

**Biophysical Impact Assessment
of The Hamptons
Development Project
Calgary, Alberta**

Prepared For:



**QUANTUM
PLACE**

**Suite 203, 1026 16 Avenue NW
Calgary, Alberta T2M 0K6**

Prepared by:

CORVIDAE

ENVIRONMENTAL CONSULTING INC.

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1 Introduction

1.1 Project Overview

The project areas (Sites A and B), are located within The Hamptons Golf Club, in northwest Calgary, Alberta. The Hamptons community is bordered by Stoney Trail to the north, Shaganappi Trail to the east, Country Hills Boulevard to the south and Sarcee Trail to the west.

The proposal is to develop residential homes on two golf course holes in Site A and no modification to the existing golf course holes for Site B (Figure 1). The 18 hole golf course will remain and be achieved through course reconfiguration. QuantumPlace Developments Ltd. is managing the planning, development, and public and regulatory requirements for the project. QuantumPlace has contracted the services of Corvidae Environmental Consulting Inc. to complete the Biophysical Impact Assessment (BIA) and help the project meet The City of Calgary requirements with respect to the minimizing impacts on the environment from the development.

1.2 Regulatory Information Requirements

The City of Calgary Parks has a BIA Framework (City of Calgary Parks and Urban Development Institute 2010). The framework provides a process that identifies potential project impacts and appropriate mitigating measures. A BIA is required for *“any approval of outline plans for land containing or abutting identified Environmentally Significant Areas (ESA); or any areas with channelization, utility crossing, within a natural environment park”*. A BIA is also required for a project that requires excavation and new construction that would change the existing land use. The BIA process is also triggered if there are waterbodies on a project site that will be disturbed.

For The Hamptons Golf Club development project, it is anticipated that two of the existing stormwater ponds on the golf course lands north of the Site A boundary will be expanded to accommodate the loss in stormwater storage capacity from the development of Site A, see Figure 2. The proposal is to develop low density residential homes while maintaining all but one of the golf course and stormwater ponds.

1.3 Project Need

There is a demand for residential housing in Calgary due to a year over year growth in population, with an increase of 38,508 new residents arriving in 2013 (City Clerk's Election and Information Services, Civil Census Results 2014). The 2013 growth is on average with the annual increase of residents in the city. In attempt to reduce urban sprawl, The City of Calgary is hoping to develop within areas that have already been developed and have existing infrastructure (roads and utilities). Areas to be developed are also to be out of the flood zones that were previously impacted in the 2013 floods. The proposed development is out



of flood zones and within an already developed area that has existing infrastructure (access and utilities). This meets The City of Calgary's desire to "grow up, not out" as part of the Municipal Development Plan policy to promote sensitive intensification in areas where infrastructure already exists.



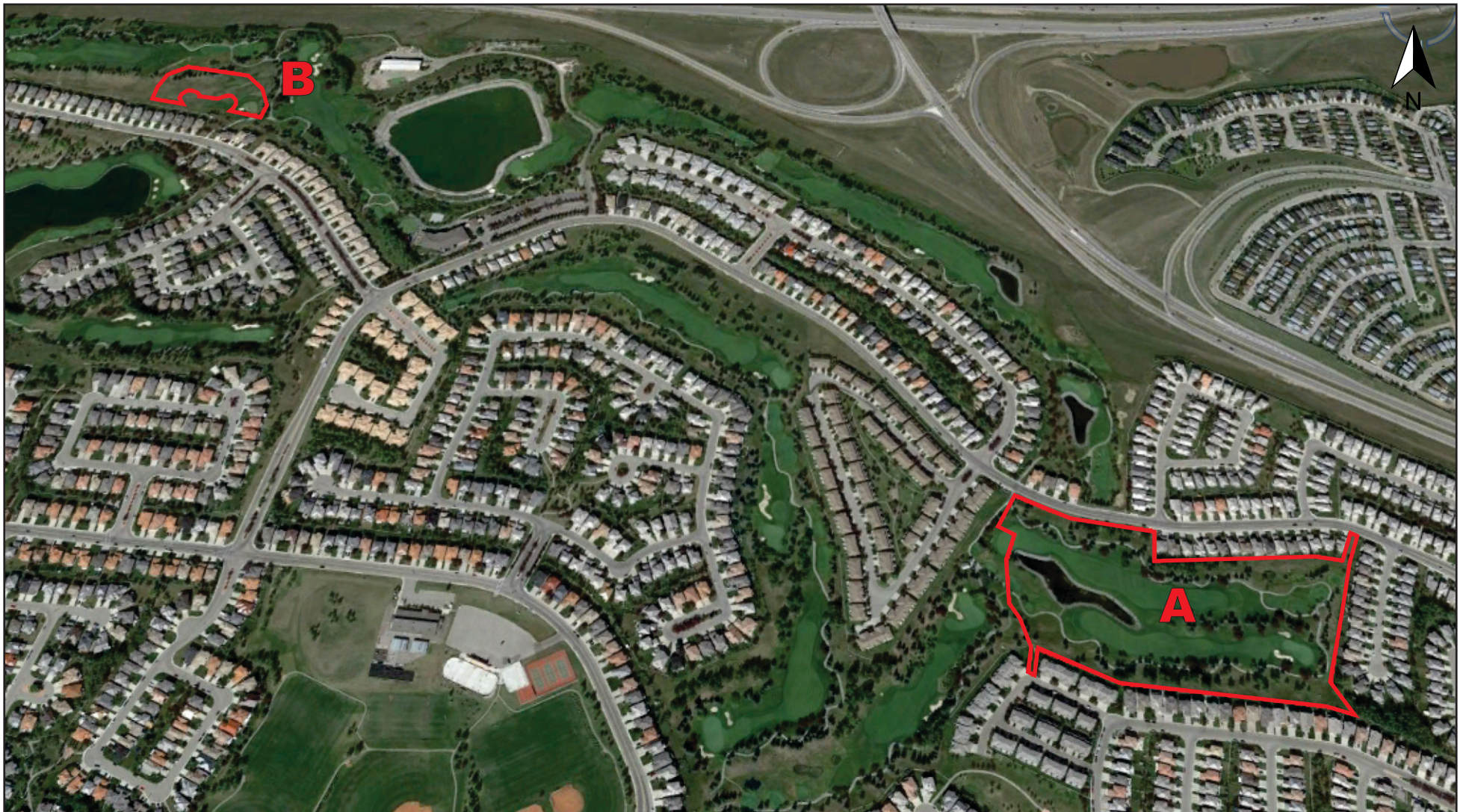


Figure 1: Project Area, Proposed Sites A and B

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Client: QuantumPlace
Developments Ltd.
Author: D. Santomauro
Date: April 6, 2016

Legend

— Site A and B Development Areas

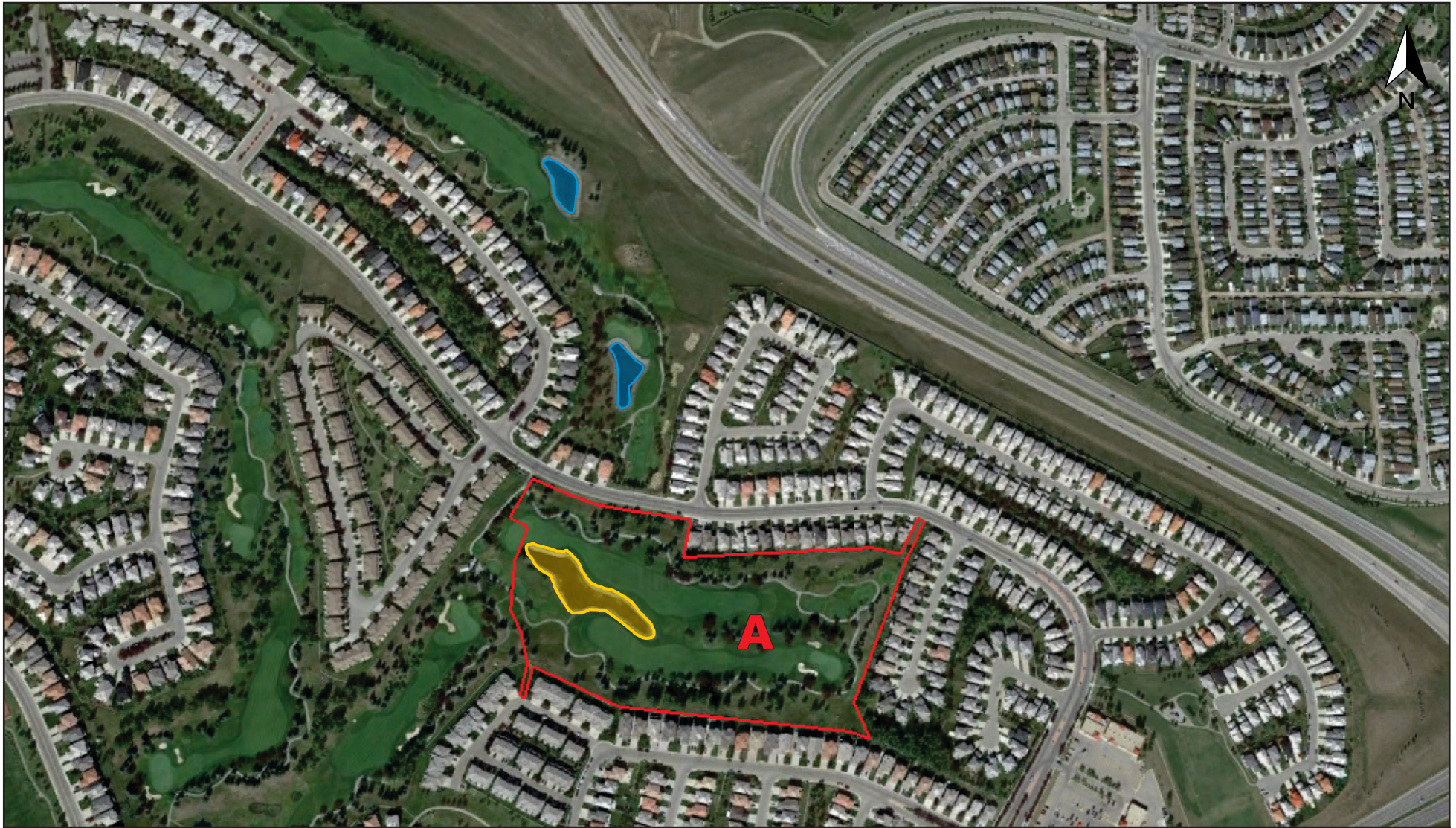


Figure 2: Stormwater Ponds, Existing and Proposed Expansion

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Author: D. Santomauro
Date: Sept. 19, 2016

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- Site A Court Development Area
- Proposed Stormwater Pond Termination/Fill
- Proposed Stormwater Pond Expansions

Aerial Imagery Source: 2016 Digital Globe

2 Environmental Assessment Scope and Methodology

2.1 Approach to the Assessment

Our approach for this BIA was to first review the requirements following The City of Calgary BIA Framework (2010) and contact The City of Calgary personnel involved with the project to discuss the scope, timeline and specific requirements. Following the initial discussions, Corvidae reviewed background information and planned the field assessment. A preliminary biophysical assessment for vegetation and wildlife was conducted in the fall 2015, and a tree inventory was completed in March 2016 (see Appendix D) and detailed wildlife and vegetation surveys were completed in June, 2016. Following our assessments and review of wildlife data, discussions with the golf course manager and experience as Qualified Environmental Professionals (wildlife, vegetation and soil biologists), Corvidae has provided mitigation measures in this report to minimize the impacts of the project.

2.2 Scope of the Assessment

The scope of work for the BIA included: a review of background data for the historical uses and biophysical features; a site assessment to document wildlife, vegetation, soils and aquatic features; review of current site uses and maintenance practices carried out by the golf course; and review of project design considerations, existing plans, timeline and project duration.

For background data, Corvidae reviewed The City of Calgary Park and Urban and Development Institute, Calgary Biophysical Impact Assessment Framework Wildlife Management Information System (FWMIS) and Alberta Conservation and Information Management System (ACIMS) and other applicable databases. See Section 6 for details.

Site assessment included assessment of the following features:

- vegetation species,
- tree habitat and species of all trees,
- surface hydrology and wetland classification (as per the Alberta Wetland Classification Guidelines and the Calgary Wetland Conservation Policy),
- aquatics habitat and species,
- surface water flow (hydrology), and
- wildlife, wildlife signs (e.g., stick nests, cavity nests, burrows, etc.) and suitable habitat for species of special management concern.

Due to the majority of the proposed development areas being on existing disturbances, cleared and used as a golf course, no rare plants would occur at those locations. There is a small patch of native vegetation present at Site B, running through the centre of the site's proposed location. Rare plants are unlikely due to the surrounding disturbance and extensive weed infestation in this area (see Section 6.1.1 for weed infestation). The ACIMS



search did not turn up any existing rare plant occurrences. Vegetated areas have been previously disturbed or are invaded with non-native plants (horticultural and invasive weeds), making it low quality or negligible rare plant habitat.

2.3 Field Assessments

Corvidae completed the field visits to assess surface water, vegetation, soils, wildlife and wildlife habitat at three different times of the year:

- November of 2015,
- March of 2016 and
- June of 2016.

2.4 Spatial and Temporal Extents

The assessment includes the entire project area and up to 500 m of the surrounding area for the field assessments. A 5 km buffer was reviewed for desktop data for wildlife and vegetation. The project area is surrounded by development, with the exception of a small patch of native prairie on the north side of Stoney Trail and intermittent small patches in The Hamptons community. The native prairie areas total up to <10% of the proposed project area (Site B), however that native prairie has extensive infestation of non-native species, including weeds, (see Table 2 to 11 for vegetation species). These areas are bordered by houses, major roads and the golf course greens.

2.5 Related Documents and Plans

The detailed plans for the development are not yet finalized. Design is in the outline plan stage with on-going public input for the project. A proposed concept plan (Appendix C) and a Land Use Redesignation application have been developed based on information gathered from four key resources over the past seven months of planning:

- 1) Technical studies and a broad context analysis to help define opportunities and constraints on the land.
- 2) City of Calgary planning policy and regulations including the Municipal Development Plan and the Crowchild Phase 4 Area Structure Plan.
- 3) Significant feedback received from the community in public engagement initiatives (open house meetings).
- 4) Biophysical features identified during the BIA process.



The technical studies assessed are listed below including the context of the analysis:

- To determine the watershed and hydrogeology of the area the *Three-Dimensional Hydrostratigraphic Modeling of the Sylvan Lake Sub-Basin in the Edmonton-Calgary Corridor, Central Alberta* was assessed.
- There was no paleontological study required, as determined by Alberta Environment and Parks and The City of Calgary.
- To review hydrological information the *Edmonton-Calgary Corridor Groundwater Atlas* was reviewed.
- To retrieve records of wildlife and fish species occurring within a 5 km area of the project the *Fish and Wildlife Management Information System* was reviewed by way of the *Fish and Wildlife Internet Mapping Tool* (Government of Alberta 2015/2016) to access the species summary reports.
- Additional resources that were reviewed to identify wildlife species at risk that may occur in the region included: the General Status of Alberta Wild Species 2010 (Government of Alberta 2011a, 2012), *Committee on the Status of Endangered Wildlife in Canada* (COSEWIC 2016) and Schedule 1 of the *Species at Risk Act* (SARA) (Government of Canada 2016).
- For rare plant occurrences in the vicinity of the project the *Alberta Conservation Information Management System* (ACIMS) database was accessed (ACIMS 2015).

All of these studies have been fully cited in the references (Section 12).

2.6 Assessment of Effects

The desktop review and field assessments in November 2015 and March 2016 provided the biophysical information to assess the effects of the project. Professional biologists assessed all the biophysical features to determine effects the project may have on the environment and provided mitigation recommendations. See Section 6 for details.

2.7 Determining Significance of Effects

Significance of effects has been determined by what species are present for vegetation and wildlife and if there were any federally or provincially listed species at risk in the project area. In addition to the wildlife and vegetation, the soils have been assessed and any sensitive soils are identified. The stormwater ponds and surface hydrology area were assessed and any pond habitat to be destroyed or altered has been documented and the significance of the effect of altering this habitat quantified.



No wildlife or vegetation species of management concern were observed in the project area. No sensitive soils were encountered during the field assessments. The waterbodies are man-made stormwater ponds with low habitat suitability for amphibians. As per Figure 3, only one manmade stormwater pond will be removed, the rest will be left or made larger. Additional low-lying areas (man-made) occur throughout the project area but these typically contain storm sewer drains and do not retain sufficient standing water for breeding amphibians. Details on all of the biophysical features are provided in Section 6: Biophysical Inventory of Existing Environment.

3 Project Description

3.1 Historical Land Use

The golf course was constructed in the early 1990's. Prior to golf course construction the area was a combination of native prairie and cultivated land. There were no existing wetlands at the time of site construction (David Whitell, golf course builder and manager, personal communication, March 2016).

To assess if the ponds were natural or manmade, and the history of surface water flow in the area, Corvidae reviewed the historical weather data to determine rain and snow fall for a period of time to accurately represent the area as well as aerial photos from the years of high and low precipitation over the six decades. Corvidae ordered the aerial photos available for specific years and overlaid the project area over the photos to show the site location in relation to the landscape. As shown in Figures 3 to 6, there is no standing water in Site A and B in even the wettest years. The historical photos provide evidence of *no historical wetlands occurring* on either sites.

The historical weather information was obtained from the Government of Canada Historical Weather Data (http://climate.weather.gc.ca/links/index_e.html). The following precipitation levels (Table 1) have been recorded and air photos that were available from the wettest and driest years prior to the golf course construction have been reviewed and provided in this report.

Table 1: Historical Precipitation 1965 to 1979

Year	Rain	Snow	Total
1965	465	168	589
1966	294	163	403
1967	134	175	255
1968	237	164	357
1969	353	107	428
1970	260	198	397
1971	273	169	391
1972	332	212	482
1973	276	124	360
1974	260	126	346



1975	240	189	368
1976	332	103	405
1977	361	78	421
1978	432	132	533
1979	180	129	285

Note: 1978 was the wettest year since 1965 (no air photos available for 1965). 1979 was the driest year since 1967 (no air photos available for 1967). Figures 5 and 6 provide comparisons of the wettest and driest years to show any surface water. There is no standing surface water shown in Site A and B in the air photos. The historical photos provide evidence of no historical wetlands occurring.





Figure 3: Project Area 1949

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Client: QuantumPlace
Developments Ltd.
Author: D. Santomauro
Date: April 6, 2016

Legend

— Site A and B Development Areas

Source: Aerial Photographic Record System, Alberta Government

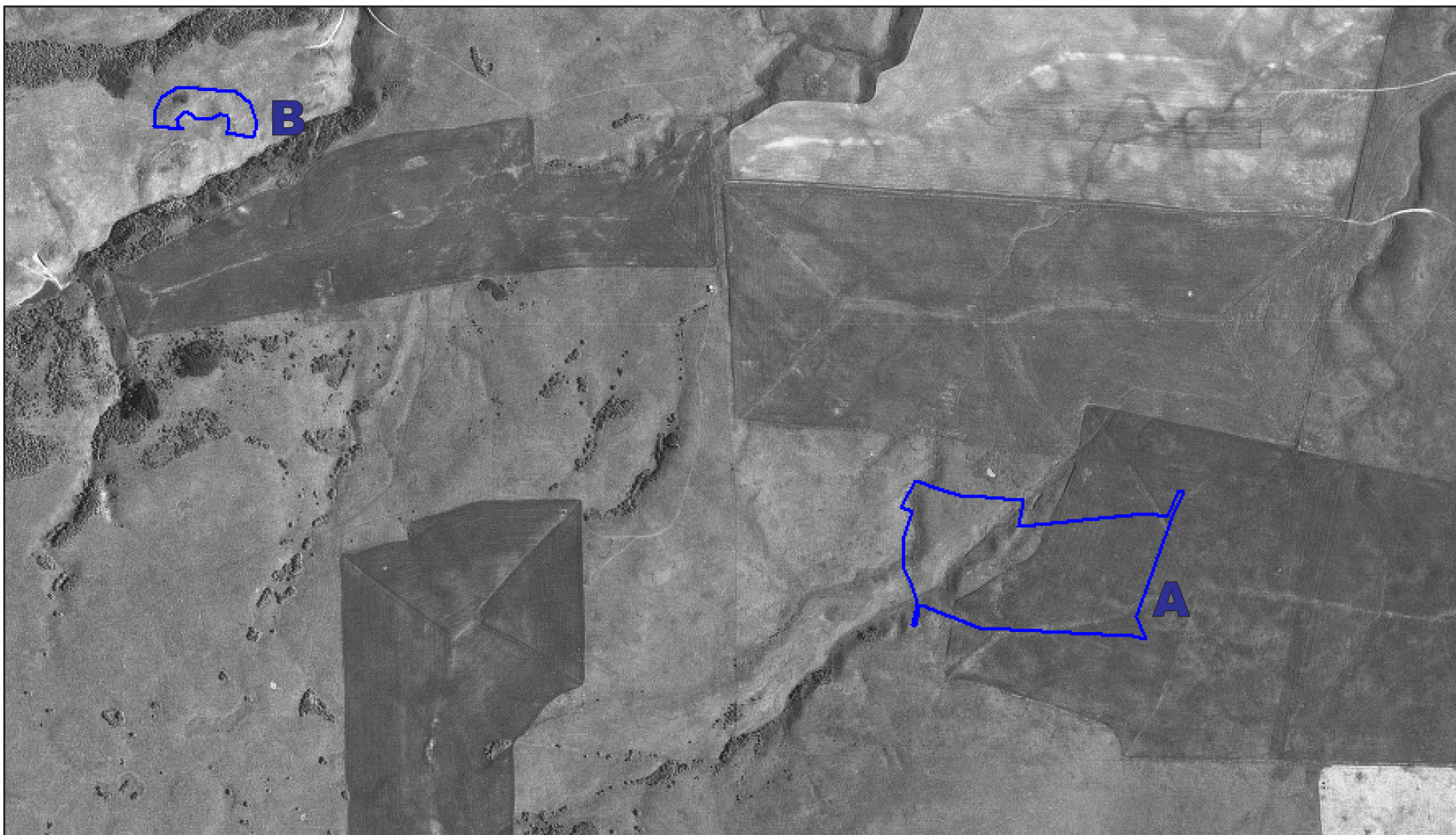


Figure 4: Project Area 1966

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Client: QuantumPlace
Developments Ltd.
Author: D. Santomauro
Date: April 6, 2016

Legend

■ Site A and B Development Areas

Source: Aerial Photographic Record System, Alberta Government

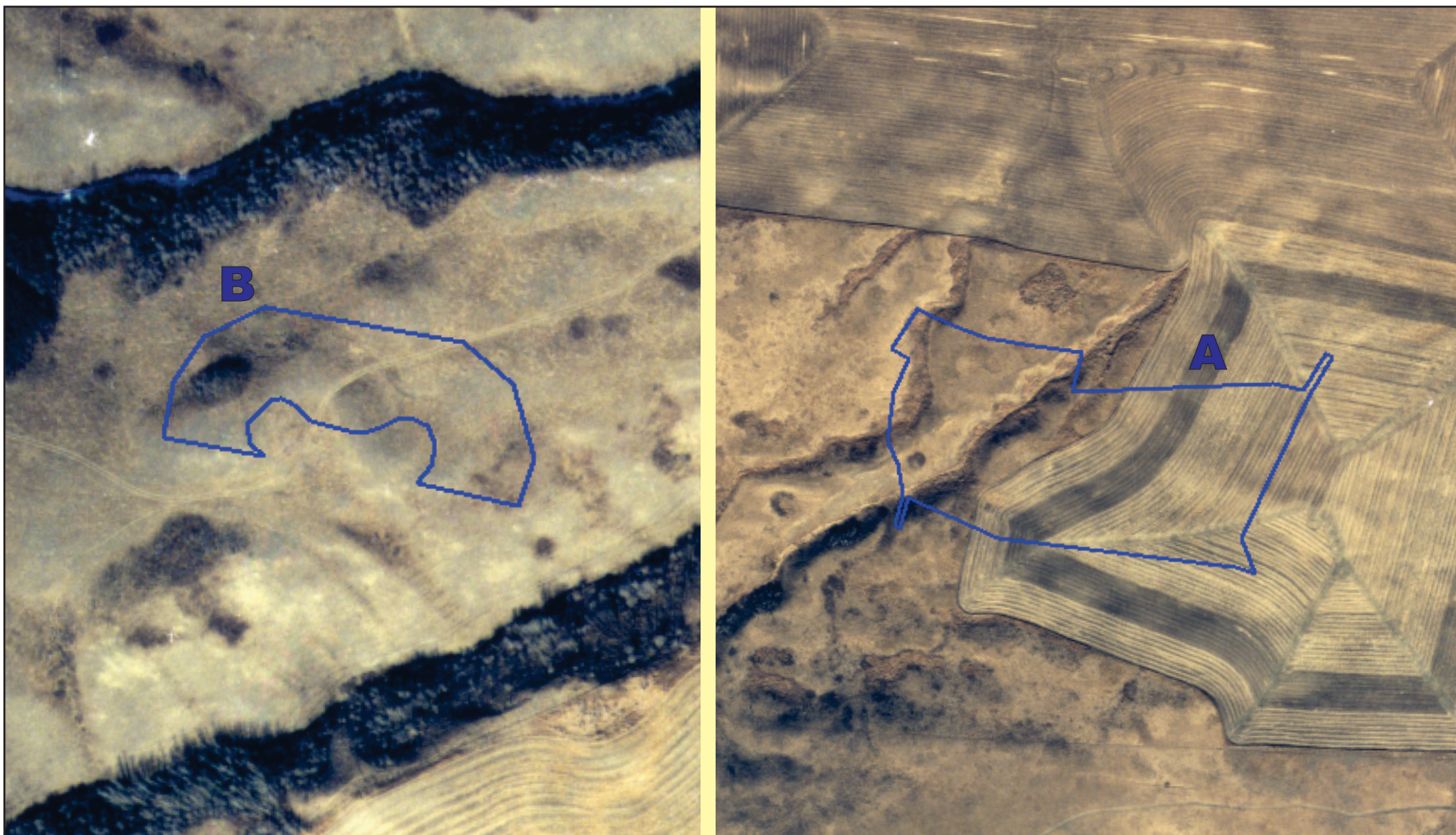


Figure 5: Project Area 1978 - Colour Detail

Legend

■ Site A and B Development Areas

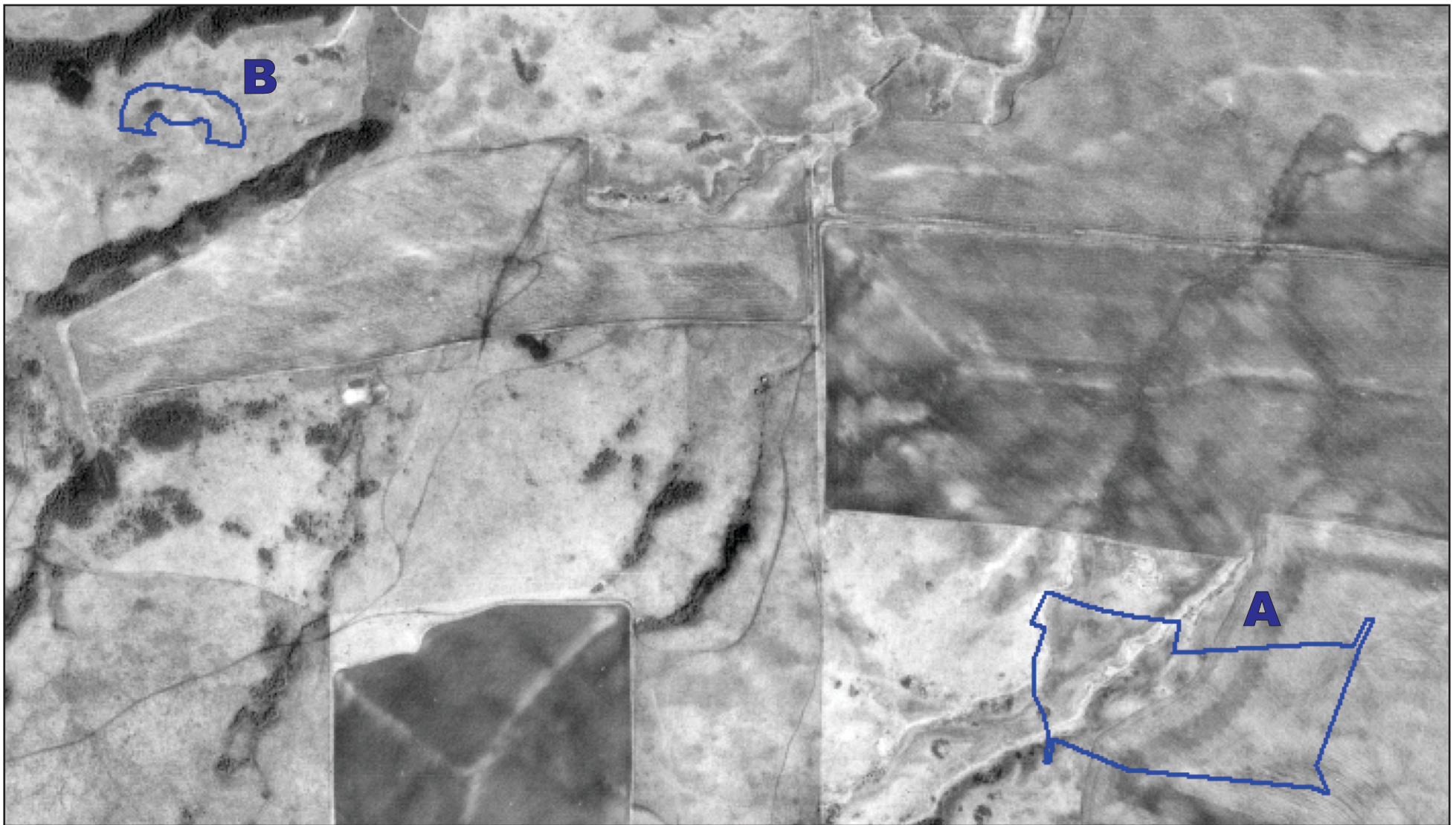


Figure 6: Project Area 1979

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Client: QuantumPlace
Developments Ltd.
Author: D. Santomauro
Date: April 6, 2016

Legend

— Site A and B Development Areas

Source: Aerial Photographic Record System, Alberta Government

3.2 Project Setting

The project area is situated in The Hamptons Golf Club northwest Calgary, directly south of Stoney Trail. The project area is a golf course surrounded on the west, north and south and east by roads and housing developments. The community is called The Hamptons, with Hidden Valley community to the east, Kincora and Simons Valley communities to the north, Citadel to the west and Edgemont to the south.

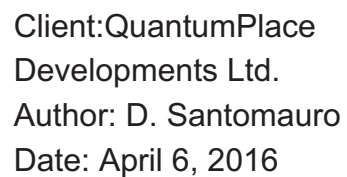
The project area is part of the Grassland Natural Region and the Foothills Fescue subregion (ASRD 2005). Historically this area would have been grazing land for cattle. The historical flora for Foothills Fescue in the area are mountain rough fescue (*Festuca campestris*), Parry's oatgrass (*Danthonia parryi*), Plains Rough Fescue (*Festuca hallii*) and bluebunch fescue (*Festuca idahoensis* Elmer). Shrubby cinquefoil (*Dasiphora fruticosa*) is also common, especially on grazed sites. (Natural Regions Committee 2006)

Figure 7 shows that the project area is not within the flood zone as identified by the Alberta Government Flood Zone mapping.

3.3 Site Description

Currently the project area is a golf course with horticultural species that were planted on site in 1991 and subsequent years. The majority of the project area is manicured turf for golfing. The golf course is 18 holes over a 200 acre (81 hectare) area and is surrounded by 900 homes. The Hamptons was built in the 90s, beginning in 1991. Details on the vegetation and stormwater ponds are provided in Section 6.





■ Site A and B Development Area

Retrieved March 8, 2016 from: <http://maps.srd.alberta.ca/FloodHazard/>

4 Federal and Provincial Regulatory Approvals

The provincial regulatory requirements are for a wildlife assessment to ensure no sensitive species habitat is being destroyed and the appropriate setbacks are being met, as per the Alberta Wildlife Act (current as of December 2014).

The Alberta Wetlands Policy has been addressed. Wetland avoidance or compensation applies to natural wetlands only. The standing water areas on the golf course are man-made stormwater ponds, as shown in the historical air photos. One stormwater pond will be filled and replaced; the capacity will be facilitated by expanded storm water pond(s) offsite on other areas of the golf course. See Figure 2 and Section 6 for details.

The Historical Resources Act applies. Archaeology and Paleontological Historical Resources Impact Assessments were not required for the project, as communicated by The City of Calgary.

There are no required federal approvals. The regulations in the Migratory Birds Convention Act will be met and no clearing will be done within the migratory or breeding bird windows unless a breeding bird survey has been completed within 7 days prior to start of clearing. For more details see Section 6.

The filling in of the existing stormwater pond does not require a notification or an approval under the Water Act because it is an isolated, non-natural water body, not tied to a natural water body (ephemeral or perennial watercourse, wetland or lake). The Water Act notifications and approvals are required for *naturally occurring waterbodies*. The stormwater pond is constructed and was not naturally occurring (see Section 3.1). In addition, the exemptions in the Administrative Guide for approvals to Protect Surface Water Bodies Under the *Water Act* (Alberta Environment 2000, current as of 2014), Appendix A Exemptions, Section D states:

(d) landscaping that is not in a watercourse, lake or wetland if the landscaping does not result in (i) an adverse effect on the aquatic environment on any parcel of land, or (ii) any change in the flow or volume of water on an adjacent parcel of land.

5 Biophysical Inventory of Existing Environment

The site is an existing golf course, prior to that it was a native prairie and agricultural cropland. The project area is part of the Grassland Natural Region and the Foothills Fescue subregion (ASRD 2005).



5.1 Vegetation

A search of the ACIMS online database reported no sensitive element occurrences for rare plants in the vicinity of the project (ACIMS 2016). A vegetation assessment of the project site was completed in November, 2015, and June, 2016, following industry accepted protocols for professional biologists. This includes walking the entire area and documenting plant communities, all plant species present and quantity and species of invasive weed species. The entire areas for Site A and B were document, including more complex habitat (e.g., trees, unmowed grassland/shrub areas, stormwater ponds). Where trees were present, each tree was identified to species. See Tables 14 and 15 and Figures 11 and 12 for details. Corvidae also completed a detailed Tree Inventory report (Appendix D).

The natural topography of the area was altered in the 1991 when the existing golf course and surrounding 900 homes were developed. The project footprint (Site A) has been planted with mostly non-native vegetation. Large portions of Site A is seeded grass that is routinely mowed. Dominant grass species that have been seeded in the greens, fairways and T's include annual bluegrass (*Poa annua*) and creeping bentgrass (*Agrostis stolonifera*). Dominant grass species outside of the greens (unmowed areas) include Kentucky bluegrass (*Poa pratensis*) and smooth brome (*Bromus inermis*). Some native plant species do occur in small patches or as scattered individuals in less disturbed portions of the unmowed areas. Dominant tree species include non-native Colorado spruce (*Picea pungens*), Schubert chokecherry (*Prunus virginiana* 'Schubert'), northwest poplar (*Populus x jackii* 'Northwest') and native balsam poplar (*Populus balsamifera*), which were planted throughout the golf course but occur primarily along the margins and between the greens and fairways. All tree species were planted at the time of the golf course construction, with additional trees planted at varying times since. There were no trees in the project area at the time of construction, only shrubs and grasses (David Whitell, personal communication, November 2015). The majority of trees proposed to be removed are located in Site A and include Colorado spruce, Schubert chokecherry, northwest poplar and balsam poplar. There are three tree species in Site B that are located on the project footprint (Colorado Spruce, Schubert Chokecherry and Willow). See the Tree Inventory for details on tree species, size and quantity (Appendix D).

Additional tree and shrub varieties were also noted. A list of vegetation found in the project area are provided in Tables 2 to 11, broken out into habitat type for each Site A and B. See Figures 8 and 9 for each area location.

Vegetation Types in Site A

Area	Community Type	Cover Classes
Area 1	Stormwater Pond	Dominant
Area 2	Horsetail Meadow	Dominant
Area 3	Greens, Fairways and Tees	Common
Area 4	Mixedwood Forest (mowed)	Occasional
Area 5	Mixedwood Forest (unmowed)	Dominant



Table 2: Vegetation Species in Site A, Area 1 Stormwater Retention Pond

Common Name	Scientific Name	Abundance	Native/Non Native
SHRUBS			
Sandbar Willow	<i>Salix exigua</i>	O	Native
Red-osier Dogwood	<i>Cornus stolonifera</i>	O	Native
Raspberry	<i>Rubus idaeus</i>	O	Native
Bebb's Willow	<i>Salix bebbiana</i>	O	Native
Wild Rose	<i>Rosa acicularis</i>	O	Native
GRAMINOIDS			
Smooth Brome	<i>Bromus inermis</i>	O	Non Native
Timothy	<i>Phleum pratense</i>	O	Non Native
Kentucky Bluegrass	<i>Poa pratensis</i>	O	Non Native
Quackgrass	<i>Elymus repens</i>	O	Non Native
Cattail	<i>Typha latifolia</i>	D	Native
Bulrush	<i>Schoenoplectus acutus</i>	D	Native
Water Sedge	<i>Carex aquatalis</i>	D	Native
Creeping Spike-rush	<i>Eleocharis palustris</i>	D	Native
Foxtail Barley	<i>Hordeum jubatum</i>	C	Non Native
Fowl Bluegrass	<i>Poa palustris</i>	C	Native
Baltic Rush	<i>Juncus balticus</i>	C	Native
Awed Sedge	<i>Carex atherodes</i>	C	Native
FORBS			
Canada Thistle	<i>Cirsium arvense</i>	C	Non Native
Wild Mint	<i>Mentha arvensis</i>	O	Native
Field Pennycress	<i>Thlaspi arvense</i>	O	Non Native
Marsh Hedge Nettle	<i>Stachys palustris</i>	O	Native
Scentless Chamomile	<i>Matricaria perforata</i>	O	Non Native
Common Peppergrass	<i>Lepidium densiflorum</i>	O	Non Native
Shore Buttercup	<i>Ranunculus cymbalaria</i>	C	Non Native
Canada Goldenrod	<i>Solidago canadensis</i>	C	Native
Larkspur	<i>Delphinium glaucum</i>	O	Native
Horsetail	<i>Equisetum arvense</i>	C	Native
Willowherb	<i>Epilobium palustris</i>	C	Native
Stonecrop	<i>Sedum Lanceolatum</i>	O	Native



Wild Licorice	<i>Glycyrrhiza lepidota</i>	C	Native
Rough Cinquefoil	<i>Potentilla norvegica</i>	O	Non Native
Common Name	Scientific Name	Location within the Project Area	Abundance

Table 3: Vegetation Species in Site A, Vegetation Species in Area 2 Horsetail Meadow

Common Name	Scientific Name	Abundance	Native/Non Native
SHRUBS			
Raspberry	<i>Rubus idaeus</i>	O	Native
Common Snowberry	<i>Symphoricarpos occidentalis</i>	O	Native
Shrubby Cinquefoil	<i>Potentilla fruticosa</i>	O	Native
Prickly Rose	<i>Rosa acicularis</i>	O	Native
GRAMINOIDS			
Smooth Brome	<i>Bromus inermis</i>	O	Non Native
Kentucky Bluegrass	<i>Poa pratensis</i>	O	Non Native
FORBS			
Canada Thistle	<i>Cirsium arvense</i>	C	Non Native
Sweet-clover	<i>Melilotus officinalis</i>	O	Non Native
Wild Mint	<i>Mentha arvensis</i>	O	Native
Field Pennycress	<i>Thlaspi arvense</i>	O	Non Native
Yellow Toadflax	<i>Linaria vulgaris</i>	O	Non Native
Canada Goldenrod	<i>Solidago canadensis</i>	C	Native
Horsetail	<i>Equisetum arvense</i>	D	Native

Table 4: Vegetation Species in Site A, Area 3 Greens, Fairways, and Tee's

Common Name	Scientific Name	Abundance	Native/Non Native
SHRUBS			
Sandbar Willow	<i>Salix exigua</i>	O	Native
GRAMINOIDS			
Annual bluegrass	<i>Poa annua</i>	C	Native
Creeping bentgrass	<i>Agrostis stolonifera</i>	O	Non Native
Smooth Brome	<i>Bromus inermis</i>	C	Non Native
Timothy	<i>Phleum pratense</i>	O	Non Native
Kentucky Bluegrass	<i>Poa pratensis</i>	D	Non Native
Quackgrass	<i>Elymus repens</i>	O	Non Native
Orchardgrass	<i>Dactylis glomerata</i>	O	Non Native
Crested Wheatgrass	<i>Agropyron cristatum</i>	O	Non Native
FORBS			
Perennial Sow-thistle	<i>Sonchus arvensis</i>	O	Non Native
Canada Thistle	<i>Cirsium arvense</i>	C	Non Native



Sweet-clover	<i>Melilotus officinalis</i>	O	Non Native
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Table 5: Vegetation Species in Site A, Area 4 Mixedwood Forest (mowed)

Common Name	Scientific Name	Abundance	Native/Non Native
TREES			
Colorado Spruce	<i>Picea pungens</i>	C	Non Native
Schubert Chokecherry	<i>Prunus virginiana</i> 'Schubert'	C	Non Native
Balsam Poplar	<i>Populus balsamifera</i>	C	Native
Northwest Poplar	<i>Populus x jackii</i> 'Northwest'	O	Non Native
European White Birch/Weeping Birch	<i>Betula pendula</i>	C	Non Native
Siberian Larch	<i>Larix sibirica</i>	O	Non Native
Laurel Willow	<i>Salix pentandra</i>	C	Non Native
Amur Cherry	<i>Prunus maackii</i>	O	Non Native
Mountain-ash	<i>Sorbus scopulina</i>	O	Native
Bur Oak	<i>Quercus macrocarpa</i>	O	Non Native
Elm	<i>Ulmus sp. Hort.</i>	O	Non Native
SHRUBS			
Red-osier Dogwood	<i>Cornus stolonifera</i>	O	Native
Canada Buffaloberry	<i>Shepherdia canadensis</i>	O	Native
Common Snowberry	<i>Symphoricarpos albus</i>	O	Native
Shrubby Cinquefoil	<i>Potentilla fruticosa</i>	O	Native
Prickly Rose	<i>Rosa acicularis</i>	O	Native
GRAMINOIDS			
Smooth Brome	<i>Bromus inermis</i>	D	Non Native
Timothy	<i>Phleum pratense</i>	O	Non Native
Kentucky Bluegrass	<i>Poa pratensis</i>	C	Non Native
Quackgrass	<i>Elymus repens</i>	O	Non Native
Crested Wheatgrass	<i>Agropyron cristatum</i>	O	Non Native
FORBS			
Perennial Sow-thistle	<i>Sonchus arvensis</i>	O	Non Native
Canada Thistle	<i>Cirsium arvense</i>	C	Non Native
Goat's-beard	<i>Tragopogon dubius</i>	O	Non Native
Hounds-tongue	<i>Cynoglossum officinale</i>	O	Non Native



Table 6: Vegetation Species in Site A, Area 5 Mixedwood Forest (unmowed)

Common Name	Scientific Name	Abundance	Native/Non Native
TREES			
Colorado Spruce	<i>Picea pungens</i>	C	Non Native
Schubert Chokecherry	<i>Prunus virginiana</i> 'Schubert'	C	Non Native
Balsam Poplar	<i>Populus balsamifera</i>	C	Native
Northwest Poplar	<i>Populus x jackii</i> 'Northwest'	C	Non Native
European White Birch/Weeping Birch	<i>Betula pendula</i>	O	Non Native
Siberian Larch	<i>Larix sibirica</i>	C	Non Native
Laurel Willow	<i>Salix pentandra</i>	C	Non Native
Amur Cherry	<i>Prunus maackii</i>	C	Non Native
Cherry	<i>Prunus virginiana</i>	O	Native
Mountain-ash	<i>Sorbus scopulina</i>	O	Native
Bur Oak	<i>Quercus macrocarpa</i>	O	Non Native
Elm	<i>Ulmus sp. Hort.</i>	O	Non Native
SHRUBS			
Red-osier Dogwood	<i>Cornus stolonifera</i>	O	Native
Raspberry	<i>Rubus idaeus</i>	O	Native
Canada Buffaloberry	<i>Shepherdia canadensis</i>	O	Native
Common Snowberry	<i>Symphoricarpos albus</i>	C	Native
Shrubby Cinquefoil	<i>Potentilla fruticosa</i>	C	Native
Prickly Rose	<i>Rosa acicularis</i>	C	Native
GRAMINOIDS			
Annual bluegrass	<i>Poa annua</i>	O	Native
Creeping bentgrass	<i>Agrostis stolonifera</i>	O	Non Native
Smooth Brome	<i>Bromus inermis</i>	C	Non Native
Timothy	<i>Phleum pratense</i>	C	Non Native
Kentucky Bluegrass	<i>Poa pratensis</i>	O	Non Native
Quackgrass	<i>Elymus repens</i>	O	Non Native
Orchardgrass	<i>Dactylis glomerata</i>	O	Non Native
Crested Wheatgrass	<i>Agropyron cristatum</i>	O	Non Native
FORBS			
Perennial Sow-thistle	<i>Sonchus arvensis</i>	O	Non Native
Canada Thistle	<i>Cirsium arvense</i>	C	Non Native
Sweet-clover	<i>Melilotus officinalis</i>	O	Non Native
Goat's-beard	<i>Tragopogon dubius</i>	O	Non Native
Sticky Groundsel	<i>Senecio viscosus</i>	O	Non Native



Harebell	<i>Campanula rotundifolia</i>	O	Non Native
Cicer Milkvetch	<i>Astragalus cicer</i>	O	Non Native
Common Peppergrass	<i>Lepidium densiflorum</i>	O	Non Native
Canada Goldenrod	<i>Solidago canadensis</i>	C	Native
Horsetail	<i>Equisetum arvense</i>	C	Native
Hounds-tongue	<i>Cynoglossum officinale</i>	O	Non Native
Star flowered false solomons seal	<i>Maianthemum stellatum</i>	C	Native
American Vetch	<i>Vicia americana</i>	C	Native
Golden Bean	<i>Thermopsis rhombofolia</i>	C	Native
Creamy peavine	<i>Lathyrus ochroleucus</i>	C	Native
Sticky Purple Geranium	<i>Geranium viscosissimum</i>	C	Native

Vegetation Types in Site B

Area	Community Type	Cover Classes
Area 1	Spruce Forest Silverberry Native	Dominant
Area 2	Shrubland	Dominant
Area 3	Smooth Brome Grassland Greens, Fairways and	Common
Area 4	Tees	Occasional
Area 5	Narrow Drainage	

Table 7: Vegetation Species in Site B, Area 1 Spruce Forest

Common Name	Scientific Name	Abundance	Native/Non Native
TREES			
Colorado Spruce	<i>Picea pungens</i>	D	Non Native
Laurel Willow	<i>Salix pentandra</i>	O	Non Native
SHRUBS			
Prickly Rose	<i>Rosa acicularis</i>	C	Native
Buffaloberry	<i>Shepherdia canadensis</i>	O	Native
GRAMINOIDS			
Smooth Brome	<i>Bromus inermis</i>	O	Non Native



Kentucky Bluegrass	<i>Poa pratensis</i>	O	Non Native
FORBS			
Common Dandelion	<i>Taraxacum officinale</i>	O	Non Native
Canada Thistle	<i>Cirsium arvense</i>	O	Non Native
Wild Vetch	<i>Vicia americana</i>	O	Native
Cicer Milkvetch	<i>Astragalus cicer</i>	O	Non Native
Prairie Smoke	<i>Geum triflorum</i>	O	Native

Table 8: Site B, Vegetation Species in Area 2 Silverberry Native Shrubland

Common Name	Scientific Name	Abundance	Native/Non Native
SHRUBS			
Silverberry	<i>Elaeagnus commutata</i>	D	Native
Common Snowberry	<i>Symphoricarpos occidentalis</i>	C	Native
Saskatoon	<i>Amelanchier alnifolia</i>	D	Native
Prickly Rose	<i>Rosa acicularis</i>	C	Native
Shrubby Cinquefoil	<i>Potentilla fruticosa</i>	C	Native
GRAMINOIDS			
Smooth Brome	<i>Bromus inermis</i>	C	Non Native
Western Wheatgrass	<i>Pascopyron smithi</i>	O	Native
Kentucky Bluegrass	<i>Poa pratensis</i>	O	Non Native
Needle Grass	<i>Stipa comata</i>	O	Native
Green Needlegrass	<i>Stipa viridula</i>	O	Native
Crested Wheatgrass	<i>Agropyron cristatum</i>	O	Non Native
FORBS			
Common Dandelion	<i>Taraxacum officinale</i>	C	Non Native
Perennial Sow-thistle	<i>Sonchus arvensis</i>	O	Non Native
Bluebur	<i>Lappula squarrosa</i>	O	Non Native



Canada Thistle	<i>Cirsium arvense</i>	C	Non Native
Goat's-beard	<i>Tragopogon dubius</i>	O	Non Native
White Sagebrush	<i>Artemisia ludoviciana</i>	O	Native
Pasture Sage	<i>Artemisia frigida</i>	C	Native
Brown-eyed Susan	<i>Gaillardia aristata</i>	C	Native
Silverweed	<i>Potentilla anserina</i>	O	Native
Wild Vetch	<i>Vicia americana</i>	C	Native
Cicer Milkvetch	<i>Astragalus cicer</i>	O	Non Native
Houndstongue	<i>Cynoglossum officinale</i>	D	Non Native
Prairie Onion	<i>Allium textile</i>	O	Native
Low Goldenrod	<i>Solidago missouriensis</i>	C	Native
Northern Bedstraw	<i>Galium boreale</i>	C	Native
Golden Bean	<i>Thermopsis rhombifolia</i>	C	Native
Spreading dogbane	<i>Apocynum androsaemifolium</i>	D	Native
plantain	<i>Plantago minor</i>	C	Non Native
Field Pennycress	<i>Thlaspi arvense</i>	O	Non Native

Table 9: Site B, Area 3 Smooth Brome Grassland

Common Name	Scientific Name	Abundance	Native/Non Native
SHRUBS			
Common Snowberry	<i>Symphoricarpos albus</i>	O	
Saskatoon	<i>Amelanchier alnifolia</i>	O	
Prickly Rose	<i>Rosa acicularis</i>	O	
GRAMINOIDS			
Smooth Brome	<i>Bromus inermis</i>	D	
Kentucky Bluegrass	<i>Poa pratensis</i>	D	
Needle Grass	<i>Stipa comata</i>	O	
Green Needlegrass	<i>Stipa viridula</i>	O	



Crested Wheatgrass	<i>Agropyron cristatum</i>	O
FORBS		
Common Dandelion	<i>Taraxacum officinale</i>	C
Perennial Sow-thistle	<i>Sonchus arvensis</i>	O
Canada Thistle	<i>Cirsium arvense</i>	C
Goat's-beard	<i>Tragopogon dubius</i>	O
White Sagebrush	<i>Artemisia ludoviciana</i>	O
Brown-eyed Susan	<i>Gaillardia aristata</i>	O
Wild Vetch	<i>Vicia americana</i>	C
Low Goldenrod	<i>Solidago missouriensis</i>	C
Showy locoweed	<i>Oxytropis splendens</i>	C
Field Pennycress	<i>Thlaspi arvense</i>	O

Table 10: Site B, Area 4 Greens, Fairways and Tees

Common Name	Scientific Name	Abundance	Native/Non Native
GRAMINOIDS			
Annual bluegrass	<i>Poa annua</i>	C	Native
Creeping bentgrass	<i>Agrostis stolonifera</i>	O	Non Native
Smooth Brome	<i>Bromus inermis</i>	C	Non Native
Timothy	<i>Phleum pratense</i>	O	Non Native
Kentucky Bluegrass	<i>Poa pratensis</i>	D	Non Native
Quackgrass	<i>Elymus repens</i>	O	Non Native
Orchardgrass	<i>Dactylis glomerata</i>	O	Non Native
Crested Wheatgrass	<i>Agropyron cristatum</i>	O	Non Native
FORBS			
Perennial Sow-thistle	<i>Sonchus arvensis</i>	O	Non Native



Canada Thistle	<i>Cirsium arvense</i>	C	Non Native
Sweet-clover	<i>Melilotus officinalis</i>	O	Non Native

Table 11: Site B, Area 5 Narrow Drainage

Common Name	Scientific Name	Abundance	Native/Non Native
GRAMINOIDS			
Green Needlegrass	<i>Stipa viridula</i>	O	Native
Fowl Bluegrass	<i>Poa palustris</i>	C	Native
Water Sedge	<i>Carex aquatalis</i>	C	Native
Awned Sedge	<i>Carex atherodes</i>	O	Native
FORBS			
Common Dandelion	<i>Taraxacum officinale</i>	C	Non Native
Canada Thistle	<i>Cirsium arvense</i>	C	Non Native
Wild Licorice	<i>Glycyrrhiza lepidota</i>	C	Native
Arrowleaf	<i>Petasites saggitatus</i>	O	Native
White Sagebrush	<i>Artemisia ludoviciana</i>	O	Native
Field Pennycress	<i>Thlaspi arvense</i>	O	Non Native





**Figure 8:
Vegetation Types in Site A**

Client: Quantum Place Developments Ltd.

Legend

- Site A Development Area
- Vegetation Types



Scale
1:2,000

CORVIDAE
ENVIRONMENTAL CONSULTING INC

Drawn By: Bruce Gleig
Date: July 02, 2016



**Figure 9:
Vegetation Types in Site B**

Client: Quantum Place Developments Ltd.

Legend

- Site B Development Area
- Vegetation Types



Scale
1:1,000

CORVIDAE
ENVIRONMENTAL CONSULTING INC

Drawn By: Bruce Gleig
Date: July 02, 2016

5.1.1 Weeds Occurring on Site and Chemical Applications

There were five provincially-listed weed species identified on the project footprint during the site assessments. All five species are listed as “Noxious” in the Alberta Weed Control Act and the County (Alberta Queen’s Printer 2010, Wheatland County 2013). Weed polygons have been documented, each weed location added as a GPS file and shown in Figure 10. No weed species listed provincially as “Prohibited Noxious” were observed during the site assessments.

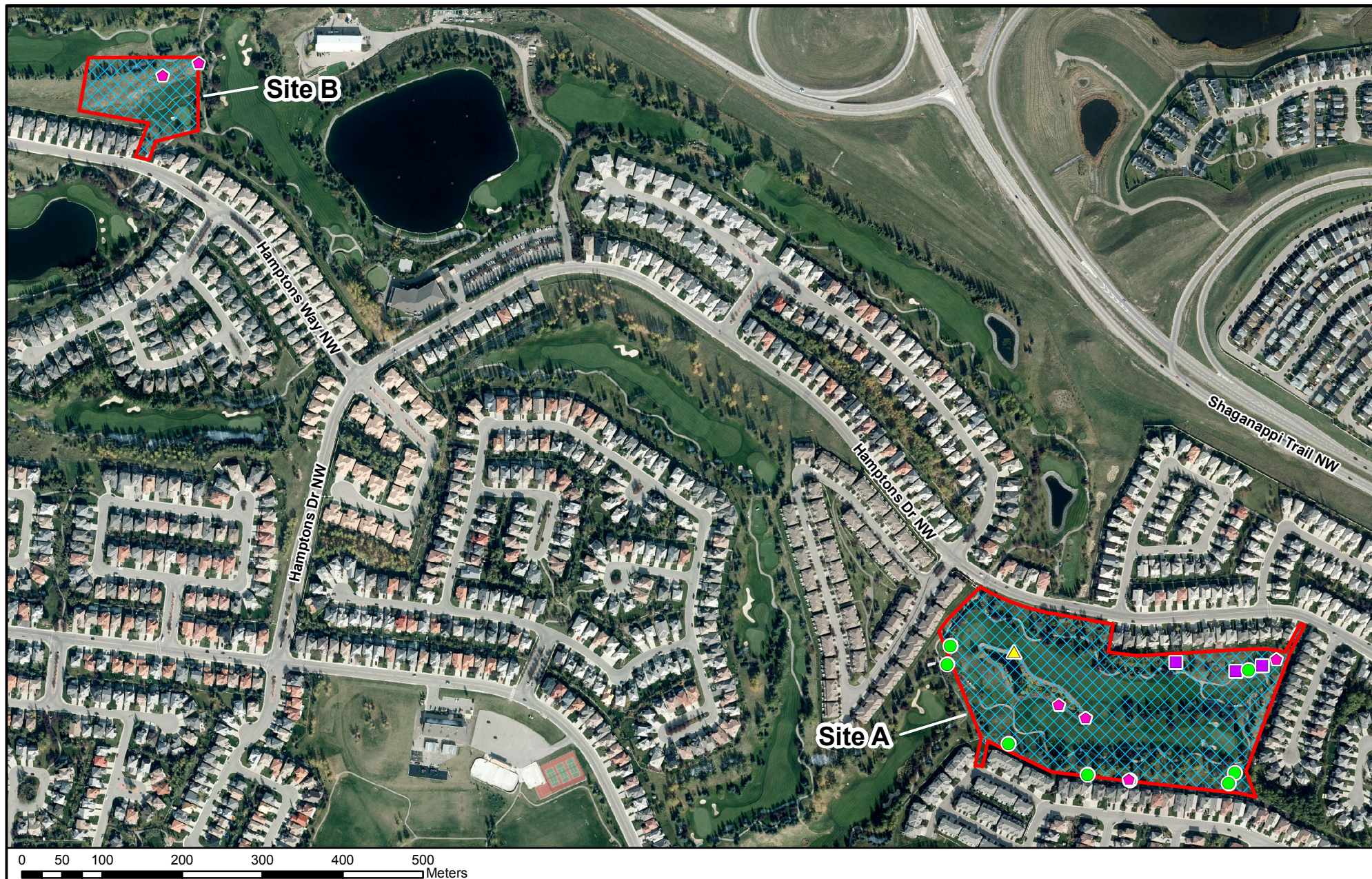
Noxious weed species observed in the project area during the site assessments include: Canada thistle (*Cirsium arvense*), houndstongue (*Cynoglossum officinale*), perennial sow-thistle (*Sonchus arvensis*), scentless chamomile (*Matricaria perforate*) and yellow toadflax (*Linaria vulgaris*).

Additional species not listed as Prohibited Noxious or Noxious in Alberta, but often considered nuisance or problem species were also recorded. These included: bluebur (*Lappula squarrosa*) (noxious in Wheatland County), bull thistle (*Cirsium vulgare*), cicer milkvetch (*Astragalus cicer*), common dandelion (*Taraxacum officinale*), common peppergrass (*Thlaspi arvense*), crested wheatgrass (*Agropyron cristatum*), field pennycress (*Thlaspi arvense*), foxtail barley (*Hordeum jubatum*), sweet-clover (*Melilotus sp.*), goat’s beard (*Tragopogon dubius*), orchardgrass (*Dactylis glomerata*), quackgrass (*Elymus repens*), smooth brome (*Bromus inermis*), sticky groundsel (*Senecio viscosus*) and timothy (*Phleum pretense*). A complete list of vegetation species observed during the site assessments is presented in Section 5.1, Tables 2 to 11. Table 12 shows weed species, quantity and location. Figure 10 shows the polygons of weeds located on Sites A and B.

Table 12: Weed Species, Location and Quantity

Quantity	Latitude	Longitude	Species
4	51.14410	-114.134	Houndstongue (<i>Cynoglossum officinale</i>)
7	51.14295	-114.134	Houndstongue (<i>Cynoglossum officinale</i>)
8	51.14283	-114.135	Houndstongue (<i>Cynoglossum officinale</i>)
9	51.14286	-114.136	Houndstongue (<i>Cynoglossum officinale</i>)
11	51.14292	-114.137	Houndstongue (<i>Cynoglossum officinale</i>)
12	51.14327	-114.138	Houndstongue (<i>Cynoglossum officinale</i>)
17	51.14436	-114.139	Houndstongue (<i>Cynoglossum officinale</i>)
18	51.14416	-114.14	Houndstongue (<i>Cynoglossum officinale</i>)
6	51.14422	-114.134	Yellow toadflax (<i>Linaria vulgaris</i>)
10	51.14287	-114.136	Yellow toadflax (<i>Linaria vulgaris</i>)
14	51.14371	-114.138	Yellow toadflax (<i>Linaria vulgaris</i>)
15	51.14356	-114.137	Yellow toadflax (<i>Linaria vulgaris</i>)
16	51.1443	-114.138	Scentless chamomile (<i>Matricaria perforate</i>)
2	51.14418	-114.135	Perennial sow-thistle (<i>Sonchus arvensis</i>)
3	51.14408	-114.134	Perennial sow-thistle (<i>Sonchus arvensis</i>)
5	51.14415	-114.134	Perennial sow-thistle (<i>Sonchus arvensis</i>)
0	51.15088	-114.153	Yellow toadflax (<i>Linaria vulgaris</i>)
1	51.15074	-114.154	Yellow toadflax (<i>Linaria vulgaris</i>)





**Figure 10:
Weed Locations on Sites A
and B**

Client: Quantum Place Developments Ltd.

Legend

- Sites A & B Development Areas
- Canada thistle (*Cirsium arvense*)

Noxious Weeds (Point Locations)

- Houndstongue (*Cynoglossum officinale*)
- Perennial sow-thistle (*Sonchus arvensis*)
- ▲ Scentless chamomile (*Matricaria perforate*)
- ◆ Yellow toadflax (*Linaria vulgaris*)



Scale
1:6,500

CORVIDAE
ENVIRONMENTAL CONSULTING INC

Drawn By: Bruce Gleig
Date: July 02, 2016

A detailed list of chemical applications for the past two years for the holes proposed to be removed (Site A) is provided in Table 13.

Table 13: Chemical Applications 2014 and 2015

Year	Product	Active Ingredients	Targeted Pest	Volume	Area
2014	Banner MAXX (fungicide)	Propiconazole (1-[[2-(2,4-dichlorophenyl)-4-propyl-1,3-dioxolan-2-yl]methyl]-1H-1,2,4-triazole)	General prevention	5000 ml	Greens, T's and fairways
2014	Heritage (herbicide)	Azoxystrobin (methyl (αE)-2-[[6-(2-cyanophenoxy)-4-pyrimidinyl]oxy]-α-(methoxymethylene)benzeneacetate)	General prevention	2000 ml	Greens, T's and fairways
2014	Instrata (herbicide)	Chlorothalonil (29.9 %) Fludioxonil (1.2 %) Propiconazole (4.7 %)	Dandelion	3000 ml	Greens, T's and fairways
2015	Banner MAXX (fungicide)	Propiconazole (1-[[2-(2,4-dichlorophenyl)-4-propyl-1,3-dioxolan-2-yl]methyl]-1H-1,2,4-triazole)	General prevention	5000 ml	Greens, T's and fairways
2015	Heritage (herbicide)	Azoxystrobin (methyl (αE)-2-[[6-(2-cyanophenoxy)-4-pyrimidinyl]oxy]-α-(methoxymethylene)benzeneacetate)	General prevention	2000 ml	Greens, T's and fairways
2015	Instrata (herbicide)	Chlorothalonil (29.9 %) Fludioxonil (1.2 %) Propiconazole (4.7 %)	Dandelion	3000 ml	Greens, T's and fairways

5.2 Wildlife and Wildlife Habitat

Surveys for wildlife and wildlife habitat were conducted on November 12, 2015 and on June 15, 2016. Additional wildlife observations made during the March 2016 tree inventory were also recorded. All surveys were conducted by qualified wildlife biologists, on foot and in suitable weather conditions (i.e. good visibility, no precipitation and winds less than 20 kph). The wildlife surveys focused on identifying the presence of important wildlife features (e.g. stick nests, cavity nests, burrows) and assessing habitat potential for federally or provincially-listed species of management concern that may be affected by the proposed development.

Wildlife surveys were conducted based on protocols outlined in the Alberta *Sensitive Species Inventory Guidelines* (AEP 2013). Survey methods were configured to assess wildlife with potential to occur at this location, considering species' ranges, historical records, habitats present, time of year and government-recommended setback distances. The June 15, 2016 breeding bird started at sunrise and was completed by approximately 09:30 MDT. The amphibian survey included both a visual survey during the day (for adults, tadpoles and egg masses) and an auditory survey during the evening, starting approximately half hour after sunset. Where suitable habitat was not identified in the project area during the initial site visit (e.g., potential hibernacula for reptiles) further surveys for that type of wildlife were not conducted. During the wildlife surveys, all wildlife species seen or heard were recorded. Trees on the golf course were assessed for bird nests and cavities.



The following sections provide a detailed overview of the species observed or potentially present in the project area. Table 14 provides a complete list of wildlife species observed during the November 2015 and June 2016 wildlife assessments as well as the March 2016 tree inventory.

5.2.1 Species at Risk

A search of the Fish and Wildlife Management Information System (FWMIS, Appendix B) data on the Fish and Wildlife Internet Mapping Tool (FWIMT)¹ was completed for a 1 km, 2 km and 5 km radius around the project area. The large radius captures more of the open grassland and wetland species which is not typical of the habitat found at the golf course. However, this spatial assessment was to cover as much area as feasible to obtain inventory of any sensitive habitat at a landscape level.

No wildlife species were reported by the FWMIS online database within 1 km of the project. Appendix B provides a summary of all species reported by the FWMIS online database within a 5 km radius.

5.2.2 Mammals

No provincially or federally-listed mammals were reported in the FWMIS database (Appendix B) within 1 km of the project. One record for grizzly bear was reported within 2 km of the project (Government of Alberta 2015), however, preferred habitat for this species does not occur in the area. During the wildlife surveys no provincially or federally-listed mammal species of management concern or their sign (e.g., tracks, scat, burrows) were observed. In the winter the golf course is likely used more frequently by mammals such as coyotes and deer due to minimal human traffic.

Evidence of deer, coyote and white-tailed jackrabbit were observed during the wildlife surveys. Evidence of northern pocket gopher (dirt mounds), was also observed at several locations throughout the project area.

There was evidence of ungulate browse of small willow and red-osier dogwood (see Appendix A - Photos) at both Sites A and B. Wildlife trails (used by white-tailed jackrabbits, coyote and/or domestic dogs, as evidenced by tracks and/or scat) were noted at both Sites A and B (see Appendix A - Photos). There was evidence of ungulate rubs on willow found along the east fence line of Site A and along the south edge of the stormwater pond in Site A.

¹ Retrieved March 30, 2015 from:

<https://maps.srd.alberta.ca/Geocortex/Essentials/4.2.1/REST/TempFiles/SpeciesSummaryReport?guid=5e45b82d-4626-4ee5-a2ee-405a43f99992&contentType=application%2Fpdf>



5.2.3 Birds

No provincially or federally-listed birds were reported in the FWMIS database within 2 km of the project (Government of Alberta 2015). Suitable habitat for most species at risk does not occur at or in the vicinity of the project due to the high level of existing anthropogenic disturbances, high level of human use and limited availability of native vegetation in these areas. Potential nesting habitat for barn swallow may occur in the vicinity of the project at nearby buildings.

No provincially or federally-listed bird species were observed during the wildlife surveys. One provincially-listed wildlife species, lesser scaup (listed as Sensitive in Alberta; Government of Alberta 2011a), was observed at the stormwater pond at Site A. Several bird species were observed during the breeding bird survey conducted in June, many of which appeared to be exhibiting breeding behavior (e.g., singing males, alarm calling, carrying food or nesting material). Several active nests of red-winged blackbirds were noted in cattail along the edge of the stormwater pond at Site A. Trees and shrubs throughout the area provide suitable nesting habitat for several species of birds, while habitat for grassland-nesting birds is found throughout the unmowed areas of the rough. Waterfowl observed in the vicinity included American wigeon, lesser scaup and American coot. A spotted sandpiper was observed foraging along the rip-rapped shoreline of the pond. Potential nesting habitat for waterfowl and waterbirds may occur at the stormwater pond in Site A and nearby unmowed areas of the rough.

Table 14 provides a list of birds observed in the project area during the November 2015, March 2016 and June 2016 field visits.

5.2.4 Amphibians

There were no records of amphibian species at risk reported in the project area or within a 2 km radius (Government of Alberta 2015). A stormwater pond containing standing water is located within the project footprint at Site A. There is low potential for amphibian species to occur within the project area due to surrounding vegetation, existing disturbances and high human activity. Additional low-lying areas (man-made) occur throughout the project area but these typically contain storm sewer drains and do not retain sufficient standing water for breeding amphibians. There is also low potential for hibernation locations in the surrounding areas as the golf course contains thick green lawn with high human use and the adjacent land use is highly developed housing, roadways and other utilities.

Corvidae assessed the stormwater pond that is to be filled, located at Site A, during the wildlife surveys. The June wildlife surveys included a detailed amphibian survey following the Government of Alberta (2015) protocol. No amphibians were observed at the stormwater pond during the field visits, however, no individuals detected does not mean that amphibians do not/cannot occur there. Environmental conditions can vary from year to year and some amphibian species are sensitive to precipitation events to trigger breeding activity. As a result, in the event the pond will be filled in during the amphibian breeding season (April 15 to September 30), visual and auditory amphibian surveys will be conducted



prior to the start of activities and amphibian salvage/translocation to a suitable location will be completed if any are found.

5.2.5 Reptiles

No reptile species were observed during the wildlife surveys. In addition, no reptile species were reported within 2 km of the project (Government of Alberta 2015). Suitable natural habitats for overwintering (potential hibernacula sites) are limited in the project area, given the high level of existing disturbance in the project area (housing developments, roads, lawn mowers, high human use).

Table 14: Wildlife Observed in the Project Area – November 2015, March 2016 and June 2016

Common Name	Scientific Name	Observation Type
MAMMALS		
Coyote	<i>Canis latrans</i>	tracks, scat, visual
Deer	<i>Odocoileus sp.</i>	tracks, pellets, browse, rubs
Mouse/vole	<i>n/a</i>	tracks
Northern pocket gopher	<i>Thomomys talpoides</i>	dirt mounds
White-tailed jackrabbit	<i>Lepus townsendii</i>	visual
BIRDS		
American coot	<i>Fulica americana</i>	visual, auditory
American crow	<i>Corvus brachyrhynchos</i>	visual, auditory
American robin	<i>Turdus migratorius</i>	visual, auditory
American wigeon	<i>Anas americana</i>	visual
Black-billed magpie	<i>Pica hudsonia</i>	visual, auditory, old stick nests
Black-capped chickadee	<i>Poecile atricapillus</i>	visual, auditory
Brown-headed cowbird	<i>Molothrus ater</i>	visual, auditory
Canada goose	<i>Branta canadensis</i>	visual, auditory
Chipping sparrow	<i>Spizella passerina</i>	visual, auditory
Clay-colored sparrow	<i>Spizella pallida</i>	visual, auditory
Common raven	<i>Corvus corax</i>	auditory
Dark-eyed junco	<i>Junco hyemalis</i>	visual, auditory
Downy woodpecker	<i>Picoides pubescens</i>	auditory
Gray partridge	<i>Perdix perdix</i>	visual
Great-horned owl	<i>Bubo virginianus</i>	feathers
House finch	<i>Haemorhous mexicanus</i>	visual, auditory
House sparrow	<i>Passer domesticus</i>	visual, auditory
House wren	<i>Troglodytes aedon</i>	visual, auditory
Killdeer	<i>Charadrius vociferus</i>	auditory
Lesser scaup	<i>Aythya affinis</i>	visual
Mallard	<i>Anas platyrhynchos</i>	visual, auditory
Merlin	<i>Falco columbarius</i>	visual, auditory
Northern flicker	<i>Colaptes auratus</i>	visual, auditory
Pine siskin	<i>Spinus pinus</i>	visual, auditory
Red-breasted nuthatch	<i>Sitta canadensis</i>	visual, auditory
Red-winged blackbird	<i>Agelaius phoeniceus</i>	visual, auditory
Rock pigeon	<i>Columba livia</i>	visual
Savannah sparrow	<i>Passerculus sandwichensis</i>	visual, auditory



Spotted sandpiper	<i>Actitis macularius</i>	visual, auditory
Tree swallow	<i>Tachycineta bicolor</i>	visual, auditory
White-winged crossbill	<i>Loxia leucoptera</i>	visual, auditory

Source: Scientific Names from NatureServe 2015

5.3 Aquatic Resources

5.3.1 Stormwater Pond

The proposed development will result in the removal of one man-made stormwater pond located in Site A of the project area. The pond is currently used as a stormwater retention pond in times of heavy rainfall. The stormwater pond most closely resembles a Class V open-water wetland, following the Stewart and Kantrud classification method (Stewart and Kantrud 1971). The pond contains a permanent open water zone and deep marsh zone containing cattail (*Typha latifolia*), bulrush (*Schoenoplectus sp.*), spike-rush (*Eleocharis palustris*) and sedges (*Carex sp.*) The assessment found no evidence that this ponds was ever natural. The historical air photos provide the same information – there was no wetland occurring historically in this area. The pond contains steep rip-rapped banks that are sparsely vegetated and weedy. The boundaries of the pond is dominated by non-native seeded grasses and mowed lawn to the edges.

The total stormwater pond surface area of the pond to be filled in Site A is approximately 0.26 hectares (2646 m²). Details on the replacement of the pond with expansion of naturalized stormwater pond(s) in the area are provided in the report provided by Watt Consulting Group and Stormwater Solutions Inc.

5.4 Geology/Geomorphology

The project area is 1100 to 1193 m in elevation above sea level in the foothills fescue biogeoclimatic zone and the western benchlands physiographic region (AER 2015). Bedrock geology typically occurring in this area is the Paskapoo formation, with surficial geology being fluvial. Sediment typically occurs from 0 to 5 m (AER 2015). The project was significantly altered during the 1990s developed into 900 homes and a golf course.

5.5 Soils and Terrain

The soils of the proposed development of Hamptons Golf are part of Soil Correlation Area 9 (Pedocan 1993). The soils are classified as well drained to moderately well drained thick black Chernozemic and region Humic Gleysols. Soils within the project area have been impacted by human activities – agricultural activities, re-contouring and soil importing for golf course levelling and homes. Typical profiles include a 10 cm Ap or Ah horizon overlaying Bm, Bt and Ck horizons. During the site assessment it was evident that topsoil was imported for the golf course construction. Source of the topsoil is unknown.



5.6 Hydrology and Hydrogeology

The average annual precipitation in the area is 401 to 450 mm. The average annual evapotranspiration is 376 to 400 mm (ERCB 2011). The annual average run-off of 0-11 mm/year; and a minimum recharge of 51-75 mm/year (Gov of Alberta 2001b). From groundwater well drilling Corvidae completed just north of the project area, the average depth to groundwater is estimated to be 3.5 m. Studies show an average groundwater yield of 72 – 113 litres per minute (Gov of Alberta 2001b). The project may require fill, raising the surface up with engineered fill material suitable for houses. The surface water from the impervious areas (houses, roads and sidewalks) will be directed to the new stormwater ponds. The groundwater will not be affected by the project because the stormwater ponds will be clay lined to create a boundary between the groundwater and surface water. Following filtration, the surface water will be discharged into the existing stormwater system. Watt Consulting Group has completed the Sanitary Servicing Study for The Hamptons Re-Development to support the Outline Plan Submission and The Hamptons Master Drainage Plan (to be submitted in 2016). These will be submitted to The City of Calgary and will be available upon request to QuantumPlace Development. The Master Drainage Plan provides the calculated surface water flow and discharge rates for surface water.

5.7 Heritage Resources

No heritage resources have been identified at the site and The City has determined a Historical Resource Impact Assessment is not required.

5.8 Land Use

The current land use is a golf course and surrounding land use is urban residential.

5.9 Traditional Land and Resource Use

The site is a golf course with no First Nation traditional land use designations, traditional use plant species or wildlife for hunting in the project area.

5.10 Visual Resources

Currently the visual resources are green mowed lawn, man-made stormwater ponds, grasslands and trees around the perimeter of the Hampton Golf Club.



6 Potential Impacts and Mitigation Measures

6.1 Impacts

6.1.1 Vegetation Impacts

The project design is planning on maintaining publically accessible green space around Site A. For Site A, 44% of the project area will be green space (2.84 ha) and 3.64 ha will be developed (0.61 ha for roads and 3.03 ha for housing). For Site B 0.76 ha will be disturbed for the housing and 0.27 ha for roads; the area surrounding the Site B development will be left in its current state (vegetated). The disturbed area immediately surrounding Site B will be landscaped following construction completion. It is recommended that retained green space and landscaped areas should be naturalized with area appropriate native plant species. See Appendix C Conceptual Design Plan.

An Erosion and Sediment Control Plan will be submitted with the application package. The erosion and sediment control measures (infrastructure such as sediment fences) will be inspected by The City of Calgary Parks at the time of construction to ensure that work is being completed within the construction footprint and vegetation is not disturbed outside of the construction envelope.

6.1.1.1 Tree Removal

Corvidae completed a detailed tree inventory of the trees on Sites A and B. Tables 15 and 16 provide lists of the trees on the site. Note: not all of these trees will potentially be removed, see Section 7.3.1 for details. Refer to the Tree Inventory of The Hamptons Development Project (Corvidae 2016) for further details on the trees on each site. Figures 11 and 12 in this report show the location of trees to be removed.

Table 15: Trees Located on Site A

Species	Total (>10cm dbh)	Total (<10cm dbh)	Standing Dead
Colorado Spruce	159	0	0
Schubert Chokecherry	84	12	0
Balsam Poplar	43	15	2
Northwest Poplar	20	2	0
Poplar species (Balsam or Northwest)	20	9	0
Laurel Willow	5	2	0
Willow species	0	35	0
Siberian Larch	8	6	0
Amur Cherry	3	0	0
Cherry species	0	9	0
Elm	6	0	0
European White Birch/Weeping Birch	6	0	0
Mountain Ash	0	1	0
Bur Oak	2	0	0
Total Trees (Site A)			449



Table 16: Trees Located on Site B

Species	Total (>10cm dbh)	Total (<10cm dbh)	Standing Dead
Colorado Spruce	25	0	0
Schubert Chokecherry	12	0	0
Laurel Willow	5	5	0
Willow species	0	12	0
Total Trees (Site B)		59	

Figure 11: Trees in The Hamptons Project Area – Site A



Figure 12: Trees in The Hamptons Project Area – Site B

6.1.2 Wildlife Impacts

Potential impacts to wildlife and wildlife habitat from the project include:

- Direct habitat loss (e.g., clearing of existing habitat, construction activities removing, damaging or disturbing nesting or denning sites).
- Mortality (e.g., construction activities removing, damaging or disturbing active nests or den sites; indirect mortality resulting from garbage attractants, introduction of chemicals or toxic materials).
- Noise disturbance (e.g., displacing wildlife, primarily during critical periods such as breeding or nesting).
- Barriers to wildlife movements (for species who may typically use the golf course to facilitate movement from one green space to another).

Recommended mitigation measures for wildlife and wildlife habitat are outlined in Section 7.3.

6.1.2.1 Impacts to Mammals

Given the urban setting of the golf course and surrounding neighbourhoods, no significant impacts to mammal species at risk are anticipated to occur as a result of the development. During the fall assessment deer, coyote, white-tailed jackrabbit and northern pocket gopher were detected. All species are common and are not listed federally or provincially as species of management concern. The long-term impacts of the project to mammals are anticipated to be minimal and will primarily result in the loss of habitat for these species. They will likely

relocate into the adjacent green spaces associated with the golf course and/or nearby parks. Any pocket gopher burrows within the project footprint would be destroyed during construction.

6.1.2.2 Impacts to Birds

Suitable habitat for most bird species at risk does not occur at or in the vicinity of the project due to the high level of existing anthropogenic disturbances, high level of human use and limited availability of native vegetation in these areas. Although none were observed during the wildlife surveys, potential nesting habitat for barn swallow may occur in the vicinity of the project at nearby buildings. Long-term impacts of the project to birds are anticipated to be minimal and will primarily result in the loss of habitat. Potential impacts to nesting birds can be minimized by conducting all clearing and grading outside of the typical breeding bird season (i.e., conduct activities prior to April 1 or after August 31) when active nests are not present and most bird species have migrated south for the winter.

6.1.2.3 Impacts to Amphibians

In the face of widespread wetland destruction in southern Alberta, amphibians widely utilize public green spaces such as golf courses and parks as safe havens (Puglis and Boone 2012). Impacts of the project to amphibians will primarily result in the loss of potential breeding habitat at the stormwater pond in Site A, however there will be an expansion of the ponds north of Site A. As discussed in section 6.2.4, no amphibians were detected in the project area and the stormwater ponds have low suitability due to being man-made with fluctuating volumes. Potential impacts to amphibians can be minimized or avoided by clearing, grading and/or filling-in the stormwater pond outside of the amphibian breeding season.

6.2 Accepted Mitigation Methods

For the project the following Best Management Practices are recommended:

- Erosion protection measures implemented in from the Erosion and Sediment Control Plan.
- Conducting all clearing and grading activities outside of the general breeding bird season, or complete a breeding bird survey prior to any clearing.
- Surveying for, and salvaging amphibians if present, prior to filling in the stormwater pond.

6.3 Recommended Mitigation Measures

6.3.1 Wildlife and Wildlife Habitat

Efforts should be made to retain existing, planted trees where regrading and filling is not required. It is likely that most of existing trees will be removed and replaced due to grading and filling.



requirements to meet The City of Calgary drainage and engineering requirements. Wildlife mitigation measures include the following:

- Clearing and grading activities are recommended outside of the general breeding bird season of early April to end of August (Government of Canada 2015). For some species, specific timing restrictions for nesting periods apply and should also be considered (e.g., raptors and owls may start nesting as early as March 1).
- In the event of activities involving the clearing of vegetation being scheduled to occur within the breeding bird season, mitigation will include a survey of the area by a qualified wildlife biologist for active nests or dens a maximum of 7 days prior to the start of activities. The search will include the project footprint and adjacent areas to coincide with recommended wildlife setback distances, where land access allows. Any active nests or dens found or indicated will be protected with a species appropriate buffer until the young have naturally fledged/left the area.
- A detailed amphibian survey was conducted at the stormwater pond in Site A. No amphibians were observed at the stormwater pond during the field visits, however, no individuals detected does not mean that amphibians do not/cannot occur there. An environmental monitor is recommended to be on site during draining or filling in activities if they occur during the amphibian breeding season (April 15 to September 30) to salvage and relocate any amphibians. The City of Calgary Parks Ecologists will be consulted on relocation options and efforts. Potential wetlands for relocation would also require an amphibian survey prior to translocation and usually need to meet similar parameters (e.g., pH, temperature) as the original. A collection and research licence from AEP would be required prior to the start of any translocation program. Clearing and/or filling in of stormwater ponds outside of the amphibian breeding season will not require an environmental monitor to be on site.
- In the event any additional wildlife habitat features (e.g., active dens, snake hibernacula) are identified prior to or during construction they will be subject to site-specific mitigation measures that will be developed in consultation with the appropriate regulators.

6.3.2 Landscaping and Re-vegetation

The green space will be landscaped with native and horticultural species that will achieve the following:

- Become quickly established to stabilize soil from wind and water erosion and to compete against weed species.
- Act as a natural visual and auditory buffer between residential yards, within the green space.
- Provide habitat for several wildlife species that presently occur in the area, including several bird species, white-tailed jackrabbits, coyotes and deer.
- Create a natural green space with vegetation species that thrive in the local climate.



- Create a network of green space for wildlife and human connectivity in the area.
- Maintain or improve soil productivity.
- Provide a diverse combination of species for ecological resilience from extreme weather and invasive species (plants, insects and disease).
- Where practical, native plant species that benefit native pollinators will be planted, improving bee populations.
- Create a natural type of landscape with wetland vegetation, riparian area and upland vegetation types. These have all been provided in Tables 17 and 18.

To control and minimize the spread of weeds on the property the following measures will be followed:

- Clean all machinery before arrival onto the site to ensure that more weed seeds and other propagules (e.g. pieces of root) are not brought into the project area.
- Clear from areas of low cover of weeds (greens and maintained areas) to those areas with high density and cover of weed species (un-mowed areas in Site B). This will reduce weeds being spread along the disturbed areas during construction.
- If bringing in topsoil, apply certified weed free topsoil that has been approved by The City of Calgary.
- Following topsoil application – seed and plant immediately with landscape plants and grasses to reduce weeds occupying bare soil. If construction is in the winter, complete planting/seeding in the early spring, immediately prior to the first growing season.

QuantumPlace will follow City of Calgary Bylaw's and standards for re-vegetation. Table 17 provides a list of recommended tree and shrub species to be planted in the project area, Table 18 provides a list of recommended grass species for the upland/dryer areas. Detailed lists of species, planting frequency and species combination will be provided in the Landscape Design Plan.

A Tree Protection Plan is not required, as per The City of Calgary Parks Tree Protection Plan Guide (City of Calgary 2012) which states that "*A Tree Protection Plan is required for any development involving excavation, storage of construction materials or access routes for people and equipment within six metres of a public tree.*" There were no trees in public areas within 6 m of the proposed developments, as confirmed by the site assessment and tree count in March 2016. The tree count was done to confirm tree species, quantity and diameter. This will be used for the reclamation of the areas surrounding the buildings in Site A and B, meeting The City's tree replacement requirements (City of Calgary 2014). All of the



vegetation species planted will require watering during dry conditions for the first and second year.

For seeding, broadcast native seeds right after snow melt when ground begins to thaw or late October to ensure germination. Seed at 45 kg/ha (City of Calgary 2014).

Ensure seeding equipment is clean and free of any weed seeds from other sites prior to entering the site. Using a broader mix of seeds provides greater assurance of controlling erosion (lower risk).



Table 17: Recommended Tree and Shrub Species*

Common Name	Scientific Name	Height (m)	Useful Life (years)	Growth Rate (cm/yr)	Source	Comments
Spruce	<i>Picea glauca</i>	25-35	150-250	20-60	Local nursery.	Conifer that is adaptable to all soil types. Prefers full sun.
Juniper	<i>Juniperus scopulorum</i>	2	30-60	10-15	Local nursery.	Prefers drier soils, full sun. Adaptable to cold climates.
Pine	<i>Pinus contorta</i>	30	150-250	20-60	Local nursery.	Conifer adaptable to all soil types, high and low lands.
Red-osier dogwood²	<i>Cornus stolonifera (sericea)</i>	1.5-4	20	60	Local tree cuttings in the late fall or early spring (source from nearby riparian area, leave 60% of the donor tree). Or from local nursery	Live stake as a cost effective option. Favours wet soils, good for banks of the stormwater pond. Capable of growing in clay loam to sandy loam soils. Excellent re-vegetation of degraded sites. Grows well in shade. Established by direct seeding, transplanting rooted cuttings or nursery grown seedlings. Its rapid growth quickly stabilizes deteriorated banks. Tolerates full sun if it has sufficient moisture.
Shrubby Cinquefoil²	<i>Potentilla fruticosa</i>	1-2	25	15	Local nursery	Able to thrive on a wide variety of soils and under tough growing conditions.
Wild Rose²	<i>Rosa woodsii</i>	1-3	25+	10-45	Local nursery	Full sun, well-drained soil. Tough, long lived, able to withstand insects, diseases and harsh climates. Can survive in drought conditions. Can substitute with <i>Rosa acicularis</i> .
Buffaloberry²	<i>Shepherdia argentea</i>	2-3	25+	10-30	Local nursery	Prefers moist sites. Native, grows on the prairies from Manitoba to Saskatchewan. Commonly found around sloughs, in coulees and on light soils on the prairies.

*These are recommendations only. Density and species combination to be determined during landscape design.

All of these species are recommended by The City of Calgary:

¹City of Calgary 2015

²City of Calgary 2014



Table 18: Recommended Grass and Perennial Flower Species*

Common Name	Scientific Name	Percent of Seed Mix
Blue grama grass	<i>Bouteloua gracilis</i>	10
Blue Fescue ¹	<i>Festuca idahoensis</i>	15
Awne d wheatgrass ²	<i>Agropyron subsecundum</i>	15
Slender wheatgrass ²	<i>Agropyron trachycaulum</i>	25
Purple Clover ²	<i>Dalea purpurea</i>	5
Prairie conflower	<i>Ratibida columnifera</i>	10
Northern wheatgrass	<i>Agropyron dasystachyum</i>	20

*Appropriate for upland areas, Riparian area species mix is a recommendation only, to be designed in detail in the Landscape Design Plan

¹City of Calgary 2015

²City of Calgary 2014

The seed mix is for the upland/dry areas and consists of species recommended by The City of Calgary (City of Calgary 2014 and 2015). The project area is in the Dry Mixedgrass seed mix zone. These grass and perennial flower seeds are recommended *only* if the landscape design is to have natural, un-mowed grass areas. Natural grass areas are recommended to provide wildlife habitat and eliminate mowing, fertilizing and irrigation (following establishment of trees, shrubs and grass).

6.4 Wetlands – No Net Loss of Wetland Function

The current wetlands are man-made stormwater ponds that regularly fluctuate in water levels. We recommend creating wetland habitat integrated in the new design plan (see Figure 2). Corvidae recommends planting native vegetation shrubs and emergent vegetation species around any naturalized stormwater ponds. Method, frequency and combination of species will be detailed in the Landscape Design Plan. The more effective the revegetation around the naturalized stormwater pond, the more effective the filtration of the water going into the existing stormwater system.

6.4.1 Filling of Existing Stormwater Pond

Draining and filling-in of the stormwater pond located within the project area should be outside of the amphibian breeding period, or monitoring and amphibian salvage completed during activities, see details in Section 6.3.1.

7 Cumulative Effects

Cumulative effects of the project in relation to the lands within the 5 km buffer are an overall reduction of privately owned, no-public access (golfers only) recreational area. The current green space (golf course) is a visual amenity to the surrounding neighbours. The proposed plan represents approximately 44% of the Site A project area becoming green space available to the public and connected by trails. The surrounding area has been developed over the past 25 years as The City of Calgary grew. Immediately surrounding the project area there are existing houses and major roadways. The project is located in a previously disturbed area (golf course) and contains minimal natural habitat in Site B (<0.7 ha) that has been invaded by non-native species, including



weeds. The project area is currently used by species of mammals (e.g. jackrabbits, deer, coyotes) and birds. However, it contains low habitat potential for species at risk. While the overall impact will be loss of habitat for common species of wildlife currently using the golf course, this area is considered to be of low habitat value due to the high level of existing development in the area, high human use, maintenance of any 'green' areas, use of chemical pesticides, high amounts of invasive species in the small native prairie area and minimal presence of native vegetation.

Cumulatively, there will be an overall impact of less golf course greens and more impervious surfaces. The long-term effect will be a landscape with natural areas for human use integrated in between the housing developments, while maintaining the majority of the existing golf course (urbanized green space).

8 Environmental Monitoring and Follow-Up

During construction Corvidae recommends mitigations are in place to minimize erosion from wind and water. These will be implemented with the Erosion and Sediment Control Plan, to be provided prior to construction. All clearing is recommended outside of the breeding bird and amphibian timing windows. In the event any clearing, filling in of stormwater ponds or grading is scheduled to occur between April 1 and August 31 (for birds) or April 15 to end of September (for amphibians), the mitigation measures for wildlife outlined in Section 7.3.1 should be implemented. An environmental monitor is also recommended to be on site during draining or filling in activities during the amphibian breeding season to salvage and relocate any individuals, eggs or larva, on an ongoing basis or as needed.

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AB. NPO Report No. 2015-14, RTMP Permit No. 2015-010, HRA Requirements
Project File: 4825-15-0037-001.



Appendix A Photos



Photo 1: View southwest showing the existing paths along Site A. Photo taken from an access gate near the NW corner of Site A (November 12, 2015; 11U 700115E 5669845N).



Photo 2: View west showing the stormwater pond located in Site A (June 15, 2016; 11U 700283E 566697).



Photo 3: View of Canada thistle on Site A (November 12, 2015; 11U 700164E 5669818N).



Photo 4: View west-northwest showing areas of the "rough" along the north side of Site A (November 12, 2015; 11U 700164E 5669818N).



Photo 5: Remnants of an old stick nest in Colorado Spruce on Site A (nest in poor condition) (November 12, 2015; 11U 700206E 566787N).



Photo 6: View south-southwest at the entrance gates to Site B (November 12, 2015; 11U 699053E 5670346N).



Photo 7: View north from near the entrance gates to Site B (note Schubert chokecherry trees and unmowed areas of the rough) (November 12, 2015; 11U 699053E 5670346N).



Photo 8: View west at an unmowed area of "rough" along south edge of the golf course at Site B (adjacent to row of houses along south side) and the drainage/swale area to the west (November 12, 2015; 11U 699055E 5670380N).



Photo 9: View northwest across Site B from near south side. Note large portions of unmowed grasses and shrubs. A patch containing native vegetation occurs along the hill in the top right of the photo (November 12, 2015; 11U 699055E 5670380N).



Photo 10: View north showing a patch of native vegetation that occurs along the hill along the north side of Site B (June 15, 2016; 11U 699056E 5670415N).



Photo 11: Evidence of ungulate browse of willow in the drainage area near Site B (November 12, 2015; 11U 699023E 5670394N).



Photo 12: Red-winged blackbirds were observed nesting along the edge of the stormwater pond at Site A (June 15, 2016; 11U 700212 5669726).



Photo 13: Lesser scaup observed at the stormwater pond in Site A (June 15, 2016; 11U 700212E 5669726N).



Photo 14: American wigeon observed foraging along the fairways in Site A (June 15, 2015; 11U 700135E 5669783N).

Appendix B ACIMS and FWMIS Data

Table A-2: FWIMS Data Results

Mammals	grizzly bear (Special Concern ¹ , At Risk ²)
Birds	barn swallow (Threatened ³ , Sensitive ²), common yellowthroat (Sensitive ²), great blue heron (Sensitive ²), horned grebe (Special Concern ¹ , Sensitive ²), lesser scaup (Sensitive ²), sora (Sensitive ²), Swainson's hawk (Sensitive ²)
Amphibians	northern leopard frog (Special Concern ^{1,3} , At Risk ² , Threatened ⁴)
Reptiles	red-sided garter snake (Sensitive ²)

Source: Government of Alberta 2015

Notes: 1 – Status designation by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) (2016)
 2 – Status designation under the General Status of Alberta Wild Species 2010 (Government of Alberta 2011a, 2012)
 3 – Status designation under Schedule 1 of the *Species at Risk Act* (Government of Canada 2016a)
 4 – Status designation under the *Alberta Wildlife Act* (Government of Alberta 2014).

There were no ACIMS listings for the project area and surrounding 2 KM



Appendix C Conceptual Design Plan



Appendix D Tree Inventory



Tree Inventory of the Hamptons Development Project Calgary, Alberta

Prepared for:



**Suite 203, 1026 16 Avenue NW
Calgary, Alberta T2M 0K6**

Prepared by:



1. Introduction

Corvidae Environmental Consulting Inc. (Corvidae) completed a tree inventory of the proposed Quantum Place Hampton Hills Development Project (Hamptons). The project area is the Hampton Hills Golf Course, located in northwest of Calgary, Alberta. The property is bordered by Stoney Trail to the north, Shaganappi Trail to the east, Country Hills Boulevard to the south and Sarcee Trail to the west. The tree inventory considered all species of trees in the entire proposed development footprint. Tree species, approximate size and location were recorded to facilitate the creation of a Tree Inventory.

There are no trees located on land owned by The City of Calgary within 6 m of the proposed project. Any City owned area bordering the project area was not treed, therefore a Tree Protection Plan is not required.

2. Methods

The survey was completed by Corvidae on March 24th, 2016. The field survey was completed to get an accurate count of all tree species and record their locations. The project is located at two sites: Site A and Site B. All trees at each site were recorded individually and information about the species, approximate size (greater or less than 10 cm diameter at breast height [dbh]) and their general condition were documented. Each tree was recorded using a GPS and photos were taken.

Table 1: Tree Species and Codes

Common Name	Species Name	Abbreviation
Colorado Spruce	<i>Picea pungens</i>	CS
Schubert Chokecherry	<i>Prunus virginiana</i> 'Schubert'	SC
Balsam Poplar	<i>Populus balsamifera</i>	BP
Northwest Poplar	<i>Populus x jackii</i> 'Northwest'	NP
Poplar species	<i>Populus sp.</i>	PS
Laurel Willow	<i>Salix pentandra</i>	LW
Willow species	<i>Salix sp.</i>	WS
Siberian Larch	<i>Larix siberica</i>	SL
Amur Cherry	<i>Prunus maackii</i>	AC
Cherry species	<i>Prunus sp.</i>	CS
Elm	<i>Ulmus sp.</i>	ES
European White Birch/Weeping Birch	<i>Betula pendula</i>	WB
Mountain Ash	<i>Sorbus sp.</i>	MA
Bur Oak	<i>Quercus macrocarpa</i>	BO



3. Results

This report provides a total inventory of tree species and their location in the project area. Most trees appear to have been planted (likely from local nurseries), since there were no trees in the project area prior to the construction of the golf course (prior to 1991) (David Whitell, golf course builder and manager, personal communication, March 2016). Tree species varied in age, the majority of which were planted at the time of the golf course construction with additional trees planted at varying times since. Figures 1 and 2 show the locations of all of the trees in the project area. Details of the tree inventory are outlined in the corresponding tables underneath each figure. A total summary is provided of all trees in Section 4 (page 4).

Figure 1: Trees in the Hamptons Project Area – Site A



Table 2: Site A

Species	Total (>10cm dbh)	Total (<10cm dbh)	Standing Dead
Colorado Spruce	159	0	0
Schubert Chokecherry	84	12	0
Balsam Poplar	43	15	2
Northwest Poplar	20	2	0
Poplar species (Balsam or Northwest)	20	9	0
Laurel Willow	5	2	0
Willow species	0	35	0
Siberian Larch	8	6	0



Species	Total (>10cm dbh)	Total (<10cm dbh)	Standing Dead
Amur Cherry	3	0	0
Cherry species	0	9	0
Elm	6	0	0
European White Birch/Weeping Birch	6	0	0
Mountain Ash	0	1	0
Bur Oak	2	0	0
Total Trees (Site A)			449

Figure 2: Trees in the Hamptons Project Area – Site B

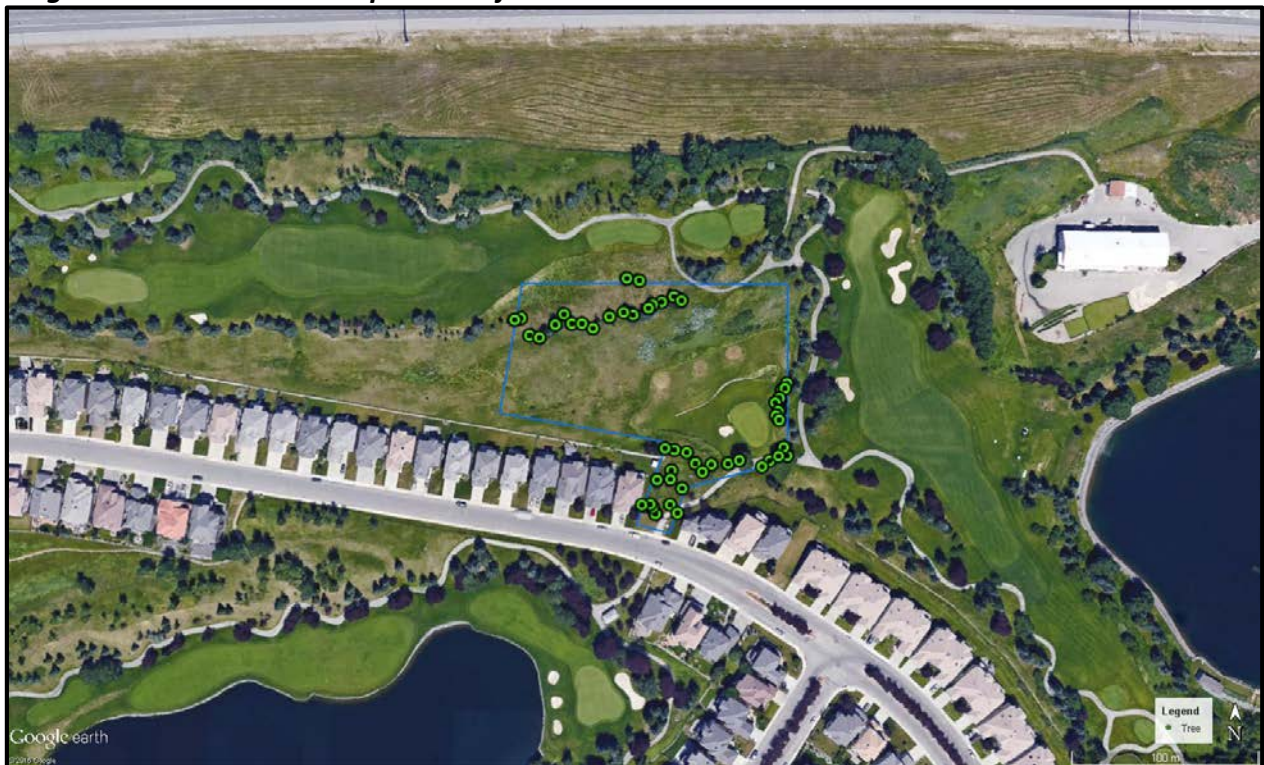


Table 3: Site B

Species	Total (>10cm dbh)	Total (<10cm dbh)	Standing Dead
Colorado Spruce	25	0	0
Schubert Chokecherry	12	0	0
Laurel Willow	5	5	0
Willow species	0	12	0
Total Trees (Site B)			59



4. Summary

Table 4: Summary of Trees Counted within the Hamptons Project Area*

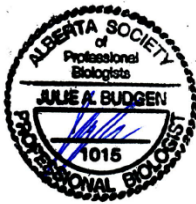
Site	Species													
	CS	SC	BP	NP	PS	LW	WS	SL	AC	CS	ES	WB	MA	BO
A	159	96	60	22	29	7	35	14	3	9	6	6	1	2
B	25	12	0	0	0	10	12	0	0	0	0	0	0	0
TOTAL	184	108	60	22	29	17	47	14	3	9	6	6	1	2

*This table includes the trees with <10 cm dbh and >10 cm dbh.

The survey was comprehensive, covering the entire project area and documenting every tree within Site A and B. Until a Storm Water Master Drainage plan is completed it is unknown which trees may be retained and which will be removed due to grading requirements. This is an estimate of trees to be removed and replaced due to their location in the project area footprint.

Please contact me with any questions or comments.

Best regards,



Julie Budgen, P.Biol., B.Sc.
 Environmental Planner
 Corvidae Environmental Consulting Inc.
 403-679-8553

