas (Approved by City Council August 24, 1993)**

<b>Criteria</b>	<b>Natural Areas</b>	<b>Significant Natural Area</b>	<b>Environmentally Sensitive Area</b>
<b>Size</b>	<ul style="list-style-type: none"> <li>• more than 0.1 ha for wetlands</li> <li>• more than 1.0 ha for forested areas</li> </ul>	<ul style="list-style-type: none"> <li>• more than 1.0 ha for wetlands</li> <li>• more than 2.0 ha for forested areas</li> </ul>	<ul style="list-style-type: none"> <li>• more than 1.0 ha for wetlands</li> <li>• more than 2.0 ha for forested areas</li> </ul>
<b>Vegetation</b>	<ul style="list-style-type: none"> <li>• existing natural vegetation</li> </ul>	<ul style="list-style-type: none"> <li>• good example of one or more types of vegetation</li> </ul>	<ul style="list-style-type: none"> <li>• presence of rare plant species</li> <li>• high plant species diversity</li> <li>• old-growth forest</li> </ul>
<b>Wildlife</b>	<ul style="list-style-type: none"> <li>• existing vegetation provides potential habitat for wildlife</li> <li>• may provide habitat for only a portion of a species life cycle</li> </ul>	<ul style="list-style-type: none"> <li>• habitat for local wildlife</li> <li>• habitat for only a portion of a species life cycle</li> </ul>	<ul style="list-style-type: none"> <li>• habitat for vulnerable, threatened or endangered species</li> <li>• high habitat diversity</li> <li>• high wildlife species diversity</li> <li>• provides critical habitat for maintenance of all or significant component of species life cycle</li> </ul>
<b>Landform</b>	not applicable	<ul style="list-style-type: none"> <li>• good example of local landform</li> </ul>	<ul style="list-style-type: none"> <li>• unique geological or landform feature</li> <li>• steep, usually unstable slopes, slumps, bedrock or landform failure (hazard lands)</li> <li>• landforms highly sensitive to disturbances</li> </ul>

<b>Criteria</b>	<b>Natural Areas</b>	<b>Significant Natural Area</b>	<b>Environmentally Sensitive Area</b>
<b>Hydrology</b>	not applicable	<ul style="list-style-type: none"> <li>temporary (ephemeral) wetlands</li> </ul>	<ul style="list-style-type: none"> <li>provides critical function in maintaining or balancing local hydrology</li> <li>permanent wetlands</li> <li>permanent open water</li> <li>groundwater discharge/springs</li> </ul>
<b>Corridors/Linkages</b>	not applicable	<ul style="list-style-type: none"> <li>provides linkages between ESAs and SNAs within the table lands</li> </ul>	<ul style="list-style-type: none"> <li>provides critical linking function to ESAs identified outside the city</li> <li>provides critical linking function to ESA's identified within the North Saskatchewan River Valley and Ravine System</li> </ul>
<b>Ability to Sustain Use</b>	Not applicable	<ul style="list-style-type: none"> <li>highly sensitive to intensive forms of disturbance (e.g. major access routes, industrial, commercial and residential development)</li> <li>low to moderate levels of sensitivity to less intensive disturbances (e.g .cross country ski trails)</li> </ul>	<ul style="list-style-type: none"> <li>highly sensitive to all forms of disturbance</li> </ul>
<b>Present Use</b>	<ul style="list-style-type: none"> <li>used by residents for recreational purposes</li> </ul>	<ul style="list-style-type: none"> <li>used by communities and organizations for educational purposes</li> </ul>	<ul style="list-style-type: none"> <li>site recognized for its value by scientific organizations, used for research purposes because of its unique qualities</li> </ul>
<b>Palaeontological/ Archaeological/Pre historic</b>	not applicable	not applicable	<ul style="list-style-type: none"> <li>recognized or documented site of significance</li> </ul>
<b>Historical Resource</b>	not applicable	not applicable	<ul style="list-style-type: none"> <li>recognized or documented site of significance by a federal, provincial or municipal government</li> </ul>

## Appendix C – Description of Environmental Elements

### Introduction

The following descriptions for the environmental elements in Table 1 and Table 2 are intended to assist in assessing the Importance Rating (High and Low) in a Stage One assessment and evaluating potential effects in a Stage One or Stage Two assessment.

In cases where there are not enough data to determine the Importance Rating, the Unknown Potential Effect may be checked in the appropriate column. In such cases the lack of data and the need for a special study may be indicated in the Comments Column.

### Environmental Elements

1. **Flora:** rare, threatened or endangered in Edmonton area, provincially, nationally or internationally. No data for this was collected as part of the *Inventory of Environmentally Sensitive and Significant Natural Areas, City of Edmonton*. The Stage One evaluator may contact local botanists and review any available literature to evaluate the likelihood of rare and endangered species existing on site. If qualified, the evaluator may also conduct a preliminary site reconnaissance for such species. For each natural site, rare and endangered plant surveys should be conducted as part of Stage Two assessment. More than one survey may be required in order to cover different growing seasons.

This element would be given a High Importance rating if the site contains rare, threatened or endangered plant species, or when there are unique “Old Growth” tree stands as identified in the *Inventory* (Geowest, 1993). Provincial government sources of relevant information include the Alberta Forest Service and Alberta Environment. Existing provincial literature on rare vascular plants includes the following:

Packer, J.G. and C.E. Bradley, 1984. A checklist of the rare vascular plants in Alberta. Prepared for Provincial Museum of Alberta, Alberta Culture. Natural History Occasional Paper No. 5.

Wallis, C. 1987. The rare vascular flora of Alberta: Volume 2. A summary of the taxa occurring in the Canadian shield, boreal forest, aspen parkland, and grassland natural regions. Prepared by Cottonwood Consultants for Alberta Forestry, Lands and Wildlife, Edmonton.

2. **Fauna** (avifauna, terrestrial biota, aquatic biota): rare, threatened or endangered in Edmonton area, provincially, nationally or internationally. Incomplete data for this element was collected as part of *the Inventory of Environmentally Sensitive and Significant Natural Areas, City of Edmonton*. The Stage One evaluator may contact local groups (Edmonton Natural History Club, Edmonton Bird Club etc.) and review any available literature to evaluate the likelihood of rare or endangered species existing on site. If qualified, the evaluator may conduct a preliminary site reconnaissance for evidence of species using the site. For each natural site, rare and endangered fauna surveys should be conducted as part of a Stage Two assessment. As different species may be present at different times of the year, more than one survey may be required.

This element would be given a High Importance rating if the site contains rare, threatened or endangered fauna. The biologist conducting the survey will reference lists of rare, threatened or endangered species (e.g. COSEWIC). Provincial government sources of relevant information include (Alberta) Environment Protection and Alberta Fish and Wildlife.

3. **Geologic or Physiographic features:** unique in Edmonton area, provincially, nationally or internationally. The uniqueness of these features is subjective, and the evaluator may have to canvass interest groups or local citizens in order to determine the values attached to features within the Table lands or the riverine systems. As well provincial and national publications which evaluate natural landscapes can be referenced. This element would be given a High Importance rating if the site contains unique geologic or physiographic features.
4. **Historic, Archaeologic or Paleontologic:** unique or rare in Edmonton area, provincially, nationally or internationally. The evaluator can consult government agencies (Alberta Culture) and university departments (Paleontology, Antiquities, History) and local Historical Societies. The presence of any historic or prehistoric features would result in High Importance rating for this element.
5. **Site Size:** site size is a critical factor in controlling the ecological viability of an area and should not be considered independently when assessing the importance rating and the potential effect. In determining the Importance, the Stage One evaluator must consider the site's size in conjunction with Ecological linkages and Biological Diversity Smaller areas, for example, less than 5 ha for forested lands and 3 ha for wetlands, are probably ecologically viable only through linkages to other natural areas. Some of the larger areas which may not have ecological linkages but do have high biological diversity may be ecologically viable or self sustaining.
6. **Ecological Linkages:** sites which provide ecological linkages between natural sites and between these sites and important ecological systems outside the City, such as the local river valley systems, would be rated as having High Importance. Ecological linkages for wetlands can be intermittent through ephemeral surface drainage pathways and through the air in the case of water fowl. Ecological linkages also exist when an animal completes part of its life cycle in a particular site area before moving on to live in another area. Other examples include riparian buffer zones along shorelines of lakes and streams which provide very effective links to other natural areas. Wildlife movement corridors are essential for wide ranging species. For example, a series of wooded areas in relatively close proximity to each other form a corridor along which deer may find shelter from weather, safety from predators and browse for food. Ecological linkages may also refer to processes. An example of an ecological process is where a wetland provides a sink for contaminants such as agro-chemicals.

7. **Biological Diversity:** this element would be given a High Importance rating if the site features high biological diversity and supports well balanced plant and animal communities. These sites may possess their own microclimate due to position in the landscape, e.g. proximity to water. Biological diversity is normally dependent on site size, as larger sites are able to maintain diversity. In addition to their high aesthetic value, they can serve as outdoor laboratories for educational purposes. Their intact preservation, however, may require restrictions on the type of development and in some cases limitations on intrusions such as by horses, bicycles or pedestrians.
8. **Wildlife Populations:** this element would be given a High Importance rating if the site contains a significant population which would be self-sustaining and sufficient in number to withstand normal fluctuations in birth/death ratios. Wildlife population is a function of the size, biodiversity, the linkages of the site to other ecologically viable areas, and the proximity to urban developments. In the case of some migratory birds, one mating pair may be considered significant if it is a rare or endangered species. In other cases where there are small numbers of relatively common animals or birds, this element would be considered of Low importance. The significance of the size of a population is different for each species and is also dependent on the rare, threatened and endangered status of the species. Actual thresholds for sustainable populations would be determined by biologists in the Stage Two assessment.
9. **Vegetation:** this element would be given a High Importance rating if the vegetation provides critical habitat for birds, fish, insects, and other animals, or if the vegetation plays an important local role in runoff and erosion control, especially where soils and terrain are susceptible to erosion. Vegetation communities may also have a High Importance rating according to its aesthetics value as part of the overall landscape scenery or “view sheds”.
10. **Bird Habitat:** this element would be given a High Importance rating if the site contains diverse habitat and supports important life stages for various migratory and resident bird species. The quality of the site is dependent upon the nature of the trees, shrubs and other vegetative cover on the site, the size of the site, the local food supply, and the presence of predators, including the domestic cat.
11. **Fisheries:** this element would be given a High Importance rating if the site provides habitat and spawning grounds for fish. Vegetation cover overhead and along bank edges, as well as protection from urban runoff and sedimentation are necessary for fish habitat use.
12. **Surface Water Quality:** this element would be given a High Importance rating if the site’s water is an integral component of the local habitat and if a change in its quantity or quality would impact the habitat preservation.

**13. Groundwater Quality:** this element would be given a High Importance rating if the site is in a groundwater recharge area such as wetlands. Sites such as wetlands can assist in the protection of groundwater quality by providing a substantial infiltration zone, where pollutants can leach out of the water or absorb onto soil constituents before the water reaches the water table.

**14. Topography and Soil:** this element would be given a High Importance rating if the site has soil or terrain that are susceptible to soil degradation.. The main characteristics affecting susceptibility are soil type (texture, drainage, depth to impermeable layers) and terrain (slope, aspect, depth to groundwater). Soil degradation includes the loss or degradation of top soil, soil compaction, wind and water erosion, and mass wasting.

**15. Part of Larger Program:** this element would be given a High Importance rating if the site plays a significant role in a larger program where:

- it is part of a flood control program;
- the site is valued by scientific organizations or used for research because of unique qualities;
- the site is used by communities and organizations for recreational or educational purposes (the Edmonton Natural History Club, the Edmonton Bird Club and adjacent schools and community leagues should be contacted to determine this);  
or
- in the case of a wetland, is part of a Ducks Unlimited habitat conservation program.

**16. Urban Floor Protection:** this element would be given a High Importance rating if the site plays a role in abating flood events and can provide some degree of urban flood protection. For example, natural or engineered wetlands can serve to varying degrees as storm retention ponds.

**17. Public Health and Safety:** this element would be given a High Importance rating if the site contributes to, or poses a risk to public health or safety. For example, a woodland areas may be a prime habitat for skunks, which can contract rabies and infect domestic pets, which in turn infect people. A mosquito outbreak could occur in a wetland, which could result in cases of encephalitis.

## Appendix D – Natural Sustainability

A critical part of the Stage One, Step One assessment is to determine whether or not an identified site is sustainable (in its own right). This means that if left alone (i.e. not developed or infringed upon), the site has the necessary attributes to retain the intrinsic values assigned to it that caused it to be classified as a natural site in the first place.

An example is a wetland and its associated vegetative fringe. For a wetland to be sustainable, a continuous source of water must be available from either upstream areas or possibly from groundwater discharge. Provided that the site is protected by means of a non-encroachment of development and is provided a source of water, the site should remain viable. To remain so, in its own right, implies that this ability to sustain its systems would not require any assistance in the way of maintenance or additions to allow it to remain ecologically functional. If these conditions are not met, and the site requires off site mitigation to remain viable, then it cannot be classified as being sustainable in its own right.

For example, this could mean that insufficient buffer lands surround the area, that the upstream water supply has been diverted or conversely, that portions of the area have been drained to allow development to occur.

The implications to the site of being non-sustainable naturally are that dollars may have to be expended if the remaining ecological values of the site are of sufficient value to warrant preservation. It should be noted, however, that a site's ability to be sustainable could potentially be increased through mitigation during development.

If a site is naturally sustainable (in its own right) in most instances it would be relatively safe from infringement from development, would likely be fairly large in terms of area and would have a high probability of being ecologically diverse. All of these attributes would increase the site's intrinsic ecological value and the probability that a full Stage Two Assessment would be required.

Since it is difficult to have a single indicator of sustainability, the Stage One process assesses those attributes, which in combination contribute to sustainability and allow an overall assessment of the site's viability and diversity in its current conditions. Using these single attributes as a non-quantified scoring scheme allows the environmental evaluator to make an educated assessment of the likelihood that a site is self-sustainable.

This assessment is based on the rapid assessment values assigned to each attribute identified in the Stage One, Step One Evaluation Matrix. Essentially the larger the number of high importance values a site is assigned the higher the probability that it will be self-sustaining. As stated in Appendix A, many of the attributes are linked. For example, item 7 of Table 1, "High Biological Diversity" would be directly related to the numbers of species of plants and animals, and the number of species present would also be related to the complexity of terrain present. Therefore, high scores in items 1, 2, 3, 8, 9, 10 and 11 of Table 1 would result in a high score for item 7. In addition, a high score in item 7 would, in the majority of cases also correlate with larger sites and high rating for item 5 of Table 1. All other items noted in the Stage One matrix relate to additional attributes of the site that are not strictly biological but contribute to its significance and can be correlated with the ecosystem components.

## APPENDIX E – STAGE TWO, DETAILED NATURAL SITE ASSESSMENT, DATA REQUIREMENTS (OUTLINE)

It is expected that the analysis will only be applied to those elements with a *high* importance rating for which either an unknown or negative impact has been identified in the Stage One assessment. A completed Stage Two assessment will follow this outline.

1. **Introduction:** Includes – Study Area; Rationale for Stage Two assessment; Relationship of Development to Natural Sites.
2. **Project Description:** Includes – Project Background and Need; Present Activities; Proposed Development; Project Timeline; Transportation Access; and Environmental Protection Plans for the project intended of offset known impacts.
3. **Baseline Description:** an overview of information provided in the Stage One assessment and description of the Environmental Elements with a *high* importance rating for which an unknown or negative impact has been identified in Stage One.
4. **Impact Assessment and Mitigation:** Each of the elements described in the Baseline section should be analyzed using the format below:
  - 4.1 Identification of Potential Effects
  - 4.2 Assessment of Effects based on Geographic or spatial effect; Magnitude; Duration; Probability; and Significance
  - 4.3 Mitigation Measures (measures designed to prevent or minimize potential effects – for example: storm runoff and erosion control planning, retention and/or augmentation of wetlands using storm runoff to form a “naturalized wetland”, wetlands enhancements, etc.)
  - 4.4 Residual Impacts (effects which remain after mitigation)
  - 4.5 Additional Work or Monitoring (additional data may be required to properly understand an important element and a more accurate assessment of potential effects, or monitoring may be required to ensure that mitigation measures are effective).
5. **Preliminary Assessment Of Management Issues:** Outlines programs necessary to conserve or enhance highly valued environmental elements within the site during the construction and operational phases of the project.

## GLOSSARY

**Biological Diversity:** This refers to the complexity of a site that allows many different types of habitats to be present and therefore can accommodate and sustain large numbers of species. For example, a woodland and wetland complex would have greater numbers of species present because of the variety of habitats present than would a uniform grassland. As a result the woodland/wetland site would exhibit high biological diversity.

**Conservation:** maintaining a site's ecological conditions to renew living things and to replenish soil, water and air.

**Development Proposals and Strategies:** Area Structure Plans, Neighbourhood Area Structure Plans, Neighbourhood Structure Plans, Servicing Concept Design Briefs, major amendments to Area Structure Plans, Neighbourhood Area Structure Plans, Neighbourhood Structure Plans, Servicing Concept Design Briefs, major redistrictings, subdivisions, all projects noted in the Capital Priorities Plan, major capital projects, plans, strategies, bylaws and policies.

**Ecological Linkages:** Processes or physical site connections between areas and/or sites that increase their ecological value. For example, hydrologic connections between sites can be important with respect to flood protection (storm drainage routing and retention). Similarly, an area could be used during a specific life stage of an organism that apart from certain times would not be found at the site. An example of this would be migratory usage by waterfowl for specific periods such as staging and breeding.

**Environmental Evaluator:** The person responsible for the Stage One and/or Stage Two assessments. This person should have an ecological background with environmental assessment training at a minimum of a Masters level (i.e. a Masters degree in natural resource planning), and be familiar with land use planning, construction phases, operational phases (ie. Sewage emissions) and development impacts. The duties of the evaluator would include undertaking site reconnaissance, desk top review of existing information, interviewing additional data sources such as the Edmonton Natural History Club or Ducks Unlimited and undertaking special studies, if qualified. The evaluator will conduct all appropriate Stage One environmental sensitivity assessments; set Terms of Reference for any required Stage Two studies; provide recommendations regarding the requirement for a Stage Three evaluation; provide recommendations regarding mitigative measures to limit identified impacts; and refer all relevant matters to the Planning and Development Department for their consideration.

**ESA (Environmentally Sensitive Area):** Undisturbed or relatively undisturbed sites which, because of their natural features, have value to society and ecosystems worth protecting, but are susceptible to further disturbance.

**Natural Sustainability:** A characteristic of a site whereby, in its present state, it is likely to retain significance, quality and ecological integrity and where adequate resources (land, water, etc) are available to afford existing species with the attributes necessary, for the long term, to maintain their current status.

**SNA (Significant Natural Area):** Sites that have the potential to remain sustainable within an urban environment and are significant from an environmental perspective to the community of Edmonton because of their size or features on the site.

**Table lands:** Those suburban and agricultural lands, outside of the North Saskatchewan River Valley, which were annexed to the City of Edmonton in 1982 (Map 1).