ECOLOGICAL INVENTORY FRAMEWORK:

AREA STRUCTURE PLANS

Version 1.1/ Q1 2016
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PUBLICATION INFORMATION

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TERMS OF USE

The *Ecological Inventory Framework: Area Structure Plans* must be used in conjunction with the *Municipal Development Plan* (The City of Calgary 2009a) and other guiding legislation, as applicable. These are referenced throughout the framework. The Framework is made available for use in Calgary effective as of the date below.

February 1, 2016

The 2016 *Ecological Inventory Framework* is presented as accurate and complete as of the date indicated above. Use of this framework does not absolve any user from the obligation to exercise their professional judgement and to follow good practice. Should any user have questions as to the intent of any procedure found in this framework, the user is advised to seek clarification from Calgary Parks.

MANUAL REVISION NOTICE

The 2016 *Ecological Inventory Framework* is intended to be at the Area Structure Plan stage of planning, and has been written to align with understood best practices, and to establish specifics around project responsibilities and sign-off. This framework is intended to be a "living" document and will be revised as changes are needed.

SECTION	STARTING ON PAGE	REVISION
Publication Information, Terms of Use, Citation	i	Updated contact information and document version number.

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EXECUTIVE SUMMARY

The City of Calgary incorporates environmental objectives into land use, urban form and transportation planning through its *Municipal Development Plan* (The City of Calgary 2009a) and *Calgary Transportation Plan* (The City of Calgary 2009b). The *Ecological Inventory Framework: Area Structure Plans* provides standards for conducting an inventory of ecological features at the Area Structure Plan stage of planning in order to meet these objectives, as well as ensuring alignment with several other pieces of policy and legislation. This inventory work takes place in advance of *Biophysical Impact Assessment Framework* (The City of Calgary Parks 2010) requirements at the Outline Plan Land Use Amendment stage.

The *Ecological Inventory Framework* identifies The City's requirements for inventory methodology, mapping of ecological features, and identifies the professional qualifications required to carry out this work. Key terminology is defined in order to provide clarity and consistency for inventory work. General requirements on assessment periods and assessment area are provided. Also included are detailed specifications to conduct an inventory of the regional environmental setting, ecosystem and land cover classification, water resources, vegetation, soils and landforms, wildlife and Environmentally Significant Areas. The inventory requirements exclude fish studies and assessments of historical, cultural, and aesthetic resources.

Further, ecological inventory reporting standards are outlined, which includes a checklist that is required for the Ecological Inventory Report submissions. The process for report submission and approvals is outlined, which includes the submission of both an initial and final Ecological Inventory Report. The *Ecological Inventory Framework* also provides details for report publication and stale dating requirements.

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LIST OF ABBREVIATIONS AND ACRONYMS

Calgary Parks uses the following industry- and government-standard abbreviations and acronyms in this framework (and other related documents):

ACIMS	Alberta Conservation Information Management System
AEP	Alberta Environment and Parks (formerly ESRD)
ARP	Area Redevelopment Plan
ASP	Area Structure Plan
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CTP	Calgary Transportation Plan
DAS	Digital Aerial Survey
DEM	Digital Elevation Model
ESA	Environmentally Significant Area
ESRD	Environment and Sustainable Resource Development
FWMIS	Fisheries & Wildlife Management Information System
FWIMT	Fish and Wildlife Internet Mapping Tool
GIS	Geographic Information System
GVI	Grassland Vegetation Inventory
ISO	International Organization for Standardization
MDP	Municipal Development Plan
NAD	North American Datum
UTM	Universal Transverse Mercator
WGS	World Geodetic System

1. INTRODUCTION

The *Ecological Inventory Framework: Area Structure Plans* (the Framework) provides a standardized process for evaluating lands within the Area Structure Plan (ASP) area at the ASP stage of development planning. The Framework contains the methodology and mapping standards for the inventory of ecological features, as well as reporting standards for an Ecological Inventory Report. The Ecological Inventory Report (the Report) will provide a broad analysis of the landscape prior to further detailed work required for development approvals.

1.1. Objectives

The objectives of the *Ecological Inventory Framework* include:

- Increasing clarity, transparency, and consistency for ecological inventories for ASPs.
- Outlining requirements for Ecological Inventory Reports.
- Establishing standard processes.
- Improving the value of data collected for long-term biodiversity management in Calgary.

The objectives of the Report are to:

- Establish the baseline ecological conditions (see Section 3) to support development of ASPs by reviewing existing data and collecting new data as required for the Area Structure Plan area (Plan Area).
- Identify and assess Environmentally Significant Areas.
- Provide recommendations for further studies to be completed before or at the Outline Plan Land Use Amendment stage of development.

1.2. Alignment

The Framework aligns with the federal, provincial, and municipal policies, legislation, and regulations listed in Appendix A.

1.2.1. Municipal Development Plan

The *Municipal Development Plan* (MDP) (The City of Calgary 2009a) is a statutory plan that was adopted by Council in 2009. The MDP directs land use, growth patterns and infrastructure in Calgary. The policies in Volume 1 of the MDP inform ASPs by "providing a city-wide level of direction on land use, urban form and transportation that is interpreted and applied within a local planning context (MDP 1.4)." Volume 2 of the MDP translates the Volume 1 objectives into implementation policy.

A primary function of Calgary's open space system is to protect ecosystems. In addition to the many social and environmental benefits of healthy ecosystems, the ecological services provided by the open space system should be viewed as an integral part of the city's services – contributing to the cleaning and production of air, land and water, and providing biodiversity (MDP 2.6.4).

The Framework provides standards for ecological inventories that will inform several goals and objectives in the MDP, including:

- Incorporate environmental objectives into land use, urban form and transportation planning to help to reduce impacts on the environment in areas such as:
    - Protecting environmentally-sensitive areas that conserve biodiversity and contribute to people's quality of life, the quality of communities and the quality of ecological systems (MDP 2.6).
- Minimize the amount of land that is taken from undeveloped areas and placed in permanent use for residential, commercial, industrial, transportation or utility corridors. Creating a more compact urban form has some of the most direct benefits on the natural environment, including:
    - Reduced disruption and fragmentation of habitat (MDP 2.6.6).
- Protect, conserve and enhance water quality and quantity by creating a land use and transportation framework that protects the watershed (MDP 2.6.3).

1.2.2. City planning overview

Ecological features are assessed at an increasing level of detail as planning and development proceeds (Figure 1), which can generally be understood from city-wide and general to site-specific and detailed.

The following provides a brief outline of the application of this Framework and ecological inventories and assessments at each of the planning stages.

- ***Municipal Development Plan*** **(MDP) and** ***Calgary Transportation Plan*** **(CTP):** The Framework aligns with the MDP (The City of Calgary 2009a) as described in Section 1.2.1, as well as the CTP (The City of Calgary 2009b).
- **Regional Context Study:** The Framework will not determine the required methodology for Regional Context Studies; however, ecological studies conducted at this scale of planning may inform ecological inventories as required by the Framework.
- **Area Structure Plan (ASP):** The Framework is intended for use at the ASP stage of planning. The Framework outlines how to conduct an inventory of ecological components in the Plan Area and produce an Ecological Inventory Report required for submission at the ASP stage of planning. Ecological inventory data available at the time of ASP development informs Environmental Open Space and land use concept development, in accordance with MDP Volume 2: Implementation Guidebook (The City of Calgary 2009a). The requirement to apply the Framework to an Area Redevelopment Plan (ARP) will be at the discretion of Calgary Parks.

- **Outline Plan Land Use Amendment:** An Outline Plan is the initial stage in a major subdivision application that conforms to the area's ASP or ARP. It is usually processed at the same time as the Land Use Amendment application. Ecological assessments at the Outline Plan stage will follow the current *Biophysical Impact Assessment Framework* (The City of Calgary Parks 2010) or successive publication, and require submission of a Biophysical Impact Assessment report.
- **Subdivision and Development Permit:** At the discretion of Calgary Parks, ecological assessments at this stage of development will follow the current *Biophysical Impact Assessment Framework* (The City of Calgary Parks 2010) or successive publication.

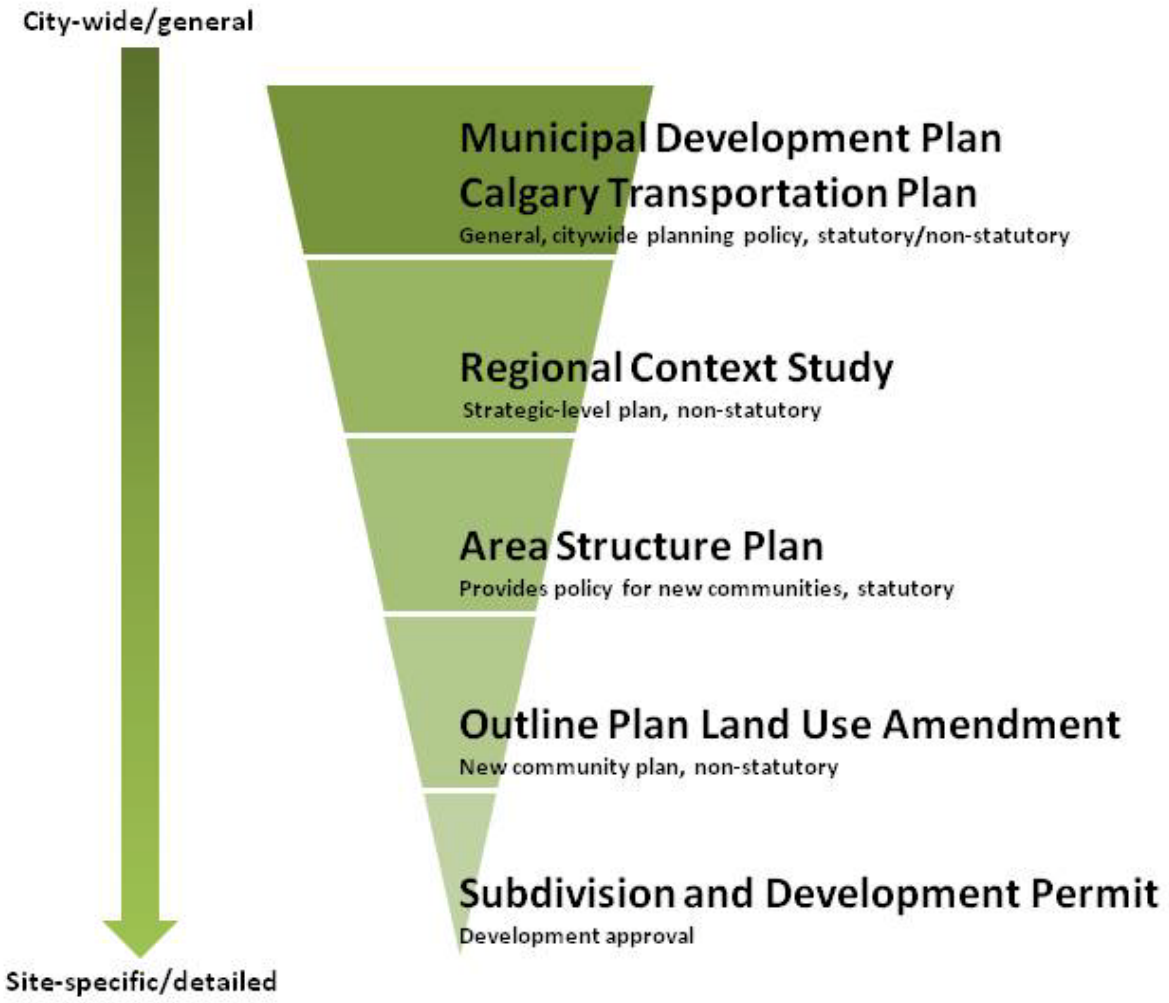

Figure 1. Hierarchy of city planning.

1.3. Exclusions and overlap

The Framework does not replace the requirements of the *Biophysical Impact Assessment Framework* (The City of Calgary Parks 2010) for conducting impact assessments at the Outline Plan Land Use Amendment application or other stages of development.

The requirements of the Framework may partially overlap with requirements of the Master Drainage Plan. Discussions with both Calgary Parks and The City of Calgary Water Resources are encouraged as part of scoping (see Section 2.1) to co-ordinate requirements.

The Framework excludes fish studies which may be required for future development approvals if triggered by provincial or federal requirements. The Framework also excludes historical, cultural, and aesthetic resource assessments which are carried out through a separate provincial process.

2.ECOLOGICAL INVENTORY OVERVIEW

2.1. Process

An Ecological Inventory Report (the Report) is required to support an Area Structure Plan (ASP). The standard process for the Report is illustrated in Figure 2.

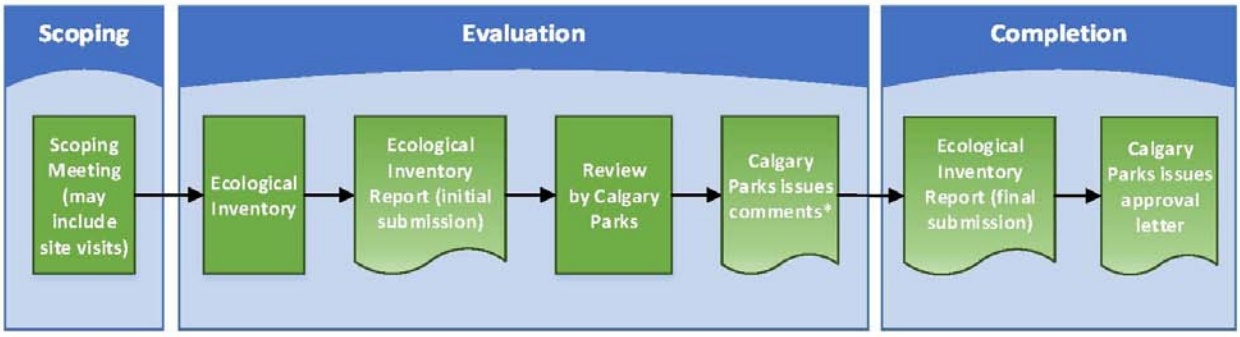

Figure 2. Ecological inventory process (*may indicate that additional assessments are required).

Following initiation of an ASP, an ecological inventory scoping meeting will be scheduled that typically includes landowners, consultants, and Calgary Parks representatives, and may include representatives from other City of Calgary Business Units. The objectives of the scoping meeting are to:

- Clarify roles and responsibilities.
- Develop the schedule of deliverables and review timelines.
- Identify any exceptions to the standard requirements, methods, and processes described in this Framework.

The consultant completes the ecological inventory including a background information desktop review, field surveys, analyses, mapping and reporting. The consultant submits the initial Report to the Calgary Parks representative for review. The initial Report submission should be a complete report that addresses all requirements (see Section 2.3).

Review and approval is an iterative process, which may involve multiple rounds of comments until the Report is deemed complete to the satisfaction of Calgary Parks (Figure 2). Calgary Parks will provide comments and/or an approval letter following review of each Report. Following approval, the Report is considered final.

All Reports must be submitted for review and approval by Calgary Parks, and will be provided to The City of Calgary Water Resources to inform the Master Drainage Plan. The Report will also be used to inform the Environmental Open Space planning and land use concept development in the ASP.

2.2. General inventory standards

2.2.1. Methods

Ecological inventories for ASPs are to use provincially-recognized or other industry-accepted standards for methodology, as well as City-accepted methodology. The methods outlined in this Framework will provide the required data; however, alternate or additional methods may be proposed. Any modification to methodology must first be approved by Calgary Parks and should be discussed during the scoping meeting (see Section 2.1).

Specified methods (see Section 3) are to be followed, unless exceptions are allowable and approved by Calgary Parks, where specified within the Framework. The methods included in the Framework are current as of the date of publication, and are detailed within Section 3. Should best practices, government regulations, policies and guidelines, and industry standards be updated, created, or implemented following publication of the Framework, it is expected that the most current standards will be applied. The methods and data sources included in the Framework are intended to be comprehensive; however, additional standards not listed in Section 3 may also apply.

Incidental wildlife (see Section 3.6.1.2.i) and vegetation (see Section 3.4.1.2.i) observations should be recorded during all field surveys.

2.2.1.1. *Assessment periods*

The majority of ecological inventory field assessments should be conducted during the growing season, when plants can be easily identified. This ensures that data collected are representative of the biophysical features in the Plan Area. The growing season typically occurs between May to September, but depends on the current season's deviation from average temperature and precipitation regimes (Natural Regions Committee 2006). Snow should be absent during the vegetation and wetland surveys.

Multiple field visits may be required over the assessment period, and supplementary assessments outside of the growing season may also be needed. Section 3 provides the necessary detail to determine appropriate assessment periods for each component of the ecological inventory.

2.2.1.2. *Assessment study area*

The standard assessment study area for ecological inventories is the ASP area (Plan Area). All field surveys, analyses, and mapping will be limited to the Plan Area unless otherwise indicated. In certain desktop review components of the ecological inventory, the area of study may extend beyond the Plan Area (see Section 3).

2.2.2. Professional qualifications

Ecological inventories should be performed by a project team consisting of one or more individuals with expertise completing the following tasks (see Section 3):

- Identifying and describing biophysical components (e.g., vegetation, soils, landforms, wildlife, water resources) with accuracy and consistency.

- Delineating and classifying upland and wetland communities.
- Completing the necessary mapping and analyses.
- Producing an Ecological Inventory Report.

The project team members must practice within their area of expertise. At least one member of the project team must be a qualified member in good standing with one of the following regulated professional organizations:

- Alberta Society of Professional Biologists (ASPB), P. Biol.
- Alberta Institute of Agrologists (AIA), P.Ag.
- Association of Professional Engineers and Geoscientists of Alberta (APEGA), P.Eng. or P.Geo.
- The Association of Science & Engineering Technology Professionals of Alberta (ASET), P. Tech
- College of Alberta Professional Foresters (CAPF), RPF, PFOR, RF

Wetland assessments must be conducted by an Interim Wetland Science Practitioner registered with AEP until May 31, 2016 (AEP 2015a), or as prescribed by AEP after this date.

The Ecological Inventory Report should be signed by the qualified professionals on the project team.

2.3. Ecological Inventory Report standards

2.3.1. Report sections and content

Ecological Inventory Reports shall include all required report sections listed in the Ecological Inventory Report Checklist (Appendix B). Report sections include an introduction, methods, results, discussion, and appendices. All required data, maps and reporting deliverables (see Section 3) should be compiled into the Report. The Report shall be submitted with a cover letter and copy of the completed checklist provided in Appendix B. The checklist must be submitted with each Report submission. The cover letter should highlight any unresolved issues or evaluation components where requirements or checklist items cannot be met.

2.3.1.1. *Mapping standards*

All maps included in the Report shall include, within the map's title block, the geographic coordinate system and projected coordinate system used. See Appendix B and Section 3 for a list of maps required for the Report. Note that maps may be combined for each sub-section of the Report if appropriate.

Spatial data (i.e., points, lines, polygons) may be collected using the NAD83 (North American Datum 1983) coordinate system and Universal Transverse Mercator (UTM) positional coordinate format (i.e., UTM zone and easting/northing represented as, for example, 11U 591934 5636174). Due to the division of the Calgary area between two UTM zones, all data collected in UTM must also identify the UTM zone; however, the spatial data must be re-projected into the required format prior to submission. See Section 2.3.2.3 for the required format for spatial data collection, mapping, and submission.

2.3.2. Ecological Inventory Report submission requirements

2.3.2.1. *Hard copy Report submission*

A total of two (2) hard copies of the initial Report are required for review and information purposes. All Reports must be forwarded to the designated Calgary Parks representative. Copies of the Report will then be forwarded to the appropriate personnel for review and information. Three (3) hard copies of the final Report must be submitted. The final Report must include all updated written content, tables, figures, and maps reflecting the comments received during the review period.

2.3.2.2. *Digital Report submission*

One (1) digital PDF (Adobe Acrobat Portable Document Format) copy of the initial Report, including cover letter, checklist, and accompanying digital data (see Section 2.3.2.3) are required for review and information purposes. The digital Report must be submitted to the designated Calgary Parks representative using an FTP (File Transfer Protocol) site or USB (Universal Serial Bus) flash drive at the time of submission of the hard copy Report.

One (1) PDF copy of the final Report must be submitted. The final Report must include all updated written content, tables, figures, and maps reflecting the comments received during the review period.

2.3.2.3. *Digital data submission*

One (1) digital copy of the Report-related data is required for review purposes, and The City of Calgary must be a party to the data (see Section 2.3.3), including data obtained from other sources. All field data listed in Appendix B and Section 3, and all related spatial datasets must be submitted to the designated Calgary Parks representative when both the initial and final Reports are submitted. Tabular data must be submitted in Microsoft Excel format. Provide all spatial data in the following geographic information system (GIS) format:

- File format: Esri shapefile (.shp) or file geodatabase (.gdb)
- Metadata schema: ISO 19115:2003 Geographic Information (ISO 2003)
- Geographic coordinate system: GCS_WGS_1984
- Projected coordinate system: Calgary_3TM_WGS_1984_W114
- Positional coordinate format: latitude and longitude in decimal degrees (e.g., N 50.123456789° W 113.123456789°; or, 50.123456789, -113.123456789)

2.3.3. Report publication

The City accepts reports and relies on the professional judgement of the qualified professional(s) authoring the report (see Section 2.2.2). Ecological Inventory Reports accepted by The City in connection with the development of an Area Structure Plan and paid for by a third party must name “The City of Calgary” as a party and addressee of the report, including all supporting data, analyses, and studies. The report must also make clear that “The City of Calgary” can use and rely on the information in the report.

Further, in accordance with The City of Calgary’s standard processes for the creation of ASPs, all such Ecological Inventory Reports, including their supporting data, analyses, and studies, will, once approved,

be made available to the public for their information and comment and, in some instances, to be referenced in other development initiatives. Initial Reports will be made available in such manner until final accepted versions are complete.

The first page of all Ecological Inventory Reports submitted to The City must state the following:

"This report has been prepared in support of the _____ (ASP NAME), which report, including all supporting data, analyses, and studies, becomes a public document upon submission and will be made available to the public by The City of Calgary. This report may be referenced by The City of Calgary in other City of Calgary development initiatives unrelated to the _____ (ASP NAME).

The City of Calgary shall be entitled to provide copies of the Report to City Council, City of Calgary employees, and City of Calgary regulatory boards. The City of Calgary shall be entitled to provide copies of the Report to Alberta Transportation, Rockyview County, Foothills County, and any other governmental authorities and regulatory bodies having jurisdiction. The City of Calgary may also contact the author or any other parties to the report to request further information respecting the Report or to discuss the Report further.

The City of Calgary shall at all times be entitled to fully use and rely on this Report, including all data, analyses, and studies, in each case notwithstanding any provision, disclaimer, or waiver in the Report that reliance is not permitted."

2.3.4. Stale dating of Reports

Approved final Reports are normally considered current for up to three (3) years following field survey dates. Approved Reports are considered acceptable for use in applications within that 3-year time period. This period may be modified at the discretion of Calgary Parks.

3. ECOLOGICAL INVENTORY SPECIFICATION REQUIREMENTS

An ecological inventory includes an assessment of the regional environmental setting (Section 3.1), ecosystem and land cover classification (Section 3.2), water resources (Section 3.3), vegetation (Section 3.4), soils and landforms (Section 3.5), wildlife (Section 3.6), and Environmentally Significant Areas (Section 3.7). These technical requirements for conducting an ecological inventory are intended to be comprehensive; however, other relevant issues may need to be addressed by the consultant due to the uniqueness of the Plan Area. The required Report deliverables are therefore subject to change. The methods described below address the required data; however, consultants may propose alternate or additional methods. Any modification to methodology must first be approved by Calgary Parks.

Incidental wildlife (see Section 3.6.1.2.i) and vegetation (see Section 3.4.1.2.i) observations should be recorded during all field surveys.

3.1. Regional environmental setting

The environmental setting component of the ecological inventory provides an overview of the ecosystems in the area based on Natural Subregion characteristics. No field surveys are required. It also provides a basis for choosing the appropriate *Range Plant Communities and Range Health Assessment Guidelines* (Government of Alberta 2003, 2012a, 2013e) and/or *Classification and Management of Riparian and Wetland Sites* (Thompson and Hansen 2002, 2003) document for identifying sites sensitive to disturbance (see Section 3.2.1.1.ii.e) and special ecological communities (see Section 3.4.1.1.vi).

3.1.1. Methods

3.1.1.1. *Desktop review*

i. Review the provincial Natural Regions and Subregions shapefile (Alberta Sustainable Resource Development 2005) to determine location of the Plan Area relative to the Natural Subregions.

ii. Review the appropriate *Range Plant Communities and Range Health Assessment Guidelines* (Government of Alberta 2003, 2012a, 2013e) and *Natural Regions and Subregions of Alberta* (Natural Regions Committee 2006) documents for overview of environmental setting.

3.1.2. Report deliverables

3.1.2.1. *Results and Discussion*

i. Describe location of Plan Area in relation to the Natural Subregion(s) it falls within, and proximity to other Natural Subregions.

ii. Describe the regional environmental setting of the Plan Area based on the characteristics of the Natural Subregion it falls within and, if applicable, adjacent Natural Subregions.

iii. Discuss relevance of environmental setting to the Plan Area.

iv. Discuss relevance of the Plan Area to the Natural Subregion that it falls within.

3.1.2.2. *Mapping*

i. **Plan Area location –** Plan Area boundary showing its location in relation to Calgary's city limit boundaries, showing major roadways and water bodies.

ii. **Plan Area environmental setting –** Plan Area boundary overlaying labelled Natural Regions/Subregions. Include overlay of the Alberta Township System grid and label legal land location, including section number(s).

3.2. Ecosystem and land cover classification

Classification of natural land cover (i.e., ecosystem classification) informs the identification of special ecological communities (see Section 3.4) and water resources (see Section 3.3) present in the Plan Area. Conversely, mapping of riparian, wetland, and true aquatic habitats (see Section 3.3) will be informed by ecosystem and land cover classification and soils and landforms (see Section 3.5) mapping.

The ecological inventory allows for a high-level ecosystem assessment, which is required to demonstrate ecological function and habitat quality required for identification of Environmental Significant Areas (see Section 3.7). Ecosystem and land cover classification at the ASP stage of development will be based on the provincial Grassland Vegetation Inventory (GVI) (AEP 2014a; Prairie Conservation Forum 2015; ESRD 2011).

With the exception of special ecological communities (see Section 3.4), detailed plant community mapping is not required for ASPs.

3.2.1. Methods

3.2.1.1. *Desktop review*

i. Obtain and review recent and historical aerial photo imagery from The City of Calgary (The City of Calgary 2015e) and other sources (e.g., AEP) where required.

ii. Complete the following GVI (AEP 2014a; Prairie Conservation Forum 2015) desktop mapping for the entire Plan Area. All GVI data will require ground-truthing, regardless of whether a GVI inventory has been previously completed in the Plan Area.

   a. Review the provincial GVI data for the Plan Area, if available. GVI landscape polygons and associated site type data may be viewed via the AEP Biophysical Mapping Tool (AEP 2015b) on GeoDiscover Alberta (Government of Alberta 2015b); however, GVI spatial files, including linear and point vegetation data must be accessed via AEP (AEP 2014a).

   b. Determine whether a GVI inventory has been completed for the Plan Area, or a portion thereof.

   c. Where GVI has not been completed in the Plan Area, or where changes have occurred on the landscape since GVI data collection that would justify updating the GVI data, delineate site type polygons with modifiers in accordance with the *Grassland Vegetation*

Inventory Specifications (ESRD 2011), and utilizing the GVI Interpretation Guides (Prairie Conservation Forum 2015) for the appropriate Natural Subregion.

d. GVI polygons should be further spatially refined to parse out complexed polygons and capture natural features that are smaller than the minimum mapping unit required in the *Grassland Vegetation Inventory Specifications* (ESRD 2011). Use a modified minimum mapping unit size of 0.05ha (500m^2). Map linear or point vegetation features as needed, regardless of the Natural Region in which the Plan Area occurs.
e. Use GVI attributes and the appropriate *Range Plant Community Guide* (Government of Alberta 2003, 2012a, 2013e) to flag GVI site types in the Plan Area that are sensitive to disturbance, in accordance with *GVI Use in Pre-Site Assessment* (Prairie Conservation Forum n.d.). The *Classification and Management of Riparian and Wetland Sites* (Thompson and Hansen 2002, 2003) documents should also be used where appropriate.

iii. Review existing background information, data (e.g., regional maps, provincial datasets), and historical air photos to inform the field programs and analyses. Previous studies completed in the area should include but not be limited to those provided by the designated Calgary Parks representative upon initiation of the ecological inventory.

3.2.1.2. *Field surveys*

i. Confirm classification and spatial accuracy of GVI mapping, including linear and point vegetation data.
   a. Design a stratified sampling study that ensures that at least 10% of each site type mapped is ground-truthed, and that all lentic and lotic site types and all site types sensitive to disturbance are ground-truthed.
   b. Record locations of all survey points and transects, as applicable.
   c. Record vegetation species (see Section 3.4) for each survey point and transect, as applicable, using ACIMS (Alberta Parks 2015a) nomenclature. Record percent cover for each species within survey plots, as applicable.
   d. Assign a habitat quality modifier to each natural site type polygon as follows:
      - Low = >75% cover invasive/exotic plants
      - Medium = >25% and <75% cover invasive/exotic plants
      - High = <25% cover invasive/exotic plants

ii. Collect incidental vegetation data during field surveys (see Section 3.4.1.2.i).

3.2.1.3. *Analysis*

i. Ecosystem classification at the ASP level should be completed to the level of Grassland Vegetation Inventory site types with modifiers in accordance with the *Grassland Vegetation Inventory Specifications* (ESRD 2011). Mapping must cover the entire Plan Area.

3.2.2. Report deliverables

3.2.2.1. *Results and Discussion*

i. Include recent and historical aerial photograph images in an appendix of the Ecological Inventory Report, including the source of the photograph and descriptive photo captions (e.g., location, date).

ii. Provide a vegetation species list resulting from field surveys combining data from each survey point and transect using ACIMS (Alberta Parks 2015a) nomenclature. Identify rare plant species and regulated weeds. Include the species conservation rank (i.e., SRank, GRank, (Alberta Parks 2015c)), ACIMS origin (i.e., exotic, hybrid, native, or unknown), and tracked/watched status.

iii. Tabulate the total area (in m^2 or ha) and percentage of Plan Area for each GVI site type with modifier classified. Tabulate the location coordinates and total length for each GVI point and linear vegetation feature, respectively, in the Plan Area. Include whether the GVI features are anthropogenic or natural, and whether they may be sensitive to disturbance.

iv. Describe the natural terrestrial and wetland ecosystems based on data collected in the field, including dominant tree, shrub and herbaceous species. Discuss the range of habitat types and the range of habitat quality modifiers within each site type with modifier. Identify any areas that may be sensitive to disturbance.

3.2.2.2. *Mapping*

i. **Survey points and transects –** Map all survey points and transect locations, as applicable.

ii. **Ecosystem and land cover classification –** Map of GVI site types with modifier covering the entire Plan Area, including all linear and point GVI vegetation features, as needed. Identify areas that may be sensitive to disturbance as appropriate.

3.3. Water resources

The ecological inventory of water resources for ASPs will focus on mapping the water bodies present within the Plan Area. Water bodies includes watercourses (i.e., lotic water bodies), true aquatic habitats (i.e., lotic or lentic deepwater habitats), wetlands and riparian areas, as defined within the Glossary (Section 4). In addition, hydrogeological surface features (i.e., springs and seeps) will also be included. It should be noted that these water resources are not necessarily mutually exclusive.

As per the provincial *Stepping Back from the Water* (Government of Alberta 2012b) handbook released under Alberta's *Water for Life* (AEP 2015e) strategy under the *Water Act* (Government of Alberta 2000b), water bodies are considered bound by their ecological boundary (see Section 4). The ecological boundary identifies the upland boundary, as defined by the *Alberta Wetland Identification and Delineation Directive* (Government of Alberta 2015a). Mapping of water bodies will also be informed by the results of ecosystem and land cover classification (see Section 3.2) and soils and landform mapping (see Section 3.5).

The inventory of watercourses includes the classification of ephemeral, intermittent, small perennial and large perennial watercourses, as defined within the Glossary (see Section 4). Mapping is based on channel characteristics described in the *Integrated Standards and Guidelines* (Government of Alberta 2013c). Watercourse mapping informs mapping of true aquatic habitats and riparian areas.

True aquatic habitats (see Section 4) are defined as having an approximate water depth of ≥2m at midsummer, as per the *Alberta Wetland Identification and Delineation Directive* (Government of Alberta 2015a). These may include deepwater portions of watercourses, and may be adjacent to wetlands and riparian areas.

Wetlands are inventoried in accordance with the *Alberta Wetland Policy* (Government of Alberta 2013a) and Calgary's *Wetland Conservation Plan* (The City of Calgary 2004) and *Riparian Strategy* (The City of Calgary 2014). Wetland mapping focuses on wetland basins and follow the *Alberta Wetland Classification System* (ESRD 2015) and *Alberta Wetland Identification and Delineation Directive* (Government of Alberta 2015a). Wetlands adjacent to watercourses are mapped as riparian areas using the ecological boundary and classified as per the *Alberta Wetland Classification System* (ESRD 2015).

Delineation of wetland boundaries inform likely Crown ownership (see Section 3.3.1.3.i) and later formal assessments of water permanence required to determine whether the bed and shore of a water body, or a portion thereof, are likely to have their ownership claimed by the provincial Crown under section 3 of the *Public Lands Act* (Government of Alberta 2013d).

3.3.1. Methods

3.3.1.1. *Desktop review*

i. Identify the watershed and, if applicable, subwatershed that the Plan Area is located within.
ii. Review the available spatial datasets found on The City of Calgary's Open Data Catalogue (The City of Calgary 2015b) on hydrology, hydrology outlines, riparian areas, and rivers and streams to inform mapping of water bodies. Include a review of the metadata and associated data limitations (e.g., restricted to riparian areas along major rivers and streams in Calgary).
iii. Review GeoDiscover Alberta (Government of Alberta 2015b) GIS data on Alberta merged wetland inventory and lotic riparian polygons to identify provincially mapped and classified riparian and wetland areas.
iv. Review any reports of studies previously conducted in the Plan Area to support mapping of water resources.
v. Review provincial flood hazard mapping (AEP 2015d) to inform mapping of water bodies.
vi. Review results of ecosystem and land cover classification (see Section 3.2) in order to identify GVI site types and site type attributes (i.e., modifiers, percent open water) indicative of anthropogenic and natural water bodies.

vii. **Hydrogeology –** Review the hydrogeology in the Plan Area, based upon available background reports and studies, to identify known or potential locations of springs and seeps, and to inform mapping of water bodies.

viii. **Watercourses –** Complete mapping of ephemeral, intermittent, small perennial, and large perennial watercourses based on desktop review of available information and channel characteristics.

ix. **True aquatic habitats –** Complete mapping of true aquatic habitats based on the desktop review of available information.

x. **Wetlands –** Determine the most appropriate delineation approach/pathway to identify and delineate the ecological boundaries of wetlands in the Plan Area, in accordance with the *Alberta Wetland Identification and Delineation Directive* (Government of Alberta 2015a).

   a. Complete the desktop methods required, including a review of air photo imagery from multiple dates and times of year, in order to map wetland ecological boundaries.
   b. Classify wetland class, form and type in accordance with the *Alberta Wetland Classification System* (ESRD 2015).

xi. **Riparian areas –** Complete mapping of riparian areas adjacent to watercourses using the ecological boundary, based on desktop review of available information.

3.3.1.2. *Field surveys*

i. **Hydrogeology –** Confirm any locations of groundwater-surface water interaction. Spatially document any additional hydrogeological surface features observed during ground-truthing.

ii. **Watercourses –** Ground-truth all desktop mapping of ephemeral, intermittent, small perennial, and large perennial watercourses to support classification of watercourse type as described in the *Integrated Standards and Guidelines* (Government of Alberta 2013c), and as defined in Section 4. Collect data on bank development, channel definition, and non-vegetated channel width. Where channels are poorly defined, collect data on vegetation and soil characteristics to identify the ecological boundary. Where permanency changes along a watercourse, professional judgement should be used to attribute watercourse types based on channel characteristics. Map any additional watercourses observed during field surveys. Ground-truthing is not required outside of the Plan Area.

iii. **True aquatic habitats** – Ground-truth all desktop mapping of both lentic and lotic true aquatic habitats (e.g., lakes, rivers, reservoirs) in accordance with the *Alberta Wetland Classification System* (ESRD 2015) classification key.

iv. **Wetlands –** Complete the field methods (i.e., field verification and/or delineation) required to identify and delineate the ecological boundaries of wetlands in the Plan Area, in accordance with the most appropriate delineation approach/pathway chosen from the *Alberta Wetland Identification and Delineation Directive* (Government of Alberta 2015a), including plot locations and required vegetation and soil data.

   a. Based on the delineated wetland area, classify wetland class, form and type according to the *Alberta Wetland Classification System* (ESRD 2015).
   b. Identify the water permanence of each wetland in the Plan Area using the *Alberta Wetland Classification System* (ESRD 2015).

v. **Riparian areas** – Identify and map riparian areas based on results of desktop review, completed watercourse mapping, and completed landform (e.g., floodplain) mapping. Spatially document any additional riparian areas observed during ground-truthing.

3.3.1.3. *Analysis*

i. **Crown ownership –** Determine all water bodies that are owned by, or that are likely to have their ownership claimed by, the provincial Crown under section 3 of the *Public Lands Act* (Government of Alberta 2013d). For wetlands, follow the *Guide for Assessing Permanence of Wetland Basins* (ESRD 2014b).

ii. Combine water body mapping with results of GVI to determine natural versus anthropogenic water bodies.

iii. Determine all restricted activity periods applicable to watercourses identified in the Plan Area, as per the *Calgary Management Area Map for the Code of Practice for Watercourse Crossings* (ESRD 2012).

3.3.2. Report deliverables

3.3.2.1. *Results and Discussion*

i. Identify the watershed and, if applicable, subwatershed that the Plan Area is located within.

ii. Identify all water bodies occurring in the Plan Area, including natural versus anthropogenic water bodies.

iii. **Hydrogeology –** Provide an overview of hydrogeology in the Plan Area, including a table of coordinate locations for springs and seeps. Discuss any locations of groundwater-surface water interaction.

iv. **Watercourses –** Identify all watercourses that occur in the Plan Area, including their classification (i.e., ephemeral, intermittent, small perennial, large perennial) and applicable restricted activity periods.

v. **True aquatic habitats –** Identify all true aquatic habitats within the Plan Area. Include named water bodies as applicable.

vi. **Wetlands –** Identify the locations, wetland class, form and type of all wetlands in the Plan Area, including ephemeral wetlands. Ensure all required data is submitted to the provincial regulatory body as required by the *Alberta Wetland Identification and Delineation Directive* (Government of Alberta 2015a). Describe the results of ground-truthing and field surveys.

vii. **Riparian areas –** Identify all riparian areas within the Plan Area.

viii. **Crown ownership –** Identify all water bodies that are Crown-owned or that are likely to have their ownership claimed by the provincial Crown.

ix. Discuss any limitations or uncertainties in the results and make recommendations for more detailed studies.

3.3.2.2. *Mapping*

i. **Hydrogeology –** Provide the locations of all springs and seeps in the Plan Area as mapped points.

ii. **Watercourses –** Map the locations and flow direction of all watercourses in the Plan Area using lines and polygons, as appropriate. Include symbols and/or labels to identify the watercourse type classification.
iii. **True aquatic habitats –** Map and label all true aquatic habitats within the Plan Area, including any named water bodies.
iv. **Wetlands –** Provide the locations of all wetlands in the Plan Area as mapped polygons, including:
    a. Label the wetland class, form, and type according to *Alberta Wetland Classification System* (ESRD 2015),
    b. Include any field delineation/verification plot locations from field surveys.
v. **Riparian areas –** Map and label all riparian areas within the Plan Area.
vi. **Crown-ownership –** Map of all water bodies in the Plan Area that are Crown-owned or that are likely to have their ownership claimed by the Crown. Include ownership labels as appropriate.

3.4. Vegetation

Additional vegetation data should be collected in order to supplement the vegetation data collected for the ecosystem plots (see Section 3.2) and wetland field verification and/or delineation (see Section 3.3), as applicable. Supplementary vegetation data should be integrated to compile a comprehensive list of the vegetation species in the Plan Area, including vascular plants, bryophytes (i.e., mosses, hornworts, liverworts), lichens, and fungi, with particular attention to rare plant species and regulated weeds (see Section 4).

In addition to vegetation species, mapping of special ecological communities (see Section 4) supports the assessment and mapping of Environmentally Significant Areas (see Section 3.7)

3.4.1. Methods

3.4.1.1. *Desktop review*

i. Complete the following Alberta Conservation Information Management System (ACIMS) (Alberta Parks 2015a); searches for sensitive and non-sensitive element occurrences of vascular and non-vascular plants (e.g., bryophytes), lichens, fungi, and ecological communities, as available. In each case, record the search criteria used.
    a. ACIMS Data Map Search to produce a Table of Results for Element Occurrences within a 3km buffer zone of the Plan Area.
    b. Review the most recent ACIMS downloadable files to identify potential vegetation species and ecological communities in the Natural Subregion, and to identify those that are tracked elements.
    c. Submit a formal ACIMS Data Request using a 3km buffer zone around the Plan Area.
ii. Review any reports of studies previously conducted in the Plan Area, relevant field guides, botanical literature, or local interest groups (e.g., Nature Calgary 2015) to support a potential vegetation species list.

iii. Compile a comprehensive list of vegetation species that may occur in the Plan Area using ACIMS (Alberta Parks 2015a) nomenclature based on the above desktop review. Include the species conservation rank (i.e., SRank, GRank) (Alberta Parks 2015c), ACIMS origin (i.e., exotic, hybrid, native, or unknown), and tracked/watched status.

iv. **Rare plant species –** Compile a list of rare plant species that may occur in the Plan Area, including the species conservation rank (Alberta Parks 2015c), based on results of above desktop review and the following:
   a. Review the endangered and threatened plants ranges layer from the ESRD Wildlife Sensitivity Maps data sets (ESRD 2014d) for relevance to the Plan Area, available via the AEP Biophysical Mapping Tool (AEP 2015b) on GeoDiscover Alberta (Government of Alberta 2015b).

v. **Regulated weeds –** Compile a list of regulated weeds that may occur in the Plan Area, including regulatory status (i.e., noxious, prohibited noxious) based on results of above desktop review.

vi. **Special ecological communities –** Compile a list of special ecological communities that may occur in the Plan Area, including ecological community conservation ranks (i.e., SRank, NRank, GRank) (Alberta Parks 2015b), based on results of above desktop review and the following:
   a. GVI site types in the Plan Area that may be sensitive to disturbance, based on results of ecosystem classification (see Section 3.2).

3.4.1.2. *Field surveys*

i. Record incidental vegetation data on rare plant species and regulated weeds when encountered, including general abundance and distribution, using GVI distribution codes and percent-cover values (ESRD 2011). All occurrences must be submitted to ACIMS (Alberta Parks 2015a) in accordance with their current data submission requirements.

ii. **Rare plant species –** Record incidental observations and submit all occurrences to ACIMS as per incidental vegetation data requirements (see Section 3.4.1.2.i).

iii. **Regulated weeds –** Record incidental observations and submit all occurrences to ACIMS as per incidental vegetation data requirements (see Section 3.4.1.2.i).

iv. **Special ecological communities –** Identify special ecological communities following *Alberta Conservation Information Center Ecological Community Sampling Guidelines* (Allen 2011) in conjunction with the current provincial *Ecological Community Tracking List* (Allen 2014) and *Minimum Patch Size Specifications for Ecological Community Occurrences* (Alberta Parks 2006). Use a minimum mapping unit size of 0.05ha or 500m^2. All occurrences must be submitted to ACIMS (Alberta Parks 2015a) in accordance with their current data submission requirements.

3.4.1.3. *Analysis*

i. Combine results of plot data from ecosystem and land cover classification (see Section 3.2) and wetland field verification and/or delineation (see Section 3.4) with the vegetation desktop review and field surveys to compile a comprehensive vegetation species list for the

Plan Area using current ACIMS (Alberta Parks 2015a) nomenclature, including the species conservation rank (i.e., SRank, GRank) (Alberta Parks 2015c), and ACIMS origin (i.e., exotic, hybrid, native, or unknown) and tracked/watched status.

3.4.2. Report deliverables

3.4.2.1. *Results and Discussion*

i. Provide a comprehensive vegetation species list resulting from analysis for the entire Plan Area using current ACIMS (Alberta Parks 2015a) nomenclature. Identify rare plant species and regulated weeds, and whether species occurrence was potential (i.e., desktop review only) or actual (i.e., observed during field surveys). Include the species conservation rank (i.e., SRank, GRank) (Alberta Parks 2015c), ACIMS origin (i.e., exotic, hybrid, native, or unknown), and tracked/watched status.
ii. Discuss in general the distribution of vegetation species in the Plan Area, with reference to GVI distribution codes (ESRD 2011) as appropriate.
iii. **Rare plant species –** Discuss regulatory requirements relating to the rare plant species observed or potentially occurring in the Plan Area.
iv. **Regulated weeds –** Discuss regulatory requirements relating to the regulated weeds observed or potentially occurring in the Plan Area.
v. **Special ecological communities –** Discuss regulatory requirements relating to special ecological communities occurring in the Plan Area.
vi. Discuss the spatial (e.g., ACIMS search extent) and temporal (e.g., ACIMS search window, season of field surveys) limitations of the results based on the methodology used.
vii. Provide recommendations for further vegetation studies (e.g., rare plant surveys, special ecological community surveys, targeted weed surveys) for Biophysical Impact Assessments at Outline Plan Land Use Amendment stage (see Section 1.2.2).
viii. Submit all vegetation species and special ecological community observations resulting from incidental or surveyed encounters to ACIMS (Alberta Parks 2015a) in accordance with their current data submission requirements. Provide a copy of ACIMS loadforms submitted as a result of field surveys, and confirm data submission.

3.4.2.2. *Mapping*

i. **Vegetation –** Rare plant species locations, regulated weed locations, and special ecological communities in the Plan Area.

3.5. Soils and landforms

Mapping of soils and landforms informs ecosystem and land cover classification (see Section 3.2) and water resources inventory (see Section 3.3). Additionally, distinctive or unusual landforms and areas of minimal soil disturbance are identified and mapped to inform the Environmentally Significant Areas assessment (see Section 3.7).

Slope and landform mapping in the Plan Area is required to identify and map slope classes to identify land areas of interest (i.e., slopes between 20%-33%, and >33%) in accordance with the *Slope Adaptive Development Guidelines Policy and Conservation Planning and Design Policy* (The City of Calgary Land Use Planning & Policy 2009). All slopes greater than 15% will be mapped.

Soil pits deeper than 30 cm typically trigger provincial ground disturbance requirements such as locating buried facilities that may be encountered during digging. The consultant is responsible for obtaining any required permits.

3.5.1. Methods

3.5.1.1. *Desktop review*

i. **Soils –** Complete the following:
   a. Identify the soil correlation areas in which the Plan Area occurs, in accordance with the *Alberta Soil Names File (Generation 3) User's Handbook* (Agriculture and Agri-Food Canada 2006), the AGRASID database (Alberta Agriculture Food and Rural Development 2013), and the Alberta Soil Information Viewer available through the Alberta Soil Information Centre (Alberta Agriculture and Forestry 2015).
   b. Review existing reports for soil series mapping (MacMillan 1987) and surficial geology (Moran 1986) for the Plan Area.
   c. Classify and map soils to soil subgroup according to the *Canadian System of Soil Classification* (Soil Classification Working Group 1998), based on existing baseline soil mapping (MacMillan 1987), the AGRASID database (Alberta Agriculture Food and Rural Development 2013), and the Alberta Soil Information Viewer (Alberta Agriculture and Forestry 2015).
   d. Identify likely soil series based on the major soil series in the Plan Area from the information provided by AGRASID (Alberta Agriculture Food and Rural Development 2013).

ii. **Slopes –** Obtain Digital Aerial Survey (DAS) 0.5m contour elevation data (The City of Calgary 2015c) and Digital Elevation Model (DEM) (The City of Calgary 2015d) for the Plan Area using the Map Search Tool (The City of Calgary 2015e).

iii. **Landforms –** Complete the following topographical desktop assessments:
   a. Review the provincial significant landforms of Alberta data (Alberta Parks 2014b). Confirm if any significant landforms occur in the Plan Area.
   b. Review completed ecosystem and land cover classification (i.e., GVI) to inform landform mapping (see Section 3.2).
   c. Complete desktop mapping of landforms through the slopes desktop review and air photo interpretation. Include all valleys (e.g., gullies, ravines, coulees, river valleys), as defined within the Glossary (see Section 4).

3.5.1.2. *Field surveys*

i. **Soils –** Confirm soil subgroup and series mapping by collecting data on soil properties in accordance with the *Canadian System of Soil Classification* (Soil Classification Working Group 1998). Include horizons, the abundance and contrast of mottles/gleying, drainage, colour, structure, depth to water, coarse fragments, texture, slope position, aspect, and parent material.

ii. **Slopes –** Record location and details of any incidental observations of slope stability concerns (i.e., shallow or deep-seated slope failures, tension cracks, localized slumping, slope surface erosion, river bank erosion or scour, and other concerns typically associated with slope stability), as defined by the *Slope Stability Management Framework* (The City of Calgary Roads 2013).

iii. **Landforms –** Record locations of any bedrock outcrops, glacial erratics, and any other distinctive or unusual landforms observed.

3.5.1.3. *Analysis*

i. **Soils –** Identify and map areas of minimal soil disturbance to support Environmentally Significant Areas assessment (see Section 3.7).

ii. **Slopes –**

a. Conduct a topographical analysis to identify slopes in the following slope classes: 15%-20%, 20%-33%, and >33%, based on The City's DAS and DEM (The City of Calgary 2015c, 2015d) data.

b. Identify sloped Land Areas of Interest as defined by the *Slope Adaptive Development Guidelines Policy and Conservation Planning and Design Policy* (The City of Calgary Land Use Planning & Policy 2009).

c. Based on completed ecosystem and land cover classification (see Section 3.2), identify GVI site types occurring in the Plan Area that may be associated with slope stability concerns, as defined by the *Slope Stability Management Framework* (The City of Calgary Roads 2013).

iii. **Landforms –**

a. Identify and map any significant landforms of Alberta (Alberta Parks 2014b) that occur in the Plan Area.

b. Complete landform mapping based on completed ecosystem and land cover classification (i.e., GVI), and desktop review. Identify bedrock outcrops, floodplains, and valleys.

c. Identify distinctive and/or unusual landforms to support Environmentally Significant Areas assessment (see Section 3.7).

3.5.2. Report deliverables

3.5.2.1. *Results and Discussion*

i. **Soils –** Identify and describe the soil correlation areas in which the Plan Area occurs. Describe and discuss soils and areas of minimal disturbance present within the Plan Area.

Discuss limitations of existing soil surveys, including where development may have affected soils since surveys were published.

ii. **Slopes –** Identify and discuss the presence of any slope stability concerns in the Plan Area. Discuss slope classes present in the Plan Area, including sloped Land Areas of Interest.

iii. **Landforms –** Describe the local topography, including aspect and exposure. Discuss the presence of any significant landforms of Alberta, bedrock outcrops, glacial erratics, and distinctive or unusual landforms that occur in the Plan Area.

iv. Identify and discuss areas of potentially unstable soils and landforms, based on field observations, slope classes, and existing background reports.

3.5.2.2. *Mapping*

i. **Soils –** Map the soil series polygons in the Plan Area. Map areas of minimal soil disturbance. Map locations of all soil pits.

ii. **Slope –** Map and label slope classes 15%-20%, 20%-33%, and >33%. Map sloped Land Areas of Interest. Overlay elevation contours at 5m or 10m intervals including elevation labels, as appropriate. Map and label any areas with slope stability concerns.

iii. **Landforms –** Map and label landforms in the Plan Area, including distinctive and/or unusual landforms, significant landforms of Alberta, bedrock outcrops, and glacial erratics.

3.6. Wildlife

The wildlife component of the ecological inventory will focus on existing data (e.g., FWMIS; Government of Alberta 2013), incidental field observations, prescribed surveys if a survey is recommended, and wildlife habitat suitability. Habitat suitability assessments broadly refer to key wildlife indicator species and results of ecosystem and land cover classification (see Section 3.2). Comprehensive wildlife species lists will highlight listed fauna species and invasive/exotic species, as defined in the Glossary (see Section 4). Where surveys are recommended by Calgary Parks, AEP, or Environment Canada, survey assessment periods and survey replications must be in concordance with requirements in the *Sensitive Species Inventory Guidelines* (Government of Alberta 2013f).

Targeted wildlife surveys will be required as part of Biophysical Impact Assessments completed for Outline Plan Land Use Amendment submissions (see Section 1.2.2).

The Framework excludes fish studies which may be required for future development approvals if triggered by provincial or federal requirements.

3.6.1. Methods

3.6.1.1. *Desktop review*

i. Complete the following ACIMS (Alberta Parks 2015a) searches for sensitive and non-sensitive element occurrences of both vertebrate and invertebrate wildlife species, as available. In each case, record the search criteria used.

a. ACIMS Data Map Search to produce a Table of Results for Element Occurrences within a 3km buffer zone of the Plan Area.
b. Review the most recent ACIMS downloadable files to identify potential wildlife species in the Natural Subregion, and to identify wildlife species that are tracked elements.
c. Submit a formal ACIMS Data Request using a 3km buffer zone around the Plan Area.

ii. Complete the following Fish & Wildlife Management Information System (FWMIS) (Government of Alberta 2013b) searches for vertebrate wildlife species and wildlife habitat features. In each case, record the search criteria used.
a. Use the Fish and Wildlife Internet Mapping Tool (FWIMT) (AEP 2015c) to produce a Fish and Wildlife Report for the area within a 3km radius of the Plan Area.
b. Submit a formal FWMIS Data Request to obtain detailed location information on species or wildlife features, using a 3km buffer zone around the Plan Area.

iii. Complete an eBird (Cornell Lab of Ornithology 2015) data download access request for basic dataset (updated quarterly) and/or reference dataset (updated annually).

iv. Review the provincial Wildlife Sensitivity Maps data sets (ESRD 2014d), including key wildlife and biodiversity zones, for wildlife key areas/sites within a 3km buffer zone of the Plan Area.

v. Complete a search of the provincial Habitat Suitability Model Search Tool (AEP 2014b) for all quarter sections within 3km of the Plan Area. Identify habitat suitability as defined by the Tool (i.e., highly suitable, suitable, less suitable, least suitable) for each of the species at risk and keystone species in the database within 3km of the Plan Area.

vi. Identify any Important Bird Areas intersecting the Plan Area using the IBA database (IBA Canada 2015). If found, search the IBA database for species occurring in that IBA, seasonal abundance, and IBA criteria category.

vii. Review any reports of studies previously conducted in the Plan Area, relevant field guides, wildlife literature, or local interest groups (e.g., Nature Calgary 2015) to support a potential wildlife species list.

viii. Compile a comprehensive list of wildlife species that may occur in the Plan Area based on the desktop review, using FWMIS (Government of Alberta 2013b) or ACIMS (Alberta Parks 2015a) nomenclature, as applicable. Include the species conservation rank (i.e., SRank, GRank) (Alberta Parks 2015c), ACIMS origin (i.e., exotic, hybrid, native, or unknown), and tracked/watched status. Identify any listed fauna species and invasive/exotic fauna species, as defined in the Glossary (see Section 4).

ix. **Key wildlife indicator species –** Identify key wildlife indicator species based on results of desktop review. Indicator species should be species that breed in the area or are species of local significance. Provide rationale for species selected.

x. Consult with Calgary Parks, AEP and Environment Canada as part of scoping field surveys that may be required at the ASP stage or later stages of development. Ensure any required research permits are obtained prior to conducting field surveys.

3.6.1.2. *Field surveys*

i. During all field visits of the Plan Area, record incidental observations and encounters of wildlife (i.e., direct observation) and wildlife features (e.g., nests, dens, browse, scat, tracks)

using the FWMIS *Random Observation Survey Loadform* (Government of Alberta 2013b), including confidence level of the observer and any photographs or related documents. Record photographs and identifying characteristics when species or feature identification has not been confirmed. Incidentals must be recorded when wildlife and wildlife features are observed by chance or as secondary observations to specific wildlife surveys. Locations must be specified by GPS (global positioning system).

ii. Conduct field visits to confirm any observations of listed fauna species or wildlife features identified in the desktop review.

iii. Conduct any field surveys recommended by Calgary Parks, AEP, and Environment Canada for the ASP stage, ensuring survey assessment periods and survey replications are in concordance with the *Sensitive Species Inventory Guidelines* (Government of Alberta 2013f).

3.6.1.3. *Analysis*

i. Review results of ecosystem and land cover classification (see Section 3.2), water resources (see Section 3.3), vegetation (see Section 3.4) and soils and landforms (see Section 3.5) in order to identify mapped features indicative of potential wildlife habitat, wildlife corridors or barriers to movement.

ii. **Habitat suitability –** Conduct qualitative habitat suitability analyses for key wildlife indicator species. Identify significant wildlife habitat, wildlife corridors and movement patterns, and any existing barriers or constraints to movement, both within the Plan Area and between the Plan Area and adjacent areas, as appropriate for the species selected.

iii. Combine results of any incidental wildlife or wildlife feature observations recorded during field visits conducted in the Plan Area with the wildlife desktop review and field surveys to compile a comprehensive wildlife species list for the Plan Area using current FWMIS (Government of Alberta 2013b) or ACIMS (Alberta Parks 2015a) nomenclature, as applicable. Include the species conservation rank (i.e., SRank, GRank) (Alberta Parks 2015c), and ACIMS origin (i.e., exotic, hybrid, native, or unknown) and tracked/watched status.

3.6.2. Report deliverables

3.6.2.1. *Results and Discussion*

i. Compile a comprehensive list of wildlife species that may occur in the Plan Area based on the desktop review, using FWMIS (Government of Alberta 2013b) or ACIMS (Alberta Parks 2015a) nomenclature, as applicable. Identify any listed fauna species and include the species conservation rank (i.e., SRank, GRank) (Alberta Parks 2015c), ACIMS origin (i.e., exotic, hybrid, native, or unknown), and tracked/watched status. Nomenclature must include class common name, species common name, species scientific name, and species code. Include an indication whether each species was directly observed or are potentially occurring in the Plan Area.

ii. Provide details of eBird (Cornell Lab of Ornithology 2015) data download access request as defined by eBird (i.e., name, email, organization, project title, project type, abstract) and results.

iii. Present results of the Wildlife Sensitivity Maps (ESRD 2014d) desktop review.

iv. Provide results of the Habitat Suitability Model Search Tool (AEP 2014b) desktop review.

v. Provide results and search criteria of Important Bird Areas (IBA Canada) desktop review (i.e., IBA criteria, species lists, seasonal abundance).

vi. **Key wildlife indicator species –** Identify the species chosen and provide a rationale for the species selected. Provide results of habitat suitability analyses, including significant wildlife habitat, wildlife corridors and movement patterns, and any existing barriers or constraints to movement, both within the Plan Area and between the Plan Area and adjacent areas.

vii. Provide documentation of consultation with Calgary Parks, AEP and Environment Canada, and results of field surveys recommended for the ASP stage. Provide all research permit numbers for any field surveys conducted.

    a. If camera traps were recommended for field surveys, provide wildlife or wildlife feature photographs from camera traps and incidental observations within an appendix to the Report. Ensure all photos included in the Report are captioned with the photo location, date, time, and wildlife species or feature name in accordance with FWMIS (Government of Alberta 2013b) nomenclature.

viii. Submit all wildlife and wildlife feature observations resulting from incidental or surveyed encounters to FWMIS (Government of Alberta 2013b) and ACIMS (Alberta Parks 2015a), as applicable. FWMIS submissions must be in accordance with the FWMIS Data Submission Guide (ESRD 2014a) using FWMIS loadforms (Government of Alberta 2013b). ACIMS submissions must be in accordance with their current data submission requirements. Provide a copy of FWMIS and ACIMS loadforms submitted as a result of field surveys, and confirm data submission.

ix. Discuss the spatial (e.g., FWMIS search extent) and temporal (e.g., FWMIS search window, season of field surveys) limitations of the results based on the methodology used.

x. **Invasive/exotic species –** Discuss regulatory requirements relating to the invasive/exotic fauna species observed or potentially occurring in the Plan Area.

xi. **Listed fauna species –** Discuss regulatory requirements relating to the listed fauna species observed or potentially occurring in the Plan Area.

xii. Provide recommendations for further wildlife surveys to be conducted for Biophysical Impact Assessments completed for Outline Plan Land Use Amendment stage (see Section 1.2.2).

3.6.2.2. *Mapping*

i. **Habitat suitability –** Provide maps of the results of the habitat suitability analyses conducted for key wildlife indicator species, as appropriate. Include significant wildlife habitat, wildlife corridors and movement patterns, and any existing barriers or constraints to movement.

ii. **Wildlife –** Map of locations of wildlife and wildlife feature observations. Include any point or transects/survey routes, as applicable.

3.7. Environmentally Significant Areas

The following describes the Environmentally Significant Areas (ESA) desktop assessment to be completed by the consultant. Field work in addition to the ecological inventory will not be required. The methods assess which areas are considered to be an ESA in a pre-development (i.e., baseline) condition, according to criteria in the *Open Space Plan* (The City of Calgary 2003). The *Open Space Plan* identifies a site as an ESA on the basis of its meeting one or all of the following criteria:

1. **Quality of biotic community:** biotic communities of high quality (i.e., minimal disturbance) and/or diversity for a specific habitat type.
2. **Ecological function – natural:** the area is important for the healthy maintenance of a natural system beyond its boundaries by maintaining biodiversity and/or acting as a staging area or corridor for wildlife within the system.
3. **Distinctive and/or unusual landform:** the area possesses a distinctive and/or unique landform (i.e., 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.

Results of the ESA assessment available at the time of ASP development will, in part, inform the Environmental Open Space planning and land use concept development in the ASP, in accordance with the *New Community Planning Guidebook* of the MDP (The City of Calgary 2009a). As per the *Open Space Plan* (The City of Calgary 2003), Calgary Parks reserves the right to make the final determination of ESAs.

Assessment of post-development ESA viability is not required for the Report. A forthcoming ecological planning framework will include further detail on how to assess this *Open Space Plan* criterion.

3.7.1. Methods

3.7.1.1. *Desktop review*

i. Review provincial ESA reports, maps, and GIS data (Alberta Parks 2014a) for:
   a. Historical 2009 ESA categories (i.e., international, national, provincial).
   b. Updated 2014 ESA scores (score >0.189 = ESA). The 2014 ESAs are an update of the 2009 Environmentally Significant Areas of Alberta, and the 2010 *Aquatic Environmentally Significant Areas of Alberta* (Fiera Biological Consulting Ltd. 2010).

ii. Review the *Aquatic Environmentally Significant Areas in Alberta* report (Fiera Biological Consulting Ltd. 2010), maps and GIS data (AEP 2012).

iii. Review the *Environmentally Significant Areas of the Calgary Region* (Lamoureux *et al.* 1983) report, with particular attention to sites deemed to be biophysically significant areas of the region.

iv. Review results of special ecological communities identified in the vegetation assessment (see Section 3.4), soils and landforms (see Section 3.5), and wildlife (see Section 3.6).

3.7.1.2. *Analysis*

i. Identify ESAs in accordance with the *Open Space Plan* (The City of Calgary 2003) criteria (i.e., quality of biotic community, ecological function – natural, distinctive and/or unusual landform, uniqueness).

ii. Identify areas with regional and local significance.

3.7.2. Report deliverables

3.7.2.1. *Results and Discussion*

i. Describe results of each component of the ESA desktop review, including applicable ESA categories, scores, and areas within the Plan Area. Tabulate results as needed.

ii. Provide results of the ESA analysis in accordance with the *Open Space Plan* criteria, including rationale.

iii. Discuss the spatial and temporal limitations of the desktop review and analysis.

3.7.2.2. *Mapping*

i. **Environmentally Significant Areas –** Include all ESAs in the Plan Area that were identified through analysis in accordance with the *Open Space Plan* criteria.

4. GLOSSARY

Ecological boundary: The furthest ecological extent of a wetland bordering upland or other non-wetland habitat, as indicated by a shift from hydric to non-hydric soils and facultative wetland vegetation to upland vegetation in the majority of years. The wetland boundary is delineated by the absence of wetland soil and vegetation indicators. A wetland boundary may include multiple contiguous classes, forms and/or types of wetlands in the *Alberta Wetland Classification System* (modified from: *Alberta Wetland Identification & Delineation Directive* (Government of Alberta 2015a)).

Ecological community: A distinct assemblage of plant species with similar total species composition and vegetation structure that can often be associated with particular environmental conditions. Given the right conditions, it reoccurs predictably. Ecological communities can be separated into three major types: terrestrial, wetland and aquatic (Allen 2011).

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 to Calgary from an environmental perspective 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 listed in Appendix C of The City of Calgary Parks *Open Space Plan* (The City of Calgary 2003).

Ephemeral watercourse (ephemeral draw): (i) A small, shallow, natural stream along which water flows only during and immediately after spring runoff and heavy rainfall, and typically dries up within a matter of days to weeks, and which can remain dry for many years and may be fully restored after prolonged precipitation. Poorly defined channel or no bank development; channel typically vegetated; channel width can range from <1 metre to several metres (modified from: *Stepping Back from the Water* (Government of Alberta 2012b) definition of 'Stream (Ephemeral)' and 'Ephemeral/Intermittent/Temporary/Seasonal Water Bodies'; *Alberta Wetland Policy* (Government of Alberta 2013a) definition of 'Ephemeral Water Body'; and *Integrated Standards and Guidelines* (Government of Alberta 2013c) glossary definition of 'watercourse' and 'watercourse (intermittent)', and Appendix D: Provincial Watercourse and Waterbody Descriptions)). **(ii)** A watercourse that flows briefly in direct response to precipitation; these channels are always above the water table; A watercourse that flows only during and immediately after snowmelt or heavy rainfall (<10% of the time) (modified from *Draft City of Calgary Riparian Action Program: A Blueprint for Resilience* (The City of Calgary 2015f)).

Habitat: The place in which an animal or plant lives. The sum of environmental circumstances in the place inhabited by an organism, population or community (Natural Regions Committee 2006).

Intermittent watercourse: (i) Small stream channels; Small springs are main source outside periods of spring runoff and heavy rainfall. Distinct channel development; channel usually has no terrestrial vegetation; channel width is less than 0.7 metres; usually some bank development (modified from: *Integrated Standards and Guidelines* (Government of Alberta 2013c)). **(ii)** A watercourse or portion of a watercourse that flows continuously only at certain times of year. At low flow, dry segments alternating with flowing segments can be present; A watercourse that flows for part of each year (e.g., flow occurs 10% to 80% of the time); A watercourse with seasonal flow that usually lasts longer than 30 days per year (modified from *Draft City of Calgary Riparian Action Program: A Blueprint for Resilience* (The City of Calgary 2015f)).

Regulated weeds: Plants included in the Alberta *Weed Control Act* (Government of Alberta 2010b) and Regulation (Government of Alberta 2010c).

Invasive/exotic species:

(i) All botanical species that meet one or all of the following criteria:

1. Regulated plants as per Alberta *Weed Control Act* (Government of Alberta 2010b) and Regulation (Government of Alberta 2010c).
2. Alberta *Wild Species Status Search* "Exotic/Alien" status (AEP 2011).
3. Species listed by the current ACIMS (Alberta Parks 2015a) Element Occurrence data as "exotic" in origin.
4. Species listed on the current Rogue's Gallery (Alberta Native Plant Council 2015).
5. Species listed on the current Alberta Weed Regulatory Advisory Committee Watch List, proposed Prohibited Noxious List, or proposed Noxious List (Alberta Agriculture and Forestry 2014).

(ii) all faunal species that meet one or all of the following criteria:

1. Alberta *Wild Species Status Search* "Exotic/Alien" status (AEP 2011).
2. Species listed by the current ACIMS (Alberta Parks 2015a) Element Occurrence data as "exotic" in origin.

Landform: (i) A topographic feature; **(ii)** The various shapes of the land surface resulting from a variety of actions such as deposition or sedimentation, erosion and earth crust movements (Natural Regions Committee 2006).

Listed fauna species: Any native animal species or subspecies that meets one or more of the following criteria:

1. Are included on the current ACIMS (Alberta Parks 2015a) *List of Tracked and Watched Elements.*
2. Are provincially listed as 'At Risk', 'May Be at Risk', or 'Sensitive' by the *General Status of Alberta Wild Species* (AEP 2010) and Alberta *Wild Species Status Search* (AEP 2011).
3. Are provincially regulated as 'Endangered' or 'Threatened' under the *Wildlife Act* (Government of Alberta 2000c).
4. Are listed as 'Endangered', 'Threatened', or 'Special Concern' by the Endangered Species Conservation Committee (ESRD 2014c).
5. Are federally regulated as 'Endangered', 'Threatened', or 'Special Concern' on Schedule 1 of Canada's *Species at Risk Act* (Government of Canada 2002).
6. Are listed as 'Endangered', 'Threatened', or 'Special Concern' by the COSEWIC (Committee on the Status of Endangered Wildlife in Canada) *Wildlife Species Search* (Government of Canada 2014).

Natural Region/Subregion: Natural Regions are the largest ecological classification unit in Alberta and allow for the geographic classification of the province based on ecological criteria. Each Natural Region is further categorized into Natural Subregions (Natural Regions Committee 2006).

Small perennial watercourse: (i) Permanent streams; often small valley bottoms; bench floodplain development. Banks and channel well defined; channel width from greater than 0.7 metres to 5 metres (modified from: *Integrated Standards and Guidelines* (Government of Alberta 2013c)). **(ii)** A watercourse or portion of a watercourse that flows year-round; A watercourse that generally flow continuously year-round (e.g., flow >80% of the time); Watercourses where base flow is dependably generated from the movement of groundwater into the channel, Perennial channels that convey water throughout the year (modified from *Draft City of Calgary Riparian Action Program: A Blueprint for Resilience* (The City of Calgary 2015f)).

Large perennial watercourse: (i) Permanent streams; Major streams or rivers; well-defined flood plains; often wide valley bottoms. Non-vegetated channel width exceeds 5 metres (modified from: *Integrated Standards and Guidelines* (Government of Alberta 2013c)). **(ii)** A watercourse or portion of a watercourse that flows year-round; A watercourse that generally flow continuously year-round (e.g., flow >80% of the time); Watercourses where base flow is dependably generated from the movement of groundwater into the channel; Perennial channels that

convey water throughout the year (modified from *Draft City of Calgary Riparian Action Program: A Blueprint for Resilience* (The City of Calgary 2015f)).

Rare plant species: Any native species, subspecies or variety of vascular plant, bryophyte (mosses, hornworts, liverworts), lichen, or fungi that, because of its biological characteristics or for some other reason, exists in low numbers or in very restricted areas in Alberta, that meets one or more of the following criteria (modified from *Rare Plant Survey Guidelines* (Alberta Native Plant Council 2000); *Guidelines for Rare Vascular Plant Surveys in Alberta* (Alberta Native Plant Council 2012)):

1. Are included on the current ACIMS (Alberta Parks 2015a) *List of Tracked and Watched Elements.*
2. Are provincially listed as 'At Risk', 'May Be at Risk', or 'Sensitive' by the *General Status of Alberta Wild Species* (AEP 2010) and Alberta *Wild Species Status Search* (AEP 2011).
3. Are provincially regulated as 'Endangered' or 'Threatened' under the *Wildlife Act* (Government of Alberta 2000c).
4. Are listed as 'Endangered', 'Threatened', or 'Special Concern' by the Endangered Species Conservation Committee (ESRD 2014c).
5. Are federally regulated as 'Endangered', 'Threatened', or 'Special Concern' on Schedule 1 of Canada's *Species at Risk Act* (Government of Canada 2002).
6. Are listed as 'Endangered', 'Threatened', or 'Special Concern' by the COSEWIC (Committee on the Status of Endangered Wildlife in Canada) *Wildlife Species Search* (Government of Canada 2014).

Riparian area: Refers to any land that adjoins or directly influences a water body, including floodplains and land that directly influences alluvial aquifers. Typical examples include the green ribbons of lush vegetation that grow on floodplains and watercourse banks. They usually are distinctly different from surrounding lands because of unique soil and vegetation characteristics that are influenced by the presence of water above the ground and below the surface. Water is present due to a water body or elevated water table such as in a seep or spring (The City of Calgary 2014).

Special ecological community: A rare or locally significant ecological community (a distinct assemblage of plant species with similar total species composition and vegetation structure that can often be associated with particular environmental conditions; that when given the right conditions, reoccurs predictably; and which may be terrestrial, wetland, aquatic, or other), as defined by the ACIMS (Allen 2011) *Ecological Community Sampling Guidelines*, meets one or more of the following criteria:

1. On the ACIMS (Allen 2014) *Ecological Community Tracking List* or watch list, and hence already considered significant at the provincial or greater level.
2. A community that is unusual, uncommon or of limited extent and so could be considered for addition to the tracking or watch list.
3. One that is locally significant (ACIMS *Ecological Community Sampling Guidelines* (Allen 2011)).

True aquatic habitat: True aquatic habitats are defined as having a water depth of approximately ≥2 metres at midsummer; the interface between wetland and deepwater might occur at the edge of a wetland connected to a river, lake, or other water body (modified from: *Alberta Wetland Identification and Delineation Directive* (Government of Alberta 2015a)).

Valley: A depression of the earth's surface that is usually traversed by a watercourse, whether it be ephemeral, intermittent, or perennial/permanent, which receives the drainage of the surrounding upland. Valleys are created by fluvial erosion, faulting or other agents but may have been subsequently modified by glacial erosion. Valleys are

sometimes referred to as coulees, canyons, draws, gullies and ravines depending upon their size, shape, evolution and locally preferred name.

Water body: Any location where water flows or is present, whether or not the flow or the presence of water is continuous, intermittent or occurs only during a flood, and includes but is not limited to wetlands and aquifers but does not include except for clause (nn) and section 99 "water body" that is part of an irrigation works if the irrigation works is subject to a license and the irrigation works is owned by the licensee, unless the regulations specify that the location is included in the definition of water body (as per the *Alberta Water Act* (Government of Alberta 2000b)).

Watercourse: A flowing water body, such as a river, stream, creek, or other natural water channel (includes ephemeral draws), and the bed along which water flows. This includes watercourses that may be ephemeral, intermittent, temporary or seasonal in nature (modified from *Stepping Back from the Water* (Government of Alberta 2012b) and *Integrated Standards and Guidelines* (Government of Alberta 2013c)).

Watershed: An area of land that catches precipitation and drains it to a specific point such as a marsh, lake, stream or river. A watershed can be made up of a number of sub-watersheds that contribute to the overall drainage of the watershed. A watershed is sometimes referred to as a basin, drainage basin or catchment area (Government of Alberta 2012b;(The City of Calgary 2014).

Wetland: (i) Land saturated with water long enough to promote wetland or aquatic processes as indicated by the poorly drained soils, hydrophytic vegetation, and various kinds of biological activity that are adapted to a wet environment (Government of Alberta 2013a); **(ii)** Land that is saturated with water long enough to promote hydric soils or aquatic processes as indicated by poorly drained soils, hydrophytic vegetation, and various kinds of biological activity that are adapted to wet environments (Natural Regions Committee 2006).

Wildlife corridor: The physical linkage connecting two areas of habitat and differing from the habitat on either side. Corridors are used by organisms to move around without having to leave the preferred habitat. A linear habitat patch through which a species must travel to reach habitat more suitable for reproduction and other life sustaining needs. Many corridors, linking several patches of habitat, form a network of habitats. The functional effectiveness of corridors depends on the type of species, the type of movement, the strength of the edge effects and its shape (Government of Alberta 2013c).

Wildlife feature: Stationary signs representing a species use or existence, i.e., tracks, nests, leks, redd, etc. These are not species observations, although all features are associated with a species (ESRD 2014a).

Wildlife habitat: The terrestrial and aquatic environments and associated ecosystem elements that in combination provide the requirements of food, cover and space needed to support self-sustaining populations of wildlife (Government of Alberta 2013c).

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APPENDIX A: LEGISLATION, REGULATIONS, POLICIES AND PLANS

Additional legislation, regulations, policies and plans may apply.

Municipal

- *Calgary River Valleys Plan* (The City of Calgary 1984)
- *Environmental Policy* (The City of Calgary 2012)
- *Environmental Reserve Setback Guidelines* (The City of Calgary 2007a)
- *Integrated Pest Management Plan* (The City of Calgary 1998)
- *Municipal Development Plan* (The City of Calgary 2009a)
- *Natural Areas Management Plan* (Calgary Parks & Recreation 1994)
- *Open Space Plan* policy (The City of Calgary 2003)
- *Our BiodiverCity, Calgary's 10-year biodiversity strategic plan* (The City of Calgary Parks 2015) and *Biodiversity Policy* (The City of Calgary 2015a)
- *Parks Urban Forest Strategic Plan* (The City of Calgary 2007b)
- *Riparian Strategy* (The City of Calgary 2014)
- *Slope Adaptive Development Guidelines Policy and Conservation Planning and Design Policy* (The City of Calgary Land Use Planning & Policy 2009)
- *The City of Calgary Wetland Conservation Plan and Policy* (The City of Calgary 2004)
- *Urban Park Master Plan & Policy* (The City of Calgary 1994)

Provincial

- *Alberta Land Stewardship Act* (Government of Alberta 2009)
- *Alberta Wetland Policy* (Government of Alberta 2013a)
- *Environmental Protection and Enhancement Act* (Government of Alberta 2000a) and *Environmental Code of Practice for Pesticides* (Government of Alberta 2010a)
- *Municipal Government Act* (Government of Alberta 2014)
- *Public Lands Act* (Government of Alberta 2013d)
- *Water Act* (Government of Alberta 2000b)
- *Weed Control Act* (Government of Alberta 2010b) and *Weed Control Regulation* (Government of Alberta 2010c)
- *Wildlife Act* (Government of Alberta 2000c)

Federal

- *Canada Wildlife Act* (Government of Canada 1985a)
- *Canadian Environmental Assessment Act* (Government of Canada 2012)
- *Canadian Environmental Protection Act* (Government of Canada 1999)
- *Fisheries Act* (Government of Canada 1985b)
- *Migratory Birds Convention Act* (Government of Canada 1994)
- *Species At Risk Act* (Government of Canada 2002)

APPENDIX B: ECOLOGICAL INVENTORY REPORT CHECKLIST

Area Structure Plan name: _____

Consulting company: _____

Contact name: _____ Contact email: _____

Ecological Inventory Report submission (check one): ☐ Initial ☐ Final

Use this checklist to ensure that all requirements for Ecological Inventory Reports have been met. See the *Ecological Inventory Framework* (see Section 3) for detailed information about items in this checklist. At all times, new Ecological Inventory Reports must meet the requirements within Section 3 of the 2016 *Ecological Inventory Framework*.

The undersigned agree and certify that all requirements on this checklist have been reviewed and properly identified as part of this submission. The undersigned understand that this checklist will be used as a tool for review of the Ecological Inventory Report by Calgary Parks.

_____ _____

Date Signature

YES	NO	N/A	CHECKLIST ITEM
			1. All items in the SHADED areas are explained in the comments section of this checklist.
			2. Submit copies (two (2) for initial Report; three (3) for final Report) of the Report that include the Professional Biologist's or overseeing professional's signature (and stamp).
			3. Cover letter highlights any unresolved issues or areas where requirements cannot be met.
			4. First page of the Report includes the report publication statement listed in Section 2.3.3.
			5. Explicitly state that all details conform to all City of Calgary standard specifications and the *Ecological Inventory Framework*, or explicitly state items that have to be addressed prior to Ecological Inventory Report approval.
			6. **Title page –** Include a descriptive Ecological Inventory Report title that specifies the Area Structure Plan project name and Report version (initial or final).
			7. **Executive summary –** Summarize the Report, including its objectives, methods, results, and discussion.
			8. **Table of contents –** Provide a table of Report contents.
			9. **Introduction –** Describe the study objectives of the ecological inventory, including a description of the Area Structure Plan. Include the study area and location, name of the project, name of landowners, and land location (i.e., legal description).

YES	NO	N/A	CHECKLIST ITEM
			10. **Methods –** Include sub-sections for each required component (see Section 3): regional environmental setting, ecosystem and land cover classification, vegetation, soils and landforms, water resources, wildlife, Environmentally Significant Areas. Describe methodology and justification for methods in detail, including a field program schedule of actual site visit dates. Specify which methods are *Ecological Inventory Framework* standards or where methods were modified. Cite all standards and data sources referenced (see literature cited). Provide maps for all survey points, routes or areas surveyed, and maps of photograph locations in the Plan Area.
			11. **Results –** Include sub-sections for each required component of the Ecological Inventory (see Section 3). Describe the results for each component, including relevant information from the background information review. Provide data in table or graphic format where appropriate. Provide maps of the results (see map list on this checklist). Cite the sources reviewed and compile in the literature cited section.
			12. **Discussion –** Summarize and discuss results for specific points of discussion for each required sub-section (see Section 3). Include discussion regulatory considerations and recommended next steps. Include an anticipated schedule for additional field work required. Cite all standards and data sources relevant to the discussion. Identify any unresolved issues or evaluation components where guidelines or checklist items cannot be met. Identify additional surveys, including appropriate assessment periods and analyses to be completed for a Biophysical Impact Assessment at the Outline Plan Land Use Amendment stage. Cite the sources reviewed and compile the information in the literature cited section.
			13. **Literature cited –** Cite in detail all references used as background information, data sources, imagery, methodology, or that are included for discussion.
			14. **Appendices –** Ecological inventory data sheets, site photographs, historical aerial photographs, vegetation and wildlife species lists, and supplementary maps.
			15. **Maps –** Maps for each sub-section may be combined. Where maps have been combined, describe in the comments section of this checklist.
			a. Regional environmental setting (see Section 3.1.2.2)
			i. Plan Area location map
			ii. Plan Area environmental setting map
			b. Ecosystem and land cover classification (see Section 3.2.2.2)
			i. Ecosystem and land cover classification: survey points and transects map
			ii. Ecosystem and land cover classification map
			c. Water resources (see Section 3.3.2.2)
			i. Hydrogeology map
			ii. Watercourses map
			iii. True aquatic habitats map
			iv. Wetlands map
			v. Riparian areas map
			vi. Crown-ownership map
			d. Vegetation map (see Section 3.4.2.2)
			e. Soils and landforms (see Section 3.5.2.2)
			i. Soils map
			ii. Slopes map
			iii. Landforms map
			f. Wildlife (see Section 3.6.2.2)
			i. Habitat suitability map
			ii. Wildlife map
			g. Environmentally Significant Areas map (see Section 3.7.2.2)

Comments:

(Calgary Parks use only)

Date received: _____ Approval date: _____

Approval: □ Yes
□ Yes (with conditions):_____
□ No (comments):_____

Approver name: _____ Approver signature: _____